

The electronic version of this file/report should have the file name:

Type of document . Site Number . Year-Month . File *Year-Year* or Report name . pdf

letter. _____ . _____ - ____ . CorrespondenceFile _____ .pdf

example: *letter . Site Number . Year-Month . CorrespondanceFileYear-Year . pdf*

report. hw932053 . 1998 - 08 . ContingencyPlan-8-19-98 .pdf

example: *report . Site Number . Year-Month . ReportName . pdf*

if a non-foilage site: add ".nf.pdf" at end of file name

Project Site numbers will be proceeded by the following:

Municipal Brownfields - B

Superfund - HW

Spills - SP

ERP - E

VCP - V

BCP - C

CRA

CONTINGENCY PLAN

**Stauffer Management Company
Lewiston, New York Site
Niagara Falls, New York**

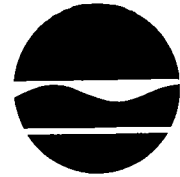
Prepared By:

**CRA Services
2055 Niagara Falls Boulevard
Niagara Falls, NY 14304**

Printed On: August 19, 1998

New York State Department of Environmental Conservation

270 Michigan Avenue, Buffalo, New York 14203-2999
(716) 851-7220



John P Cahill
Commissioner

August 26, 1998

Ms. Carol Dickerson
Hydrological Associate
Zeneca, Inc.
Wilmington, DE 19897

Dear Ms. Dickerson:

Stauffer Plant Site # 932053
Lewiston, NY
Contingency Plan - August 1998

I have looked at the Contingency Plan for the Stauffer Plant Site and have noted some points which I think may need to be clarified or modified.

- 1) Section 1.0 does not mention a route to the nearest hospital in the list of figures.
- 2) Subpoint (iii) in section 1.0 indicates that a dense non-aqueous phase liquid (DNAPL) recovery system is presently in operation at the site. Does this refer to the DNAPL recovery well located in the DNAPL shed? If so you may want to modify this plan since this recovery well has yet to operate and if I remember correctly there are no immediate plans for its operation.
- 3) Question - Is the high level switch in the floor sump, as noted in section 1.2.1, tested on a regular basis?
- 4)

Sincerely,

Gerald F. Pietraszek
Project Manager
Region 9
Division of Environmental Remediation

cc: Mr. Martin L Doster - Environmental Remediation - Region 9
Mr. Brian Sadowski - Environmental Remediation - Region 9

RECEIVED

AUG 24 1998

NYSDEC - REG. 9
FOIL
REL UNREL

CONTINGENCY PLAN

Stauffer Management Company
Lewiston, New York Site
Niagara Falls, New York

AUGUST 1998

REF. NO. 6488-76 (6)

This report is printed on recycled paper.

CRA SERVICES

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION.....	1
1.1 SITE SECURITY	2
1.2 TREATMENT AREA DESCRIPTION.....	2
1.2.1 GROUNDWATER TREATMENT AREA CONTAINMENT.....	2
1.2.2 GROUNDWATER TREATMENT SYSTEM.....	2
1.2.3 AREA A SVE SYSTEM.....	3
1.2.4 AREA T4 SVE SYSTEM.....	3
1.2.5 AREA C SVE SYSTEM	3
2.0 PROJECT PERSONNEL RESPONSIBILITIES DURING EMERGENCIES.....	4
3.0 EMERGENCY TELEPHONE NUMBERS	5
4.0 RESPONSE TO EMERGENCY SITUATIONS.....	7
4.1 GENERAL INSTRUCTIONS.....	7
4.2 STORAGE TANKS AND PIPING SYSTEM FAILURES	8
4.3 MEDICAL EMERGENCIES.....	9
4.4 FIRE.....	9
4.5 EXPLOSION	11
5.0 LIST OF EMERGENCY EQUIPMENT	12
6.0 EVACUATION PLAN.....	13
7.0 SUMMARY OF AGREEMENTS WITH EMERGENCY RESPONSE OFFICIALS.....	14

LIST OF FIGURES
(Following Report)

FIGURE 1.1	SITE LAYOUT
FIGURE 1.2	SITE PLAN
FIGURE 1.3	LAYOUT/FLOOR PLAN OF THE TREATMENT FACILITY

LIST OF TABLES

TABLE 1.1	TANK INFORMATION
TABLE 1.2	CHEMICAL COMPOUNDS OF CONCERN
TABLE 1.3	EXPOSURE ROUTES AND EXPOSURE LEVELS FOR THE CHEMICAL COMPOUNDS OF CONCERN

1.0 INTRODUCTION

This Contingency Plan is prepared to handle emergency situations at the Stauffer Management Company (SMC) remediation system.

It is essential that all personnel be prepared in the event of an emergency. Emergencies can take many forms; illnesses or injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather. The following sections outline the general procedures that will be followed in the event of an emergency at the SCM Site (Site) located in the Town of Lewiston, New York, immediately north of the Forebay for the Roberts Moses Power Plant.

Figure 1.1 presents the location of the Site at 5607 Old Lewiston Road in the Town of Lewiston, New York. Figure 1.2 presents the layout of the Site and Figure 1.3 presents the layout of the floor plan of the Treatment Facility, including identification of all tanks and their contents, location of eyewash, shower stations, fire extinguishers, and evacuation routes. Table 1.1 presents information on all of the tanks and their contents which are present at the Treatment Facility. Table 1.2 presents the chemical compounds of concern that are present in the waste stream. Table 1.3 presents the exposure routes and exposure levels for the chemical compounds of concern.

hospital
route

ESSENTIAL INFORMATION

Flammable materials are not stored on Site. Hazardous wastes (carbon awaiting disposal, etc.) are temporarily stored in the hazardous waste areas labeled on Figure 1.3. Non-hazardous wastes (spent bag filters, personal protective equipment [PPE]) are stored in the non-hazardous waste storage area labeled on Figure 1.3. Contaminated groundwater being treated within the facility, as identified in Table 1.1 is at very low concentrations (<0.02 percent).

Five remediation systems are currently being operated at the Site:

- i) a groundwater extraction and treatment system;
- ii) three soil vapor extraction (SVE) and treatment systems; and
- iii) a dense non-aqueous phase liquid (DNAPL) recovery system.

— ? NOT operating

The Site is a former chemical manufacturing facility which was previously owned and operated by Stauffer Chemical Company. All structures associated with the former plant have been demolished and a treatment building (Treatment Facility) has been

erected to house the groundwater treatment system and SVE system for Area A. The two other SVE systems are mounted in trailers. The Area T4 trailer is located on-Site, southwest of the Treatment Facility. The Area C trailer is located off-Site, beyond the southeast corner of the Site property. The DNAPL recovery system is housed on-Site in a wooden shed, west of the Treatment Facility.

1.1 SITE SECURITY

The entire Site is secured by a 7-foot chainlink fence. Access to the Site is controlled through a main gate which is kept locked when the Site is unattended. A sign identifying the Site has been posted on the main gate. A telephone number has been identified on the sign in case the general public notices an emergency at the Site. Access to the Site is controlled by individuals who possess Site gate keys. Visitors may enter the property only when escorted by authorized attendants.

1.2 TREATMENT AREA DESCRIPTION

1.2.1 GROUNDWATER TREATMENT AREA CONTAINMENT

The Groundwater Treatment System receives water from seven wells located across the Stauffer property. The water is directed through an underground double-contained forcemain system to the treatment building.

All water is directed into the DNAPL separator and through the rest of the treatment system. The treatment building is designed to contain 110 percent of the volume of the largest treatment vessel.

In the event of a leak in the treatment facility a high level switch in the building sump will trigger a high level alarm. This alarm will shut down all processes that send water to the treatment facility. *Is this tested regularly?*

1.2.2 GROUNDWATER TREATMENT SYSTEM

Influent water to the groundwater treatment system enters the DNAPL separator (T-100). Any DNAPL is removed and stored in the adjacent drums. The water gravity flows to the carbon pump tank (T-700). The water is then pumped through the bag filters (T-701A-E) for solids removal; the liquid phase carbon vessels (T-720 A/B) for

organics removal; and to the air stripper for potential treatment of methylene chloride. After air stripping the water gravity flows to the Site outfall at the New York Power Authority (NYPA) forebay.

The carbon transfer spent water tank (T-730) holds water used to transfer carbon during a carbon changeout. Normally this tank is empty.

1.2.3 AREA A SVE SYSTEM

The Area A SVE system takes soil vapor from the former operations area to the east of the treatment building and provides organics removal through a vapor phase carbon system. Area A also has three shallow dual groundwater/SVE wells that bring groundwater to the treatment building at Area A and then to the groundwater treatment system.

1.2.4 AREA T4 SVE SYSTEM

The Area T4 SVE system takes soil vapor from Area T4 to the Area T4 SVE trailer and provides organics removal through a vapor phase carbon system. Area T4 also has one shallow dual groundwater/SVE well that brings groundwater to the groundwater treatment system in the main building.

1.2.5 AREA C SVE SYSTEM

The Area C SVE system takes soil vapor from the former Area C landfill to the Area C SVE trailer and provides organics removal through a vapor phase carbon system.

2.0 PROJECT PERSONNEL RESPONSIBILITIES DURING EMERGENCIES

The on-Site Operation and Maintenance (O&M) Technician will serve as the primary Emergency Coordinator. The O&M Project Manager once notified of any emergency situation will become the primary Emergency Coordinator if he or she is present on-Site.

O&M PROJECT MANAGER AND TECHNICIAN

As the administrator of the project, the O&M Project Manager has primary responsibility for responding to and correcting emergency situations. The O&M Project Manager will:

- i) take appropriate measures to protect personnel including: withdrawal from any Exclusion Zone (EZ), total evacuation and securing of the Treatment Facility or upgrading or downgrading the level of protective clothing and respiratory protection;
- ii) take appropriate measures to protect the public and the environment including isolating and securing the Treatment Facility, preventing runoff to surface waters, and ending or controlling the emergency to the extent possible;
- iii) notify SMC Site Coordinator;
- iv) ensure that appropriate Federal, State, and local agencies are informed, and emergency response plans are coordinated. In the event of a fire or explosion, the local fire department should be summoned immediately. In the event of an air release of toxic materials, the local authorities should be informed in order to assess the need for community evacuation;
- v) ensure that cleanup operations are carried out as described in this plan;
- vi) ensure that appropriate decontamination has been given for exposed or injured personnel;
- vii) determine the cause of any emergency and make recommendations to prevent the recurrence; and
- viii) ensure that all required reports have been prepared.

3.0 EMERGENCY TELEPHONE NUMBERS

Emergency..... 911

Ambulance Service:

Frontier Ambulance Service..... 285-3663
Niagara Ambulance Service..... 284-4228
Niagara Falls Medical Center..... 278-4000
Mount St. Mary's Hospital..... 297-4800
Emergency Room..... 298-2325

Fire Department:

Town of Lewiston Upper Mountain Fire Company..... 297-0330

Police:

Niagara County Sheriff..... 438-3393
New York State Police (Lewiston, New York)..... 297-0755
Niagara Park Police..... 278-1777
Town of Lewiston Police Department..... 754-8477

Pollution, Health:

New York State Spill Emergency Response Hot Line..... 800-424-8802
National Response Center..... 800-424-8802
New York State Dept. of Environmental Conservation (Buffalo)..... 851-7220
New York State Dept. of Environmental Conservation (Albany)..... 518-457-5636
Poison Control Center..... 800-888-7655
Niagara County Health Department:
Lockport..... 439-7515
New York State Department of Health:
Buffalo..... 847-4502
United States Environmental Protection Agency Region II..... 201-548-8730
(24 hour hotline)
Occupational Safety and Health Administration..... 684-3891

Miscellaneous:

Underground Utilities Locating Service	800-258-UULS
National Fuel Gas Company	285-6915/800-444-3130
Telephone Repair Service	282-9061/800-722-2300
Niagara Mohawk Trouble	297-7774/800-932-0301
Power Authority State of New York	285-3211
Town of Lewiston Water Department	754-8214
Town of Lewiston Supervisor	754-8213 or 754-2598
SMC Site Coordinator (Carol Dickerson)	302-886-5123
CRA Services O&M Project Manager (Rick Passmore)	297-2160(W) 836-1254(H)
CRA Services O&M Project Industrial Hygienist (Craig Gebhardt)	297-2160
CRA Services O&M Coordinator (Doug Oscar)	297-2160(W) 874-5167(H)
CRA Services 24-Hour Site Access	888-785-8511

4.0 RESPONSE TO EMERGENCY SITUATIONS

4.1 GENERAL INSTRUCTIONS

For all cases which require implementation of the Contingency Plan, the following actions should be taken in order:

1. Get immediate attention for any injuries. Emergency phone number of police, fire, or ambulance is 911. Other emergency phone numbers are listed in Section 3.0.
2. Shut down all plant process pumps and field pumps. Field pumps can be shut down from the Treatment Facility office control panel. Shut off the main electric power and potable water as necessary. The location of the shutoff controls are presented on Figure 1.3.
3. Notify the Project Manager who in turn will notify the SMC Site Coordinator.
4. Perform a primary search of the situation and determine the level of severity based on the amount of release, material involved, and area damaged.
5. Stop any continuous release if able to do so without entering contaminated environment.
6. Inform the emergency response organizations and the New York State Emergency Response Commission and National Response Center if appropriate.
7. Proceed with response and cleanup activities outlined in the appropriate following sections.
8. An investigation should be conducted to determine the cause of the event which triggered the implementation of this Contingency Plan. Ways to reduce a future occurrence of the event should be undertaken.

Each time the Contingency Plan is put into effect, the complete details of the incident must be reviewed and a critique of the emergency response will be made. Changes to this Contingency Plan will be made if the critique determines that changes are required.

4.2 STORAGE TANKS AND PIPING SYSTEM FAILURES

Protective Clothing Required

1. Level C PPE.
2. Respiratory protection may be removed after sufficient air monitoring shows continuous levels of less than 1 part per million (ppm) total organic vapor concentration and oxygen levels greater than 19.5 percent.

Note: If organic vapor levels are present at levels greater than 50 ppm then supplied air respiratory protection will be required.

Equipment and Materials Required for Cleanup

1. A minimum of two persons will be required for all cleanup activities.
2. Protective clothing, mops, detergents, and disposal containers (drums) are stored in the process area.

Action to be Taken

1. Shut down all plant processes.¹
2. Suit up in protective clothing and appropriate respiratory protection.
3. Calibrate an organic vapor detector and begin monitoring affected areas.
4. Close upstream valve.
5. If leak is continuing, take action to contain then stop the leak. For a leaking pipe, patch pipe or contain and collect leaking fluids. For a tank leak, empty contents of tank to below the source of the leak.
6. Bleed pipe from valve to source of leak if necessary.
7. Flush spilled material to floor drain with large volume of water using available low pressure water hoses. Use industrial cleaning agents if necessary to aid in flushing to the floor drain.
8. Steam clean affected areas of the floor using high pressure steam from Steam Jenny.
9. Mop floor and dispose of mop(s) when done with cleanup.
10. Decontaminate any equipment which became contaminated during leak (e.g., step ladder, etc.).

¹ Process pumps may be run under the observation of the Technician for the purpose of emptying a leaking tank.

Final Cleanup and Inspection

All mop heads and protective clothing should be placed in drums for disposal. The floor should be visually inspected (especially in tight areas around the tank) for contamination. Air should be monitored with an organic vapor detector. If readings persist above background levels, the floor should be steam cleaned and scrubbed until readings correspond to background levels.

Immediate arrangements should be made to replace or repair tank and all affected pipes. Similar equipment should be inspected for possible failure in the same area.

4.3 MEDICAL EMERGENCIES

Any person who becomes ill or injured at the Treatment Facility must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed as much as possible without causing further harm to the patient. First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the Project Manager.

4.4 FIRE

SMALL FIRE WITH NO THREAT OF CHEMICAL CONTAMINATION

1. Protective Clothing Required:

Level D or greater level of protection if already being worn.

2. Equipment and Materials Required for Cleanup:

Fire extinguishers are located in the treatment area as shown on the floor plan.

3. Action to be Taken:

- a. Shut down electrical equipment.
- b. Use appropriate fire extinguisher.

- c. If extinguisher is ineffective in fighting fire, take the same action described below for a large fire - Dial 911.
- d. Watch for reignition.

4. Final Cleanup and Inspection:

When cool, dispose of all waste items properly. If fire was electrical, have electrical contractor review circuits prior to energizing. Try to determine the cause of the fire. Make a list of all items destroyed or unusable. Get extinguisher recharged.

LARGE FIRE OR FIRE WITH THREAT OF CHEMICAL CONTAMINATION

1. Protective Clothing Required:

None initially. During final cleanup and inspection, Level C shall be worn unless a lesser level is appropriate as determined by the Project Industrial Hygienist.

2. Equipment and Materials Required for Cleanup:

None.

3. Action to be Taken:

- a. Shut down electrical equipment and compressors, if possible.
- b. Call Fire Department - dial 911.
- c. Evacuate to a safe distance. The Emergency Coordinator will meet the Fire Department and provide pertinent information such as a listing and location of any hazardous materials which are present at the Treatment Facility.
- d. Emergency Coordinator will assist as necessary with the Fire and Police Departments.

4. Final Cleanup and Inspection:

Approval will be obtained from the Fire Department prior to entering the Treatment Facility. Upon approval, the Emergency Coordinator will conduct a thorough investigation of the building and establish a list of cleanup and inspection priorities.

4.5 EXPLOSION

1. Protective Clothing Required:

See Action to be Taken.

2. Equipment and Materials Required for Cleanup:

None.

3. Action to be Taken:

- a. Call Fire Department.
- b. Report incident to the Project Manager.
- c. Cease operations.
- d. Notify others in vicinity.
- e. Leave the Treatment Facility quickly. Commence Evacuation Plan if necessary.

4. Final Cleanup and Inspection:

After the Fire Department has determined the area of the explosion to be safe, clean up any debris. Assess damage, being sure to also look for any splattering of liquids on walls and process equipment, cracked windows, and loose pipe connections.

5.0 LIST OF EMERGENCY EQUIPMENT

<i>Item</i>	<i>Location</i>	<i>Description and Capabilities</i>
Fire Extinguisher	See figure of the floor plan for locations.	For the purpose of putting out small fires.
First Aid Kit	In the Control Room.	For treatment of accident victims.
Shower/Eyewash Stations	See figure of the floor plan for locations.	Used to flush contaminants from body or eyes.
PPE (Polycoated Tyvek Suits, Boots, Gloves, Respirator, Cartridges, Hard Hat, Safety Glasses)	In the Control Room.	For the purpose of providing personal protection.
Organic Vapor Detector	In the Control Room.	For the purpose of measuring organic vapor levels.
Mops, Industrial Cleaners	In the Control Room.	For the purpose of cleaning up spills.

6.0 EVACUATION PLAN

1. Responsibility:

The Emergency Coordinator will be responsible for the evacuation of all personnel from the Treatment Facility. The Emergency Coordinator will conduct the evacuation or appoint an individual to conduct the evacuation.

2. Signal:

The signal to evacuate the Treatment Facility will be the directive given by the Emergency Coordinator or his designee to evacuate. A face-to-face communication will be used.

3. Procedure:

- a. Shut down all ongoing operations.
- b. Exit the nearest accessible exit. See evacuation routes that are presented on the Floor Plan figure.
- c. Assemble at meeting area.

4. Meeting Area:

All persons evacuated will initially meet in the driveway on the north side of the Site. The Emergency Coordinator or his designee will count heads and verify that everyone has been evacuated. If the primary meeting area is inaccessible, then safely move to the exit gate of the Site.

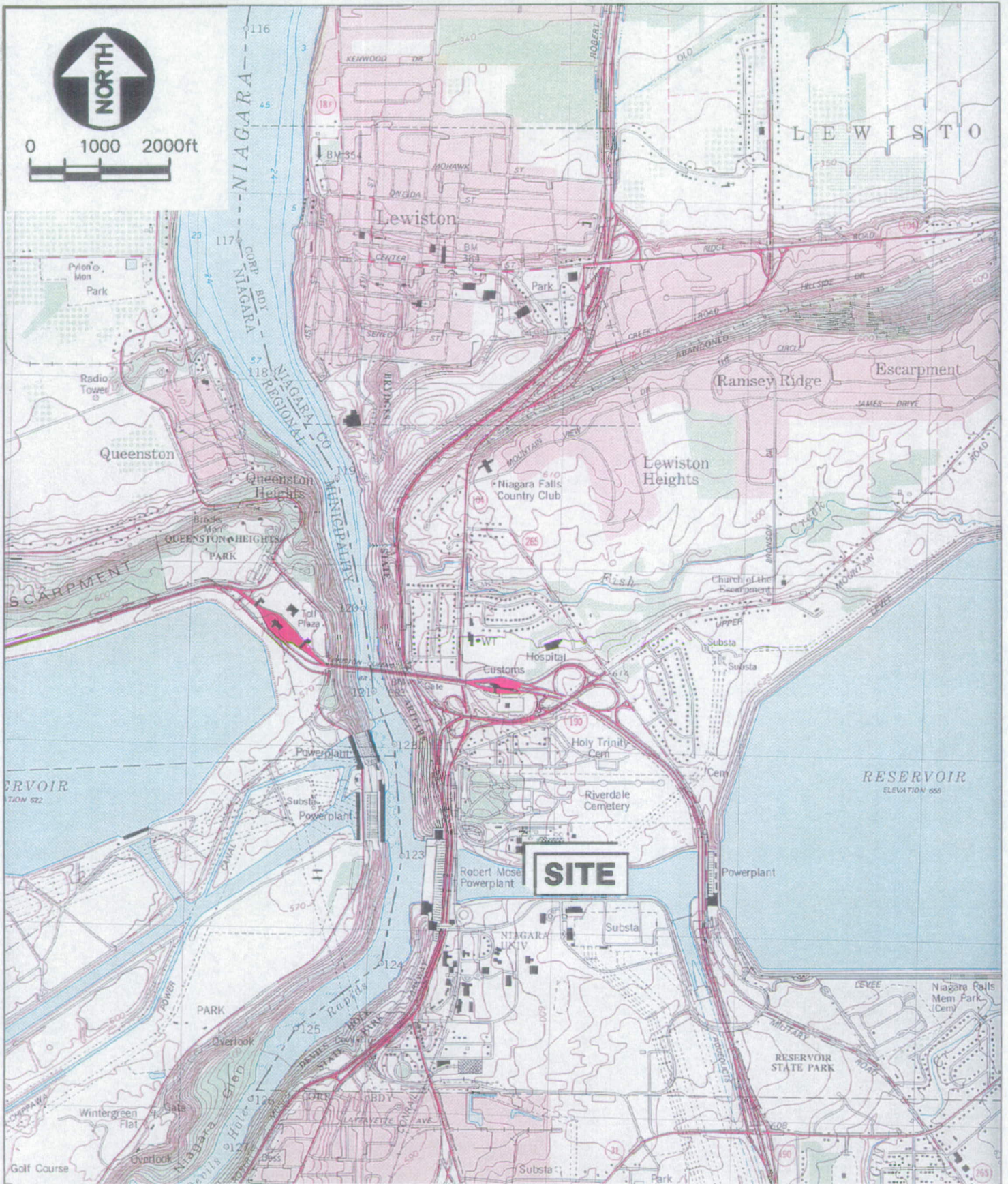
The fire department will be responsible for evacuation of the surrounding community if required.

7.0 SUMMARY OF AGREEMENTS WITH EMERGENCY RESPONSE OFFICIALS

[To be completed after the Site visit.]



FIGURES



SOURCE: USGS

figure 1.1
 SITE LOCATION
 STAUFFER MANAGEMENT COMPANY
 NIAGARA FALLS SITE
 Lewiston, New York

CRA Services

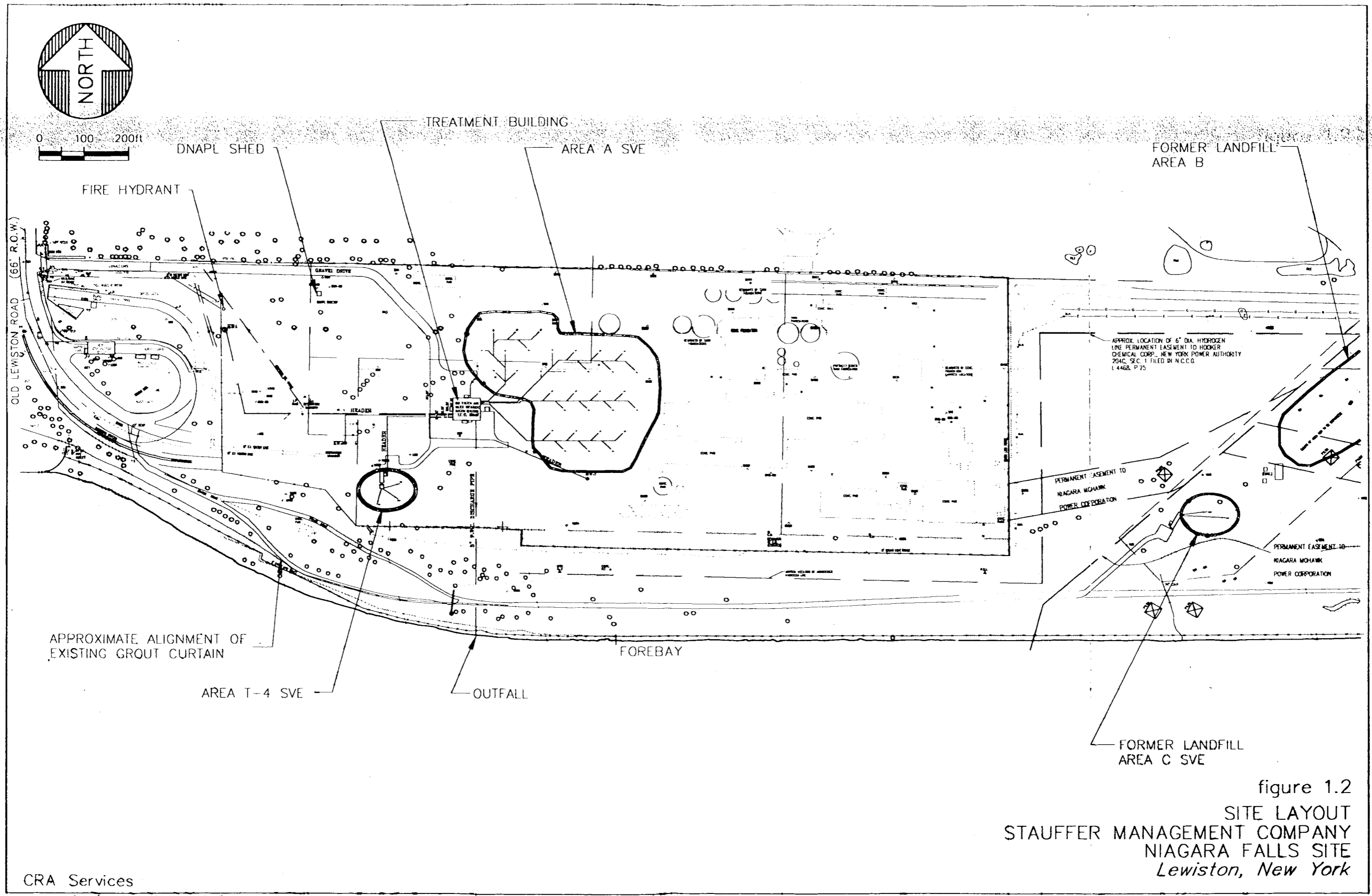
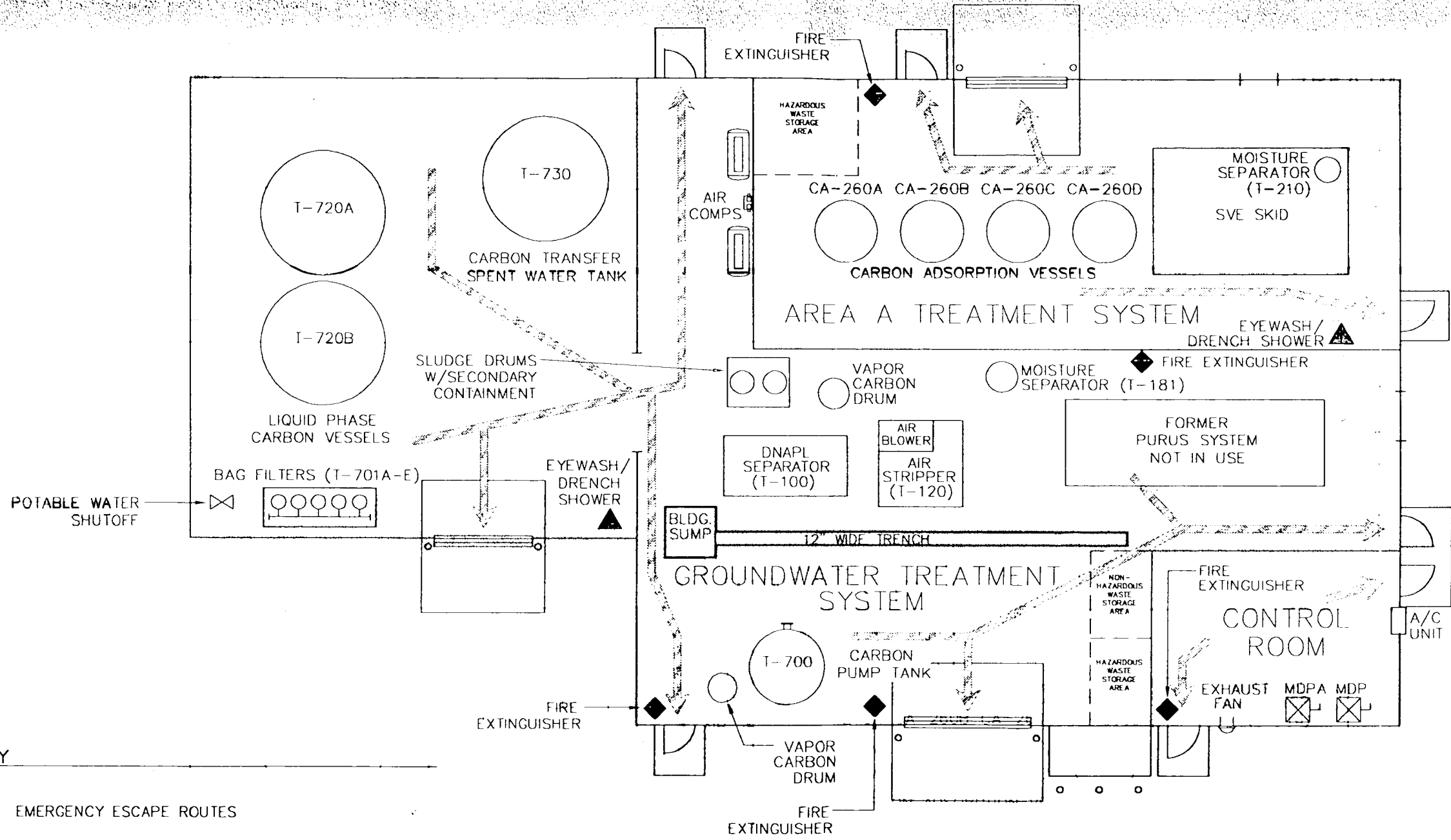


figure 1.2
 SITE LAYOUT
 STAUFFER MANAGEMENT COMPANY
 NIAGARA FALLS SITE
 Lewiston, New York



KEY






-  EMERGENCY ESCAPE ROUTES
-  MAIN DISTRIBUTION PANELS (ELECTRICAL SHUTOFFS)
-  POTABLE WATER SHUTOFF
-  EYEWASH/DRENCH SHOWER
-  FIRE EXSTINGUISHER

figure 1.3
TREATMENT BUILDING FLOOR PLAN
STAUFFER MANAGEMENT COMPANY
NIAGARA FALLS SITE
Lewiston, New York



TABLES

TABLE 1.1
TREATMENT FACILITY TANK INFORMATION
STAUFFER MANAGEMENT COMPANY
NIAGARA FALLS, NEW YORK

<i>Tank No. Number</i>	<i>Tank Name</i>	<i>Capacity</i>	<i>Contents</i>
<i>Groundwater Treatment System</i>			
T-100	DNAPL Separator	1,000 gallons	GW with low levels of SSPL compounds
T-700	Carbon Pump Tank	1,000 gallons	GW with low levels of SSPL compounds
T-701A-E	Bag Filters	<100 gallons	GW with low levels of SSPL compounds
T720A&B	Liquid-Phase Carbon System	20,000# Carbon Ea.	Carbon and GW with SSPL Compounds
T-730	Carbon Transfer Spent Water Tank	5,500 gallons	GW with low levels of SSPL compounds
T-120	Air Stripper	<100 gallons	Treated GW
T-181	Air Stripper Moisture Separator	<100 gallons	Treated GW
<i>Area A SVE Treatment System</i>			
T-120	Area A Moisture Separator	40 gallons	GW with SSPL Compounds
CA-260A-D	Area A Vapor-Phase Carbon	2,000# Carbon Ea.	Dry Carbon with SSPL Compounds
<i>Area C SVE Treatment System</i>			
T-310	Area C Moisture Separator	11 gallons	GW with SSPL Compounds
CA-360 A&B	Area C Vapor-Phase Carbon	500# Carbon Ea.	Dry Carbon with SSPL Compounds
<i>Area T4 SVE Treatment System</i>			
T-410	Area T4 Moisture Separator	11 gallons	GW with SSPL Compounds
CA-460A-D	Area T4 Vapor-Phase Carbon	200# Carbon Ea.	Dry Carbon with SSPL Compounds

Notes:

GW Groundwater.

SSPL Site-Specific Parameter List of chlorinated volatile organic compounds (VOCs).

See Table 1.2 for list.

TABLE 1.2
CHEMICAL COMPOUNDS OF CONCERN
STAUFFER MANAGEMENT COMPANY
NIAGARA FALLS, NEW YORK

Benzene
Carbon tetrachloride
Carbon disulfide
Chloroform
Methylene chloride
Methylchloro-benzene (benzyl chloride)
Tetrachloroethylene (perchloroethylene)
Toluene
Trichloroethylene

TABLE 1.3
 EXPOSURE ROUTES AND EXPOSURE LEVELS FOR THE
 CHEMICAL COMPOUNDS OF CONCERN
 STAUFFER MANAGEMENT COMPANY
 NIAGARA FALLS, NEW YORK

<i>Chemical Compound</i>	<i>Ionization Potential</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels in Air</i>
Benzene	9.2	Inhalation, Ingestion Skin Absorption Human Carcinogen	1 ppm (1) 3,000 ppm (2)
Carbon tetrachloride	11.5	Inhalation, Ingestion Skin Absorption Human Carcinogen	5 ppm (1) 200 ppm (2) 25 ppm (3)
Carbon disulfide	10.1	Inhalation, Ingestion Skin Absorption	10 ppm (1) 500 ppm (2)
Chloroform	11.4	Inhalation, Ingestion Possible Human Carcinogen	10 ppm (1) 1,000 ppm (2)
Methylene chloride	11.3	Inhalation, Ingestion Possible Human Carcinogen	50 ppm (1) 5,000 ppm (2)
Methylchloro-benzene (benzyl chloride)	-	Inhalation, Ingestion	0.5 ppm (3)
Tetrachloroethylene (perchloroethylene)	9.3	Inhalation, Ingestion Animal Carcinogen	25 ppm (1) 500 ppm (2)
Toluene	8.8	Inhalation, Ingestion Skin Absorption	50 ppm (1) 2,000 ppm (2)
Trichloroethylene	9.5	Inhalation, Ingestion	50 ppm (1) 1,000 ppm (2)

Notes:

- (1) 1997-1998 Values, American Conference of Governmental Industrial Hygienist (ACGIH) Threshold Limit Values (TLVs).
 - (2) Immediately Dangerous to Life and Health (IDLH).
 - (3) Federal OSHA ceiling level (15 minutes).
- ppm Parts Per Million.

