REVISED SECTION 3 OF THE
WORK PLAN FOR

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
ROME (Kingsley Avenue)
FORMER MGP SITE

PREPARED FOR

NIAGARA MOHAWK

PREPARED BY:

ES

ENGINEERING-SCIENCE, INC.
Liverpool, New York

AUGUST 1994

N:\GRAPHICS\97864\NIMOCV.DS4

ES
ENGINEERING-SCIENCE, INC.

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September 20, 1994

Mr. John Spellman, P.E.
Bureau of Construction Services
Division of Hazardous Waste Remediation
NYSDEC
50 Wolf Road
Albany, New York 12233-7010

RE: Revised Section 3 for RI/FS Work Plans at Gloversville, Rome and Schenectady former MGP sites

Dear Mr. Spellman:

Based on your approval for these revised sections, dated August 18, 1994, Niagara Mohawk Power Company (NMPC) has instructed Engineering-Science, Inc. (ES) to transmit the bound copies of these sections.

The addition to the Gloversville text, requested in your letter, has been made.

Please call Mr. Steve Stucker at (315) 428-5652 or me at (315) 451-9560 if you have any questions.

Sincerely,

ENGINEERING-SCIENCE, INC.

Katherine E. Leonard, C.P.G.
Project Manager

KEL/klb

cc: See attached distribution list

RECEIVED
SEP 23 1994
BUREAU OF CONSTRUCTION SERVICES

cc: w/o attachment

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M. Sherman, NMPC (all sites)
C. Schewe, NMPC (Schenctady)
J. Howe, NMPC (Schenectady)
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A. Barber, NMPC (Schenectady)
M. Waldecker, NMPC (Schenectady)
D. Tulley, NMPC (Gloversville)
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D. Steenberge, P.E., NYSDEC (Gloversville)
D. Swerdoski, P.E., NYSDEC ~~(all sites)~~ Rome
A. Carlson, NYSDOH (all sites)
File 725725 #8 (Gloversville)
File 725726 #8 (Rome)
File 725727 #8 (Schenectady)

SECTION 3

REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) TASK DESCRIPTIONS

This section describes the work effort that will constitute the RI/FS. The work effort is divided into a logical sequencing of four discrete tasks. These tasks are based on NYSDEC guidance (NYSDEC, 1989) and USEPA guidance (USEPA, 1988) as follows:

- Task 1 - Phase I Site Characterization:
- Task 2 - Phase II Site Characterization (if required);
- Task 3 - Prepare Remedial Investigation Report:
- Task 4 - Conduct Feasibility Study and Prepare Report

The project activities will be carried out in conformance with the National Contingency Plan (40 CFR Part 300) and the Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (USEPA, 1988). Each of the RI/FS tasks are discussed separately in this section.

3.1 PHASE I SITE CHARACTERIZATION - TASK 1

A summary of the Phase I and II site characterization activities is provided in Table 3.1. The subtasks are described in more detail herein.

3.1.1 Site Screening - Task 1.1

The primary objectives of the site screening activities are to identify the optimum sampling locations for the remaining site characterization activities. The samples obtained and other data generated during the remainder of the site characterization program will provide the basis for the Phase I Feasibility Study. Prior to the start of drilling and sampling, a public meeting will be held by NMPC and NYSDEC to explain the field work program, the schedule of the investigation reports and to receive public input.

The site screening task also includes additional data/records searches to supplement existing site information with respect to historical waste disposal practices and facilities, sensitive land uses and receptors in the site vicinity, and the potential for non-MGP waste related contamination to be present. More definitive off-site contamination source data and sensitive receptor (i.e. residential wells) information will help focus the RI/FS activities and provide a better assessment of site-related conditions and associated off-site impacts. Furthermore, due to the significant contamination detected during previous sampling (NUS, 1991) in the upstream sediment sample, upgradient sources will be investigated. The location of contamination discovered during a recent property transfer investigation south of the Rome MGP site will also be identified.

TABLE 3.1

TASKS 1 AND 2

PHASE I AND PHASE II SITE CHARACTERIZATION

- Task 1 - Phase I Site Characterization
  - Task 1.1 Site Screening
    - Task 1.1.1 Site Reconnaissance
    - Task 1.1.2 Arrange Off-Site Access
    - Task 1.1.3 Clear Sample Locations
    - Task 1.1.4 Mobilization
    - Task 1.1.5 Background Data Usability Assessment
  - Task 1.2 Source Characterization
    - Task 1.2.1 Test Pit Excavation
    - Task 1.2.2 Soil Borings
  - Task 1.3 Migration Pathways Characterization
    - Task 1.3.1 Subsurface Soil
    - Task 1.3.2 Groundwater
    - Task 1.3.3 Surface Soil
    - Task 1.3.4 Sediment/Surface Water
    - Task 1.3.5 Air
    - Task 1.3.6 Site Survey
  - Task 1.4 Data Validation and Evaluation
- Task 2 - Phase II Site Characterization
  - Task 2.1 Phase II Sampling and Analysis
  - Task 2.2 Data Validation
  - Task 2.3 Data Evaluation

3.1.1.1 Site Reconnaissance - Task 1.1.1

The intent of this task is to coordinate site investigation activities with NMPC operating personnel, to identify initial locations for borings, wells and sampling points, to identify staging areas for equipment, materials and decontamination zones, and to coordinate with underground facilities protective organization (UFPO) and NMPC personnel for clearance of all subsurface utilities and services. The NMPC Project Manager will arrange a site reconnaissance meeting including the Field Team Leader, the Project Geologist and the subcontract driller's representative at least one week prior to the scheduled start date of on-site activities to ensure that all of these necessary arrangements are completed prior to the start of work. This will allow adequate time for current NMPC operations to be alerted and modified, for locating all subsurface utilities and services, and for moving any stored equipment or materials for access to the proposed drilling/sampling locations.

3.1.1.2 Arrange Off-Site Access - Task 1.1.2

After the on-site and off-site sampling/boring locations are finalized during the site reconnaissance, NMPC will be responsible for identifying off-site property owners and arranging access permission. To the extent practicable, access arrangements will allow for flexibility in placing the sample/boring locations in case of subsurface interferences or other conditions requiring minor changes in sample/boring locations.

3.1.1.3 Clear Sample Locations - Task 1.1.3

The on-site and off-site utilities must be identified for the health and safety of field personnel and to prevent damage to underground utilities during drilling. Public and privately-owned utilities will be located by contacting responsible agencies to provide mark-outs of underground utilities. The site reconnaissance team will evaluate these utility locations in planning the field surveys, particularly soil boring, monitoring wells and test pit locations. Locations for subsurface investigations must be clear of underground utilities prior to boring or test pitting.

A supplemental metal detector screening will be conducted prior to test pitting or drilling to locate any unidentified underground utilities and possible buried drums or tanks. Initially, the locator will be tested on known locations of underground utilities to verify that it is functioning properly. The metal detector screening is intended as a precautionary, supplemental health and safety measure only.

If there is no indication of buried utilities, drums or tanks, then subsurface sampling will proceed. However, if the locator indicates the presence of a buried object, activities will not proceed in that location until the type of buried object is determined. If the object cannot be identified from surface or shallow digging, a test pit may be needed to determine the identity of the buried object. If a test pit is needed, the procedure and scope will be reviewed with the NMPC Project Manager prior to conducting the work.

3.1.1.4 Mobilization - Task 1.1.4

The Consultant will provide to NMPC a schedule of mobilization events and a site plan showing the approximate location of all set-down and decontamination areas. The 3-mobilization schedule and site plan will be provided following the site reconnaissance and associated discussions with site personnel about impacts on site operations.

3.1.1.5 Background Data Usability Assessment - Task 1.1.5

The purpose of this task is to document the type and quality of all existing data for the site and to assess the usability of each data type for use in this RI/FS. The results of this assessment will be included in the RI Report.

3.1.2 Source Characterization - Task 1.2

The overall objective of this task is to define the horizontal and vertical extent of contamination on-site (i.e. free-phase tar or oily materials and purifier waste remaining after the 1994 IRM), and to characterize their nature through laboratory analyses. Sample locations are shown on Figure 3.1. Each of the subtasks below are described in terms of their objectives, data uses and methods. Table 3.2 contains a summary of the chemical and geotechnical parameters to be analyzed during the Remedial Investigation. Tables 3.3 through 3.5 contain a detailed summary of soil boring and monitoring well locations and soil analyses. Table 3.6 summarizes other analytical samples collected during test pits, surface soil, sediment, surface water and groundwater sampling.

3.1.2.1 Test Pit Excavations - Task 1.2.1

Objectives

A series of test pit trenches are proposed to (1) further investigate the extent of contamination sources, (2) investigate the potential for contamination in previously univestigated areas, (3) locate the mill races, (4) characterize the nature of the contamination via laboratory analyses, and (5) allow investigation of the effectiveness of geophysical techniques for locating the old canal and mill races.

Data Uses

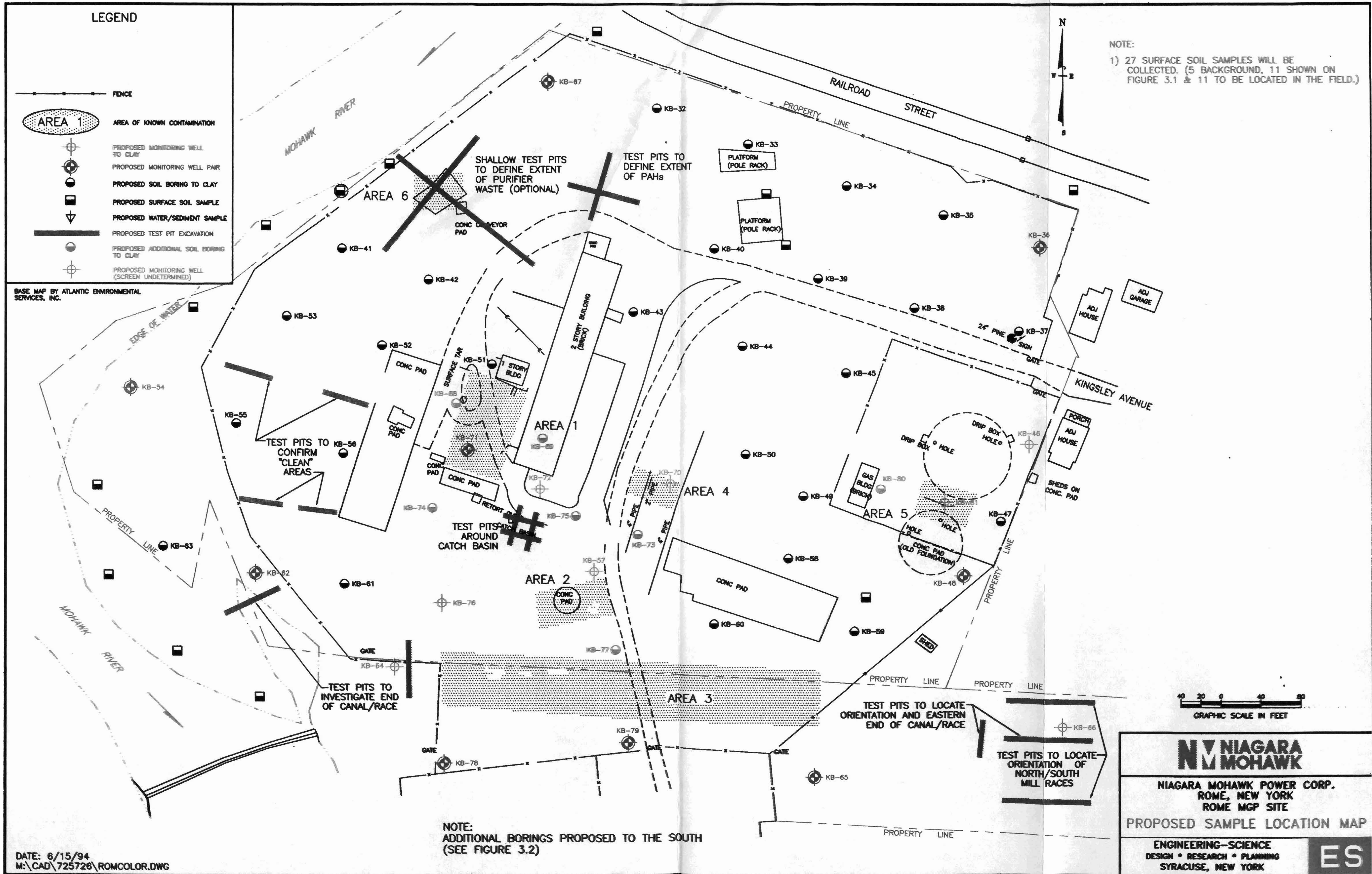
The visual assessment of the test pit excavations will be used to determine the horizontal and vertical extent of the visibly contaminated material. The laboratory analysis data will be used to fully characterize the compounds present in the residue and to determine whether the material is characteristically hazardous, thereby requiring special handling and disposal methods.

Methods

Up to eighteen test pits will be conducted. Included are test pit excavations in the previously uninvestigated areas in the western portion of the site between the concrete pads and the Mohawk River and around the catch basin located south of the two-story building (Figure 3.1).

The remaining test pits are to further define the extent of the previously identified sources: (1) two shallow trenches associated with the purifier wastes in the northwest

Figure 3.1


LEGEND
FENCE
AREA 1
AREA OF KNOWN CONTAMINATION
PROPOSED MONITORING WELL TO CLAY
PROPOSED MONITORING WELL PAIR
PROPOSED SOIL BORING TO CLAY
PROPOSED SURFACE SOIL SAMPLE
PROPOSED WATER/SEDIMENT SAMPLE
PROPOSED TEST PIT EXCAVATION
PROPOSED ADDITIONAL SOIL BORING TO CLAY
PROPOSED MONITORING WELL (SCREEN UNDETERMINED)
BASE MAP BY ATLANTIC ENVIRONMENTAL SERVICES, INC.
NOTE:
1) 27 SURFACE SOIL SAMPLES WILL BE COLLECTED. (5 BACKGROUND, 11 SHOWN ON FIGURE 3.1 & 11 TO BE LOCATED IN THE FIELD.)
RAILROAD STREET
KINGSLEY AVENUE
MOHAWK RIVER
EDGE OF WATER
PROPERTY LINE
AREA 6
AREA 1
AREA 2
AREA 3
AREA 4
AREA 5
SHALLOW TEST PITS TO DEFINE EXTENT OF PURIFIER WASTE (OPTIONAL)
TEST PITS TO DEFINE EXTENT OF PAHs
TEST PITS TO CONFIRM "CLEAN" AREAS
TEST PITS AROUND CATCH BASIN
TEST PITS TO INVESTIGATE END OF CANAL/RACE
TEST PITS TO LOCATE ORIENTATION AND EASTERN END OF CANAL/RACE
TEST PITS TO LOCATE ORIENTATION OF NORTH/SOUTH MILL RACES
2 STORY BUILDING (BRICK)
1 STORY BLDG
PLATFORM (POLE RACK)
CONC PAD
CONC CONVEYOR PAD
SURFACE TAR
RETORT
GAS BLDG (BRICK)
DRIP BOX HOLE
CONC PAD (OLD FOUNDATION)
HOLE
ADJ HOUSE
ADJ GARAGE
PORCH
SHEDS ON CONC. PAD
SHED
GATE
24" PINE
SIGN
4" PIPE
2" PIPE
6" PIPE
KB-32
KB-33
KB-34
KB-35
KB-36
KB-37
KB-38
KB-39
KB-40
KB-41
KB-42
KB-43
KB-44
KB-45
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KB-73
KB-74
KB-75
KB-76
KB-77
KB-78
KB-79
KB-80
N
S
W
E
40 20 0 40 80
GRAPHIC SCALE IN FEET
NOTE:
ADDITIONAL BORINGS PROPOSED TO THE SOUTH (SEE FIGURE 3.2)
DATE: 6/15/94
M:\CAD\725726\ROMCOLOR.DWG
NIAGARA MOHAWK
NIAGARA MOHAWK POWER CORP.
ROME, NEW YORK
ROME MGP SITE
PROPOSED SAMPLE LOCATION MAP
ENGINEERING-SCIENCE
DESIGN • RESEARCH • PLANNING
SYRACUSE, NEW YORK
ES

TABLE 3.2
SUMMARY OF ANALYTICAL PARAMETERS
ROME (KINGSLEY AVE) RI/FS
NIAGARA MOHAWK POWER COMPANY

ANALYSES	PARAMETERS
TCL/TAL	TARGET COMPOUND LIST ORGANICS: -- VOLATILE ORGANIC COMPOUNDS -- SEMI-VOLATILE ORGANIC COMPOUNDS -- PESTICIDES -- POLYCHLORINATED BIPHENYLS (PCBs) TARGET ANALYTE LIST METALS
CYANIDE	TOTAL CYANIDE; IF DETECTED, ADD AMENABLE
WASTE CHARACTERIZATION (W.C.)	TCLP ORGANIC AND INORGANIC ANALYTES IGNITABILITY CORROSIVITY REACTIVITY TOTAL SULFUR
TREATABILITY CHARACTERISTICS (T.C.)	BTU CONTENT TOTAL PETROLEUM HYDROCARBONS (TPH) TOTAL ORGANIC HALOGENS (TOX) PERCENT ASH **DO FOLLOWING AS GEOTECH:** PERCENT MOISTURE GRAIN SIZE
MGP INDICATORS	BTEX POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)
GEOTECHNICAL	PERCENT MOISTURE BULK DENSITY TOTAL ORGANIC CARBON (TOC) pH ATTERBERG LIMITS TRIAXIAL PERMEABILITY
CONVENTIONAL WATER QUALITY PARAMETERS (CONV)	SULFIDE SULFATE NITRITE NITRATE CHLORIDE CARBONATE HARDNESS TOTAL DISSOLVED SOLIDS (TDS) BOD5 COD pH OIL & GREASE POTASSIUM SODIUM CALCIUM MAGNESIUM ALKALINITY

Table 3.3
Rome (Kingsley Ave) RI/FS
Niagara Mohawk Power Company
Boring and Monitoring Well Locations

Boring ID / MW ID	Location / Task Number
KB-32	North End / Task 1.2.2
KB-33	North End / Task 1.2.2
KB-34	North End / Task 1.2.2
KB-35	North End / Task 1.2.2
KB-36 (well pair)	Upgradient location, northeast corner; shallow well augered without sampling. / Task 1.2.2 & 1.3.2
KB-37	North side of access road / Task 1.2.2
KB-38	North side of access road / Task 1.2.2
KB-39	North side of access road / Task 1.2.2
KB-40	North side of access road / Task 1.2.2
KB-41	West side / Task 1.2.2
KB-42	West side / Task 1.2.2
KB-43	Immediately east of former building / Task 1.2.2
KB-44	South and east of access roads / Task 1.2.2
KB-45	West of gas regulator station / Task 1.2.2
KB-46 (well)	Monitor northeast of holders; budgeted @ 15'; place deeper if evidence of DNAPL. / Tasks 1.2.2 and 1.3.2
KB-47	Between and east of holders / Task 1.2.2
KB-48 (well pair)	Southeast of relief holder to assess off-site migration from holders. Target contaminated zones. Shallow well augered without sampling. / Tasks 1.2.2 and 1.3.2
KB-49	Southwest corner of regulator station / Task 1.2.2
KB-50	West of regulator station / Task 1.2.2
KB-51	West of former building / Task 1.2.2
KB-52	West of former building / Task 1.2.2
KB-53	West of former building / Task 1.2.2
KB-54 (well pair)	Far west side of site. Purpose to assess flow relationship between Mohawk River and groundwater. Shallow well augered without sampling Tasks 1.2.2 and 1.3.2
KB-55	West side / Task 1.2.2
KB-56	West side / Task 1.2.2
KB-57 (well)	West of access road near Area 2. Purpose to assess presence of DNAPL Tasks 1.2.2 and 1.3.2
KB-58	Southeast side of site / Task 1.2.2
KB-59	Southeast side of site / Task 1.2.2
KB-60	Southeast side of site / Task 1.2.2
KB-61	Southwest side of site / Task 1.2.2
KB-62 (well pair)	Southwest side of site. Purpose to assess flow relationship between Mohawk River and groundwater. Shallow well augered without sampling Tasks 1.2.2 and 1.3.2
KB-63	Southwest side / Task 1.2.2
KB-64 (well)	At west end of Area 3. Purpose to assess groundwater quality and off-site migration via the former canal / race. Task 1.2.2 and 1.3.2
KB-65 (well pair)	Southeast of Area 3. Purpose to assess groundwater quality moving off-site. Shallow well augered without sampling. / Tasks 1.2.2 and 1.3.2
KB-66 (well)	East of Area 3. Purpose to assess groundwater quality and off-site migration via the former canal / race. Task 1.2.2 and 1.3.2
KB-67 (well pair)	Upgradient location at northwest corner, shallow well augered without sampling. / Tasks 1.2.2 and 1.3.2
KB-68	West side of Area 1 / Task 1.2.2
KB-69	East side of Area 1 / Task 1.2.2
KB-70 (well)	In Area 4. Screen most contaminated zone. / Tasks 1.2.2 and 1.3.2
KB-71 (well pair)	In Area 1. Screen top of clay to monitor DNAPL. Screen most highly contaminated contaminated zone above with shallow well. Shallow well augered without sampling. / Tasks 1.2.2 and 1.3.2
KB-72 (well)	Southeast of Area 1. Screen most contaminated zone. / Tasks 1.2.2 and 1.3.2
KB-73	South of Area 4 / Task 1.2.2
KB-74	South of Area 1 / Task 1.2.2
KB-75	Between and south of Areas 1 and 4 / Task 1.2.2
KB-76 (well)	West of Area 2. Purpose to assess presence of DNAPL. / Task 1.2.2 and 1.3.2
KB-77	South of Area 2 / Task 1.2.2
KB-78 (well pair)	Southwest of Area 3. Purpose to assess vertical gradients and water quality migrating off-site south from canal / race. Shallow well augered without sampling. / Tasks 1.2.2 and 1.3.2
KB-79 (well pair)	South of Area 3. Purpose to assess vertical gradients and water quality migrating off-site south from the canal/race. Shallow well augered without sampling. Tasks 1.2.2 and 1.3.2
KB-80	East of gas regulator building. / Task 1.2.2
KB-81 (well)	Between holders. Purpose to assess groundwater quality in immediate vicinity of holders. Tasks 1.2.2 and 1.3.2
KB-82	Northwest corner of substation / Task 1.3.1
KB-83 (well pair)	Southwest corner of substation. Purpose to assess groundwater quality downgradient of the site along the river and assess groundwater/surface water flow relationships. Shallow well augered without sampling. / Tasks 1.3.1 and 1.3.2
KB-84	Southwest of substation / Task 1.3.1
KB-85	Southwest of substation / Task 1.3.1
KB-86	Southwest of substation / Task 1.3.1

Locations of borings, wells, and well screens are subject to geologist's discretion based on field conditions.
Locations of KB-32 through KB-81 shown on Figure 3.1
Locations of KB-82 through KB-86 shown on Figure 3.2

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Table 3.4
Rome (Kingsley Ave) RI/FS
Niagara Mohawk Power Company
Soil Boring Sample Analysis -- Tasks 1.2.2, 1.3.1, 1.3.2

		Sample Analysis											
		Source Characterization				Clean Zone							
Boring ID	Total Depth (ft)	TCLP W.C. & T.C.	TCL/TAL	Cyanide	MGP Indicators	Ensys Field PAHs	TCL/TAL	Cyanide	MGP Indicators	PID Screening	Geotech (1)	Shelby Tube Permeability	Termination Point
Total Accounted for	2900	0	15	110	110	110	9	55	55	All SS Samples --	3	6	Max 50' --
KB-32	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-33	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-34	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-35	50	0	0	2	2	2	0	1	1	All		1*	5' into clay
KB-36 (well pair)	50/15*	0	0	2	2	2	1*	1	1**	All	Sand/Gravel		5' into clay
KB-37	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-38	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-39	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-40	50	0	0	2	2	2	0	1	1	All	Silt/Sand		5' into clay
KB-41	50	0	1*	2	2**	2	1*	1	1**	All		1*	5' into clay
KB-42	50	0	1*	2	2**	2	0	1	1	All			5' into clay
KB-43	50	0	0	2	2	2	1*	1	1**	All			5' into clay
KB-44	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-45	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-46 (well)	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-47	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-48 (well pair)	50/15*	0	1*	2	2**	2	1*	1	1**	All			5' into clay
KB-49	50	0	0	2	2	2	0	1	1	All		1*	5' into clay
KB-50	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-51	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-52	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-53	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-54 (well pair)	50/15*	0	0	2	2	2	0	1	1	All			5' into clay
KB-55	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-56	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-57 (well)	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-58	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-59	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-60	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-61	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-62 (well pair)	50/15*	0	0	2	2	2	0	1	1	All			5' into clay
KB-63	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-64 (well)	50	0	1	2	2**	2	1	1	1**	All			5' into clay
KB-65 (well pair)	50/15*	0	0	2	2	2	0	1	1	All			5' into clay
KB-66 (well)	50	0	1	2	2**	2	1	1	1**	All		1	5' into clay
KB-67 (well pair)	50/15*	0	0	2	2	2	0	1	1	All			5' into clay
KB-68	50	0	1*	2	2**	2	0	1	1	All			5' into clay
KB-69	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-70 (well)	50	0	1	2	2**	2	1	1	1**	All			5' into clay
KB-71 (well pair)	50/15*	0	1	2	2**	2	1	1	1**	All			5' into clay
KB-72 (well)	50	0	1	2	2**	2	0	1	1	All			5' into clay
KB-73	50	0	1	2	2**	2	0	1	1	All			5' into clay
KB-74	50	0	1	2	2**	2	0	1	1	All	Clay	1	5' into clay
KB-75	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-76 (well)	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-77	50	0	0	2	2	2	0	1	1	All		1	5' into clay
KB-78 (well pair)	50/15*	0	1	2	2**	2	0	1	1	All			5' into clay
KB-79 (well pair)	50/15*	0	1	2	2**	2	0	1	1	All			5' into clay
KB-80	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-81 (well)	50	0	1	2	2**	2	1	1	1**	All			5' into clay
KB-82	50	0	1	2	2**	2	0	1	1	All			5' into clay
KB-83 (well pair)	50/15*	0	0	2	2	2	0	1	1	All			5' into clay
KB-84	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-85	50	0	0	2	2	2	0	1	1	All			5' into clay
KB-86	50	0	0	2	2	2	0	1	1	All			5' into clay

MGP Indicators – BTEX and PAHs
* – Subject to geologist's discretion based on field conditions.
** – If a TCL/TAL sample is collected, it will take the place of one MGP indicator analysis.
PID – Photoionization detector readings
WT – Water table

(1) Geotech samples are intended to be collected from each of the three geologic units -- sand/gravel, silt/sand, and clay preferably within the screened section of a well, if possible.
(2) Matrix Spike & Matrix Spike Duplicate (MS & MSD) samples will be collected at a frequency of 1 pair per 20 field samples per 7 calendar days for TCL or MGP indicators
(3) Field Duplicate samples will be collected at a frequency of 1 per 20 field samples for TCL/TAL or MGP Indicators
(4) Matrix Spike and Matrix Duplicate samples will be collected at a frequency of 1 pair per 20 field samples per 7 calendar days for TAL metals or cyanide.

PARESSYR01\VOL1:WP\725726.01\ROMESAMP

Table 3.5
Rome (Kingsley Ave) RI/FS
Niagara Mohawk Power Company
Monitoring Wells

Boring ID	Total Depth (ft)	Preferred Screen Location
Total Budgeted	10 pairs @ 50/15 8 singles @ 15	–
Total Accounted for	10 pairs/8 singles	–
KB–36 (well pair)	Pair @ 50'/15'*	
KB–46 (well)	Single @ 15'*	Shallow*
KB–48 (well pair)	Pair @ 50'/15'*	TOC*/WT*
KB–54 (well pair)	Pair @ 50'/15'*	TOC*/WT*
KB–57 (well)	Single @ 50'*	TOC
KB–62 (well pair)	Pair @ 50'/15'*	TOC*/WT*
KB–64 (well)	Single @ 15'*	Shallow*
KB–65 (well pair)	Pair @ 50'/15'*	TOC*/WT*
KB–66 (well)	Single @ 15'*	Shallow*
KB–67 (well pair)	Pair @ 50'/15'*	TOC*/WT*
KB–70 (well)	Single @ 15'*	Use PID
KB–71 (well pair)	Pair @ 50'/15'*	TOC/Use PID
KB–72 (well)	Single @ 15'*	Use PID
KB–76 (well)	Single @ 50'*	TOC*
KB–78 (well pair)	Pair @ 50'/15'*	TOC/PID
KB–79 (well pair)	Pair @ 50'/15'*	TOC/PID
KB–81 (well)	Single @ 15'*	PID
KB–83 (well pair)	*	TOC/PID

* – Subject to geologist's discretion based on field conditions.
TOC – Top of clay
PID – Photoionization detection readings
WT – Water table

PARESSYR01\VOL1:WP\725726.01\ROMEWELL

TABLE 3.6
SUMMARY OF ANALYTICAL SAMPLES FOR GROUNDWATER, SURFACE SOIL, SURFACE WATER, SEDIMENT, TEST PIT SOILS, AND WASTE DISPOSAL
ROME MGP, KINGSLEY AVE
NIAGARA MOHAWK POWER COMPANY

SUBTASK	MATRIX / PARAMETER	FIELD SAMPLES	FIELD AND LAB QC SAMPLES				TOTAL SAMPLES		
			TRIP BLK (3)	FIELD DUP (1)	WASH BLK (2)	MS/MSD (TOTAL # SAMPLE BOTTLES	SOIL	WATER	AIR
1.2.1	**TEST PIT SOILS AND WASTE SAMPLES**								
	TCL ORGANIC COMPOUNDS	5				1	6		
	TAL METALS	5				1	6		
	CYANIDE	5				1	6		
	TCLP	5					5		
	IGNITABILITY	5					5		
	CORROSIVITY	5					5		
	REACTIVITY	5					5		
	BTU CONTENT	5					5		
	TPH	5					5		
	TOTAL ORGANIC HALOGENS	5					5		
	PERCENT MOISTURE	5					5		
	PERCENT ASH	5					5		
	GRAIN SIZE	5					5		
1.2.1	**AIR SAMPLES**								
	BTEX	20							20
	PAHs	20							20
1.3.2	**SOIL -- WASTE DISPOSAL**								
	TCLP	1					1		
	IGNITABILITY	1					1		
	CORROSIVITY	1					1		
	REACTIVITY	1					1		
1.3.2	**WATER -- WASTE DISPOSAL**								
	TCLP	1						1	
	IGNITABILITY	1						1	
	CORROSIVITY	1						1	
	REACTIVITY	1						1	
1.3.2	**GROUNDWATER -- FIRST ROUND ONLY**								
	TCL VOCs	29	4	2	2	4		41	
	TCL SEMI-VOL ORGANICS, PEST, PCB	29		2	2	4		37	
	TAL METALS	29		2	2	4		37	
	CYANIDE	29		2	2	4		37	
	SULFIDE	6						6	
	SULFATE	6						6	
	NITRATE	6						6	
	NITRITE							6	
	CHLORIDE	6						6	
	CARBONATE	6						6	
	HARDNESS	6						6	
	TOTAL DISSOLVED SOLIDS	6						6	
	BOD5	6						6	
	COD	6						6	
	pH	6						6	
	OIL & GREASE	6						6	
1.3.3	**SURFACE SOIL**								
	TCL ORGANICS	10		1	1	1	12	1	
	TAL METALS	10		1	1	1	12	1	
	CYANIDE	10		1	1	1	12	1	
	FIELD PAH/PCB	25					25		
1.3.4	**SURFACE WATER**								
	TCL ORGANICS	7						7	
	TAL METALS	7	Combine with groundwater *for QC purposes*					7	
	CYANIDE	7						7	
1.3.4	**SEDIMENT**								
	TCL ORGANICS	12				1	13		
	TAL METALS	12				1	13		
	CYANIDE	72				4	76		
	BTEX	60				3	63		
	PAHs	60				3	63		
	FIELD PAHs	30					30		

FOOTNOTES:

(1) Field duplicates, MS/M(S)D = SAME MATRIX AS FIELD SAMPLE. Collected at frequency of 1 per 20 field samples per 7 calendar day period.

(2) Field blanks -- WATER ONLY

(3) Trip blanks -- VOCs ONLY, WATER ONLY

PARESSYR01\VOL1:WP\72572 6.01\ROMESAM2

portion of the site (Area 6); however these are optional pending the status of the on-going IRM, (2) two test pits associated with the PAH contamination north of the former two-story building, (3) two test pits in the southwest portion of the site to investigate the western end of the canal/race, 4) four test pits off the southeastern portion of the site, but still in the NMPC right-of-way, to locate the eastern end of the canal/race and where the canal/race may intersect the north/south oriented mill race, and (5) four test pits around the catch basin, south of the former building. These may be relocated to the northwest to investigate a former tar well. All test pit locations will be field checked. If too close to residential areas, borings may be substituted.

The Project Geologist will direct the excavation activities and prepare geologic logs of the excavation contents. The objective of the excavations will be to identify the absence or presence of MGP residues and their lateral and vertical extent to the degree possible, subject to subsurface utility clearances.

The trenches will be up to four feet wide by up to ten feet deep, or to the top of the water table. Excavated material will be placed on plastic sheeting and backfilled in the reverse order that it was removed (last out-first in). The surface will be replaced with compacted crushed gravel; in case of settlement over time, additional gravel can be added. The corners of the test pit excavation will be flagged for subsequent site surveying (Task 1.3.6).

An electromagnetic (EM-31) survey will also be run in conjunction with the test pits that are to be excavated perpendicular to the old canal. This will allow a determination of the effectiveness of the EM in locating the canal/races at the Rome Site and allow comparison of the EM data with the actual trench locations. If the EM is effective in identifying the canal, it will be used to help locate the north/south mill race that may intersect the eastern end of the old canal. Three days of EM survey will be conducted including the field data interpretation.

Laboratory analyses will characterize contamination identified in the test pits (Table 3.6). First, a sample of each distinct contamination type will be collected and analyzed for Target Compound List (TCL) volatiles, semivolatiles, pesticide/PCBs, Target Analyte List (TAL) metals and cyanide. Five of these analyses are included to provide comprehensive characterization of the contaminant sources. Second, one sample of each distinct contamination type will be collected and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) methods for regulated volatiles, semivolatiles and metals, plus reactivity (cyanide/sulfide), ignitability and corrosivity. Five of these analyses are included to characterize the waste as hazardous or non-hazardous. This information will be necessary for assessing the regulatory status of the residue and the need for removal and special handling and disposal of the residue. Treatability characteristics will also be measured for use in the feasibility study (Table 3.2).

Experience with test pit excavations at MGP sites has shown the potential exists for generating coal tar/naphthalene odors. This does not necessarily constitute a health and safety threat because the odor threshold for naphthalene is very low, and is below health risk levels. However, the presence of odors during the excavations may be noticed by local residents or NMPC workers. Odor mitigation measures will be available for implementation if needed during the test pits. The soil will be wetted with water if visible dust is generated. To provide documentation that unsafe releases have not occurred, and to ensure the protection of NMPC employees and the public, air monitoring will be conducted at the perimeter of the exclusion zone. One upwind and three downwind air monitoring stations will be established to collect samples for laboratory analysis. A total of four samples will be collected for analysis each day to document that releases of contaminants have not occurred during the test pit excavations. The air samples will be analyzed for BTEX and PAHs. Cyanide will be monitored with Draeger tubes. This air monitoring and analysis will be supplemented by photoionization detector (PID) monitoring and continuous particulate monitoring at the excavation to provide for the health and safety of site workers.

In addition to the excavation contractor, two people will be present for the test pit activities. One person will log the excavations, and the second person will perform PID monitoring at the excavation and conduct the perimeter air monitoring.

3.1.2.2 Soil Borings and Subsurface Soil Sampling - Task 1.2.2

Objectives

This activity will be conducted after the test pit excavations investigate the known potential sources of contamination (holders, purifiers, retorts, etc). The soil borings will have three objectives: to provide deeper vertical characterization of contamination sources identified by the test pits or previous borings; to provide coverage of the entire former MGP site to determine the presence and extent of contamination, and to provide stratigraphic information for the site.

Data Uses

The visual assessment of the soil boring samples will be used to assess the subsurface stratigraphy of the site and to identify the lower extent of contamination sources. Field screening data will be used to select samples for laboratory analysis. The laboratory analysis data will be used to characterize the visibility contaminated material and document that the lower extent of contamination has been defined.

Methods

For the purposes of this Work Plan, the RI/FS borings are labeled using the same nomenclature used during PSA/IRM. Since there were 31 borings installed previously, the new borings are labeled KB-32 through KB-81. The boring and monitoring well locations are described on Table 3.3 and shown on Figure 3.1.

Borings will be located in areas identified in the PSA/IRM as likely source areas and in areas where additional information is necessary to determine the vertical and horizontal extent of contamination.

The borings will be drilled with hollow-stem augers as subsurface conditions permit. If borings encounter conditions which do not permit the effective use of hollow stem augers, an alternate method such as spin casing will be employed.

Situations which may require alternate methods include flowing sands, or dense gravel or till layers at depths greater than 50 feet below ground surface. Borings will be continuously sampled with split-spoons.

Split-spoon samples will be collected at two-foot intervals in each boring, screened for total volatile organic compounds (VOCs) with a PID, visually inspected, and geologically logged. At completion, the boreholes will be grouted to the surface.

All borings will terminate five feet into the clay layer which forms the lower boundary of the aquifer. Six shelby tube samples will be collected to estimate the vertical permeability of the clay using triaxial permeability testing.

Samples from each of the borings will be analyzed in a laboratory for the analytes shown on Table 3.4. The laboratory analyses will focus both on demonstrating that the lower boundary of contamination has been defined and also on characterizing the composition of the visibly contaminated material.

EnSys PAH field analysis kits will be used to screen the soil samples and ensure that the samples selected to demonstrate the lower boundary of contamination do not contain PAHs in excess of approximately 1 part per million (ppm). The *EnSys* immunoassay field analysis system is semiquantitative and will provide a positive/negative response for two concentration end points; in this case, 1 ppm and 100 ppm. The field analysis results will indicate whether the total PAH concentration of a sample is less than 1 ppm, between 1 ppm and 100 ppm, or above 100 ppm. Use of this system will provide real time data confirming that a sample with no visual evidence of PAH contamination has, in fact, a total PAH concentration of less than 1 ppm. Up to two samples per boring will be screened in the field with the *EnSys* system.

A summary of the field and laboratory analyses, and quality control sample requirements, are presented on Table 3.4. Geotechnical analyses will also be run to support the feasibility study (Table 3.4).

All drilling equipment except the drill rig will be decontaminated by steam cleaning supplemented by the use of Citraclean if necessary. All drill cuttings, fluids and decontamination water will be contained in drums (or a roll-off for soils) and staged on-site for subsequent disposal by NMPC. The roll-offs or drums will be labelled with respect to their contents (development water, decon water, personnel protective equipment, etc.) and origin (well or boring number) where practical. The drums will be labelled as non-hazardous pending subsequent composite sampling and analysis of the drum contents as described in Task 1.3.2.

3.1.3 Migration Pathways Characterization - Task 1.3

The overall objective of this task is to define the horizontal and vertical extent of site-related contamination and visibly contaminated materials off-site, to characterize their nature through laboratory analyses and to provide stratigraphic information for the site. The following subtasks are described in terms of their objectives, data uses and methods, and are organized by media.

3.1.3.1 Subsurface Soils - Task 1.3.1

Objective

The objective of the subsurface soil sampling is to determine the nature and extent of site-related contamination in the subsurface soils off-site to the south, where contamination was indicated to be at the property line during the PSA/IRM, and to provide stratigraphic data.

Data Uses

Visual assessment data from borings will be used to define the stratigraphy and the horizontal and vertical extent of site-related contamination. Field screening data from the borings will be used to select samples for laboratory analysis. The laboratory analysis data will be used to characterize the off-site contamination and to document that the lower extent of contamination has been defined.

Methods

Five borings will be drilled off-site south of the site to determine whether contamination is migrating in this direction. The locations of five borings (KB 82-86) are shown on Figure 3.2. The determination of final locations will depend on conditions encountered in the field.

A summary of the field and laboratory analyses, and quality control sample requirements, are presented on Table 3.4. Geotechnical analyses will also be run to support the feasibility study (Table 3.4).

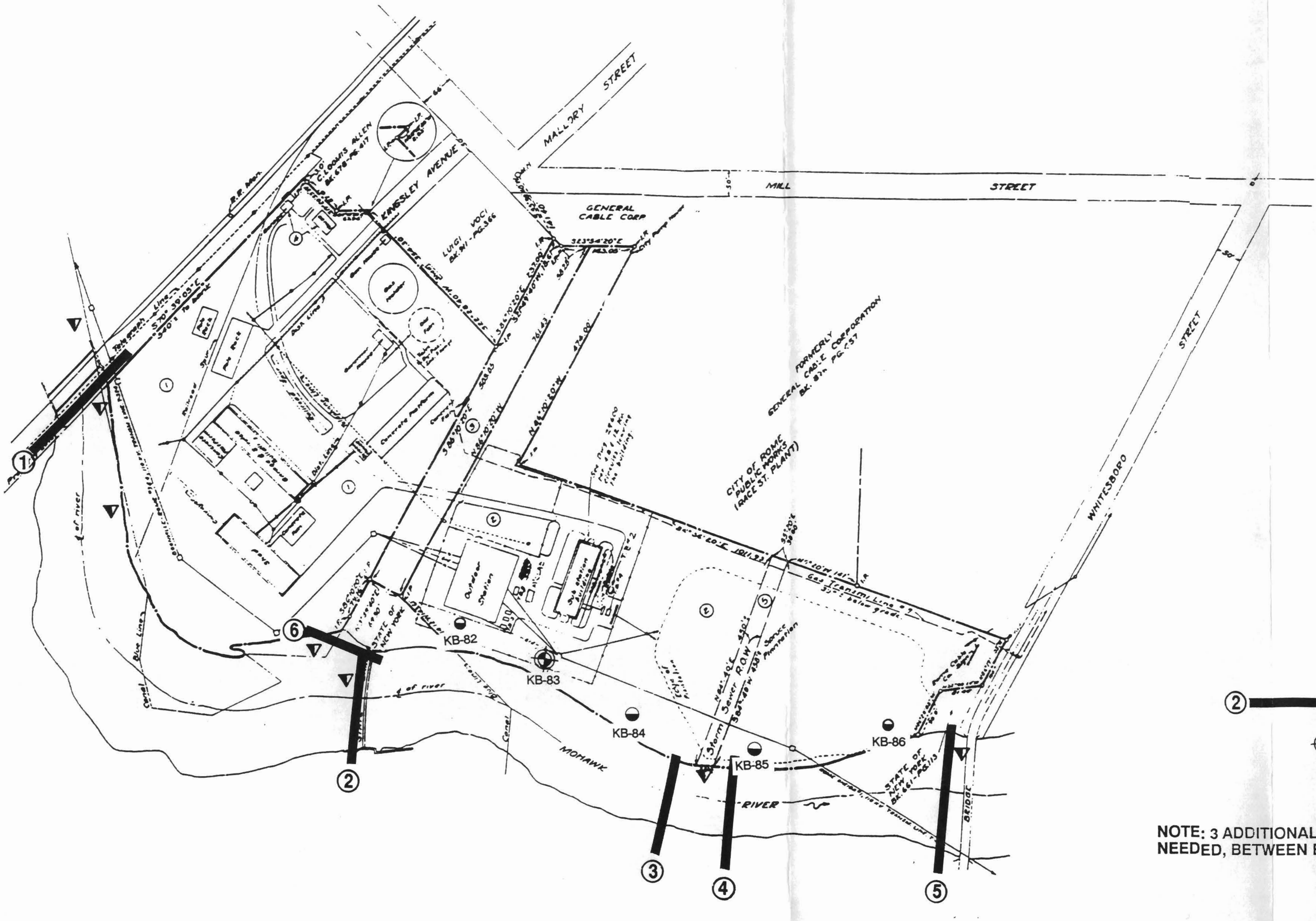
All drilling equipment except the drill rig will be decontaminated by steam cleaning supplemented by the use of Citraclean if necessary. All drill cuttings, fluids and decontamination water will be contained in drums (or a roll-off for soils) and staged on-site for subsequent disposal by NMPC. The roll-offs or drums will be labelled with respect to their contents (development water, decon water, personnel protective equipment, etc.) and origin (well or boring number) where practical. The drums will be labelled as non-hazardous pending subsequent composite sampling and analysis of the drum contents as described in Task 1.3.2.

The borings will be drilled and sampled continuously to the target intervals specified in Table 3.4 using the methods and sampling rationale previously described for Task 1.2.2. Samples will be analyzed as indicated on Table 3.4. The TCL/TAL analyses will be run on visibly contaminated material from the off-site borings to help ensure that possible off-site contamination has the same characteristics as the source(s) on-site, and that the off-site contamination is likely to be site-related.

3.1.3.2 Groundwater - Task 1.3.2

Objectives

To determine the presence, nature, and extent of site-related groundwater contamination on-site and off-site, to provide information regarding vertical and horizontal hydraulic gradients, and to provide hydraulic conductivity information for selected wells.



LEGEND

- PROPOSED SOIL BORING
- PROPOSED SURFACE WATER SAMPLE
- ② PROPOSED SEDIMENT CORE CROSS SECTION
- PROPOSED WELL PAIR

NOTE: 3 ADDITIONAL BORINGS (NOT SHOWN) TO BE PLACED, AS NEEDED, BETWEEN BORING SHOWN TO IDENTIFY FRONT OF PLUME.

SOURCE: NIAGARA HUDSON CENTRAL DIVISION
DRAWING NO. 26821, 1941.

APPROX. SCALE
200 0 200 FT.

CREATED: 6/8/93
SEC 3-C-17

FIGURE 3.2

NIAGARA MOHAWK POWER CORP.
ROME, NEW YORK
PROPOSED OFF - SITE
SAMPLING LOCATIONS

ENGINEERING - SCIENCE
DESIGN • RESEARCH • PLANING
SYRACUSE, NEW YORK

Data Uses

Laboratory analysis data will be used to characterize the nature of any site-related groundwater and/or soil contamination. TCL/TAL analytical data will be compared to New York State Class GA groundwater standards and guidance values, and be used to assess risks to human health. The data from on-site and downgradient wells will be compared to upgradient well data to differentiate site-related contamination from that due to upgradient sources. Groundwater data for "conventional" parameters will be used to support the feasibility study.

Methods - Well Installations

Two-inch diameter PVC monitoring wells will be installed as indicated on Figures 3.1 and 3.2 and Table 3.5. The screen slot size will be 0.02-inch in order to permit DNAPL to flow into the well, if it is present. Steam cleaning of the well screen and pipe will not be necessary as long as the pipe and screen are sealed in the manufacturer's bags.

Well screen placement will be dependent on visual observations, the PID screening results and geologic stratum to be monitored. Well screen placement will target zones indicated in Table 3.5. All wells will have a two-foot sump beneath the screen to allow collection and measurement of any dense NAPL present. The well depths are shown on Table 3.5. Well screens will be a maximum of 10 feet in length. Shallow and intermediate wells in pairs will be augered to the desired depth without sampling.

The double cased monitoring wells will be designed and installed in accordance with NYSDEC-approved methods and specifications. The decision to install double cased wells will be made on a boring-specific basis by the field geologist in consultation with the project manager or technical director. Double cased wells will be installed when the boring for the monitoring well penetrates a presumed confining layer. The confining layer shall be defined as a minimum 5-foot thick, predominantly clay unit which has been shown to be laterally continuous across the site. In the event that the field geologist and project manager or technical director decide a reasonable possibility exists for contamination to be deposited in deeper, clean zones during the drilling and installation of a monitoring well, the well will be double cased. The purpose of the steel protective casing is to ensure that residual contamination is not deposited at the depth of the screened interval during the drilling process.

Double cased wells will be installed in a separate boring, at a minimum distance of 5 feet from the soil boring in which the presumed confining layer or contamination was identified. Five-inch steel outer casing will be installed to a depth of at least 5 feet below the lower limit of observed or measured contamination. This casing will be grouted in place with cement to inhibit downward migration of shallow contamination.

The 5-inch steel casing will be installed through 6.25-inch hollow stem augers. The augers will be filled with grout prior to their removal to ensure the integrity of the borehole and the grout seal. Then the 5-inch steel casing will be installed into the grout and hydraulically pushed approximately 1 foot beyond the bottom of the boring. Potable water will be tremied to the bottom of the inside of the casing to dilute the grout and thereby allow the grout to be more easily pumped out of the casing. The grout pumped out of the inside of the casing will be drummed and staged with other investigation-derived waste.

The cement grout remaining in the annulus between the casing and the formation will be allowed to set for at least 48 hours before drilling is continued. The drilling will then continue using 4-inch diameter flush-joint spin casing and potable water. All lubricant water will be contained with the well development water.

The well will be constructed of 2-inch diameter PVC riser pipe and screen, sand pack, bentonite seal, grout, and surface casing as specified for single-cased monitoring wells, and in accordance with NYSDEC requirements. The bentonite seal may consist of pellets or a mixture of bentonite slurry in proportions relative to 30 gallons of water to 25-30 pounds of bentonite. The grout will consist of the appropriate amount of the following proportional mix: 30 gallons water to three 94-pound bags cement to 25 pounds granular bentonite.

Either a standpipe or flush-mounted construction will be used depending on the final location of each well, the site considerations, potential for damage, etc.

As previously noted, drill cuttings and liquids will be placed in a roll-off container and drums, respectively, and staged on-site. At the completion of the subsurface investigation, two composite samples will be collected; one from the solids and one from the liquids staged on-site. Each sample will be analyzed for TCLP and waste characteristics to determine the proper handling and disposal required for the materials. The Consultant will arrange for the necessary paperwork, but NMPC will ultimately be responsible for directing the Consultant as to the transporter and disposal facility to be used, and for signing the manifests.

Soil samples from each new deep well boring will be analyzed in the field for PAHs and in the laboratory for TCL/TAL as specified in Table 3.4. The well boring samples are to be combined with the soil boring samples (Tasks 1.2.2 and 1.3.1) for QC purposes.

<u>Methods - Groundwater Sampling</u>

Two rounds of samples will be collected from each of the new monitoring wells plus two existing wells in accordance with NYSDEC-approved methods. The wells will be adequately developed (see Appendix A.1) such that field filtering will not be necessary. Each sample will be monitored with an interface probe for NAPL and analyzed for TCL/TAL and selected well pairs will also be analyzed for conventionals. Numbers of samples for this round of groundwater collection are shown on Table 3.6.

The second round of groundwater samples will only be analyzed for the analyte groups detected in the first round. If the VOC concentrations detected during the initial round are low, a low detection limit method (502.2) will be used during the second round for volatile organic analyses.

The groundwater sample analyses, and all other laboratory analyses, will be conducted using NYSDEC Analytical Services Protocol (ASP) methods and Category B deliverables. The laboratory will be an accredited Environmental Laboratory Approval Program (ELAP) laboratory, and well-versed in generating data under the NYSDEC ASP and Superfund program. Use of the ASP methods and deliverables ensures that the methods and format for reporting will allow full data validation if necessary.

Methods - In-Situ Permeability Testing

In-situ permeability testing will be performed on selected monitoring wells to obtain estimates of groundwater velocities and potential groundwater recovery rates for the aquifer in the vicinity of each well. The objective of the hydrologic testing is to characterize the hydraulic properties of the aquifer in the vicinity of the site.

Slug tests will be conducted in selected monitoring wells utilizing the rising and/or falling head slug test techniques. The slug tests will be performed by subjecting water bearing units in the screened interval of monitoring wells to a stress caused by the sudden injection or withdrawal of a stainless steel or PVC slug.

The tests will be conducted using slugs generally consisting of 4- or 10-foot lengths of 1-inch PVC or stainless steel. Slugs and any other down-hole equipment will be decontaminated before and after each test by methods described in Appendix A.

Prior to conducting each slug test, the static water level in the well will be measured to the nearest hundredth of a foot. Water levels will be measured during the test with an electric sounder (water level indicator) graduated to the nearest hundredth of a foot, and also with pressure transducers attached to a digital data logger, thereby providing water level measurements by two independent devices.

A weighted slug will be inserted gently into the well below the water table. The water level will be measured until the water level returns to the pre-insertion level. The slug will be suddenly withdrawn from the well and the water level recovery will be monitored at appropriate intervals until recovery is complete.

Wells which were bailed dry during development (or redevelopment of existing wells) may not be able to provide meaningful data through slug tests. Tests will be terminated in wells which do not recover significantly within 30 minutes to one hour. These wells will be bailed dry, and their recovery measured with an electronic water level indicator while slug tests are conducted in other wells.

In-Situ Permeability Test Analysis

The slug test data will be analyzed using either the Cooper, Bredehoeft, and Papadopulos (1967) type curve method or the Bouwer and Rice (1976, 1989) method. The Cooper et al. analysis assumes that the well penetrates a confined aquifer, and the Bouwer and Rice method applies where unconfined conditions are prevalent.

Well Abandonment

If necessary, wells will be abandoned in the following manner:

1) Remove the protective casing and pad.

2) Overdrill the well casing using hollow-stem augers or casing to at least one foot below the depth of the well as indicated on the boring log.
3) Remove the well casing from the hole. If the casing cannot be removed while the augers are in place, cut off the casing at least two feet, and if possible five feet, below ground surface.
4) Add cement/bentonite grout via tremie from the bottom of the augers as the augers are withdrawn. If the well casing cannot be overdrilled and removed, the well casing will be filled with grout, from the bottom up. The grout mixture will be as specified for the well installation.
5) Add grout to the point where the casing was cut off. From that point up to ground surface, backfill with the native material surrounding the boring.

3.1.3.3 Surface Soil - Task 1.3.3

Objective

The objective of surface soil sampling is to characterize the presence, nature and extent of surface soil contamination on-site. Off-site characterization is not warranted at this time because the historical site boundaries have been consistent over time and activities are not known to have extended off-site.

Data Use

Field screening data will be used to assess the horizontal extent of site-related contamination and to select samples for laboratory analysis. Laboratory analysis data will be used to characterize the nature of site-related contamination and to address risk assessment data requirements. Samples are specified in Table 3.6.

Methods

Five off-site surface soil samples (i.e. top six inches) will be collected and analyzed for TCL/TAL to establish background conditions. The locations will be determined during the site screening (Task 1.1) activities in consultation with NYSDEC. Sample numbers and analyses are summarized on Table 3.6.

Exposed surface soils on-site (i.e. top six inches) will be field screened with the *EnSys* PAH and PCB field kits. Field screening will focus on the areas shown on Figure 3.1. A total of 25 field screening tests will be collected. Only 11 suggested sampling locations are shown on Figure 3.1. Since three background samples will be collected, 11 sample locations will be selected in the field. Five samples will be collected and analyzed for confirmatory laboratory analysis for TCL/TAL. Three of the TCL/TAL analyses will confirm PAH/PCB field positives, and two TCL/TAL analyses will confirm PAH/PCB field negatives.

3.1.3.4 Sediment/Surface Water - Task 1.3.4

Objectives

The objectives of the sediment/surface water sampling are to determine the presence, nature and extent of site-related contamination in surface water/sediments in the Mohawk River.

Data Uses

Field screening data and visual observations will be used to select samples for laboratory analysis and to determine the extent of contamination as specified in Table 3.6. The analytical data will be used to characterize site-related surface water/sediment contamination and to support risk assessments.

Methods

There are three components to this task. First, seven surface water samples will be collected from the following locations in the Mohawk River (Figure 3.2):

1. Upgradient of the site between the Railroad Street Bridge and the northern property boundary.
2. Further upstream to assess the impact of any potential upstream source identified in Task 1.1.1 Site Reconnaissance which may have caused the high levels of contamination observed by NUS in their upstream sample.
3. On-site to investigate the impact from the purifier waste area.
4. In the backwash area between the site and the dam.
5. Upstream of the dam.
6. Storm sewer discharge or downstream of the storm sewer discharge.
7. Whitesboro Street Bridge.

These samples will be analyzed for TCL/TAL to determine whether the site is impacting this surface water body.

The surface water sampling during this task will be combined with the groundwater sampling to minimize the number of QC samples.

Second, six cross-sections of sediment cores will be taken in the Mohawk River. The cross-sections will each consist of six sediment cores (or grab samples if sufficient sediments are not present) taken of the river bottom. The purpose of the cores will be to visually determine if stratification of the river bottom exists and to what depth the sediments may have been impacted by site contaminants. The cross-sections will be made across the Mohawk at the following locations (Figure 3.2):

1. Mohawk River upstream of the site.
2. Mohawk River upstream of the dam, downstream of the site.
3. Mohawk River upstream of the storm sewer.
4. Mohawk River downstream of the storm sewer.
5. Mohawk River at the Whitesboro Street Bridge.

6. Upstream of the dam at the end of the former canal/race across what is now the backwash area.

These locations may be changed in the field based on site conditions.

Third, following sample collection, the core samples will be visually inspected over depth for evidence of contamination or high organic layers which may have adsorbed the contamination. Five field PAH analysis will be conducted at each cross-section to supplement the visual analysis and assist in selecting samples for laboratory analyses (total of 30 field PAH analysis). Twelve of the sediment samples will be submitted to the laboratory for TCL/TAL analysis; two samples will be taken from a core location within each transect. One sample will be from the most contaminated location and one from the apparent clean depth beneath it, based on the PAH analysis. For the other 30 core locations, two MGP indicator analyses will be conducted at each core location to characterize the contaminated/clean zones.

3.1.3.5 Air - Task 1.3.5

The air pathway is addressed as part of Task 1.2.1 - Test Pit Excavations.

3.1.3.6 Site Survey - Task 1.3.6

After the sampling activities are completed, a licensed land surveyor will survey the monitoring wells, sample points, and any other features pertinent to the investigation. A map will be prepared showing the locations and appropriate elevations (i.e., ground surface, top of monitoring well casing, and top of protective well casing, etc.) for each boring, monitoring well, sampling point, and other key points. Vertical control to the nearest 0.01 foot will be established for the ground surface at each boring and the top of each monitoring well PVC casing. Elevations will be determined relative to a regional, local, or project-specific datum point. Horizontal control for exploratory borings, monitoring wells, and sampling points will be located by ties (location and distance) relative to one another and the specified datum point. USGS benchmarks will be used whenever available. A site boundary and topographic survey of the site will also be performed. NMPC will be responsible for all surveying activities.

3.1.4 Data Validation and Evaluation - Task 1.4

Data received from the laboratory from the RI efforts will be validated using EPA Guidelines (EPA, 1991a, 1991b) by a NYSDEC-approved data validator. Any concerns about the use of the laboratory data for engineering evaluation or risk assessment purposes will be documented. Data validation reports will be included along with the reported data.

Following data validation, the data from the RI efforts will be reduced, tabulated and evaluated. Sample analysis data and QA/QC results will be included in the data evaluation effort. All tabulated data will be included in the applicable RI/FS reports.

The raw analytical data will be compiled onto spreadsheets and submitted with the boring logs to NYSDEC as an interim RI data submittal. No interpretation or evaluation of the data will be included. This document will be submitted prior to the Phase II RI activities and prior to the RI report.

3.2 PHASE II SITE CHARACTERIZATION - TASK 2

Based on the results of the Task 1 activities, a second phase of field investigation may be recommended. Should the need arise, a brief Phase II RI Work Plan and revised schedule will be prepared for NYSDEC review and approval. Task 2 is summarized in Table 3.1.

3.2.1 Phase II Sampling and Analysis - Task 2.1

The primary objective of the Phase II RI sampling effort will be to obtain the data necessary to more completely evaluate site characteristics, and to carry out a more detailed evaluation of various alternatives for use at the site. The scope of this effort will be fully developed following the Phase I Site Characterization effort, and agreed to with NMPC and NYSDEC prior to performing additional field work. The additional field work could require additional soil, sediment, groundwater or air samples. If the Phase I investigation finds that contamination from the site is affecting the off-site ecology, a more extensive habitat based assessment (Step II) may be conducted based on discussions with NMPC and NYSDEC, as discussed in Section 3.3.1.2.

3.2.2 Phase II Data Validation - Task 2.2

Data received from the laboratory from the Phase II effort will be validated using EPA Guidelines (EPA, 1991a, 1991b) by a NYSDEC-approved data validator. Any concerns about the use of the laboratory data for engineering evaluation or risk assessment purposes will be documented. Data validation reports will be included along with the reported data.

3.2.3 Phase II Data Evaluation - Task 2.3

Following data validation, the data from the Phase II RI efforts will be reduced, tabulated and evaluated. Sample analysis data and QA/QC results will be included in the data evaluation effort. All tabulated data will be included in the applicable RI Report. A data usability report will be prepared which identifies data gaps caused by non-compliant or rejected data, and indicates what steps have been or will be taken to fill these gaps.

3.3 PREPARE REMEDIAL INVESTIGATION REPORT - TASK 3

A summary of Task 3 activities is presented on Table 3.7

3.3.1 Risk Assessment - Task 3.1

3.3.1.1 Baseline Human Health Evaluation - Task 3.1.1

A human health evaluation and ecological evaluation will be conducted for the site, in accordance with the most recent EPA guidance for risk assessment. The nature of the human health evaluation will depend on the chemicals detected, however it is

TABLE 3.7

TASK 3 SUMMARY

PREPARE REMEDIAL INVESTIGATION REPORT

Task 3.1 Perform Risk Assessment

- Task 3.1.1 Baseline Human Health Evaluation
- Task 3.1.2 Ecological Habitat-Based Assessment

Task 3.2 Prepare Draft RI Report

Task 3.3 NYSDEC Review

Task 3.4 Prepare Final RI Report

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anticipated that a baseline human health evaluation will be necessary. The following guidance documents will be used, as appropriate:

- U.S. EPA Risk Assessment Guidance for Superfund: Vol. I. Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December, 1989.

  U.S. EPA Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors", OSWER Directive 9285.6-0.3, March, 1991.

- U.S. EPA Assessing Human Health Risks from Chemically Contaminated Fish and Shellfish: A Guidance Manual. EPA-503/8-89-002. September, 1989.
- U.S. EPA Exposure Factors Handbook EPA/600/8-89/043. March, 1990.
- U.S. EPA Dermal Exposure Assessment: Principles and Applications. Interim Report. EPA/600/8-91/011B. January, 1992.

  Health Effects Assessment Summary Tables (HEAST). (Most recent listing available from EPA)

  U.S. EPA IRIS (Integrated Risk Information System) database (on-line, 1991)

  U.S. EPA Risk Assessment Guidance for Superfund: Vol. II. Environmental Evaluation Manual (EPA, 1989)

- U.S. EPA Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference. EPA/600/3-89/013. March, 1989.

The objective of the baseline evaluation is to assess the potential risks to human health and the environment which may be caused by hazardous substances released from the site in the absence of any actions to control or mitigate these releases (the no-action alternative). Current and hypothetical future exposure scenarios will be considered. Basic steps involved in the risk assessment include data evaluation, exposure assessment, toxicity evaluation and risk characterization. Analytical data collected at the site will be used to generate quantitative estimates of risk. All assumptions and uncertainties will be defined in the assessment. Because contamination may be present in soils associated with the human exposure pathways, a baseline evaluation will most likely include:

- Oral, dermal and inhalation exposure to chemicals in surface soils by residents and workers;
- Oral, dermal and inhalation exposure to chemicals in deeper soils (over 2 feet) by hypothetical future residents who might live on-site;
- Oral, dermal and inhalation exposure to chemicals in groundwater by hypothetical future residents who might actually live at the site.

The objective of the exposure assessment is to estimate the type and magnitude of exposures to the chemicals of potential concern that are present at or migrating from the site. A completed exposure pathway is comprised of the following four elements:

- A source and mechanism for chemical release:
- An environmental transport medium;
- An exposure point; and
- A human receptor and a feasible route of exposure at the exposure point.

A pathway is not complete unless each of these elements is present.

The ecological assessment will focus on impacts associated with soil contamination, and upon potential impacts, if any, on nearby surface waters.

3.3.1.2 Ecological Habitat-Based Assessment - Task 3.1.2

A habitat site description will be developed per NYSDEC Guidance (NYSDEC, 1991a) using existing data acquired from state and federal agency resource files, aerial photography (scale 1:15,000 preferred), USGS topographic maps (scale 1:24,000), and information obtained from a two-day visit. The site visit will be conducted by an ecologist experienced in identifying, characterizing, and evaluating terrestrial, wetland, and general aquatic conditions. The ecologist will concentrate field characterization activities on the site and on the 0.5-mile zone surrounding the site. Information on dominant vegetation species, cover types, associated common wildlife, and the presence of significant habitats (as defined by NYSDEC) will be recorded as appropriate within this zone.

The ecologist will also complete a more general reconnaissance level survey of fish, wildlife, vegetation cover types, and significant habitat conditions within the 2-mile zone. The purposes of this survey will be to identify and characterize the presence, location, and uses of special resources within this zone, and to ensure that existing data and information collected for this area actually reflects present conditions. For special resources occurring within the 2-mile zone, the ecologist will note major vegetative communities, typical plant species, likely fish and wildlife uses, and common wildlife species observed during the field survey. All other habitat conditions and characteristics will be derived from existing information, photographs, reports, and maps obtained from the appropriate state, federal, and local agencies or sources.

The current and potential use(s) of fish and wildlife resources by humans will be determined and described. Sources of information for this determination will include field observations and personal communications with the local NYSDEC conservation officer and local residents. Uses will be determined for the site and the 0.5-mile and the 2.0-mile areas.

Finally, applicable New York State standards, criteria, and guidelines (SCGs) ARARs, and TBCs will be identified, compiled, and organized into related groups of regulatory criteria for the purposes of supporting the design of the site remediation investigation and for selecting desirable remediation objectives. These criteria will be established after the type and nature of the contaminants in the different physical media have been identified by the initial site sampling program. Contaminant-specific and site-specific criteria will be included. In addition, any substantive permitting requirements associated with accommodating these criteria will be identified and concisely summarized as they apply to the site characteristics. The biological implications or potential risks resulting from contaminant concentrations meeting or exceeding these criteria will not be addressed as part of Step I. Rather, detailed evaluations will be addressed by Step II - contaminant-specific impact analysis (if necessary). As part of Step I, an initial screening analysis of mean and maximum contaminant concentrations against the regulatory criteria will be conducted to identify whether any of the contaminants are present at concentrations that might represent adverse conditions for fish, wildlife, and/or vegetation resources.

Step II - HBA Effort

The need for completion of additional HBA tasks will be determined during the first phase steps outlined in the preceding sections. Possible additional work could include the following items:

- Conduct contaminant-specific impact analysis (Step II), and determine the ecological effects of remedial alternatives (Step III).
- Collect and analyze biological tissue samples for contaminants of concern identified during Step II; should this phase be necessary, special standard analytical techniques required to achieve the low detection limits needed for the impact analysis will be utilized;
- Collect and analyze additional physical media samples (e.g., sediment or surface water) to fill data gaps identified during Steps I and II;
- Expand toxicological research efforts for any chemicals of concern for which sufficient data to adequately characterize risks were not obtained during Phase I;
- Revise impact analyses and mitigation recommendations as appropriate; and,
- Revise the interim findings in the report to reflect results of all efforts.

Should the need for Step II HBA activities arise, a Step II work plan and schedule will be prepared for NYSDEC review and approval. The level of effort will be determined based on data needs, the management and cleanup goals, and the Fish and Wildlife Impact Analysis (NYSDEC, 1991) guidance document.

3.3.2 Prepare Draft RI Report

The Draft RI Report will present data collected during the Site Characterization efforts and previous site activities such as the PSA/IRM, and assess the nature, extent, and potential impacts of the contamination to human health or the environment. These impacts will be assessed as discussed in Section 3.3.1. The report will also document all work performed and present results of chemical and geotechnical analyses. The RI Report will be organized in accordance with EPA's 1988 RI/FS guidance. The report will be organized into the following sections:

- Section 1 - Introduction, including purpose and background;

- Section 2 - Study Area Investigation, including source identification and data collection methods;
- Section 3 - Physical Characteristics of the Study Area, including surface features, hydrology, geology, etc.;
- Section 4- Nature and Extent of Contamination, including potential contaminant sources, analytical results, and contamination assessment;
- Select 5 - Contaminant Fate and Transport, including potential routes of migration, persistence, and migration;
- Section 6 - Baseline Risk Assessment, including human health evaluation and ecological assessment; and
- Section 7 - Summary, Conclusion, and Recommendations.

3.3.3 NYSDEC Review - Task 3.4

Following submission of the Draft RI Report, a meeting with NMPC and NYSDEC will be conducted to review the conclusions and recommendations. The review will include a discussion of any additional data needs which may be necessary in evaluating the alternatives.

This meeting will form the basis for the finalizing the RI Report. During the meeting, the direction of the FS will be discussed. Public involvement during this effort is described in the Citizen Participation Plan included in the Appendix C.

3.3.4 Prepare Final RI Report

Following NYSDEC review, the department's comments will be addressed and incorporated into the Final RI Report.

3.4 CONDUCT FEASIBILITY STUDY - TASK 4

The following sections describe the various tasks involved with the Phase I Feasibility Study in preparation of the Preliminary Data Evaluation Report. The Task 2 activities are summarized in Table 3.8. The FS reports will be prepared in accordance with "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (USEPA, October 1988) and NYSDEC TAGMs HWR-89-4025 "Guidelines for Remedial Investigation/Feasibility Studies" and HWR-90-4030 "Selection of Remedial Actions at Inactive Hazardous Waste Sites".

3.4.1 Identify ARARs - Task 4.1

This task includes the identification of applicable or relevant and appropriate requirements (ARARs) such as those listed in Table 3.9, and other potential action levels such as for metals and PCBs in soils. Federal and state criteria, advisories, and guidance which are applicable to the contaminated substances of concern at the site will be identified. If suitable ARARs are not available that account for the potential exposures to each target contaminant, available dose response information will be

TABLE 3.8

TASK 4 SUMMARY
CONDUCT FEASIBILITY STUDY

Task 4.1	Identify ARARs
Task 4.2	Establish Remedial Action Objectives
Task 4.3	Develop General Response Actions
Task 4.4	Identify Volumes and Areas of Concern
Task 4.5	Identification and Screening of Remedial Technologies and Process Options
Task 4.6	Develop Remedial Alternatives
Task 4.7	Preliminary Screening of Alternatives
Task 4.8	Literature Survey
Task 4.9	Treatability Studies
Task 4.10	Information Collection
Task 4.11	Alternative Evaluation and Assessment
Task 4.12	Select Recommended Remedy
Task 4.13	Design Conceptual Plan
Task 4.14	Prepare Draft FS Report
Task 4.15	NYSDEC Review
Task 4.16	Prepare Final FS Report

identified for use in Task 3.1.1. The ARARs identified during this effort will be listed in the Preliminary Data Evaluation Report.

3.4.2 Establish Remedial Action Objectives - Task 4.2

Remedial action objectives will be developed for soils, sediment, groundwater, and other media as needed, specifying the contaminants of interest, exposure pathways and remediation goals. The objectives may vary from one media to another depending upon, for example, the contaminants present in each media and the significance of each exposure pathway. These objectives will be based on contaminant-specific cleanup criteria and ARARs and on the results of the site-specific risk assessment. The guidance for cleanup criteria will include the NYSDEC Hazardous Waste Remediation Draft TAGM: "Determination of Cleanup Goals" and the Division of Fish and Wildlife's Sediment Criteria Document. The NYSDEC will be consulted during this phase of the study for input concerning cleanup objectives. The remedial action objectives described in the FS report will be modified based on site-specific considerations.

3.4.3 Develop General Response Actions - Task 4.3

General response actions describe those actions that will satisfy the remedial action objectives. This may include actions such as treatment, containment, excavation, disposal, institutional controls, or a combination of these. General response actions will be developed for all contaminated media of concern.

3.4.4 Identify Volumes and Areas of Concern - Task 4.4

Based on the results of the Phase I RI efforts and on the site-specific remedial action objectives, the areas and volumes of contaminated media requiring remedial action will be estimated. These estimates may require refinement following the Phase II RI efforts.

3.4.5 Identification and Screening of Remedial Technologies and Process Options - Task 4.5

Remedial technologies which have the potential for satisfying each of the identified remedial objectives will be identified. Technologies proven effective will be considered and will be used during development of site-specific remedial alternatives. Emerging technologies, such as those currently being evaluated by EPA will be included as information about such technologies becomes available. Testing of remedial technologies for their applicability to the conditions at the site will be done as needed during the Phase II RI efforts.

Tables 3.10 and 3.11 list some specific technologies that may be applicable for remediating groundwater and soils, respectively. Typical data needs for each type of technology are also listed. Technologies for remediation of other media such as sediment or buildings will be developed as necessary. Additional data that are needed once technologies are identified as relevant to the site will be collected as part of the Phase II Site Characterization efforts.

TABLE 3.9

TYPICAL POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

- Federal and State solid and hazardous waste rules and regulations under RCRA, CERCLA/SARA.
- Applicable requirements under the Federal Toxic Substances Control Act (TSCA) (e.g., for PCBs).
- Federal and State surface water and groundwater quality standards and criteria.
- Ambient air quality standards.
- Discharge permit requirements under the State Permit Discharge Elimination System (SPDES) program.
- Drinking water maximum contaminant levels.
- Limits for protection of human health developed by the Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH).
- Federal and State regulations for protection of wetlands, endangered and threatened species and other specially designated natural resources.

TABLE 3.10

TECHNOLOGIES POTENTIALLY APPLICABLE FOR TREATMENT, STABILIZATION OR CONTAINMENT OF CONTAMINATED SOILS AND SEDIMENTS

Technology	Description	Potential Technology Data Needs	Comment
Soil Washing/Soil Flushing	Elute contaminants from soil in-situ (flushing) or after excavation (washing) with special solution. Treat the elutrate.	• Soil type and uniformity • Percent moisture • Bulk density • Grain-size distribution • Atterberg limits • Permeability • Unconfined compressive strength	• Bench-scale testing would be needed.
Fixation Technologies (e.g., Solidification)	Immobilize contaminants for landfill disposal or placement on-site. May be immobilized through cementatious process or asphalt batching.	• Percent moisture • Bulk density • Grain-size distribution • Atterberg limits • Unconfined compressive strength	• Bench-scale testing would be needed with different stabilization agents. • Cementing being tested off-site at Harbor Point. • Asphalt batching being tested on-site at Harbor Point site.
Biological Treatment	Treatment of soils or sediments in-situ or after excavation by enhancing the growth of microbes especially adapted to dechlorination and/or degradation of organic compounds.	• Contaminant concentrations • Soil pH • % Moisture • Soil type and uniformity • Bulk density • Total organic carbon (TOC) • Types and quantities of microorganisms and nutrients	• Bench-scale testing would be needed. • Temperature dependent. • Bioslurry being tested at Harbor Point site for treatment of river sediment.

TABLE 3.10, CONTINUED

TECHNOLOGIES POTENTIALLY APPLICABLE FOR TREATMENT, STABILIZATION OR CONTAINMENT OF CONTAMINATED SOILS AND SEDIMENTS

Technology	Description	Potential Technology Data Needs	Comment
Dewatering	Removal of water to reduce volume and perhaps mobility or toxicity	• Percent moisture • Bulk density • Grain-size distribution • Atterberg limits • Unconfined compressive strength	• Bench-scale dewaterability testing would be needed. • Various types of dewatering processes are potentially applicable. • Bearing capability and other geotechnical characteristics of dewatered material would need to be evaluated.
On-Site Containment	Cap with or without containment such as slurry walls in other directions.	• Organic and metal concentrations • EP toxicity • Bulk density	• Treatment or stabilization could precede containment. • Slurry walls may be appropriate for certain site settings.
Off-Site Landfill Disposal	Excavation and transport to an approved landfill.	• Soil characterization as dictated by the landfill operator and the governing regulatory agency. • Bulk density • Moisture content	• Same as for on-site containment above.

TABLE 3.10, CONTINUED
TECHNOLOGIES POTENTIALLY APPLICABLE FOR TREATMENT, STABILIZATION OR CONTAINMENT OF CONTAMINATED SOILS AND SEDIMENTS

Technology	Description	Potential Technology Data Needs	Comment
On-Site or Off-Site Incineration	Combustion/oxidation at very high temperatures.	• Metal concentrations • Ash percentage and toxicity • Moisture content • pH • Bulk density • BTU Value • Carbon content • Sulfur content • Volatile solids	• Parameters specific to incineration could be analyzed as part of a treatability study. • Metals would likely be concentrated in residual ash. • Being tested off-site at Harbor Point site.
Dechlorination	Destruction of chlorinated compounds by reaction with an alkali metal polyethylene glycol reagent such as KPEG.	• Contaminant concentration • Moisture content	• Bench-scale testing would be needed.
Solvent Extraction	Extraction of organics from contaminated soils and sediments using a liquified gas or other suitable solvent.	• Contaminant concentration • Moisture content • Bulk density • Soil type and uniformity • Grain-size distribution	• Being considered for testing at Harbor Point site.
In-Situ Vitrification	Uses an electrical network to melt soil @ 1600-2000°C thus destroying organic contaminants and immobilizing inorganic contaminants.	• Contaminant concentration • Moisture content • Bulk density • Void volume • Volume of suitable glass forming materials • Percent buried metals • Soil type and uniformity • Grain-size distribution	• Has been demonstrated at field-scale on radioactive waste. • Has been tested at pilot-scale on chemical wastes.

TABLE 3.10, CONTINUED
TECHNOLOGIES POTENTIALLY APPLICABLE FOR TREATMENT, STABILIZATION OR CONTAINMENT OF CONTAMINATED SOILS AND SEDIMENTS

Technology	Description	Potential Technology Data Needs	Comment
In-Situ Steam/Air Stripping	Air/steam injected into contaminated soil to vaporize and remove volatile organic contaminants. Off-gas is treated on site.	Contaminant concentration • Moisture content • Bulk density • Soil type and uniformity • Grain-size distribution	• Has been tested at field-scale. Results not yet available.
Thermal Desorption	Thermal desorption operating at temperature between 500°F and 1150°F. Volatiles and low boiling point hydrocarbon fractions removed at the lower temperature. High boiling point fractures (e.g. PCBs) desorbed at higher temperatures. Off gasses are treated by unit.	• Contaminant Concentrations • Moisture Content • Oil & Grease Content • Bulk Density • Soil Type and Uniformity • Grain-Size Distribution	• Commercially available. Being tested at Harbor Point site, including Dutch process.

TABLE 3.11

TECHNOLOGIES POTENTIALLY APPLICABLE FOR TREATMENT OR CONTAINMENT OF CONTAMINATED GROUNDWATER

Technology	Description	Field Data Requirement	Comment
Slurry Wall	Physical barrier to horizontal subsurface migration.	• Depth to water table • Depth to confining layer • Groundwater gradients • Wall material-contaminant compatibility	
Leachate Collection	Subsurface piping to collect groundwater having potentiometric heads that exceed pipe slot elevations.	• Depth to water table • Groundwater gradients • Hydraulic conductivity • Specific yield estimate • Porosity	
Groundwater Recovery via wells or trench	Water level drawdown with well points or a lin trench that acts as a series of wells.	• Same as for leachate collection above	• Aquifer tests may be necessary prior to system design.
Discharge to POTW	Discharge contaminated water to sanitary sewer system. Contaminants are air stripped or biodegraded at waste water treatment plant.	• Contaminant types and concentration	• Requires easy access to sanitary sewer system and permitting from POTW.

TABLE 3.11, CONTINUED

TECHNOLOGIES POTENTIALLY APPLICABLE FOR TREATMENT OR CONTAINMENT OF CONTAMINATED GROUNDWATER

Technology	Description	Field Data Requirement	Comment
Discharge to Surface Water	Contaminated groundwater discharge to surface water body where it is more likely to be volatilized or biodegraded.	• Contaminant type and concentration	• Requires large body of water to accommodate contaminated water and NPDES permit.
Granular Activated Carbon (GAC)	Contaminants such as VOCs or PCBs removed from water by adsorption to GAC.	• Total Organic Carbon (TOC) • Chemical Oxidation Demand (COD) • Total Suspended Solids (TSS)	• Well established technology.
Biological Treatment	Organic contaminants destroyed by enhanced microbial growth system such as a fixed film reactor.	• Contaminant type and concentration • pH • TOC	• Innovative technology. • Difficult for chlorinated compounds.
Oxidation	Water contaminants destroyed by oxidation using UV light, ozone or some other oxidizer.	• pH • Alkalinity • Contaminant type and concentration • Total suspended solids (TSS)	

3.4.6 Develop Remedial Alternatives - Task 4.6

The alternatives to be evaluated will include no-action, media treatment, media containment, media removal and combinations thereof. Technologies which meet remedial action objectives and are applicable to the site will be incorporated into a limited number (4 to 6) of remedial action alternatives. These remedial alternatives may include the use of different technologies at different areas of the site.

3.4.7 Preliminary Screening of Alternatives - Task 4.7

The purpose of the preliminary screening is to narrow the list of potential remedial actions for the detailed alternatives evaluation effort. The preliminary screening of the alternatives will be accomplished using NYSDEC TAGM HW-90-4030, considering effectiveness and implementability. Effectiveness will include an evaluation of the action from the following perspectives: (1) ability to meet the ARARs and protect human health and the environment (degree of protection), (2) ability to significantly and permanently reduce contaminant toxicity, mobility or volume (accomplish performance objectives), (3) ability to provide a permanent solution or remedy and thereby limit operation and maintenance requirements, (4) technical reliability, (5) demonstrated performance, and (6) ability to comply with Federal, state and local laws and regulations. Implementability will include the following: (1) constructability (technical and administrative feasibility), (2) concerns for worker and public health and safety during construction, (3) the period of time for the alternative to become operational and effective, and (4) availability of components or treatment facilities.

Innovative alternatives will be carried through this screening, if these actions offer a potential for better treatment performance or implementability, fewer adverse impacts, or lower costs than demonstrated technologies. The retained actions will also include a containment alternative and the no action alternative.

3.4.8 Literature Survey - Task 4.8

Technical literature and information available from manufacturers about the performance, costs, applicability and implementability of candidate technologies will be assessed. The need for treatability testing will be documented from the available literature and other information.

3.4.9 Treatability Studies - Task 4.9

The purpose of the additional studies is to further assess the feasibility or performance of a particular technology(ies) for the wastes or media at the site. Treatability studies are often conducted to fill information gaps that exist following a review of full- and treatability-scale operations performed elsewhere. The effectiveness of these technologies must be tested on the soil and waste type found at the site to assure they will be successful.

Several potentially applicable technologies have already been tested at the bench-scale by Niagara Mohawk at the Harbor Point site and pilot-scale testing is currently underway. It is anticipated that this testing will minimize additional testing requirements. However, additional bench-scale and/or pilot-scale testing may be required to test specific technologies under site-specific conditions. Technologies not evaluated at the Harbor Point site may also be considered.

If it is determined that treatability testing is needed, a work plan for such testing will be submitted to NMPC for its review and approval. The treatability study work plan would, as needed, contain the same three elements as the RI/FS Work Plan: The main body of the work plan, a sampling and analysis plan, and a health and safety plan. The main body of the work plan would include objectives, procedures, methods, conditions to be tested, and methods for data analysis, and include specific identification of criteria for judging possible acceptance for full scale application. The sampling and analysis plan and the health and safety plan, if needed, would prescribe supplemental field, quality assurance and health and safety procedures not specified in this RI/FS Work Plan.

After any treatability work is completed, a treatability study evaluation will be submitted to NMPC as part of the Draft RI/FS Report. If conducted, this evaluation will include a presentation and analysis of the treatability study results including an evaluation of the suitability of the tested technology(ies) for the site.

3.4.10 Information Collection - Task 4.10

The information required to more completely refine the alternatives that remain after preliminary screening, and to allow evaluation of each alternative, will be developed in this task. The information required to refine alternatives at this stage of the process may consist of preliminary design calculations, process flow diagrams, sizing of key process components, preliminary site layouts, and a knowledge of limitations, assumptions, and uncertainties concerning each alternative.

3.4.11 Alternative Evaluation and Assessment - Task 4.11

Individual alternatives will be evaluated against the criteria and factors in Table 3.12 using NYSDEC guidance (NYSDEC, 1990) procedures and evaluation forms. Following the individual evaluations, a comparative analysis will be conducted to evaluate the relative performance of each alternative in relation to each specific evaluation criterion. This analysis is in contrast to the preceding analysis in which each alternative was analyzed independently without the consideration of interrelationships between alternatives. This comparative analysis will identify the advantages and disadvantages of each alternative relative to one another so that the key trade-offs to be evaluated by the decision maker can be identified.

Current guidance - Each alternative is scored with the lowest cost option receiving the highest score, highest cost option receiving lowest score, and those in between scored relative to the highest and lowest cost alternatives.

Future guidance which is out for public review may modify this cost evaluation. If implemented, alternatives will no longer receive a numerical score. Remedies will be ranked in order of preference without cost. More effective remedies will be selected until the increase in effectiveness does not justify the increase in cost.

TABLE 3.12

NYSDEC CRITERIA FOR DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

Short-Term Impacts and Effectiveness	Long-Term Effectiveness and Performance	Reduction of Toxicity, Mobility and Volume	Implementability
• Protection of Community During Remedial Actions	• Magnitude of Residual Risk	• Treatment Process Used and Materials Treated	• Ability to Construct and Operate the Technology
• Protection of Workers During Remedial Actions	• Adequacy of Controls	• Amount of Hazardous Materials Destroyed or Treated	• Reliability of the Technology Based on its Acceptable Demonstrations
• Environmental Impacts	• Reliability of Controls	• Degree of Expected Reductions in Toxicity, Mobility and Volume	• East of Undertaking Additional Remedial Actions, if Necessary
• Time Until Remedial Action Objectives are Achieved		• Degree to Which Treatment is Irreversible	• Ability to Monitor Effectiveness of Remedy
		• Type and Quantity of Hazardous Residuals Remaining After Treatment	• Availability of Necessary Equipment and Specialists
			• Timing of New Technology Under Consideration

TABLE 3.12, CONTINUED

NYSDEC CRITERIA FOR DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

Compliance With ARARs	Protection of Human Health and the Environment	Cost
• Compliance With Contaminant-Specific ARARs	• Environmental Impacts	• Immediate Capital Costs
• Compliance With Action-Specific ARARs	• Transport of Hazardous Materials	• Operating and Maintenance Costs
• Compliance With Location-Specific ARARs	• Health Impacts	• Cost to Future Land Use
• Compliance With Other Criteria, Advisories and Guidances		• Present Worth Cost
		• Future System Upgrade Costs

Reference: NYSDEC, 1989b

3.4.12 Select Recommended Remedy - Task 4.12

Based on the detailed evaluation, a remedy will be recommended that is protective of public health and the environment, meets the applicable or relevant and appropriate regulatory requirements and cleanup objectives that have been identified to the maximum extent practicable, is cost effective, reflects consideration of the preference for treatment rather than disposal, and represents the best balance of all evaluation criteria and considerations acceptable to NYSDEC.

3.4.13 Design Conceptual Plan - Task 4.13

A conceptual plan will be designed for implementing the recommended alternative and verifying that it is feasible.

This conceptual plan will include:

- Preliminary Design Calculations
- Process Flow Diagrams
- Sizing of Key Process Components
- Preliminary Site Layout
- Cost Estimates for Implementation
- Expected Performance
- Implementation Schedule
- Health and Safety
- Description of Design and Operational Features
- Protection of the Public and Environment.

3.4.14 Prepare Draft FS Report - Task 4.14

A Draft FS Report will summarize the Phase I and Phase II site characterization data, document the recommendations made, and describe all preceding FS tasks performed and assist the decision maker in selecting the final remedy. The report will describe the remedial technologies and alternatives that were evaluated and the rationale for selection. The most feasible alternative, along with its projected cost and regulatory impact will be identified.

The report will be consistent with the suggested FS report format in the 1988 EPA guidance document. The report will consist of the sections listed below:

Section 1 Introduction - Includes site background and project objectives, including a description of the field activities carried out as part of the site investigation, site characteristics such as geology, hydrogeology, meteorology, surface features, the nature and extent of contamination, contaminant fate and transport, discussion and conclusions of the baseline human health evaluation and habitat-based assessment;

Section 2 Identification and Screening of Technologies - This section will include remedial action objectives and ARARs along with the technology screening;

Section 3 Development and Screening of Alternatives - Describes screening of the remedial alternatives considered for the site;

Section 4 Detailed Analysis and Ranking of Alternatives - The alternatives are analyzed and ranked;

Section 5 Recommended Remedy; and

Section 6 Conceptual Plan - Includes a conceptual plan for implementation of the recommended remedial alternative.

3.4.15 NYSDEC Review - Task 4.15

Following completion of the submission of the Draft FS Report, a meeting with NMPC and NYSDEC will be conducted to review the analysis and discuss how the alternatives comply with the established ARARs and objectives. The detailed analysis and discussion meeting will form the basis for the finalization of the FS Report. The community involvement in this process is described in the Citizen Participation Plan included in Appendix C.

3.4.16 Prepare Final FS Report - Task 4.16

A Final FS Report will be prepared for NMPC and distributed to NYSDEC. The final report will incorporate those changes to the Draft FS Report recommended and approved by NMPC, and incorporate NYSDEC concerns as appropriate.