WISCONSIN
DEPT. OF NATURAL RESOURCES

George E. Meyer, Secretary
William H. Smith, District Director

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

NORTHWEST DISTRICT HEADQUARTERS
P.O. Box 309
STH 70 West & First Street
Spooner, Wisconsin 54801
TELEPHONE 715-635-2101
TELEFAX 715-635-4105

June 14, 1995

Mr. Ronald Beidelman
Division Environmental Specialist
ENRON Northern Natural Gas Company
Suite 209, 7901 Xerxes Avenue South
Minneapolis, Minnesota 55431

Re: **Mercury Contamination Related to Meter Stations**
NWD ERRP Cases # 55-00141 Ladysmith
51-00142 Park Falls
16-00143 Superior

Dear Mr. Beidelman:

This letter is to advise you that the three referenced sites were presented to the Northwest District Closeout Committee (Committee) for review. Presentation to the Committee was primarily based on your August 1994 submittal, Final Report for Meter Site Remedial Activities in Wisconsin, and your responses to my November 10, 1994 and May 23, 1994 letters

On June 13, 1995, review of the information available on the sites was completed by the Committee for a determination for case close-out as provided in ch. NR 726, Wis. Adm. Code. Based on the documentation submitted it appears as though the sites have been remediated to standards acceptable to the Department of Natural Resources (Department). Therefore, the Department considers the three referenced sites "closed" and no further action is necessary at this time.

You should note that this letter does not constitute Department "verification" under s.144.765 (2) (a) 3, WI Stats., as created by 1993 Wisconsin Act 453 (May 12, 1994). Persons who meet the definition of "purchaser" in s. 144.765 (1) (c), Wis. Stats., must receive Department pre-approval prior to conducting a site investigation in order to be eligible for the liability exemption under s. 144.765, Wis. Stats. For more information regarding Wisconsin Act 453, call (800) 367-6076 (in state long distance) or (608) 264-6020 local or out-of-state).

Additionally, based on the results of your initial investigation of the Ashland Meter Station, noted in your April 5, 1994 submittal, no further action is necessary at this time for that location. The Ashland location was not placed on tracking as a site.

Should you have any questions regarding the above please contact me at (715) 635-4048.

Sincerely;

T Koehn

Terry Koehn
District ERP Hydrogeologist

cc: T. Kendzierski/G. LeRoy NWD/Spooner
S. Ashenbrucker NWD/Park Falls
B. Evans WD

16-00143

NWD TRACKING UPDATE FORM

SITE NAME: ENRON/Superior Motor Station

NEW NAME: _____

LEGAL DESCRIPTION: ____ 1/4 ___ 1/4 SECT. _____ TOWN _____ N RANGE _____ E/W

RESPONSIBLE PARTY:

Company Name: _____
Contact Person: _____
Address: _____
_____
Phone Number: ____/____-_____

cc's: _____ _____
_____ _____
_____ _____
_____ _____

CONSULTANT:

Company Name: _____
Contact Name: _____
Address: _____
_____
Phone Number: ____/____-_____

SUBSTANCES:

	# Tank(s)	Size
___(1) Leaded Gas	_____	_____
___(2) Unleaded Gas	_____	_____
___(3) Diesel	_____	_____
___(4) Fuel Oil	_____	_____
___(5) Unkwn Hydrocrbn	_____	_____
___(8) Other: _____		
___(12) Waste Oil	_____	_____

IMPACTS:

___(1) Fire/Explosion Threat
___(2) Contaminated Private Well(s) #_____
___(3) Contaminated Public Well
___(4) Groundwater Contamination
___(5) Soil Contamination
___(6) Other: _____
___(7) Surface Water
___(9) Floating Product

CASE STATUS:

	Start Date	Stop Date
(E) Emergency Response	___/___/___	___/___/___
(R) LTF Emergency	___/___/___	___/___/___
(L) Long Term Monitoring	___/___/___	___/___/___

SCORE: _____

FUNDING SOURCE: _____

PRIORITY: _____

A 6/19/95 SS

CLOSURE DATE: 06/13/95

UID: 16-00143 SITE NAME: ENRON / Superior

ACTIONS SUMMARY

02 = RP Letter Sent				
03 = NTC of Non Compliance*	**21 = Contest Case Hearing***	34 = Tnk Cls/SA Rpt Appv'd	**40 = RA Work Plan Appv'd***	46 = Form 4 Denied
04 = Enf. Conference*	**23 = Referral to DOJ***	35 = SI Work Plan Recv'd	**41 = RA Report Recv'd***	47 = PECFA Reimbursement
14 = Notice of Violation*	**30 = Notice to Proceed***	**36 = SI Work Plan Appv'd***	42 = RA Report Appv'd	**48 = Free Product Recovery***
18 = Admin. Order Issued*	31 = Tnk Cls/SA Work Plan	**37 = SI Report Recv'd***	**43 = Qrtly/Mthly Status Rpt***	**49 = Alternate Water Supplied***
19 = Admin. Order Modified	32 = Tnk Cls/SA WP Appv'd	38 = SI Report Appv'd	44 = Form 4 Received	
20 = Admin. Order Cancelled	33 = Tnk Cls/SA Rept Recv'd	39 = RA Work Plan Recv'd	45 = Form 4 Approved	

60 = 120 Soil App Rec'd	68 = WPDES Approved	76 =	84 =	92 =
61 = 120 Soil App Approved	69 =	77 =	85 =	93 =
62 = 120 Soil App Denied	70 =	78 =	86 =	94 =
63 = 149 Soil App Rec'd	71 =	79 =	87 =	95 =
64 = 149 Soil App Approved	72 =	80 =	88 =	96 =
65 = 149 Soil App Denied	73 =	81 =	89 =	97 =
66 = Request Status Update	74 =	82 =	90 =	98 =
67 = Request Misc Info	75 =	83 =	91 =	99 =

ACTION UPDATES:

no tracking @ this time SJ→ 6/19/95

Action Code	Date Received/Sent	Compliance Due Date	Compliance Achieved	Date Entered in Tracking
[illegible]	/ / (R/S)	/ /	/ /	/ /
41	09/07/94 (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /
	/ / (R/S)	/ /	/ /	/ /

CORRESPONDENCE/MEMORANDUM STATE OF WISCONSIN

DATE: April 13, 1994

TO: Terry Koehn - DNR, Spooner

FROM: Chuck Warzecha - DOH

SUBJECT: ENRON Northern Natural Gas Company Mercury Contamination

---

I have reviewed the information that you sent to me on the ENRON Northern Natural Gas Company mercury sampling results. The company proposes to cleanup mercury contamination in soils to 20 mg/kg at a number of remote locations in the state. No adverse health effects are expected as a result of daily exposure to soils with 20 mg/kg of mercury. From the letter, it does not appear that a such an exposure could occur because of access restrictions. Therefore, the cleanup level of 20 mg/kg proposed by the company is protective of public health.

If you have any additional questions or would like further clarification if this information please contact me at (608) 267-3732.

cc. Tom Kendziersky - DNR, Spooner
Mark Giesfeldt - DNR, SW/3

A

F

T

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 2

To Terry Koehn	From Chuck Warzecha
Co DNR-Spooner	Co DHSS
Dept	Phone # 267-3732
Fax #	Fax #

R 4-13-94

ENRON
Northern Natural Gas Company

Suite 209, 7901 Xerxes Avenue South Minneapolis, Minnesota 55431 (612) 887-1700

April 5, 1994

Mr. Tom Kendzierski
Department of Natural Resources
P.O. Box 309
Highway 70 West
Spooner, Wisconsin 54801

Dear Mr. Kendzierski:

I talked with Mr. Mark Giesfeldt about Northern Natural Gas Company (NNG) having some sites within Wisconsin where mercury is present in the soil. Mr. Giesfeldt referred me to you.

Northern Natural Gas Company is involved in a program to remove the soil at meter stations along its pipeline where mercury is present above regulated levels. Orifice meters containing small amounts of mercury have been used throughout the natural gas pipeline industry for more than 40 years. These meters have been used to measure the volumes of gas moving through the pipeline. The amount to mercury used amounts to about one cup. Because of some minor spillage of mercury could have occurred over the years, NNG tested the meter station sites and, if appropriate, remediate those sites. We want to stress that any sites that have mercury present are expected to have little more than trace amounts of mercury, and the presence of mercury will be highly localized and pose no threat to the public safety.

Attached is a copy of the listing of sites and sampling information. Also enclosed is a copy of the work plan that Northern Natural Gas Company has used in Minnesota and Iowa. A critical component of this process is establishing target levels for the remediation activities. The sites in your area NNG is concerned with are the Park Falls TBS, Price County (24 ppm), Superior TBS, Douglas County (200 ppm), and Lady Smith TBS, Rusk County (50 ppm).

contact - W DOH
- W Dist Eshen

In a letter dated February 18, 1993 (enclosed) the Director of the Office of Waste Program Enforcement points out that the Proposed RCRA Corrective Action Rule (Subpart S) specifies a soil "action level" for inorganic mercury of 20 mg/kg (ppm). The Director continues to point out that this level is generally believed to be safe for children and adults who come in contact with this soil on a daily basis. He also points out that this level is quite conservative considering the nature of the sites.

One state had a contractor, PRC Environmental Management, Inc., conduct a risk assessment which indicated a level of just over 20 ppm would be protective of children who come into contact with the soil on a daily basis. This calculation is enclosed for your review. In addition, other states such as New Mexico and Texas have 140 ppm to 150 ppm target levels in remote areas and 15 to 20 ppm in non remote areas.

On the strength of this information, it appears that the Office of Waste Program Enforcement's suggestion that cleanup level of 20 ppm is more than adequate to protect human health and the environment is justified. This would be particularly true since access to many of Northern's sites are restricted.

Please review this information at your earliest convenience. I will be contacting your office soon to discuss this issue. If you have any questions please do not hesitate to call me at (612) 887-1712.

Sincerely,
ENRON Northern Natural Gas Company

Ronald C. Beidelman

Ronald C. Beidelman, REM
Division Environmental Specialist

cc Lou Soldano, Esquire
Tom Humason

METER ID	STATION	SOIL COMP MVA (mg/m3)	LAB DATA 1 (mg/kg)	Qual	LAB DATA 2 (mg/kg)	Qual	Duplicate
782011	SUPERIOR TBS,WI	0.123	200.0		0.0	NA	N
742501	PARK FALLS TBS,WI	0.058	24.0		13.0		Y
742091	ASHLAND TBS,WI	0.000	2.4	U	0.0	NA	N
761062	LACROSSE 1A,WI	0.004	2.4	U	0.0	NA	N
799031	VIROQUA,WI	0.001	2.3	U	2.3	U	Y
790-601	RIVER FALLS TBS,WI	0.000	2.2	U	0.0	NA	N
749651	TOMAH #1,WI	0.000	2.1	U	0.0	NA	N
749581	SPARTA #1,WI	0.017	2.1	U	0.0	NA	N
749321	LADYSMITH, WI	0.311	50.0				
754401	NEW RICHMOND	0.001	22.0				
761051	HUDSON	0.004	5.7				

Qualifiers:

U = Mercury not detected above the method detection limit

J = Concentration is estimated

NA = Not applicable - no second lab sample submitted

NOTE: An MVA soil composite results of 99.999 mg/m3 indicates that visible mercury was observed and that a soil composite reading was not taken.

ASSESSMENT AND SAMPLING PLAN

2.0 METHODOLOGY

2.1 Assessment and Sampling

The following procedure was to assess each site.

The site was visually inspected upon arrival, including the meter building and the surrounding property. Most sites consisted of a single square or rectangular building which housed the gas meters. Doors were present on opposite walls, and floors were concrete, with some exceptions as described later in this report. All observations and measurements were recorded on Meter Station Assessment Forms (Appendix B) to document the site inspections.

Mercury in liquid or droplet form tends to accumulate in low spots and can migrate down slopes and through gravel to a solid surface. Therefore, close attention was paid to the following areas of the site:

- Low spots on meter building floor and outside meter building
- Cracks in meter building floor
- Outside the main entry door to the meter building
- Locations where meter service trucks typically park

2.1.1 Field Screening

Soil samples were collected from seven to ten locations, generally by the main door, for field screening using a Jerome 411 mercury vapor analyzer (MVA). The field screening procedure involves measuring the mercury concentrations in the headspace of sample containers, and consisted of the following:

- Gravel cover was removed, if present, using a shovel or rake
- Approximately 4 ounces of soil were collected with a disposable plastic scoop and placed in a 1-quart plastic ziplock bag
- The plastic bag was sealed and placed into a cooler with no ice
- The temperature inside the cooler was measured and recorded

- The sample was allowed to equilibrate for ten minutes.
- No field screening was run on samples with visible mercury droplets present; the presence of mercury droplets was recorded on the Meter Station Assessment Form
- After ten minutes, the ziplock bag was opened to a minimum opening size and the sample was screened with the MVA
- The location of the sample and the MVA reading were recorded on the grid map on the Meter Station Assessment Form

The meter building ambient air, chart box, and floor (if concrete) were screened with the MVA during the assessment. The following method was used:

- Ambient air was screened at the breathing zone (5 to 6 feet in height) in five locations (each of the four walls and near the gas meter)
- The inside and top of the chart box were screened
- The concrete floor in each corner and along the downhill side was screened
- Screening readings were recorded on the front of the Meter Station Assessment Form

2.1.2 Soil Sampling

Based on the results of the soil screening, a composite soil sample as collected for laboratory analysis. The following method was used:

- A total of five aliquots of soil were collected from the area with the highest MVA readings using a disposal plastic scoop
- Aliquots were placed into a glass bow and mixed thoroughly
- Samples were divided into two portions: one portion was placed into a 4-ounce glass jar for submittal to the laboratory, and the second portion was screened for headspace, as described above.
- The location of the sample aliquots was recorded on the grid map on the back of the Meter Station Assessment Form

- Results of the sample screening were recorded on the Chain of Custody Record

The compositing bowl was decontaminated using the following procedure:

- Washed with detergent solution
- Rinsed with distilled water
- Rinsed with 10 percent nitric acid solution
- Rinsed with distilled water
- Decontamination fluids were dispersed on the site property
- All trash, gloves, and scoops were collected and disposed as solid waste

Quality assurance samples were collected as follows:

- One blind duplicate was collected for every twenty samples
- One field blank (water) was collected each day at the final location of the day. The field blank consisted of distilled water placed directly into the sample container.

2.2 Laboratory Analytical Procedure

The samples were submitted to AnalytiKEM in Houston, Texas, for analysis for mercury. Each sample as analyzed in accordance with SW846 Method 6010 ICP, modified.

The analytical method was modified to provide for the potential for free mercury droplets in the soil samples. The modification involved extracting 15 grams of soil, instead of 5 grams, to acquire a representative aliquot of the sample for analysis. The method detection limits (MDL) were also modified due to the larger aliquot size. The MDL for this project ranged from 2.2 mg/kg to 2.4 mg/kg.

SAMPLE DATA SUMMARY & SAMPLE DATA

APPENDIX F

Wisconsin Data Summary

Wisconsin Enron Stations

(Sites With Detected Mercury in Soil)

Meter ID: 782011 Station: SUPERIOR TBS Date: 06/24/93
Section: 9 Township: 48N Range: 14W Time: 8.45
County: Douglas State: WI Temp: 65 (deg. F)
Meter Type: A Wind speed: 5 Wind direction: N
Notes: Site is very wet. Puddles of water cover the site. Photo 5, Roll 3
Two former meter locations: one on east half, one on west half.

---------- INTERIOR DATA ----------

WALL READINGS (mg/m3): Main access door is on the south wall.
North wall: 0.000 East wall: 0.000 South wall: 0.000 West wall: 0.000

Number of readings at chartbox: 0
MVA reading near Chartbox 1: 0.000 mg/m3 MVA reading near Chartbox 2: 0.000 mg/m3
Number of readings at meter/former meter location: 2
MVA reading near meter 1: 0.000 mg/m3 MVA reading near meter 2: 0.000 mg/m3

FLOOR READINGS (mg/m3): NW corner: 0.000 NE corner: 0.000
SW corner: 0.000 SE corner: 0.000

---------- SOIL DATA ----------

Soil composite MVA result: 0.123 (Outside the door on the south side of the building)
NOTE: MVA result of 99.999 indicates no reading was taken due to the presence visible mercury in sample.

Composite lab result 1: 200.0 mg/kg
Composite lab result 2: 0.0 NA mg/kg (Duplicate: N)

Lab data qualifiers: U = mercury not detected above the method detection limit
J = estimated concentration; NA = Not applicable - no sample
NA = No sample submitted for laboratory analysis

SOIL MVA READINGS (mg/m3) (Soil readings 1 - 4 apply to this site)

Soil 1: 0.001 Soil 2: 0.000 Soil 3: 0.123 Soil 4: 0.000 Soil 5: 0.000
Soil 6: 0.000 Soil 7: 0.000 Soil 8: 0.000 Soil 9: 0.000 Soil 10: 0.000

---------- MISCELLANEOUS MVA READINGS ----------

Misc. data 1: 0.000 mg/m3 Description: Indoor ambient air
Misc. data 2: 0.000 mg/m3 Description: Not applicable
Misc. data 3: 0.000 mg/m3 Description: Not applicable
Misc. data 4: 0.000 mg/m3 Description: Not applicable
Misc. data 5: 0.000 mg/m3 Description: Not applicable

** END OF METER ID 782011 DATA **

Meter ID: 742501 Station: PARK FALLS TBS Date: 06/24/93
Section: 25 Township: 40N Range: 1W Time: 12.30
County: Price State: WI Temp: 70 (deg. F)
Meter Type: A Wind speed: 15 Wind direction: S
Notes: Building #1 has steel floor. Former meter location in #1 near west wall. Building #2 has a rock floor. Two former meter locations in #2 located along west wall. All wall, former meter location readings, and ambient air in Building #2 = 0.000 mg/m3. Photo 7, Roll 3. Duplicate sample collected. Wall and floor readings in this record are Building #1. Soil 2 from Bldg. 2 floor.

---------- INTERIOR DATA ----------

WALL READINGS (mg/m3): Main access door is on the south wall.
North wall: 0.000 East wall: 0.000 South wall: 0.000 West wall: 0.000

Number of readings at chartbox: 0
MVA reading near Chartbox 1: 0.000 mg/m3 MVA reading near Chartbox 2: 0.000 mg/m3
Number of readings at meter/former meter location: 1
MVA reading near meter 1: 0.083 mg/m3 MVA reading near meter 2: 0.000 mg/m3

FLOOR READINGS (mg/m3): NW corner: 0.000 NE corner: 0.000
SW corner: 0.000 SE corner: 0.000

---------- SOIL DATA ----------

Soil composite MVA result: 0.058 (Outside the door on the south side of the building)
NOTE: MVA result of 99.999 indicates no reading was taken due to the presence visible mercury in sample.

Composite lab result 1: 24.0 mg/kg
Composite lab result 2: 13.0 mg/kg (Duplicate: Y)

Lab data qualifiers: U = mercury not detected above the method detection limit
J = estimated concentration; NA = Not applicable - no sample
NA = No sample submitted for laboratory analysis

SOIL MVA READINGS (mg/m3) (Soil readings 1 - 6 apply to this site)

Soil 1: 0.000 Soil 2: 0.011 Soil 3: 0.002 Soil 4: 0.357 Soil 5: 0.666
Soil 6: 0.018 Soil 7: 0.000 Soil 8: 0.000 Soil 9: 0.000 Soil 10: 0.000

---------- MISCELLANEOUS MVA READINGS ----------

Misc. data 1: 0.021 mg/m3 Description: Indoor ambient air, Building #1
Misc. data 2: 0.000 mg/m3 Description: Floor, meter, air readings, Bldg. #2
Misc. data 3: 0.000 mg/m3 Description: Not applicable
Misc. data 4: 0.000 mg/m3 Description: Not applicable
Misc. data 5: 0.000 mg/m3 Description: Not applicable

** END OF METER ID 742501 DATA **

Meter ID: 749321 Station: LADYSMITH Date: 09/15/93
Section: 32 Township: 35N Range: 6W Time: 13.00
County: Rusk State: WI Temp: 55 (deg. F)
Meter Type: A Wind speed: 5 Wind direction: N
Notes: Gravel yard; steel floor in building and steel grates outside north and south doors. One meter located in center of building on east half. Chartbox located in southwest corner. One small VISIBLE MERCURY droplet noted under grate at north door.

---------- INTERIOR DATA ----------

WALL READINGS (mg/m3): Main access door is on the north wall.
North wall: 0.000 East wall: 0.000 South wall: 0.000 West wall: 0.000

Number of readings at chartbox: 1
MVA reading near Chartbox 1: 0.000 mg/m3 MVA reading near Chartbox 2: 0.000 mg/m3
Number of readings at meter/former meter location: 1
MVA reading near meter 1: 0.000 mg/m3 MVA reading near meter 2: 0.000 mg/m3

FLOOR READINGS (mg/m3): NW corner: 0.000 NE corner: 0.000
SW corner: 0.000 SE corner: 0.000

---------- SOIL DATA ----------

Soil composite MVA result: 0.311 (Outside the door on the north side of the building)
NOTE: MVA result of 99.999 indicates no reading was taken due to the presence visible mercury in sample.

Composite lab result 1: 50.0 mg/kg
Composite lab result 2: 0.0 mg/kg (Duplicate: N)

Lab data qualifiers: U = mercury not detected above the method detection limit
J = estimated concentration; NA = Not applicable - no sample
NA = No sample submitted for laboratory analysis

SOIL MVA READINGS (mg/m3) (Soil readings 1 - 4 apply to this site)

Soil 1: 0.000 Soil 2: 0.581 Soil 3: 0.221 Soil 4: 0.000 Soil 5: 0.000
Soil 6: 0.000 Soil 7: 0.000 Soil 8: 0.000 Soil 9: 0.000 Soil 10: 0.000

---------- MISCELLANEOUS MVA READINGS ----------

Misc. data 1: 0.000 mg/m3 Description: Indoor ambient air
Misc. data 2: 0.000 mg/m3 Description:
Misc. data 3: 0.000 mg/m3 Description:
Misc. data 4: 0.000 mg/m3 Description:
Misc. data 5: 0.000 mg/m3 Description:

** END OF STATION 749321 DATA **

Meter ID: 754401 Station: NEW RICHMOND Date: 09/14/93
Section: 13 Township: 29N Range: 18W Time: 13.30
County: St. Croix State: WI Temp: 46 (deg. F)
Meter Type: A Wind speed: 5 Wind direction: W
Notes: Gravel yard, steel building. Steel grate outside of east and west doors. Two meters located in center of building: one on north half, one on south half. Chartbox located east of north meter. Composite sample collected at 13:45.

---------- INTERIOR DATA ----------

WALL READINGS (mg/m3): Main access door is on the east wall.
North wall: 0.000 East wall: 0.000 South wall: 0.000 West wall: 0.000

Number of readings at chartbox: 1
MVA reading near Chartbox 1: 0.000 mg/m3 MVA reading near Chartbox 2: 0.000 mg/m3
Number of readings at meter/former meter location: 2
MVA reading near meter 1: 0.001 mg/m3 MVA reading near meter 2: 0.000 mg/m3

FLOOR READINGS (mg/m3): NW corner: 0.002 NE corner: 0.000
SW corner: 0.000 SE corner: 0.000

---------- SOIL DATA ----------

Soil composite MVA result: 0.001 (Outside the door on the east side of the building)
NOTE: MVA result of 99.999 indicates no reading was taken due to the presence visible mercury in sample.

Composite lab result 1: 22.0 mg/kg
Composite lab result 2: 0.0 mg/kg (Duplicate: N)

Lab data qualifiers: U = mercury not detected above the method detection limit
J = estimated concentration; NA = Not applicable - no sample
NA = No sample submitted for laboratory analysis

SOIL MVA READINGS (mg/m3) (Soil readings 1 - 6 apply to this site)

Soil 1: 0.000 Soil 2: 0.000 Soil 3: 0.001 Soil 4: 0.000 Soil 5: 0.000
Soil 6: 0.001 Soil 7: 0.000 Soil 8: 0.000 Soil 9: 0.000 Soil 10: 0.000

---------- MISCELLANEOUS MVA READINGS ----------

Misc. data 1: 0.000 mg/m3 Description: Indoor ambient air
Misc. data 2: 0.000 mg/m3 Description:
Misc. data 3: 0.000 mg/m3 Description:
Misc. data 4: 0.000 mg/m3 Description:
Misc. data 5: 0.000 mg/m3 Description:

** END OF STATION 754401 DATA **

Meter ID: 761051 Station: HUDSON Date: 09/14/93
Section: 13 Township: 29N Range: 20W Time: 11.30
County: St. Croix State: WI Temp: 48 (deg. F)
Meter Type: A Wind speed: 5 Wind direction: N
Notes: Gravel yard, steel building. Composite collected at 11:40 AM. Duplicate composite collected at 11:45. Two meters are located in center of building: one on north side, one on south side. Chartbox located east of south meter.

---------- INTERIOR DATA ----------

WALL READINGS (mg/m3): Main access door is on the west wall.
North wall: 0.000 East wall: 0.000 South wall: 0.000 West wall: 0.000

Number of readings at chartbox: 1
MVA reading near Chartbox 1: 0.000 mg/m3 MVA reading near Chartbox 2: 0.000 mg/m3
Number of readings at meter/former meter location: 2
MVA reading near meter 1: 0.000 mg/m3 MVA reading near meter 2: 0.000 mg/m3

FLOOR READINGS (mg/m3): NW corner: 0.000 NE corner: 0.000
SW corner: 0.000 SE corner: 0.001

---------- SOIL DATA ----------

Soil composite MVA result: 0.004 (Outside the door on the west side of the building)
NOTE: MVA result of 99.999 indicates no reading was taken due to the presence visible mercury in sample.

Composite lab result 1: 5.7 mg/kg
Composite lab result 2: 7.1 mg/kg (Duplicate: Y)

Lab data qualifiers: U = mercury not detected above the method detection limit
J = estimated concentration; NA = Not applicable - no sample
NA = No sample submitted for laboratory analysis

SOIL MVA READINGS (mg/m3) (Soil readings 1 - 4 apply to this site)

Soil 1: 0.000 Soil 2: 0.004 Soil 3: 0.000 Soil 4: 0.000 Soil 5: 0.000
Soil 6: 0.000 Soil 7: 0.000 Soil 8: 0.000 Soil 9: 0.000 Soil 10: 0.000

---------- MISCELLANEOUS MVA READINGS ----------

Misc. data 1: 0.004 mg/m3 Description: Duplicate composite reading
Misc. data 2: 0.000 mg/m3 Description: Indoor ambient air
Misc. data 3: 0.000 mg/m3 Description:
Misc. data 4: 0.000 mg/m3 Description:
Misc. data 5: 0.000 mg/m3 Description:

** END OF STATION 761051 DATA **

EPA LETTER & PRC ENVIRONMENTAL RISH DATA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 18 1993

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Texas Eastern's Inventory of Metering and Regulation Stations and Proposed Soil Mercury Assessment Program

FROM: Bruce M. Diamond, Director
Office of Waste Programs Enforcement

TO: Waste Management Division Directors, Regions I-X

In a July 24, 1992 memo, the Office of Waste Programs Enforcement and the Office of Toxic Substances notified the Regions that there is potential contamination of soil with small amounts of mercury at many metering and regulation ("M & R") stations along natural gas pipelines, including the Texas Eastern pipeline, due to previous meter breakage and "poor housekeeping" practices. At that time, we requested that Texas Eastern provide us with an inventory of these sites, where they are located, and any available concentration data.

In a December 7, 1992 memo, Texas Eastern provided EPA and State Program contacts in affected States with an inventory of these M&R stations, and notification of Texas Eastern's intent to begin a voluntary sampling program of one surface soil sample per M & R station, to be completed by March, 1993 (see Attachment). Texas Eastern also sent a Property Conveyance Notification (November 16, 1992) on the sale of portions of Texas Eastern properties containing M & R stations which use or have used mercury meters (see Attachment). We are enclosing copies of these notifications and the M & R site inventory for your information, and ask that you coordinate your activities with the affected States in your Regions, as well as with your CERCLA program offices.

At this time, we believe that these M & R sites can best be addressed at the Regional and State level in the context of the RCRA Implementation Plan and other national guidance, rather than through modification to the Federal Consent Decree with Texas Eastern; mercury characterization and remediation is not currently covered under the Federal Decree. We also believe that Texas Eastern's voluntary cleanup proposal, or a cleanup conducted voluntarily under a state hazardous waste program, if applicable, may be the most expeditious and appropriate way of cleaning up the contaminated soil at these sites. However,

please note that Texas Eastern's sampling proposal calls for only one screening sample per site. While this may be adequate at the majority of sites, which we believe are very small (a few square feet) based on information from Texas Eastern, some sites may be substantially larger, having multiple meters, and therefore may require several samples.

For your information, under separate State agreements, Texas Eastern has already conducted mercury sampling at M & R stations in New Jersey and Pennsylvania, and agreed to remediate contaminated M & R sites. New Jersey required a 2-phase sampling program for mercury (in conjunction with sampling for total petroleum hydrocarbons and PCBs). For sites where mercury was found above 14 mg/kg (ppm) on initial screening sampling, New Jersey required additional sampling to further characterize the site and develop a cleanup plan. During New Jersey's Phase I sampling program, soil mercury concentrations of 6 ppm to 1520 ppm were found at 7 out of 26 sites; the other 19 sites were not found to require further sampling for mercury under the State program. New Jersey's mercury cleanup goal is also 14 ppm for these sites.

Although EPA does not have a single soil cleanup standard applicable to all sites, the proposed RCRA Corrective Action Rule (Subpart S) specifies a soil "action level" for inorganic mercury of 20 mg/kg (ppm). This action level is a human-health based level which relies on standard exposure assumptions for direct ingestion of soil. This concentration level is generally believed to be safe for children and adults who might be in contact with this soil on a daily basis. Since the areas of contaminated soil that are at issue at these particular sites are believed to be very small, reducing the chances for exposure, the exposure scenario used as the basis for the 20 ppm action level is probably quite conservative for these sites. Nevertheless, given the volumes of contaminated soil in question, we believe that use of the proposed action level is a reasonable and protective presumptive cleanup goal for mercury at the M & R stations. Alternatively, State-specified cleanup levels could be applied, and there may be situations where the 20 ppm cleanup level should be adjusted, either higher or lower, to reflect site-specific circumstances, as discussed in the preamble to the Subpart S proposal.

Please note that both the proposed Subpart S Action Level and New Jersey's action level are based upon total soil mercury levels, not Toxicity Characteristic Leaching Procedure (TCLP) levels. Further, the applicability of the TCLP test for evaluating mobility of metals under field conditions in general

has also been questioned.[1] For these reasons, total mercury analysis appears to be an appropriate method of analysis to determine whether removal is necessary. However, for your information, the TCLP regulatory level for elemental mercury is 0.2 ppm.

The Regions and states should also be aware that the Agency has granted a generic case-by-case extension on the effective date for meeting LDR treatment standards for certain hazardous soils that will be in effect until May 8, 1993 (Federal Register, October 20, 1992, p. 47,772). This extension would be applicable to mercury-contaminated soils removed from the Texas Eastern M & R sites, and means that these soils may be disposed of in Subtitle C landfills without meeting LDR treatment standards until May 8, 1993. Texas Eastern wishes to conduct their mercury sampling at the same time they are conducting their PCB sampling at M & R stations as required under the Federal Consent Decree, and to complete remediation while the LDR extension is in effect.

We hope this information will be helpful to you. Please have your staff direct questions or requests for further information to Rose Law, FTS 202/260-6720.

Attachments

cc: Sally Mansbach, OWPE/CED
Arthur Weissman, OWPE/CED
Steve Ells, OWPE/CED
Elizabeth Cotsworth, OWPE
Mike Calhoun, OPPTS/OCM
Mike Stahl, OPPTS/OCM
Robin Lancaster, OE
Mike Walker, OE
Wayne Roape, OSW
Frank Covington, NEIC
Barratt Benson, NEIC
Robert Homiak, DOJ
David Nielsen, OE
Shelley Brodie, Region 7, WMD
Joel Golumbek, Region II
Mary Letzkus, Region III
Alan Farmer, Region IV
William Buller, Region V
Ralph Frank, Region VI
Mary Flournoy, Region VII
RCRA Branch Chiefs, Regions I-X

---

[1] See EPA Ground Water Issue: Behavior of Metals in Soils, EPA/540/S-92/018, October 1992, by Joan E. McLean and Bart Bledsoe, Superfund Technology Support Center for Ground Water, Robert S. Kerr Environmental Laboratory, Ada, Oklahoma.

PRC ENVIRONMENTAL MANAGEMENT, INC.
PROPOSED RISK-BASED SOIL CLEANUP LEVELS for MERCURY (inorganic)

GENERAL EXPOSURE PARAMETERS - RESIDENTIAL CHILD SCENARIO

EXPOSURE DURATION (ED)	=	6	years
EXPOSURE FREQUENCY (EF)	=	350	days/year
EXP. FREQ. (DERMAL) (EFDR)	=	150	days/year
BODY WEIGHT (BW)	=	15	kg.
AVERAGING TIME (AT)	=	2190	days
CONVERSION FACTOR (CF)	=	1.0E-06	kg/mg

INGESTION

INGESTION RATE (ING)	=	200	mg/day

INGESTION EXPOSURE CONSTANT = ING x ED x EF x CF / (BW x AT)

(INGEC) = 1.28E-05 [days]E-1

DERMAL CONTACT

SURFACE AREA (SA)	=	2000	cm2/day
ADHERENCE FACTOR (AF)	=	1	mg/cm2
ABSORPTION FACTOR (ABS)	=	0.01	unitless

DERMAL EXPOSURE CONSTANT = SA x AF x ABS x ED x EFDR x CF / (BW x AT)

(DEC) = 5.48E-07 [days]E-1

INHALATION

INHALATION RATE (INH)	=	20	m3/day
PARTICULATE CONC. (PC)	=	0.07	mg/m3
RESPIRABLE FRACTION (RF)	=	1	unitless

INHALATION EXPOSURE CONSTANT = INH x PC x RF x ED x EF x CF / (BW x AT)

(INHEC) = 8.95E-08 [days]E-1

TOTAL EXPOSURE CONSTANT (TEC) = 1.34E-05 [days]E-1
(INGEC + DEC + INHEC)

MERCURY (Toxicological criteria from IRIS, 1993)

ORAL REFERENCE DOSE (RfD)	=	3.0E-04 [mg/kg-d]
INHAL. REFERENCE DOSE (RfD)	=	3.0E-04 [mg/kg-d]
HAZARD QUOTIENT (HQ)	=	1.0E+00 unitless

SOIL CLEANUP GOAL = HQ x [(RfD / TEC)]

= 2.2E+01 mg/kg

REMEDIAL PLAN, SAMPLE VERIFICATION, & REPORTING

2.0 REMEDIAL ACTIONS

This section of the work plan describes the specific activities that will be completed during the remedial activities. These activities include:

- Site preparation
- Removing elemental mercury using a mercury vacuum
- Excavating and stockpiling soils containing mercury above Target Clean-up Levels (TCL)
- Collecting samples of stockpiled soils for laboratory analysis
- Collecting soil verification samples for laboratory analysis
- Vacuuming dusts inside the meter buildings
- Decontaminating equipment
- Site restoration

Following receipt of the laboratory analytical results, a disposal option for the soils from each site will be selected. The subsequent phase of remediation involves collecting the soils from each site and implementing the selected disposal option in accordance with the technical memorandum.

2.1 Site Preparation

The sites will require preparation prior to initiating remedial activities. ENSR will contact the appropriate excavation hotline for the sites at least three days prior to starting work at those sites. Some of the meter buildings have metal grates welded to the meter building. These grates will require removal using a cutting torch. Due to the special training required to use a cutting torch near a natural gas pipeline, NNG will be responsible for removing the grates prior to site remediation.

Two locations, Albert Lea #1A and Dairyland Co-Op are brick buildings with brick floors. The initial assessment indicated that mercury is present in the pores of the bricks. NNG will remove all miscellaneous equipment and piping prior to site remediation. Site remediation at these sites will involve removal of the affected portion of the floor and underlying soils.

Immediately prior to beginning the excavation, a stockpile location adjacent to the building will be selected for the excavated soils.

2.2 Elemental Mercury Vacuuming

The first remedial activity for each site will be to remove any visible free mercury from the building floors, cracks in concrete or brick floors, and pools or puddles of mercury in soils, if necessary. A mercury vacuum utilizing a high efficiency particulate air (HEPA) filter and an activated carbon filter will be used to vacuum the mercury (minimum 99.97 percent efficient at 0.3 microns). Care will be taken to minimize the amount of dirt that could clog or otherwise damage the HEPA filter during vacuuming.

Mercury droplets observed in the soils will not be vacuumed because excessive dirt will clog the HEPA filter. Mercury droplets in the soils will be excavated and stockpiled as described below.

2.3 Soil Excavating and Stockpiling

The second remedial activity for each site after mercury vacuuming will be soils excavation. At each site, the area to be excavated will be delineated based on field screening results obtained during the initial assessment described in Section 1.0. The data for the field screening are presented on the site inspection forms.

Based on the site conditions observed during the initial assessments, soils will generally be removed from one of three locations:

1. Outside of the meter building, immediately in front of the main door
2. Inside of meter buildings with dirt floors
3. Around gas piping, inside and outside the building

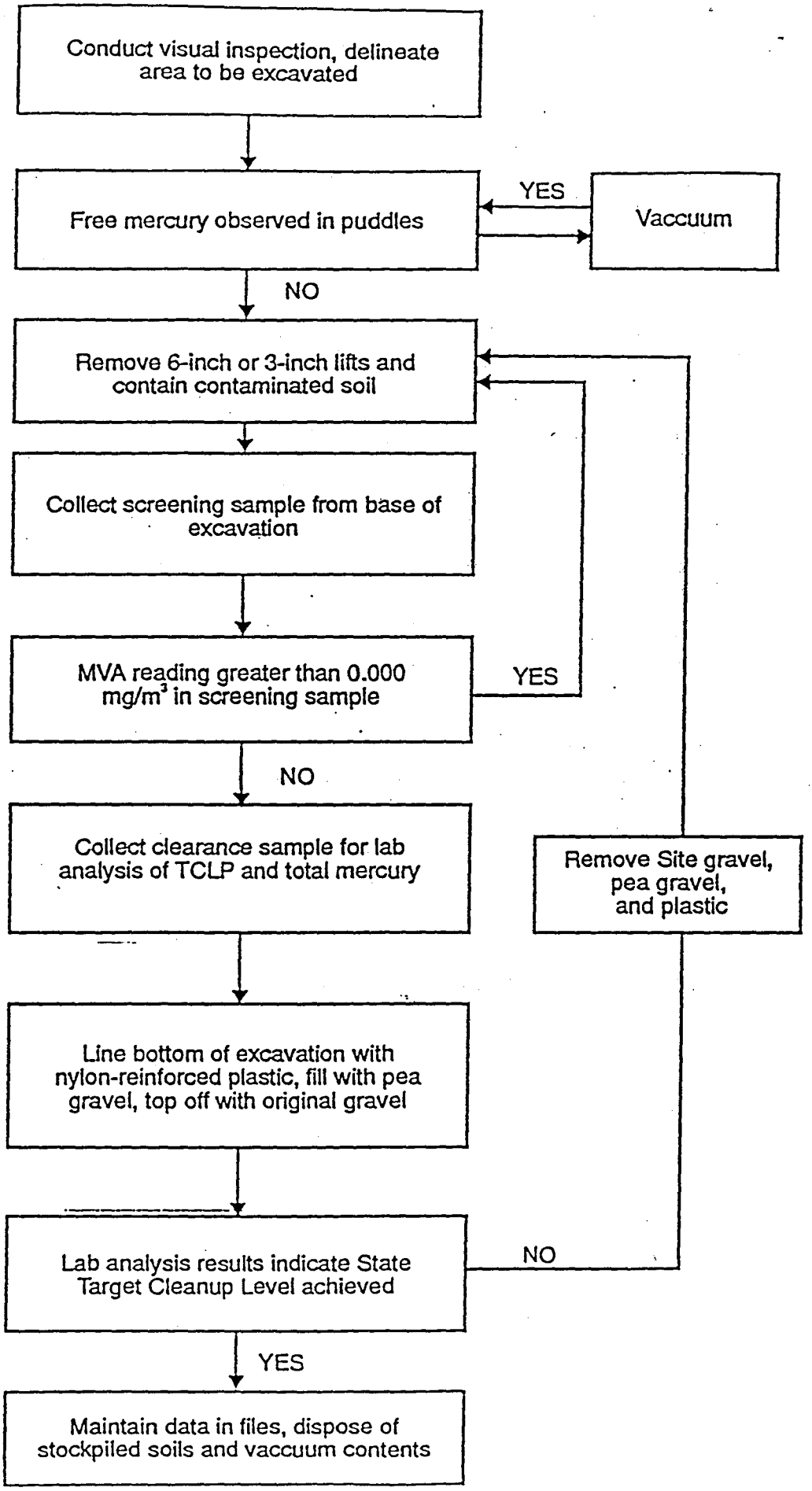
A small backhoe or front-end loader (Bobcat type) will be used to remove soils from sites containing soils outside the main door. Soils inside the meter buildings and around the gas pipelines will be hand dug with a shovel.

Figure 2-1 presents a simplified flow chart illustrating the removal plan. The general procedures for soil removal are as follows:

- The surficial gravel will be removed and set aside for reuse.

- Soils in the delineated area(s) of concern will be removed with a backhoe or shovels. The first lift will be a 6-inch lift. Subsequent lifts will be either 3-inch or 6-inch lifts, based on the conditions observed by the field assessor.

Figure 2-1
ENRON Remediation Flow Chart



- Soils will be stockpiled on nylon-reinforced plastic sheeting on-site.

- Field screening samples will be collected, as described in Section 3.0, after each lift has been excavated. Additional lifts will be excavated based on the results of the screening samples.

- The stockpiled soils will be covered with nylon-reinforced plastic sheeting. The sheeting will be secured to prevent loss due to storm water runoff or wing erosion.

- Soil verification samples will be collected from the excavation as described in Section 2.4.

2.4 Soil Verification Sampling

Soil verification sample(s) will be collected upon completion of the soil excavation. The verification sample(s) will be used to confirm that all soils above the cleanup criteria have been removed. The verification sample(s) will be grab samples collected from the undisturbed base of the excavation. One verification sample will be collected for every 16-square foot area (4 feet long by 4 feet wide area, or equivalent) of the excavation. However, no more than three verification samples are planned to be collected per site.

The laboratory analysis of the verification samples will determine whether the remedial activities have met the Target Clean-up Levels (TCLs). If the analytical result of the verification samples exceed the TCLs, the excavation procedure described above will be repeated.

2.5 Mercury Dust Vacuuming

Dusts containing mercury at the sites listed in Section 1.0 (Table 1-2) and at sites where soils are excavated from inside the meter building will be vacuumed using the mercury vacuum described above. The vertical walls, piping and chart boxes will be vacuumed. Vacuuming shall continue until an MVA reading of 0.000 mg/m^3 over background readings has been achieved.

2.6 Decontamination

The bucket of the backhoe or front-end loader will be scraped and swept to remove residual soils. These soils will be included with the stockpiled soils.

2.7 Site Restoration

Following completion of the verification sampling, the site will be restored. The bottom of the excavation will be covered with nylon-reinforced plastic sheeting. Pea gravel will then be placed over the sheeting to the former soil grade elevation. The purpose of the pea gravel and plastic sheeting is to facilitate continued site remediation if the soil verification samples indicate that mercury is still present above the TCL. The site gravel will be used to finalize the cover over the pea gravel. The location will be graded smooth, and all trash will be removed for off-site disposal.

NNG will be responsible for re-installing the metal grates at its sites. However, this activity must follow receipt of the laboratory results that confirm that the site activities have been completed.

3.0 SAMPLING PROCEDURES

This section describes the procedures that will be used to ensure that each sample collected is representative of the conditions at that location, and that the sample is neither altered nor contaminated by the sampling and handling procedure. Table 3-1 lists the ENSR Standard Operating Procedures (SOPs) applicable to this project. These SOPs are included in Appendix C.

3.1 Field Screening Samples

This section describes the methods for collecting screening soil samples from the excavation. The results of the screening will be used to determine the need for additional soil excavation.

After the lift of soil has been removed, soil sample(s) will be collected for mercury vapor screening. The screening procedure will be:

- Using a disposable plastic scoop, collect approximately 4 ounces of soil from the excavation or backhoe (depending on the depth of the excavation) and place the soil in a 1-quart plastic ziplock bag
- Knead the bag to loosen the soil
- Seal the plastic bag and warm the soil to at least 60°F for at least five minutes
- Open the bag to a minimum opening size and screen the sample with the MVA (Jerome 431 or 411)
- Record the location and depth of the sample and the MVA reading on the Remedial Activities Worksheet
- Two screening samples will be collected from each 16-square foot area of the excavation, with a minimum of three screening samples collected from the excavation.
- Discard the bagged sample in the excavated soils stockpile

TABLE 3-1

Standard Operating Procedures List

Number	Title
7110	Surface Soil Sampling
7115	Subsurface Soil Sampling
7315	Operation/Calibration of HNu Photoionization Analyzer
7510	Packaging and Shipment of Samples
7600	Decontamination of Equipment

3.2 Verification Samples

One verification sample will be collected for laboratory analysis for every 16-square foot area of the excavation. However, no more than three verification samples will be collected from an excavation. The sample collection procedure will be:

- Divide the excavation into equal size areas, if the total area is greater than 16 square feet
- Using a disposable plastic spoon, fill a clean 4-ounce sample jar with a grab soil sample from each area from the bottom of the excavation
- Record the location and depth of the soil sample on the Remedial Activities Worksheet
- Label, package and ship the sample(s) to the laboratory for analysis

All verification samples will be analyzed for total mercury. Composite samples will not be collected for soil cleanup verification.

3.3 Stockpiled Soil

One composite soil sample will be collected from stockpiled soil for laboratory analysis. The sample will be analyzed for TCLP mercury and total mercury. Procedures for collecting the composite are:

- Collect a total of five equal aliquots of soil using a disposable plastic scoop from the stockpile
- Place the aliquots into a glass bowl and mix the sample thoroughly
- Fill a 4-ounce glass jar for submittal to the laboratory
- Label, package, and ship the sample to the analytical laboratory

3.4 Decontamination

All sample collection equipment will be fully decontaminated before sampling and between sampling events in accordance with ENSR SOP 7600 (Decontamination of Equipment). The procedure for decontaminating the compositing bowl is:

- Wash with a non-phosphate detergent and tap water
- Rinse with distilled or deionized water
- Rinse with a 10 percent nitric acid solution
- Rinse with distilled or deionized water
- Disperse the decontamination fluids on the stockpiled soil
- Collect all trash, gloves, and scoops for off-site disposal as solid waste

No other sampling equipment is expected to be decontaminated.

4.0 SAMPLE IDENTIFICATION

Samples will be labeled with an eight-digit code that will easily identify the sample location and type of sample. The planned labeling procedure is described below:

- The first two letters indicate the state of the site (e.g., MN)
- The third, fourth and fifth letters are the first three letters of the meter station name (e.g., HAR for Harrisburg)
- The sixth letter indicates the type of sample collected (V = verification sample; S = Stockpile sample; B = Decontamination Blank)
- The seventh digit consecutively numbers the type of sample from the site (e.g., C2 indicates the second clearance sample collected for laboratory analysis)

Duplicate samples will be indicated by adding a "D" to the end of the code. Any deviations from this method will be documented.

5.0 DISPOSAL OPTIONS

The laboratory analysis of the stockpile samples will determine the options available for disposal of the soils. There will be three classifications of the soils from the sites:

1. Soil has TCLP mercury extract concentration less than 0.2 mg/ℓ and total mercury less than 260 mg/kg

2. Soil has TCLP mercury extract concentration greater than 0.2 mg/ℓ and total mercury less than 260 mg/kg

3. Soil has TCLP mercury extract concentration greater than 0.2 mg/ℓ and total mercury greater than 260 mg/kg

Category 1 soils can be disposed in a Subtitle D special waste landfill. Category 2 soils can be disposed in a Subtitle C hazardous waste landfill. Category 3 soils must be treated by the Best Demonstrated Available Technology (BDAT), which is either retorting or incineration.

A technical memorandum will be prepared that will:

- List the sites that fit each of the above criteria

- Describe the disposal options and costs for those options

- Provide the details of the transportation "milk run" procedure that will be used to collect the soils in each category

- Describe the containerization and manifesting procedures

- Provide a schedule for completion of the removal and disposal of the soils

Some disposal options, locations, and estimated cost for disposal (excluding transportation) are presented in Table 5-1 for budgeting purposes.

The contents of the mercury vacuum will be transported to a central location for temporary storage. The contents will later be disposed as a hazardous waste at a retorting facility. Retorting facilities that can treat the vacuum contents include:

TABLE 5-1

Soil Disposal Options

Result of Analysis	Disposal Method	Potential Disposal Facilities	Estimated Cost of Disposal
<260 ppm Hg/Passes TCLP	Industrial waste landfill	USPCI, Roseville, MN	$60/ton
<260 ppm Hg/Fails TCLP	Hazardous waste landfill	USPCI, Lone Mountain, OK	$140/ton plus $125/ton if stabilization is required
	Incineration	ThermalKEM, Rock Hill, SC	$1890/cubic yard if <50 ppm Hg $2268/cubic yard if >50 ppm Hg (plus $325 approval fee if waste is accepted)
>260 ppm Hg/Fails TCLP	Incineration	USPCI, Clive, UT	$0.90/pound ($1800/ton)
>260 ppm Hg/Fails TCLP			

Estimates are based on a total disposal volume of 100 to 200 cubic yards. Estimates do not include transportation. Trucking costs are approximately $2.90 per load mile with a 20 yard load.

- Mercury Refining Company, Inc., Albany, New York ($65/gallon)
- Bethlehem Apparatus, Bethlehem, Pennsylvania ($170/gallons with a five gallon minimum)

Other treatment facilities may be available for this materials. These facilities will be identified in the technical memorandum.

ENSR estimates that the contents of three vacuums (approximately 2 gallons) will require disposal.

6.0 REPORTING

ENSR will prepare the technical memorandum described in the proceeding sections upon completion of field activities. The memorandum will describe the remedial activities completed at each meter station and will provide summary tables of the volume of soils removed, the area of building vacuumed, and the results of the clearance sample analyses. This memorandum will be the planning tool for the removal of the soils from the sites.

Data from the Remedial Activities Worksheets will be entered into the electronic database and will be used to generate the summaries discussed above. The Remedial Activities Worksheets will be included as an appendix to the memorandum.

HEALTH & SAFETY PLAN
&
QUALITY ASSURANCE PLAN

Health and Safety Plan

for

Site Remediation

at

Northern Natural Gas Company Meter Sites

Prepared By: _____ Date: _____
Regional Health and Safety Manager

Approved By: _____ Date: _____
Project Manager

ENSR Consulting and Engineering
August 1993

6792-072-201

CONTENTS

1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed by ENSR to inform ENSR employees and ENSR subcontractors of the hazards associated with the soil removal activities at ENRON Meter sites. It also establishes the health and safety procedures required to help minimize potential risk to personnel who will be performing these work activities. The provisions of this plan apply to all ENSR and ENSR subcontractor personnel who will potentially be exposed to safety and/or health hazards related to activities listed in Section 3.0 of this document. The addition of any tasks beyond those described in Section 3.0 may require modification to this HASP.

All activities covered by this HASP must be conducted in compliance with this HASP and with all applicable federal, state, and local health and safety regulations.

Personnel covered by this HASP must receive, read, and comply with its provisions. Each employee must sign a copy of the HASP acknowledgement form indicating receipt of this HASP (see Attachment 1).

A pre-entry health and safety briefing will be conducted prior to commencing field activities and at other times, as necessary. The focus of the briefing will be the contents of the HASP and other health and safety concerns. All personnel will then sign the safety meeting log (see Attachment 2).

The procedures outlined in this plan have been developed based on current knowledge regarding the specific chemical and physical hazards that are known, anticipated, or alleged for each of the specific tasks to be conducted at these sites. Should additional information become available regarding site hazards, or should operations at the site change, it may be necessary to modify this HASP. All proposed modifications to this HASP must be reviewed and approved before such modifications are implemented. Any significant modifications must be incorporated into the written HASP and the document must be reissued.

2.0 SITE HISTORY/BACKGROUND

ENSR completed initial site assessments of meter sites in Minnesota. The site assessments evaluated the site soils and meter buildings for the presence of mercury. A mercury vapor analyzer was used to screen the building and soils for mercury and to select locations for collection of soil samples for laboratory analysis. Soil samples were analyzed for total mercury to identify sites that may exceed target clean-up criteria. Mercury was detected at 95 sites in concentrations ranging from 2.0 mg/Kg to 92500 mg/Kg. Droplets of mercury were observed in the soils at several sites.

3.0 SCOPE OF WORK

The scope of work for the ENRON sites is to excavate soil containing mercury and to vacuum dust and free mercury from the meter buildings. A backhoe or front-end loader will be used to excavate impacted soil and stockpile it on-site. The soils will be collected for off-site disposal at a later date using a front-end loader and dump truck or equivelant.

The amount of soil to be removed at each location will vary, as will the dimensions of the excavations. Excavation depth is not expected to exceed 3 feet at any location.

4.0 HAZARD ASSESSMENT

4.1 Chemical Hazard Assessment

The primary compounds of concern at each site are elemental mercury, and natural gas from pipes.

Mercury

Potential routes of exposure to mercury at the ENRON Meter sites include ingestion, dermal contact, or inhalation of airborne mercury from volatilization during excavation activities. Mercury's Permissible Exposure Limits are provided in the following table:

Permissible Exposure Limits

Substance	Time-Weighted Average	Short-Term Exposure Limit
Mercury, vapor	0.05 mg/m^3	*
Mercury, aryl/inorganic	0.1 mg/m^3 C	*

C - Ceiling
* - Not established

Mercury is used in electrical apparatus, thermometers, pressure gauges, pesticides, dentistry, and many other applications. Exposure may be to mercury in the form of inorganic or elemental mercury, alkyl mercury, and other inorganic mercury (aryl). Mercury metal is a liquid at room temperature, and has a high enough vapor pressure to cause poisoning at elevated temperatures.

All mercury entering the body, through inhalation, ingestion, or percutaneous absorption, can potentially have toxic effects. Mercury can damage most tissues of the body, but produces the most profound effects on the lungs, kidneys, and the central nervous system.

Acute exposures may produce severe lung damage and the "metal fume fever" symptoms of chills, chest tightness, and nausea. High concentrations may cause corrosive bronchitis and pneumonitis.

In chronic exposure, the first signs may be fatigue, weakness, loss of appetite, weight loss, and gastric disturbances. This may be followed by tremors of the fingers, eyelids, and lips, progressing to violent spasms of the extremities. Later, behavioral and personality changes may occur, along with delirium and hallucinations.

Other signs of mercury poisoning may include severe salivation, gum disease, and corneal changes. Mercury may also cause sensitization and immunologic disease.

The 8-hour OSHA exposure limit for mercury vapor is 0.05 mg/m^3. For alkyl mercury, the 8-hour limit is 0.01 mg/m^3, with a short-term exposure limit of 0.03 mg/m^3. For aryl- and inorganic mercury, there is a ceiling limit of 0.1 mg/m^3 (as mercury).

Natural Gas

While there is no direct physiological effect from overexposure, natural gas can displace air, which may result in an oxygen-deficient environment. Natural gas vapor is more dense than air and may accumulate in low areas. Prior to working in the meter sheds, the door(s) should be opened to provide ventilation. Smoking is not permitted on-site.

4.2 Physical Hazard Assessment

The following procedures will be followed when working on-site.

- Smoking or open flames are not permitted.
- Underground utilities will be identified before excavation work begins.
- The backhoe will be placed upwind (if possible) from the excavation to help prevent operator exposure to airborne mercury.
- At least 10 feet clearance will be maintained between the backhoe and power lines.
- The excavation must be closed or backfilled immediately upon completion of soil removal.

5.0 AIR MONITORING

A Jerome™ mercury vapor analyzer will be used to monitor the breathing zone of workers at the site for the pressure of airborne mercury.

The table below lists the action levels at which respiratory protection will be donned.

Action Levels for Respiratory Protection

	Level D	Level C (Half-Mask)	Level C (Full-Face)
Mercury (ppm)	<0.1	0.1-1.0	0.1-5.0

6.0 PERSONAL PROTECTIVE EQUIPMENT

It is anticipated that the level of protection for the task listed in Section 3.0 will require the following minimum personal protection:

Level D - Protective Clothing Requirements

✓	Work Clothes/Coveralls (short-sleeved)
✓	Chemical Protective Clothing (Tyvek™ coveralls)
✓	Boots (chemical resistant, steel-toed, not leathers)
✓	Gloves (neoprene or nitrile outers and latex inners during contact with impacted soils)
✓	Hard Hat
✓	Safety Glasses

Based on the hazard assessment for the work activities listed in Section 3.0, the field work will be conducted in Level D protection. Respiratory protection may be upgraded to Level C (air-purifying respirators) if air monitoring for mercury indicates that such protection is necessary.

The following personal protection may be worn during the work activities.

- Level C: Half-face or full-face air purifying respirators with MSA brand MERSORB or equivalent cartridges.

7.0 SITE CONTROL

To prevent both exposure of unprotected personnel and contaminant migration caused by tracking by personnel or equipment, the work area around each excavation will be clearly identified with barricade tape or existing chain-link fencing.

Work at each site is expected to be completed in one day. Only authorized personnel will be allowed access to the site while remedial activities are conducted. Excavations will be filled at the end of each day and all stockpiled soils will be covered each night.

8.0 DECONTAMINATION PROCEDURES

Personnel Decontamination

Proper decontamination is required for all personnel and equipment before leaving the sites. Personnel decontamination will be accomplished by following a systematic procedure of cleaning and removing personal protective clothing. Contaminated personal protective equipment, such as boots and hardhats, will be brushed free of heavy amounts of soil. The removed soil will be placed in the stockpile with other soils. Persons coming in contact with materials suspected or known to be contaminated will wash contaminated equipment prior to leaving the site.

Disposable personal protective equipment, such as Tyvek™ coveralls, gloves, outer boots, etc., will be collected and disposed at an off-site location. Respirators will be cleaned after each use with respirator wipe pads and stored in plastic bags after cleaning. Alternative chemical decontamination procedures, such as steam cleaning of field boots, may be used if available. Decontamination procedures should be carried out in the following order:

- Remove and wipe clean hard hat
- Decontaminate boots and gloves
  - Brush heavy amounts of soil or material
- Remove outer disposable boots (if worn)
- Remove outer gloves
- Remove polycoated Tyvek™ coveralls
- Remove respirator (if worn), wipe clean, and store properly
- Remove inner gloves

Boots that have been decontaminated can be worn into the support zone.

Equipment Decontamination

All equipment that becomes contaminated will be decontaminated by scraping and brooming. The soils generated by decontamination will be stockpiled with the excavated soils. Equipment that is anticipated to need decontamination includes:

- Backhoe bucket.

9.0 SAFETY EQUIPMENT

Safety Equipment

- ✓ First aid kit
- ✓ Poison ivy lotion
- ✓ Fire extinguisher
- ✓ Emergency eye wash
- ✓ Portable telephone
- ✓ Decontamination equipment
- ___ Safety belt (harness and lanyard)
- ___ Airhorn
- ✓ Caution tape
- ___ Barricading equipment
- ___ Hazard warning cones
- ✓ Air monitoring equipment

ATTACHMENT 1

HASP RECEIPT FORM

HEALTH AND SAFETY PLAN

for the

ENRON Meter Sites

Document No: 6792-072-201

Date: August 23, 1993

ISSUED TO:

_____ _____

(Representing) (Name and Title)

I have received a copy of the ENSR Health and Safety Plan for this project and I have read and understand its purpose and scope.

_____

Signature

_____

Date

NOTE: The following information is requested in the event of an emergency.

Special Medical Conditions or Allergies: _____

Current Medications: _____

Person(s) to be Notified (Name and Telephone Number) _____

_____

ATTACHMENT 2

PRE-JOB SAFETY MEETING FORM

PRE-JOB SAFETY MEETING
ENRON METER SITES

Date: _____

Attended by:

Name	Signature

Topic(s) covered:

Conducted by:

_____

ATTACHMENT 3

EMERGENCY REFERENCE SHEET

EMERGENCY REFERENCE

These emergency telephone numbers must be conspicuously posted on-site.

POISON CONTROL CENTER: 1/800-942-5969

NATIONAL RESPONSE CENTER: 1/800-424-8802

- **ENSR REPRESENTATIVE:**

ENSR/WESTMONT, IL		
- JOHN ANGELO, RHSM	708/887-1700	X 364
	708/506-1327	(HOME)
ENSR/ACTON, MA		
- KEVIN POWERS, CHSM	508/635-9500	X 4558
	207/439-4009	(HOME)

- AGENCY REPRESENTATIVE:

- CLIENT REPRESENTATIVE:

NEAREST PHONE: Use a portable telephone or locate a nearby telephone.

QUALITY ASSURANCE PLAN

for

Meter Site Remedial Activities

Prepared for
Northern Natural Gas Company
Minneapolis, Minnesota

CONTENTS

CONTENTS
(Cont'd)

LIST OF TABLES

LIST OF FIGURES

1.0 PROJECT DESCRIPTION

This project involves completing site remediation at gas meter stations on the Northern Natural Gas Company system. The remediation includes:

- Delineating the area for remedial action
- Removing free mercury
- Excavating soils that contain mercury
- Vacuuming dust containing mercury
- Stockpiling excavated soils
- Screening the excavation to determine if additional excavation is required
- Collecting Target Cleanup Level (TCL) verification samples
- Collecting stockpile samples for disposal evaluation

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

Figure 2-1 shows the organization for this project.

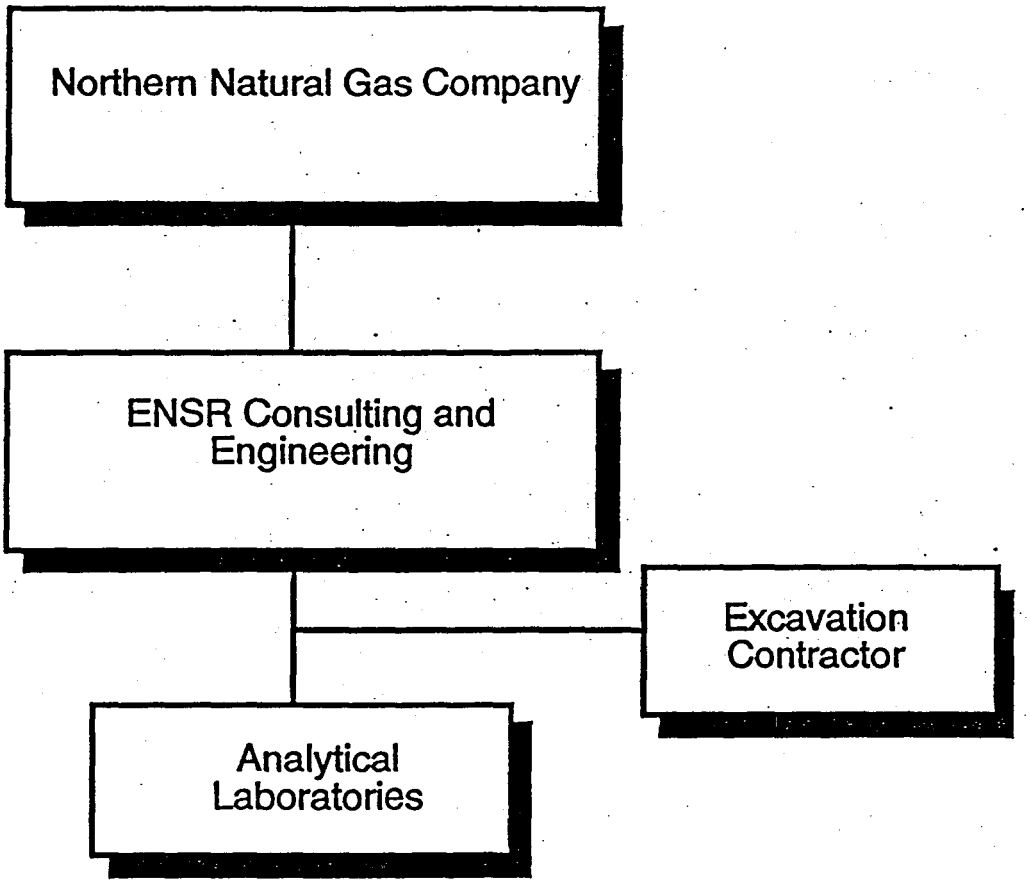
ENSR will be responsible for:

- Coordinating project subcontractor activities
- Collecting soil samples for screening and laboratory analysis
- Ensuring compliance with the provisions of the Work Plan, the QAPP, and the Health and Safety Plan (HASP)

The various project subcontractors will be responsible for completing their assigned duties in compliance with the Work Plan, the QAPP, and HASP.

FIGURE 2-1

Project Organization



ENSR™
Consulting and Engineering

Figure 2-1
Project Organization
Northern Natural Gas Company

DRAWN: KSH	DATE: 9/2/93	PRJ. NO.: 6792-072-201

3.0 QUALITY ASSURANCE OBJECTIVES

The purpose of this QAPP is to provide internal procedures of control and review so that results generated through combined field and laboratory efforts accurately fulfill the Data Quality Objectives (DQOs) established for the Field Sampling Program. The DQOs ensure that the data will be gathered or developed in accordance with procedures appropriate for its intended use, and that data so gathered will be of known and documented quality so as to be able to withstand scientific and legal scrutiny.

3.1 Data Quality Objectives

DQOs are qualitative and quantitative statements that specify the quality of the data required to support decisions made during remedial activities and are based on the end uses of the data to be collected. There are five analytical levels that address various data uses and the quality assurance/quality control (QA/QC) effort and methods required to achieve the desired level of quality. These levels are:

Level I - Field Screening. This level is characterized by the use of portable instruments which can provide real-time data to assist in the optimization of sampling point locations and for health and safety support. Results are often not compound specific and are not quantitative.

Level II - Field Analysis. This level is characterized by the use of portable analytical instruments which can be used on-site or in mobile laboratories stationed near a site. Depending on the type of contaminants, sample matrix and personnel skills, qualitative and quantitative data can be obtained.

Level III - Laboratory Analysis. Level III analyses may or may not use CLP procedures, but do not utilize the validation or documentation procedures required of CLP Level IV analysis.

Level IV - CLP Routine Analytical Services (RAS). This level is characterized by rigorous QA/QC protocols and documentation and provides qualitative and quantitative analytical data.

Level V - Non-standard methods. Analyses which may require method modification and/or development. CLP Special Analytical Services (SAS) are considered Level V.

3.2 Laboratory Objectives

The quality of a data set is measured by certain characteristics of the data, namely: Precision, Accuracy, Representativeness, Completeness and Comparability (PARCC). These parameters are discussed below:

3.2.1 Precision and Accuracy

Field and laboratory precision and accuracy performance can affect the attainment of project objectives, particularly when compliance with established criteria is based on laboratory analysis of environmental samples.

Analytical precision and accuracy will be evaluated upon receipt of the laboratory data. Analytical precision will be measured as the relative standard deviation of the data from the laboratory (internal) duplicates. Analytical accuracy measures the bias as the percent recovery from matrix spike and matrix spike duplicate samples. Environmental Protection Agency (EPA) SW 846 criteria and action limits will be applied to all analyses.

Field sampling precision and accuracy are not easily measured. Field contamination, sample preservation, and sample handling will affect precision and accuracy. By following the appropriate SOPs, precision and accuracy errors associated with field activities can be minimized. Field duplicates will be used to estimate field sampling precision and accuracy.

Validity of data with respect to its intended use will be assessed based on laboratory-supplied QA/QC data and protocols routinely employed for validation of analytical 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.

3.2.2 Representativeness

Representativeness describes the degree to which analytical data accurately and precisely define the population being measured. Several elements of the sampling and sample handling process must be controlled to maximize the representativeness of the analytical data (e.g., appropriate number of samples collected, physical state of the samples, site specific factors, sampling equipment, containers, sample preservation and storage, holding times, sample identity, and chain of custody (COC) procedures. The sampling program is designed to provide analytical data that are representative of the contaminant levels existing on the site.

Representativeness of data is also affected by sampling techniques. Sampling techniques are described in the SOPs and summarized in Section 4.0.

3.2.3 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, 95 percent completeness is expected. However, as matrix complexity and heterogeneity increase, completeness may decrease. Where analysis is precluded or where DQOs are compromised, effects on the overall program must be considered. Whether or not any particular sample is critical to the program will be evaluated in terms of the sample location, the parameter in question, the intended data use, and the risk associated with the error.

Critical data points may not be evaluated until all the analytical results are evaluated. If, in the evaluation of laboratory results, it becomes apparent that the data for a specific medium are of limited quality either with respect to the number of samples or to an individual analysis, a subsequent sampling event may be necessary.

For the purposes of this effort, 90 percent is established as the minimum acceptable level of completeness. A data point shall be determined to contribute to the completeness of the data set if the information provided is meaningful, useful, and contributes to the project objectives.

3.2.4 Comparability

One of the objectives of the field sampling effort is to provide analytical data that are characterized by a level of quality that is comparable between sampling points as well as with data collected during subsequent sampling efforts. By specifying the use of standard analytical procedures (e.g., CLP and EPA SW846 methods) and standard field sampling procedures (SOPs), the potential for variables to affect the final data quality have been effectively minimized. Analytical methods for the Work Plan are outlined in Table 6.1.

3.3 Quality Control Samples

The quality control (QC) samples to be collected during the sampling effort are identified below. QC samples include field duplicates or replicates, laboratory duplicates or replicates, trip blanks and field blanks. Each type of field quality control sample will undergo the same preservation, holding time, analysis, reporting, and validation as the field samples. Field QC samples will be collected in accordance with EPA methodology. Table 3-1 presents a summary of samples to be collected for this field program.

3.3.1 Field Blanks

Field blanks will be collected at a rate of one per day.

3.3.2 Decontamination Blanks

Decontamination blanks will be collected at a rate of 1 per 20 decontamination events.

3.3.3 Field Duplicates

Field duplicate results are used to assess the combined field and laboratory precision. The results are anticipated to exhibit more variability than laboratory duplicates, which measure only laboratory precision. The field duplicate sample should be clearly designated on the COC form. Field duplicates include replicate and collocated samples. Replicates are collected by mixing a double portion of the required volume of sample and dividing it into two sample containers. Collocated samples are two discrete samples obtained at the same sample point. Field duplicate samples will be collected at a frequency of one per 20 samples. Field duplicate results will be compared to assess sample homogeneity, handling, shipping, storage, preparation and analysis.

TABLE 3-1

Sample Summary Table

Parameter	No. of Samples	No. of Duplicates
Mercury	up to 180	up to 18

4.0 SAMPLING PROCEDURES

This section describes the special precautions that will be taken to ensure that each sample collected is representative of the conditions at that location and that the sample is neither altered nor contaminated by the sampling and handling procedure. Table 4-1 lists the ENSR Standard Operating Procedures (SOPs) applicable to this project. These SOPs are included in Appendix C.

4.1 Sampling Plan

This section describes the procedures that will be used to ensure that each sample collected is representative of the conditions at that location, and that the sample is neither altered nor contaminated by the sampling and handling procedure. Table 4-1 lists the ENSR Standard Operating Procedures (SOPs) applicable to this project. These SOPs are included in Appendix C.

4.2 Field Screening Samples

This section describes the methods for collecting screening soil samples from the excavation. The results of the screening will be used to determine the need for additional soil excavation.

After the lift of soil has been removed, soil sample(s) will be collected for mercury vapor screening. The screening procedure will be:

- Using a disposable plastic scoop, collect approximately 4 ounces of soil from the excavation or backhoe (depending on the depth of the excavation) and place the soil in a 1-quart plastic ziplock bag
- Knead the bag to loosen the soil
- Seal the plastic bag and warm the soil to at least 60°F for at least five minutes
- Open the bag to a minimum opening size and screen the sample with the MVA (Jerome 431 or 411)

TABLE 4-1

Standard Operating Procedures List

Number	Title
7110	Surface Soil Sampling
7115	Subsurface Soil Sampling
7315	Operation/Calibration of HNu Photoionization Analyzer
7510	Packaging and Shipment of Samples
7600	Decontamination of Equipment

- Record the location and depth of the sample and the MVA reading on the Remedial Activities Worksheet

- One screening sample will be collected from each 16-square foot area of the excavation, with a minimum of two screening samples collected from the excavation.

- Discard the bagged sample in the excavated soils stockpile

4.3 Verification Samples

One verification sample will be collected for laboratory analysis for every 16-square foot area of the excavation. However, no more than three verification samples will be collected from an excavation. The sample collection procedure will be:

- Divide the excavation into equal size areas, if the total area is greater than 16 square feet

- Using a disposable plastic spoon, fill a clean 4-ounce sample jar with soil from each area from the bottom of the excavation

- Record the location and depth of the soil sample on the Remedial Activities Worksheet

- Label, package and ship the sample(s) to the laboratory for analysis

All verification samples will be analyzed for total mercury. Composite samples will not be collected for soil cleanup verification.

4.4 Stockpiled Soil

One composite soil sample will be collected from stockpiled soil for laboratory analysis. The sample will be analyzed for TCLP mercury and total mercury. Procedures for collecting the composite are:

- Collect a total of five equal aliquots of soil using a disposable plastic scoop from the stockpile
- Place the aliquots into a glass bowl and mix the sample thoroughly
- Fill a 4-ounce glass jar for submittal to the laboratory.
- Label, package, and ship the sample to the analytical laboratory.

4.5 Decontamination

All sample collection equipment will be fully decontaminated before sampling and between sampling events in accordance with ENSR SOP 7600 (Decontamination of Equipment). The procedure for decontaminating the compositing bowl is:

- Wash with a non-phosphate detergent and tap water
- Rinse with distilled or deionized water
- Rinse with a 10 percent nitric acid solution
- Rinse with distilled or deionized water
- Disperse the decontamination fluids on the stockpiled soil
- Collect all trash, gloves, and scoops for off-site disposal as solid waste

No other sampling equipment is expected to be decontaminated.

5.0 SAMPLE CUSTODY

Successful analysis depends on the capability to produce valid data and to demonstrate such validity. In addition to proper sample collection and handling, appropriate sample identification and COC procedures are necessary to help support the validity of the data.

5.1 Sample Containers and Preservation

Sampling kits will be supplied by the laboratory. The sampling kits will be packaged in coolers and will include the appropriate sample containers, preservatives, COC records and trip blanks. Decontamination solvents and deionized water should also be obtained from the laboratory. Table 5-1 summarizes sample volumes, container types, preservation requirements and holding times.

Once a sample has been collected, steps will be taken to preserve the chemical and physical integrity of the sample during transport and storage prior to analysis. Sample preservation will follow the procedures outlined in the analytical methods listed in Table 5-1.

5.2 Remedial Activity Worksheets

Each sampling team will maintain detailed Remedial Activity Worksheets for recording information that is not recorded on sample log sheets or other documentation. All entries in this log will be accompanied by the signature of the author and the date of entry, the project name and number and the location. At the beginning of each sampling day, the designated team member will start the daily log by entering the date and time, the locations to be sampled, weather conditions, field team present and any potential problems.

5.3 Sample Identification

As samples are collected and containerized in the field, the following information will be recorded on each label:

TABLE 5-1

Sample Container Preservation and Holding Time Requirements (Individual)

Parameter	Container	Preservation	Holding Time	
			Soil	Liquid
Mercury	4-oz. glass w/Teflon liner	4°C	28 days	

- Project identification
- Sampling site identification
- Sample identification
- Data and time of sample collection
- Analyses to be performed
- Initials of the sample collector

Each sample will be identified by a unique alphanumeric code. All information necessary to identity each sample, and the corresponding sample code, will be recorded in the field notebook. Sampling locations will be recorded on a scale map of the site.

After collection, preservation, and labeling, the sample will be maintained under the COC procedures discussed below.

5.4 Chain-of-Custody Procedures

COC procedures are intended to maintain and permanently document sample possession from the time of collection to disposal, in accordance with federal guidelines. A sample is considered to be under a person's custody if:

- It is in that person's possession
- It is in that person's view, after being in that person's possession
- It was in that person's possession and was locked up by them to prevent tampering
- It has been placed in a designated secure area by that person

The COC record will be initiated in the field for all samples collected. At a minimum, the following information shall be recorded on the form:

- Signature of custodian
- Date of signature
- Sampling site identification
- Sampling date and time
- Sample identification
- Preservation, if any
- Sample description (type and quantity)

- Analyses to be performed
- COC tape number
- Method of shipment and courier name(s) in the remarks box, if applicable

The initial custodian will: sign the COC record; enter the date, time, and COC seal numbers; tear off and file the back copy with the appropriate sampling log; and place the remainder in the shipping container with the samples. The sample documentation will be placed in a sealed plastic bag and taped to the inside lid of the cooler. Each kit will be sealed with COC tape, which is signed and dated by the sample custodian.

The laboratory sample custodian will receive and sign the form for the laboratory, and record the date, time, and COC tape numbers. The laboratory log-in record will explicitly state the condition of the COC seal, any evidence of damage, whether the seal is air-tight, and the completeness of accompanying records. After inspection, each sample will be logged in and assigned a unique laboratory sample identification number. In addition, the following information will be entered in the logging system for each sample:

- Field sample identification number
- Laboratory sample identification number
- Date received
- Project name and number
- Collection date
- Sample type
- Condition of sample
- Sample pH
- Temperature of sample cooler (if samples were stored on ice)
- Analyses to be performed
- Assigned storage location

After sample log-in is complete, a copy of the COC record, with laboratory sample numbers and notations of any discrepancies, will be sent to the Project Manager (PM) to be entered into the project file. The original COC form will be filed in the laboratory with the shipper's waybill or airbill attached. Any problems or discrepancies will be reported immediately to the ENSR Field Supervisor and/or the Laboratory Analytical Coordinator.

5.5 Sample Handling and Shipment

Following collection, samples that require cooling will be placed on ice in coolers for transport to the laboratory. Samples will be packaged to prevent damage in accordance with ENSR SOP 7510 (Packaging and Shipment of Samples). Samples will be hand-carried or shipped to the laboratory via overnight commercial carrier to ensure that sample holding times are met (Table 5-1). Samples that require cooling will be cooled to 4°C from the time of collection until commencement of the analytical procedure. Samples collected for physical parameter analysis do not require cooling.

6.0 CALIBRATION PROCEDURES

6.1 Field Instrumentation

All field measurement equipment will be operated and maintained in accordance with ENSR SOPs (Table 4-1) and manufacturers instructions. The MVA analyzers will be calibrated daily prior to use.

The Field Supervisor will be responsible for the issuance and control of field measurement equipment. All field calibrations will be documented in the field notebook. Equipment problems, including the corrective action taken, will also be noted in the field records.

6.2 Laboratory Instrumentation

Calibration is required to ensure that the analytical system is operating correctly and functioning at the proper sensitivity to meet established detection limits. The analytical methodologies listed in Table 6-1 will be used to analyze samples collected for this project. These methodologies include specific instrument calibration procedures that will be followed by the laboratory. If an instrument has not been properly calibrated and the quality of the data has been adversely affected, the corrective actions outlined in Section 13.0 will be implemented.

TABLE 6-1

Analytical Methods

Parameter	Method
Mercury cold vapor	SW846 7470 flame

7.0 ANALYTICAL PROCEDURES

The following is a description of the overall quality control program that will be incorporated into the analyses of samples associated with this project. General laboratory quality control procedures, such as balance calibration and maintenance and glassware cleaning will be described in the laboratories SOPs.

7.1 Sample Analysis

Selection of the analytical parameters of interest for each sampling site has been based on prior site activities and suspected or known contaminants.

All analytical procedures will be in accordance with the approved EPA methodologies and will meet DQO Level III. Specific quality control procedures will explicitly follow the approach defined in these methods.

7.2 Documentation

All analytical results will be thoroughly documented in reproduction quality and on computer media for ease of data transfer, if possible. Duplicate records will be kept whenever practical.

For each analytical result, including all blanks, spikes, calibration standards and samples; supporting documentation will be maintained that includes at least the following:

- Complete chain-of-custody records for the sample
- Records of traceability to Certified Reference Materials for all analytical standards, spikes, and balance calibration weights.
- Records of all sample preparation and analysis, including weights and volumes of samples, solvents, reagents, dilution ratios, standards, etc. These records should be in laboratory notebooks and/or on formalized data sheets, and should undergo review by a supervisor or quality control officer

- Documentation of all manual calculations in reproduction quality
- Copies of all calibrant calculations, plotted concentration calibration curves and computer derived quantitation reports
- The accompanying package of sample tracking records, analyst logbook pages, computer printouts, raw data summaries and instrument logbook pages.

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

8.1 Laboratory Data Review

The process of reviewing analytical results and documentation against established criteria is a critical step. The Laboratory Quality Control Coordinator will be responsible for performing data review in the laboratory.

The precision and accuracy of data will be computed and compared to the control limits as part of the data review process. Precision is determined from the analytical results of duplicate samples. Accuracy is computed from spike recoveries.

8.2 Analytical Records

Reports of analyses will be delivered to the project manager within the time period requested at the time of sample delivery.

All analytical results will be reported following the standard format presented in the current SW 846 methods.

A report narrative should accompany each submission, summarizing the contents, results and all relevant circumstances of the work. The following data deliverables are required from the laboratory:

Sample Identification

- Date and time collected - Chain of Custody
- Date extracted and/or digested
- Date and time analyzed
- Chain of Custody documentation; including sample log-in tracking information

Sample Results

- Sample results; including integration (raw) data, sample result summary sheets (Form 1) and chromatograms
- Field duplicate results; including integration (raw) data, sample result summary sheets (Form 1) and chromatograms
- Laboratory blanks, field blanks and trip blanks results; including integration (raw) data, sample result summary sheets (Form 1) and chromatograms
- Matrix spike/matrix spike duplicate and/or blank spike results; including integration (raw) data, sample result summary sheets (Form 1) and chromatograms
- MS/MSD recoveries
- Surrogate recoveries for all samples, blanks and duplicates

Supporting QA/QC

- Methodology
- Method detection limits, instrument detection limits
- Initial and continuing calibration summaries; including standard chromatogram and integration tables
- Percent solids for soils, sludges and sediments
- Cleanup procedures used, if applicable
- Laboratory QA/QC procedures and checklists

8.3 Data Validation

Data validation is a process of review of the analytical results and documentation against established criteria. Validation of all data generated as part of this field program will be performed in accordance with EPA guidelines. EPA guidelines are presented in the following documents:

- National Functional Guidelines for Organic Data Review, U.S. EPA draft, December 1990, Revised June, 1991.
- Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, U.S. EPA; February 1, 1988, modified November 1, 1988.
- Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, U.S. EPA; June 13, 1988, modified February 1989.

Validation of data generated from non-CLP methods will involve thorough review of method specified QA/QC criteria, including method blanks, field blanks, instrument calibration, spikes and duplicates.

Validation will be performed by ENSR and will include a QA assessment to assess that the proper analytical and QA/QC protocols were followed by the laboratory. Data qualifiers will be reviewed by the data validator and specific data validation qualifiers will be added to data spreadsheets.

9.0 INTERNAL QUALITY CONTROL CHECKS

QC samples will be collected in the field to assess sample contamination, precision, and accuracy. The types and frequency of QC samples that will be prepared during this field program are discussed in Section 3.3. A summary of the QC samples to be collected during this field program is presented in Table 3-1.

Internal laboratory QC checks include matrix spike and matrix spike duplicate analysis, sample duplicate analysis, method blank analysis, and system monitoring compounds (surrogate) recoveries. Laboratory QC procedures will be performed in accordance with EPA requirements.

9.1 Method Blanks

Method or preparation blanks are generated within the laboratory during the processing of the actual samples. These blanks are processed using the same reagents and procedures and at the same time as the actual samples which are being monitored. Contamination found in the preparation blank would indicate that similar contamination found in the samples may have been introduced in the laboratory and is not actually present in the original samples. Method blanks will be prepared and analyzed for VOCs at a frequency of one per analytical batch, or one per 12-hour analysis period, whichever is greater. Method blanks will be prepared and analyzed for all other samples at a frequency of one per 20 samples or one per day, whichever is greater.

9.2 Laboratory Duplicates

Duplicate samples prepared in the laboratory account for analytical variability only. Laboratory duplicates are prepared by thoroughly mixing and splitting duplicate samples and analyzing the resulting samples following the same procedures.

For organic analyses, the laboratory duplicates are analyzed as field duplicates and matrix spike/matrix spike duplicates, as discussed in Section 3.3.3. Assessment of duplicate results will be consistent with EPA guidelines.

For inorganic analyses, laboratory duplicates will be analyzed from each group of samples of a similar matrix type and concentration. Laboratory duplicate results will be assessed in accordance with EPA guidelines.

9.3 Matrix Spikes and Matrix Spike Duplicates

Matrix spikes are prepared by adding a known quantity of analyte into an actual field sample. The matrix spike is prepared and processed as specified in the cited methods (Table 6-1). Recovery of the spike reflects the ability to accurately determine the quantity of the analyte in that particular sample.

Matrix spike results are expressed in terms of percent recoveries. The percent recovery is obtained by dividing the amount recovered by the amount spiked and multiplying the quotient by 100. Matrix spike recoveries must fall within the established control limits specified in the cited methods.

Matrix spike duplicates are identical to matrix spikes. Another aliquot of the same field sample used for the matrix spike is fortified with an identical quantity of analyte and processed in an identical manner. In addition to providing a measure of the accuracy of the determination, the results of the matrix spike and matrix spike duplicate provide a measure of the precision of the determinations. The precision is expressed as the relative percent difference (RPD) and is calculated by dividing the difference between determinations by the average value and multiplying the quotient by 100. RPDs must fall within the established control limits specified in the cited methods.

For organic analyses, samples for matrix spike/matrix spike duplicate analyses will be collected at a frequency of one per every ten samples. For all other analyses, samples for matrix spikes will be collected at a frequency of one per every twenty samples or one per sample batch, whichever is more frequent.

9.4 System Monitoring Compounds

System monitoring compounds (surrogates) are added to each organic sample, blank, matrix spike and matrix spike duplicate prior to extraction and/or analysis. The purpose of the system monitoring compounds (surrogates) is to evaluate the preparation and analysis of the samples.

System monitoring compound (surrogate) recoveries are calculated and assessed in accordance with specified method criteria.

10.0 SYSTEMS AND PERFORMANCE AUDITS

System audits will be performed to evaluate all components of the measurement system in order to assure that work is being implemented in accordance with the approved project plan and in an overall satisfactory manner. Systems audits should include an evaluation of both field and laboratory QC procedure implementation. Systems audits are performed prior to or shortly after systems are operational; however, such audits should be performed on a regularly-scheduled basis during the project.

Performance audits are an assessment of project-specific monitoring activities in the field and in the laboratory. These audits should focus on actual QC activities of the data collection system and should include an evaluation of:

- Sample collection activities
- Sample analysis activities
- Equipment maintenance and calibration
- Decontamination protocols
- Sample containers, preservation techniques and sample COC
- QC sample collection

Performance audits should be performed periodically throughout the project.

Audit reports will be documented by the QA Manager and included in the project files.

11.0 PREVENTIVE MAINTENANCE

Field measurement equipment will be maintained in accordance with ENSR SOPs and manufacturer's instructions. The instrument operator is responsible for ensuring that equipment is operating properly prior to use. Any problems encountered while operating the instrument will be documented in the filed notebook, including a description of the symptoms and corrective actions taken. Use of the instrument will not be resumed until the problem is resolved.

Preventive maintenance for field instrumentation will be performed according to manufacturer's instructions and applicable ENSR SOPs.

12.0 DATA ASSESSMENT PROCEDURES

The data validation procedures will be used by the Data Validator to assess duplicate, spike, and blank samples which have been submitted to the analytical laboratory from the field or generated internally by the laboratory in accordance with this QA/QC Plan. The purpose of implementing these procedures is to verify that the chemical data generated during the project are accurate, precise, and complete and are therefore representative of Site conditions. The format for QC data assessment and reporting is presented below.

12.1 Procedures for Assessing Data Accuracy, Precision, and Completeness

Chemical data generated from sample analyses will be assessed for accuracy, precision, and completeness for both the analytical laboratory and field sample collection programs. The goal of these programs is to provide data that is representative of the Site. To meet this goal, a combination of statistical procedures and qualitative evaluations will be used to check the quality of the data. Data will not be eliminated from the database based on the results of the statistical analyses. If problems arise and data are found to deviate from previous analyses or surrounding conditions, the data will be annotated. Sample re-collection and re-analysis may be used as a corrective action.

The QA/QC assessment program will evaluate site data based on the types of quality control samples described in Section 3.3 (spikes, blanks, duplicates etc. and summarized below).

12.1.1 Blanks

Blanks will be used to evaluate whether laboratory or field procedures represent a possible source of contamination of the field samples. Trip blanks are QA/QC samples prepared by the laboratory, transferred to the field, and returned to the laboratory for VOC analysis. Field blanks will be prepared by pouring deionized water through the sampling equipment after decontamination and before sample collection. Method blanks are laboratory blanks prepared and analyzed by the laboratory as part of the laboratory QA program.

The procedure for assessing blank samples is as follows:

- Tabulate the blank sample data
- Identify any blank samples which have detected compounds
- If no compounds are detected in any blank samples, no qualifications are necessary to the data
- If any compounds are found in blank samples, the compound(s) and concentration(s) will be reported and the field data for that sample delivery group will be assessed according to U.S. EPA data validation criteria

No data will be removed from the database on the basis of compounds being detected in blank samples. Appropriate qualifications, however, will be made to the data and summarized in the validation report.

12.1.2 Matrix Spike Samples

Spiked samples will be used to evaluate the analytical precision and accuracy of the laboratory. Matrix spike samples for inorganic analyses and matrix spike/matrix spike duplicate samples for organic analyses will be prepared by the laboratory on designated site samples according to the particular methodology specified in Table 6-1.

Matrix spikes and matrix spike duplicates (MS/MSDs) will be assessed on the basis of percent recovery (%R). The formula for calculation of %R is as follows:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

SSR = Spiked Sample Results
SR = Sample Result
SA = Spike Amount

MS/MSD recoveries must fall within the established control limits specified in the cited methods.

12.1.3 Duplicate Samples

Duplicate samples will be used to evaluate the analytical precision of the laboratory. Field duplicate preparation and analysis is discussed in Section 4.3.3.1. Laboratory duplicate preparation and analysis is discussed in Section 4.9.2.

Duplicate samples will be compared on the basis of RPD. The formula for calculation of RPD is as follows:

$$RPD = \frac{Sample\ A - Sample\ B}{Average\ of\ Sample\ A + B} \times 100$$

Duplicate analyses must have a RPD less than the established control limits specified in the cited methods.

12.2 Completeness

Completeness is the adequacy in quantity of valid measurements to ensure accurate interpretation and to meet the needs of the sampling and analysis program. Valid measurements will be determined through the examination of project documentation and through the outcome of the previous assessment criteria. Completeness will be addressed by ensuring that valid results are achieved, based upon all of the above criteria, for 90 percent of the samples analyzed. Overall completeness for the collected sample data will be calculated according to the following equation:

$$\%Completeness = \frac{No.\ of\ Valid\ Results}{No.\ of\ Expected\ Results} \times 100$$

Analytical data that fall outside the control limits will be qualitatively evaluated. This evaluation will focus on historic variations in concentration, whether problems arise for one particular compound or random compounds, and whether the problem is limited to one or several sampling locations or wells, etc. If data quality problems arise, the analytical data will be annotated in accordance with data validation guidelines and the laboratory will be notified for corrective action, as appropriate.

13.0 CORRECTIVE ACTION

The QA program will enable problems to be identified, controlled, and corrected. Potential problems may involve nonconformance with the SOPs and/or analytical procedures established for the project or other unforeseen difficulties. Any person identifying an unacceptable condition will notify the PM. The PM, with the assistance of the project analytical coordinator, will be responsible for developing and initiating appropriate corrective action and verifying that the correction action has been effective. Corrective actions may include resampling and/or reanalysis of samples or modifying project procedures.

14.0 QUALITY ASSURANCE REPORTS/DOCUMENTS

At the completion of field activities, the Field Supervisor shall submit all field records, data, field notebooks, the site logbook, COC receipts, sample collection data log sheets, and health and safety records and sheets to the PM. The PM shall ensure that these materials are properly labelled, organized, and entered into the project file.

All data and correspondence associated with this project shall be maintained in the project files.

STANDARD OPERATING PROCEDURE

Title: Surface Soil Sampling

Date: 1st Qtr 1
Number: 7110
Revision: 1

1.0 General Applicability

This SOP describes the methods used for obtaining surface soil samples for physical analysis or quality/chemical analysis. This SOP also describes the procedures for using the various types of sampling equipment, which include shovels, trowels, and hand augers. The equipment may be constructed of special materials (for example, stainless steel, inert plactics) according to specific project requirements.

2.0 Equipment Descriptions:

2.1 shovel - long or short handle type. Used for penetrating the upper surface and/or obtaining soil samples directly.

2.2 trowel - basic garden variety, which resembles a small shovel. Constructed of steel or polypropylene (plastic)*. The blade of a trowel is generally flat and 5 to 6 inches in length. A scoop (blade has curved edges versus flat) may be substituted if necessary. Both can be purchased with volume calibrations.*

2.3 Hand auger - This tool consists basically of a short spiral-bladed metal rod (Auger) attached to a handle. Clockwise rotation of the T handle initiates the cutting process. Most of the loose soil is discharged upwards as the auger moves downwards. However, if the soil is cohesive some of it will stick to the auger flight providing a collectable sample at a measurable depth. Samples of surface soil can also be collected using a tube sampler which will be attached to the end of the auger rods and advanced into the soil to extract a sample.

3.0 Responsibilities

The project geologist/engineer will be responsible for the proper use and maintenance of all types of equipment used for obtaining surface soil samples; and the collection, labelling, handling and storage of all samples until further chain of custody procedures are undertaken.

4.0 Supporting Materials

- Sample containers/Labels
- Sample Logs/Boring Logs
- Decontamination materials (if required)*
- Field notebook
- Six-foot folding rule or tape measure for depth measurement

*Requirements for inert materials, decontamination, or calibrated sampling tools may be required depending upon the purpose of the sampling. These requirements will be detailed in a project-specific sampling plan.

STANDARD OPERATING PROCEDURE

Title: Surface Soil Sampling

Date: 1st Qtr 198
Number: 7110
Revision: 1

5.0 Method or Protocol

5.1 General Procedures

Specific sampling equipment and methodology will be dictated by the characteristics of the soil to be sampled, the type of soil samples required by the project and the analytical procedures to be employed. Soil samples obtained at the surface may be collected using a shovel or trowel. The type of analysis requested (e.g., grain-size distribution, physical, chemical) may require specific soil amounts or the use of specialized sampling equipment. Sampling to obtain uniform coverage within a specified area will require the use of an area grid. These considerations will be followed based upon specific project requirements defined in the project sampling plan.

A hand auger can be used to extract shallow soil samples up to three (3) feet below the surface. Representative samples will be collected directly from the auger flight as it is withdrawn from the ground, or from the tube sampler attached to the end of the rods and advanced into the soil.

The location of sample points will be determined on a project specific basis.

5.2 Standard Procedures

5.2.1 Select the specific sampling location. Construct a sampling grid if necessary. Remove all surface materials that are not to be included samples, for example, rocks, twigs, leaves.

5.2.2 Select type of sampler required to obtain the correct sample. At the surface, use a shovel, trowel or tube sampler; below surface, use a hand auger or tube sampler.

5.2.3 Obtain a sufficient quantity of soil for the desired chemical or physical analyses.

5.2.4 When using the hand auger, auger the hole to the required depth, then slowly remove the auger and collect the soil sample from the auger flight itself at the point corresponding to the required depth. Reinsert and continue augering if deeper samples are required. In addition, a tube sampler can be attached to the auger rods after augering to the desired depth, inserted into the open bore, and then advanced into the deposits at the base of the boring. If sampling is needed in sandy or non-cohesive soil, a shovel may be necessary to obtain samples.

5.2.5 Cap the sample container; attach label; seal container (if analysis for volatile chemical species is anticipated). Record all observations such as visual soil description in a field book or on a surface soil sample log. Complete chain of custody records. Utilize proper storage procedures (see SOP 7510).

5.2.6 Decontaminate the sampler between collection points. Decontamination procedures will be performed as identified in SOP 7600 Decontamination unless otherwise specified.

5.2.7 Initiate proper procedures for delivery of the samples to the designated laboratory. This includes packaging, and shipping with chain of custody forms (see SOP 7510).

6.0 Documentation

Various forms are required to ensure that adequate documentation is made of the sample collection activities. These forms include:

- field log books
- sample logs
- chain of custody forms
- shipping forms

The field book will be maintained as an overall log of all samples collected throughout the study. These documents will be retained in the appropriate project files.

Title: Packaging and Shipment of Samples

1.0 Applicability

This Standard Operating Procedure (SOP) is concerned with procedures associated with the packaging and shipment of samples. Two general categories of samples exist: environmental samples consisting of air, water and soil; and waste samples which include non-hazardous solid wastes and hazardous wastes as defined by 40 CFR Part 261.

2.0 Responsibilities

It is the responsibility of the project manager to assure that the proper packaging and shipping techniques are utilized for each project. The site operations manager shall be responsible for the enactment and completion of the packaging and shipping requirements outlined in the project specific sampling plan. The site operations manager shall be responsible to research, identify and follow all applicable U.S. Department of Transportation (DOT) regulations regarding shipment of materials classified as waste.

3.0 General Method

The objective of sample packaging and shipping protocol is to identify standard procedures which will minimize the potential for sample spillage or leakage and maintain field sampling program compliance with U.S. EPA and U.S. DOT regulations.

The extent and nature of sample containerization will be governed by the type of sample, and the most reasonable projection of the sample's hazardous nature and constituents. The EPA regulations (40 CFR Section 261.4(d)) specify that samples of solid waste, water, soil or air, collected for the sole purpose of testing, are exempt from regulation under the Resource Conservation and Recovery Act (RCRA) when all of the following conditions are applicable:

A. Samples are being transported to a laboratory for analysis;
B. Samples are being transported to the collector from the laboratory after analysis;
C. Samples are being stored (1) by the collector prior to shipment for analyses, (2) by the analytical laboratory prior to analyses, (3) by the analytical laboratory after testing but prior to return of sample to the collector or pending the conclusion of a court case.

Qualification for categories A and B above require that sample collectors comply with U.S. DOT and U.S. Postal Service (USPS) regulations or comply with the following items if U.S. DOT and USPS regulations are found not to apply:

The following information must accompany all samples and will be entered on a sample specific basis on chain of custody records:

- sample collector's name, mailing address and telephone number,
- analytical laboratory's name, mailing address and telephone number,
- quantity of sample,
- date of shipment,
- description of sample, and

in addition, all samples must be packaged so that they do not leak, spill or vaporize.

4.0 General Methods

4.1 Place plastic bubble wrap matting over the base and bottom corners of each cooler or shipping container as needed to manifest each sample.

4.2 Obtain a chain of custody record as shown in Figure 1 and enter all the appropriate information as discussed in Section 3.0 of this SOP. Chain of custody records will include complete information for each sample. One or more chain of custody records shall be completed for each cooler or shipping container as needed to manifest each sample.

4.3 Wrap each sample bottle individually and place standing upright on the base of the appropriate cooler, taking care to leave room for some packing material and ice or equivalent. Rubber bands or tape should be used to secure wrapping, completely around each sample bottle.

4.4 Place additional bubble wrap and/or styrofoam pellet packing material throughout the voids between sample containers within each cooler.

4.5 Place ice or cold packs in heavy duty zip-lock type plastic bags, close the bags, and distribute such packages over the top of the samples.

4.6 Add additional bubble wrap/styrofoam pellets or other packing materials to fill the balance of the cooler or container.

4.7 Obtain two pieces of chain of custody tape as shown in Figure 2 and enter the custody tape numbers in the appropriate place on the chain of custody form. Sign and date the chain of custody tape.

4.8 To complete the chain of custody form enter the type of analysis required for each sample, by container, under the "ANALYSES" section. Under the specific analysis enter the quantity/volume of sample collected for each corresponding analysis.

If shipping the samples where travel by air or other public transportation is to be undertaken, sign the chain of custody record thereby relinquishing custody of the samples. Relinquishing custody should only be performed when directly transmitting custody to a receiving party or when transmitting to a shipper for subsequent receipt by the analytical laboratory. Shippers should not be asked to sign chain of custody records.

4.9 Remove the last copy from the chain of custody record and retain with other field notes. Place the original and remaining copies in a zip-lock type plastic bag and place the bag on the top of the contents within the cooler or shipping container.

4.10 Close the top or lid of the cooler or shipping container and with another person rotate/shake the container to verify that the contents are packed so that they do not move. Improve the packaging if needed and reclose.

When transporting samples by automobile to the laboratory, and where periodic changes of ice are required, the cooler should only be temporarily closed so that reopening is simple. In these cases, chain of custody will be maintained by the person transporting the sample and chain of custody tape need not be used. If the cooler is to be left unattended, then chain of custody procedures should be enacted.

4.11 Place the chain of custody tape at two different locations on the cooler or container lid and overlap with transparent packaging tape. For coolers with hinged covers, if the hinges are attached with screws, chain of custody tape should also be used on the hinge side.

4.12 Packaging tape should be placed entirely around the sample shipment containers. A minimum of one to two full wraps of packaging tape will be placed at at least two places on the cooler. Shake the cooler again to verify that the sample containers are well packed.

4.13 If shipment is required, transport the cooler to an overnight express package terminal or arrange for pickup. Obtain copies of all shipment records as provided by the shipper.

4.14 If the samples are to travel as luggage, check with regular baggage.

4.15 Upon receipt of the samples, the analytical laboratory will open the cooler or shipping container and will sign "received by laboratory" on each chain of custody form. The laboratory will verify that the chain of custody tape has not been broken previously and that the chain of custody tape number corresponds with the number on the chain of custody record. The analytical laboratory will then forward the back copy of the chain of custody record to the sample collector to indicate that sample transmittal is complete.

5.0 Documentation

As discussed in Section 4.0 the documentation for supporting the sample packaging and shipping will consist of chain of custody records and shipper's records. In addition a description of sample packaging procedures will be written in the field log book. All documentation will be retained in the project files following project completion.

0908J

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location	ANALYSES
Project No.	Field Logbook No.	
Sampler: (*Signature*)	Chain of Custody Tape No.	

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample							REMARKS

Relinquished by: (*Signature*)	Date	Time	Received by: (*Signature*)	Date	Time
Relinquished by: (*Signature*)	Date	Time	Received by: (*Signature*)	Date	Time
Relinquished by: (*Signature*)	Date	Time	Received for Laboratory: (*Signature*)	Date	Time
Sample Disposal Method:	Disposed of by: (*Signature*)			Date	Time

SAMPLE COLLECTOR	ANALYTICAL LABORATORY	
ERT - A Resource Engineering Company 696 Virginia Road Concord, MA 01742 617-369-8910		ENSR № 1663

1974-3-84

Figure 1

STANDARD OPERATING PROCEDURE

Title: Decontamination

Date: 1st Qtr 1984
Number: 7600
Revision: 1

1.0 General Applicability

This SOP describes the methods to be used for the decontaminization of all field equipment which becomes potentially contaminated during a sample collection task. The equipment may include split spoons, bailers, trowels, shovels, hand augers, or any other type of equipment used during field activities.

Decontamination is performed as a quality assurance measure and a safety precaution. It prevents cross-contamination between samples and also helps to maintain a clean working environment for the safety of all field personnel involved, including the environment.

Decontamination is mainly achieved by rinsing with liquids which include: soap and/or detergent solutions, tap water, deionized water, and methanol. Equipment will be allowed to air dry after being cleaned or may be wiped dry with chemical free cloths or paper towels if immediate re-use is needed.

The frequency of equipment use, dictates that most decontamination be accomplished at each sampling site between collection points. Waste products produced by the decontamination procedures such as waste liquids, solids, rags, gloves, etc. will be collected and disposed of properly based on the nature of contamination. All cleaning materials and wastes should be stored in a central location so as to maintain control over the quantity of materials used and/or produced throughout the study.

2.0 Responsibilities

It is the primary responsibility of the site operations manager to assure that the proper decontamination procedures are followed and that all waste materials produced by decontamination are properly stored and disposed of.

It is the responsibility of the project safety officer to draft and enforce safety measures which provide the best protection for all persons involved directly with sampling and/or decontamination.

It is the responsibility of any subcontractors (i.e., drilling contractors) to follow the proper, designated decontamination procedures that are stated in their contracts and outlined in the Project Health and Safety Plan.

It is the responsibility of all personnel involved with sample collection or decontamination to maintain a clean working environment and to ensure that any contaminants are not negligently introduced to the environment.

3.0 Supporting Materials

- cleaning liquids: soap and/or detergent solutions, tap water, deionized water, methanol
- personal safety gear (defined in Project Health and Safety Plan)
- chemical-free paper towels
- disposable gloves
- waste storage containers: drums, boxes, plastic bags
- cleaning containers: plastic buckets, galvanized steel pans
- cleaning brushes

4.0 Methods or Protocol for Decontamination

4.1 General Procedures

4.1.1 The extent of known contamination will determine to what extent the equipment needs to be decontaminated. If the extent of contamination cannot be readily determined, cleaning should be done according to the assumption that the equipment is highly contaminated until enough data are available to allow assessment of the actual level of contamination.

4.1.2 Adequate supplies of all materials must be kept on hand. This includes all rinsing liquids and other materials listed in Section 3.0.

4.1.3 The standard procedures listed in the following section can be considered the procedure for full field decontamination. If different or more elaborate procedures are required for a specific project, they will be spelled out in the project work plan. Such variations in decontamination may include following all, just part, or an expanded scope of the decontamination procedure stated herein.

4.2 Standard Procedures

4.2.1 Remove any solid particles from the equipment or material by brushing and then rinsing with available tap water. This initial step is performed to remove gross contamination.

4.2.2 Wash equipment sampler with the soap or detergent solution.

4.2.3 Rinse with tap water

4.2.4 Rinse with deionized water

4.2.5 Rinse with methanol

4.2.6 Repeat entire procedure or any parts of the procedure if necessary

4.2.7 Allow the equipment or material to air dry before re-using

4.2.8 Dispose of any soiled materials in the designated disposal container

5.0 Specific Decontamination Procedures

5.1 Submersible Pump

5.1.1 Applicability

This procedure will be used to decontaminate submersible pumps between ground-water sample collection points and at the end of each day of use.

5.1.2 Materials

- o plastic-nalgene upright cylinder
- o 5-10 gallon plastic water storage containers
- o methanol and dispenser bottle
- o deionized water and dispenser bottle
- o chemical free paper towels

5.1.3.1 During decontamination the submersible pump will be placed on a clean surface or held away from ground.

5.1.3.2 When removing the submersible pump from each well the power cord and discharge line will be wiped dry using chemical-free disposable towels.

5.1.3.3 Clean the upright plastic-nalgene cylinder with first a methanol and then a deionized water rinse, wiping the free liquids after each.

5.1.3.4 Reverse pump backwashing all removable residual water present in the pump tubing. The pump should be shut off as soon as intermittent flow is observed from the reverse discharge.

5.1.3.5 Rinse the stainless steel submersible down hole pump section with a liberal application of methanol and wipe dry.

5.1.3.6 Place the submersible pump section upright in the cylinder and fill the cylinder with tap water, adding 50-100 ml of methanol for every one liter of water.

5.1.3.7 Activate the pump in the forward mode withdrawing water from the cylinder.

5.1.3.8 Continue pumping until the water in the cylinder is pumped down and air is drawn through the pump. At this time air pockets will be observed in the discharge line. Shut off the pump immediately.

5.1.3.9 Remove the pump from the cylinder and place the pump in the reverse mode allowing that all removable water be discharged on to the ground surface as discussed in Step 2.

5.1.3.10 Using the water remaining in the cylinder, rinse the sealed portion of the power chord and discharge tube by pouring the water carefully over the coiled lines.

5.1.3.11 When reaching the next monitoring well place the pump in the well casing and wipe dry both the power and discharge lines with a clean paper towel as the pump is lowered.

5.1.4 Quality Assurance

To assure that decontamination is complete, field blank samples shall be collected using the cleaned submersible pump. These field blanks will be subsequently analyzed for the parameters of interest with respect to the ground water.

The procedure for collecting the field blanks will comprise using the pump to withdraw the tap water used for decontamination, from the plastic cylinder to sample containers. This field blank sample collection procedure shall only be performed after the materials to be used have been decontaminated.

STANDARD OPERATING PROCEDURE

Title: Surface Soil Sampling

Date: 1st Qtr 19
Number: 7110
Revision: 1

1.0 General Applicability

This SOP describes the methods used for obtaining surface soil samples for physical analysis or quality/chemical analysis. This SOP also describes the procedures for using the various types of sampling equipment, which include shovels, trowels, and hand augers. The equipment may be constructed of special materials (for example, stainless steel, inert plactics) according to specific project requirements.

2.0 Equipment Descriptions:

2.1 shovel - long or short handle type. Used for penetrating the upper surface and/or obtaining soil samples directly.

2.2 trowel - basic garden variety, which resembles a small shovel. Constructed of steel or polypropylene (plastic)*. The blade of a trowel is generally flat and 5 to 6 inches in length. A scoop (blade has curved edges versus flat) may be substituted if necessary. Both can be purchased with volume calibrations.*

2.3 Hand auger - This tool consists basically of a short spiral-bladed metal rod (Auger) attached to a handle. Clockwise rotation of the T handle initiates the cutting process. Most of the loose soil is discharged upwards as the auger moves downwards. However, if the soil is cohesive some of it will stick to the auger flight providing a collectable sample at a measurable depth. Samples of surface soil can also be collected using a tube sampler which will be attached to the end of the auger rods and advanced into the soil to extract a sample.

3.0 Responsibilities

The project geologist/engineer will be responsible for the proper use and maintenance of all types of equipment used for obtaining surface soil samples; and the collection, labelling, handling and storage of all samples until further chain of custody procedures are undertaken.

4.0 Supporting Materials

- Sample containers/Labels
- Sample Logs/Boring Logs
- Decontamination materials (if required)*
- Field notebook
- Six-foot folding rule or tape measure for depth measurement

*Requirements for inert materials, decontamination, or calibrated sampling tools may be required depending upon the purpose of the sampling. These requirements will be detailed in a project-specific sampling plan.

5.0 Method or Protocol

5.1 General Procedures

Specific sampling equipment and methodology will be dictated by the characteristics of the soil to be sampled, the type of soil samples required by the project and the analytical procedures to be employed. Soil samples obtained at the surface may be collected using a shovel or trowel. The type of analysis requested (e.g., grain-size distribution, physical, chemical) may require specific soil amounts or the use of specialized sampling equipment. Sampling to obtain uniform coverage within a specified area will require the use of an area grid. These considerations will be followed based upon specific project requirements defined in the project sampling plan.

A hand auger can be used to extract shallow soil samples up to three (3) feet below the surface. Representative samples will be collected directly from the auger flight as it is withdrawn from the ground, or from the tube sampler attached to the end of the rods and advanced into the soil.

The location of sample points will be determined on a project specific basis.

5.2 Standard Procedures

5.2.1 Select the specific sampling location. Construct a sampling grid if necessary. Remove all surface materials that are not to be included samples, for example, rocks, twigs, leaves.

5.2.2 Select type of sampler required to obtain the correct sample. At the surface, use a shovel, trowel or tube sampler; below surface, use a hand auger or tube sampler.

5.2.3 Obtain a sufficient quantity of soil for the desired chemical or physical analyses.

5.2.4 When using the hand auger, auger the hole to the required depth, then slowly remove the auger and collect the soil sample from the auger flight itself at the point corresponding to the required depth. Reinsert and continue augering if deeper samples are required. In addition, a tube sampler can be attached to the auger rods after augering to the desired depth, inserted into the open bore, and then advanced into the deposits at the base of the boring. If sampling is needed in sandy or non-cohesive soil, a shovel may be necessary to obtain samples.

5.2.5 Cap the sample container; attach label; seal container (if analysis for volatile chemical species is anticipated). Record all observations such as visual soil description in a field book or on a surface soil sample log. Complete chain of custody records. Utilize proper storage procedures (see SOP 7510).

5.2.6 Decontaminate the sampler between collection points. Decontamination procedures will be performed as identified in SOP 7600 Decontamination unless otherwise specified.

5.2.7 Initiate proper procedures for delivery of the samples to the designated laboratory. This includes packaging, and shipping with chain of custody forms (see SOP 7510).

6.0 Documentation

Various forms are required to ensure that adequate documentation is made of the sample collection activities. These forms include:

- field log books
- sample logs
- chain of custody forms
- shipping forms

The field book will be maintained as an overall log of all samples collected throughout the study. These documents will be retained in the appropriate project files.

SURFACE SOIL SAMPLE LOG

PROJECT NO. _____ PROJECT LOCATION _____

SAMPLE POINT NO. _____

DATE _____ TIME _____

SAMPLE POINT DESCRIPTION/DESIGNATION _____

_____

SAMPLE COLLECTION:

EQUIPMENT USED _____

NO. OF SAMPLES COLLECTED _____ CONTAINER SIZE _____

SAMPLE NO.	DEPTH	TYPE OF MATERIAL	ANALYSIS REQUEST

COMMENTS _____

_____

_____

LAB DESIGNATION _____

SHIPPING BOX NO. _____

COLLECTOR'S NAME _____

0887J

Title: Packaging and Shipment of Samples

1.0 Applicability

This Standard Operating Procedure (SOP) is concerned with procedures associated with the packaging and shipment of samples. Two general categories of samples exist: environmental samples consisting of air, water and soil; and waste samples which include non-hazardous solid wastes and hazardous wastes as defined by 40 CFR Part 261.

2.0 Responsibilities

It is the responsibility of the project manager to assure that the proper packaging and shipping techniques are utilized for each project. The site operations manager shall be responsible for the enactment and completion of the packaging and shipping requirements outlined in the project specific sampling plan. The site operations manager shall be responsible to research, identify and follow all applicable U.S. Department of Transportation (DOT) regulations regarding shipment of materials classified as waste.

3.0 General Method

The objective of sample packaging and shipping protocol is to identify standard procedures which will minimize the potential for sample spillage or leakage and maintain field sampling program compliance with U.S. EPA and U.S. DOT regulations.

The extent and nature of sample containerization will be governed by the type of sample, and the most reasonable projection of the sample's hazardous nature and constituents. The EPA regulations (40 CFR Section 261.4(d)) specify that samples of solid waste, water, soil or air, collected for the sole purpose of testing, are exempt from regulation under the Resource Conservation and Recovery Act (RCRA) when all of the following conditions are applicable:

A. Samples are being transported to a laboratory for analysis;
B. Samples are being transported to the collector from the laboratory after analysis;
C. Samples are being stored (1) by the collector prior to shipment for analyses, (2) by the analytical laboratory prior to analyses, (3) by the analytical laboratory after testing but prior to return of sample to the collector or pending the conclusion of a court case.

Qualification for categories A and B above require that sample collectors comply with U.S. DOT and U.S. Postal Service (USPS) regulations or comply with the following items if U.S. DOT and USPS regulations are found not to apply:

The following information must accompany all samples and will be entered on a sample specific basis on chain of custody records:

- sample collector's name, mailing address and telephone number,
- analytical laboratory's name, mailing address and telephone number,
- quantity of sample,
- date of shipment,
- description of sample, and

in addition, all samples must be packaged so that they do not leak, spill or vaporize.

4.0 General Methods

4.1 Place plastic bubble wrap matting over the base and bottom corners of each cooler or shipping container as needed to manifest each sample.

4.2 Obtain a chain of custody record as shown in Figure 1 and enter all the appropriate information as discussed in Section 3.0 of this SOP. Chain of custody records will include complete information for each sample. One or more chain of custody records shall be completed for each cooler or shipping container as needed to manifest each sample.

4.3 Wrap each sample bottle individually and place standing upright on the base of the appropriate cooler, taking care to leave room for some packing material and ice or equivalent. Rubber bands or tape should be used to secure wrapping, completely around each sample bottle.

4.4 Place additional bubble wrap and/or styrofoam pellet packing material throughout the voids between sample containers within each cooler.

4.5 Place ice or cold packs in heavy duty zip-lock type plastic bags, close the bags, and distribute such packages over the top of the samples.

4.6 Add additional bubble wrap/styrofoam pellets or other packing materials to fill the balance of the cooler or container.

4.7 Obtain two pieces of chain of custody tape as shown in Figure 2 and enter the custody tape numbers in the appropriate place on the chain of custody form. Sign and date the chain of custody tape.

4.8 To complete the chain of custody form enter the type of analysis required for each sample, by container, under the "ANALYSES" section. Under the specific analysis enter the quantity/volume of sample collected for each corresponding analysis.

If shipping the samples where travel by air or other public transportation is to be undertaken, sign the chain of custody record thereby relinquishing custody of the samples. Relinquishing custody should only be performed when directly transmitting custody to a receiving party or when transmitting to a shipper for subsequent receipt by the analytical laboratory. Shippers should not be asked to sign chain of custody records.

4.9 Remove the last copy from the chain of custody record and retain with other field notes. Place the original and remaining copies in a zip-lock type plastic bag and place the bag on the top of the contents within the cooler or shipping container.

4.10 Close the top or lid of the cooler or shipping container and with another person rotate/shake the container to verify that the contents are packed so that they do not move. Improve the packaging if needed and reclose.

When transporting samples by automobile to the laboratory, and where periodic changes of ice are required, the cooler should only be temporarily closed so that reopening is simple. In these cases, chain of custody will be maintained by the person transporting the sample and chain of custody tape need not be used. If the cooler is to be left unattended, then chain of custody procedures should be enacted.

4.11 Place the chain of custody tape at two different locations on the cooler or container lid and overlap with transparent packaging tape. For coolers with hinged covers, if the hinges are attached with screws, chain of custody tape should also be used on the hinge side.

4.12 Packaging tape should be placed entirely around the sample shipment containers. A minimum of one to two full wraps of packaging tape will be placed at at least two places on the cooler. Shake the cooler again to verify that the sample containers are well packed.

4.13 If shipment is required, transport the cooler to an overnight express package terminal or arrange for pickup. Obtain copies of all shipment records as provided by the shipper.

4.14 If the samples are to travel as luggage, check with regular baggage.

4.15 Upon receipt of the samples, the analytical laboratory will open the cooler or shipping container and will sign "received by laboratory" on each chain of custody form. The laboratory will verify that the chain of custody tape has not been broken previously and that the chain of custody tape number corresponds with the number on the chain of custody record. The analytical laboratory will then forward the back copy of the chain of custody record to the sample collector to indicate that sample transmittal is complete.

5.0 Documentation

As discussed in Section 4.0 the documentation for supporting the sample packaging and shipping will consist of chain of custody records and shipper's records. In addition a description of sample packaging procedures will be written in the field log book. All documentation will be retained in the project files following project completion.

0908J

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location	ANALYSES
Project No.	Field Logbook No.	
Sampler: (*Signature*)	Chain of Custody Tape No.	

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample							REMARKS

Relinquished by: (*Signature*)	Date	Time	Received by: (*Signature*)	Date	Time
Relinquished by: (*Signature*)	Date	Time	Received by: (*Signature*)	Date	Time
Relinquished by: (*Signature*)	Date	Time	Received for Laboratory: (*Signature*)	Date	Time
Sample Disposal Method:	Disposed of by: (*Signature*)			Date	Time

SAMPLE COLLECTOR

ERT - A Resource Engineering Company
696 Virginia Road
Concord, MA 01742
617-369-8910

ANALYTICAL LABORATORY

ENSR

Nº 1663

1974-3 84

Figure 1

STANDARD OPERATING PROCEDURE

Title: Decontamination

Date: 1st Qtr 1984
Number: 7600
Revision: 1

1.0 General Applicability

This SOP describes the methods to be used for the decontaminization of all field equipment which becomes potentially contaminated during a sample collection task. The equipment may include split spoons, bailers, trowels, shovels, hand augers, or any other type of equipment used during field activities.

Decontamination is performed as a quality assurance measure and a safety precaution. It prevents cross-contamination between samples and also helps to maintain a clean working environment for the safety of all field personnel involved, including the environment.

Decontamination is mainly achieved by rinsing with liquids which include: soap and/or detergent solutions, tap water, deionized water, and methanol. Equipment will be allowed to air dry after being cleaned or may be wiped dry with chemical free cloths or paper towels if immediate re-use is needed.

The frequency of equipment use, dictates that most decontamination be accomplished at each sampling site between collection points. Waste products produced by the decontamination procedures such as waste liquids, solids, rags, gloves, etc. will be collected and disposed of properly based on the nature of contamination. All cleaning materials and wastes should be stored in a central location so as to maintain control over the quantity of materials used and/or produced throughout the study.

2.0 Responsibilities

It is the primary responsibility of the site operations manager to assure that the proper decontamination procedures are followed and that all waste materials produced by decontamination are properly stored and disposed of.

It is the responsibility of the project safety officer to draft and enforce safety measures which provide the best protection for all persons involved directly with sampling and/or decontamination.

It is the responsibility of any subcontractors (i.e., drilling contractors) to follow the proper, designated decontamination procedures that are stated in their contracts and outlined in the Project Health and Safety Plan.

It is the responsibility of all personnel involved with sample collection or decontamination to maintain a clean working environment and to ensure that any contaminants are not negligently introduced to the environment.

3.0 Supporting Materials

- cleaning liquids: soap and/or detergent solutions, tap water, deionized water, methanol
- personal safety gear (defined in Project Health and Safety Plan)
- chemical-free paper towels
- disposable gloves
- waste storage containers: drums, boxes, plastic bags
- cleaning containers: plastic buckets, galvanized steel pans
- cleaning brushes

4.0 Methods or Protocol for Decontamination

4.1 General Procedures

4.1.1 The extent of known contamination will determine to what extent the equipment needs to be decontaminated. If the extent of contamination cannot be readily determined, cleaning should be done according to the assumption that the equipment is highly contaminated until enough data are available to allow assessment of the actual level of contamination.

4.1.2 Adequate supplies of all materials must be kept on hand. This includes all rinsing liquids and other materials listed in Section 3.0.

4.1.3 The standard procedures listed in the following section can be considered the procedure for full field decontamination. If different or more elaborate procedures are required for a specific project, they will be spelled out in the project work plan. Such variations in decontamination may include following all, just part, or an expanded scope of the decontamination procedure stated herein.

4.2 Standard Procedures

4.2.1 Remove any solid particles from the equipment or material by brushing and then rinsing with available tap water. This initial step is performed to remove gross contamination.

4.2.2 Wash equipment sampler with the soap or detergent solution.

4.2.3 Rinse with tap water

4.2.4 Rinse with deionized water

4.2.5 Rinse with methanol

4.2.6 Repeat entire procedure or any parts of the procedure if necessary

4.2.7 Allow the equipment or material to air dry before re-using

4.2.8 Dispose of any soiled materials in the designated disposal container

5.0 Specific Decontamination Procedures

5.1 Submersible Pump

5.1.1 Applicability

This procedure will be used to decontaminate submersible pumps between ground-water sample collection points and at the end of each day of use.

5.1.2 Materials

- o plastic-nalgene upright cylinder
- o 5-10 gallon plastic water storage containers
- o methanol and dispenser bottle
- o deionized water and dispenser bottle
- o chemical free paper towels

5.1.3.1 During decontamination the submersible pump will be placed on a clean surface or held away from ground.

5.1.3.2 When removing the submersible pump from each well the power cord and discharge line will be wiped dry using chemical-free disposable towels.

5.1.3.3 Clean the upright plastic-nalgene cylinder with first a methanol and then a deionized water rinse, wiping the free liquids after each.

Department of Natural Resources

ENVIRONMENTAL REPAIR PROGRAM
CASE TRACKING FORM FOR VER. 2.1
Form 4400-150

I.D. # 143

District: NWD County: Douglas (16)
Site Name: ENRON
Superior Meter Station
Address:
Legal Municipality:
Superior (T) V C

Case No.: PMN:
FID:
Proj. Mgr: Terry Koelin
Support Person:
Legal Desc: NW 1/4 NW 1/4 Sec 9, T 48N R 14 E (W)
Lat: N ___ ° ___ . ___ ' Long: W ___ ° ___ . ___ '

Date of Discovery: 04 / 05 / 94
Date of RP Contact: 04 / 05 / 94

PRIORITY SCREENING:
- ___ 1 = High
- X 2 = Low
- ___ 3 = Unknown

PRE-SCORE
11 . 54

FUNDING SOURCE:
- X 1 = RP
- ___ 2 = LTF
- ___ 3 = EF
- ___ 4 = SF
- ___ 5 = None
- ___ 6 = Other (Describe In Comments)
- ___ 7 = EPA Emergency Resp.

ENFORCEMENT AUTHORITY:
- X 1 = Spill Law s. 144.76, Wis. Stats.
- ___ 2 = Envir Repair Law s. 144.442, Wis. Stats.
- ___ 3 = Hazardous Waste Rules NR 600 Series
- ___ 4 = Solid Waste Rules NR 500 Series
- ___ 5 = CERCLA
- ___ 6 = Abandoned Container s. 144.77, Wis. Stat.
- ___ 7 = Other (Describe in Comments)

PROGRAMS INVOLVED: (L - LEAD S - SUPPORT)

___ Aban Containers	___ NR 500 Solid Waste	___ Water Supply
___ Lust	___ Spills	___ Water Resources Mgt
___ NR 600 Hazardous Waste	___ Superfund	X Env. Repair

RESPONSIBLE PARTY:
Business Name: ENRON-Northern Natural Gas Company
Owner/Mgr.:
Address: 1901 Xerxes Ave South, Suite 209
Minneapolis MN 55431
Phone: 612 / 887-1712
Contact Person: Ronald Beidelman, Div. Env. Spec

Business Name:
Owner/Mgr.:
Address:
Phone: ___ / ___
Contact Person:

		KNOWN IMPACTS (X)	POTENTIAL IMPACTS (X)
No Threat		___	
Fire/Explosion threat	(1)	___	___
Contaminated Private Well	(2)	___	___
Contaminated Public Well	(3)	___	___
Groundwater Contamination	(4)	___	X
Soil Contamination	(5)	X	___
Direct Contact	(10)	___	X
Contaminated Surface Water	(7)	___	X
Contaminated Air	(8)	___	___
Other ___	(6)	___	___

CONSULTANT INFORMATION:
Company: ENSR Consulting and Engineering
Contact Person: Chris White
Address: 4500 Park Glen Rd., Suite 210
St Louis Park, MN 55416
Phone: 612 / 924, 0117
(List additional on separate sheet & attach.)

Company:
Contact Person:
Address:
Phone: ___ / ___

Superior

EPA HAZARDOUS SUBSTANCES

(Please indicate if quantities are product or contaminated soil in pounds, gallons or cubic yards.)

TYPE (Enter Code)	DISCHARGED	RECOVERED	TREATED	STORED	DISPOSED	DISPOSAL LOCATION CITY	STATE

ERP CASE STATUS

(x as appropriate)

		DATE INITATED (MM YY)	DATE COMPLETED (MM YY)	COMMENTS
	NO ACTION TAKEN	/	/	
	EMERGENCY	/	/	
X	WORK PLAN APP	04 / 94	05 / 94	
X	FIELD INVEST I	/	06 / 93	Site Inspection
	II	/	/	
	III	/	/	
	REM DESIGN	/	/	
X	REM ACTION I	06 / 94	08 / 94	Limited Excavation
	O & M I	/	/	
	REM ACTION II	/	/	
	O & M II	/	/	
	LONG TERM MONT	/	/	
	ENFORCEMENT	/	/	

EF STATE LEAD CONSULTANT COST (OPTIONAL)

CONSULTANT	CONTRACT/PURCHASE ORDER NUMBER	CONTRACT AMOUNT	AMOUNT PAID TO DATE	LAST INVOICE APPROVED DATE
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /
		$	$	/ /