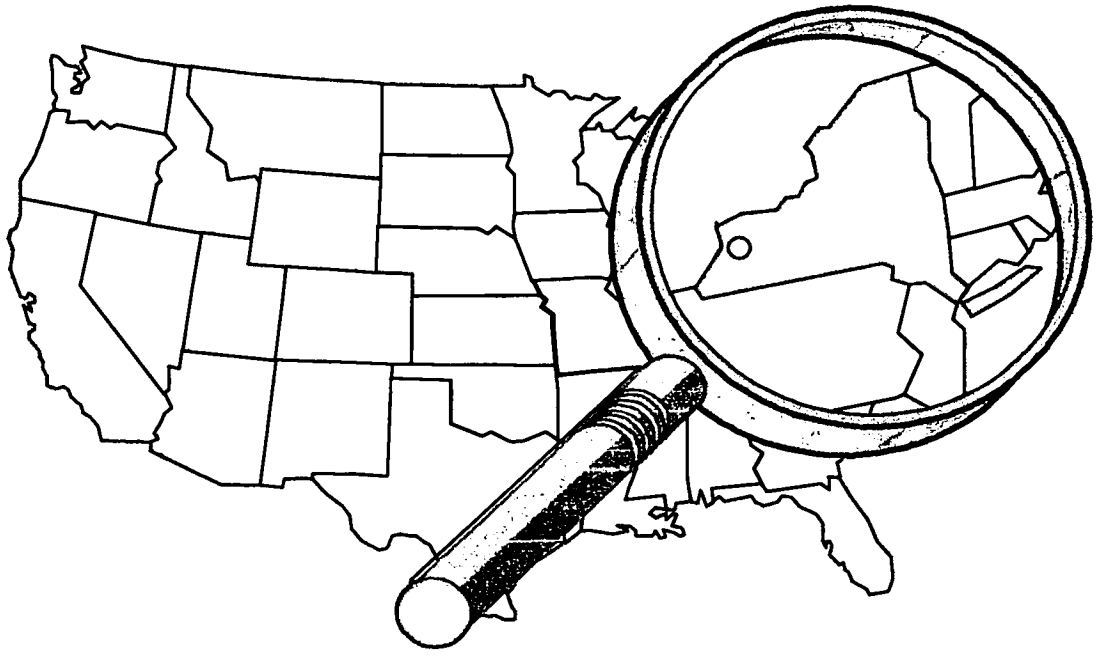
Management Action Process Document for the Tonawanda, New York, FUSRAP Site



May 1996

U.S. Department of Energy

Formerly Utilized Sites Remedial Action Program (FUSRAP)

TONAWANDA SITES AT A GLANCE

[Reference Sections in Brackets]

Background

- 4 properties — Linde Air Products, Ashland 1, Ashland 2, and Seaway Landfill [2.1]
- 1942–46 — MED/AEC uranium processing operations at Linde [2.1]
- 1944-46 — Disposal of ore refinery residues from Linde at Ashland 1 [2.1]
- 1974 — Disposal of soil containing construction wastes from Ashland 1 at Ashland 2 and Seaway [2.1]
- Seaway, Ashland 1 and Ashland 2 properties are near Niagara River [2.3]
- Seaway is an operating sanitary landfill [2.5]
- Linde is a 135-acre, operating industrial facility owned by Praxair, Inc. [2.5]; one vicinity property — Town of Tonawanda Landfill [2.3]

Waste Volumes and Primary Radioactive Constituents

- Volumes: Ashland 1 — 120,000 yd^3; Ashland 2 — 52,000 yd^3; Linde — 71,000 yd^3; Seaway — 117,000 yd^3
- Primary radioactive constituents are uranium-238, radium-226, thorium-230
- No RCRA waste

Major Environmental Restoration Activities to Date

- 1976–88 — Radiological surveys at Ashland 1, Ashland 2, Linde, and Seaway
- 1988–89 — Radiological survey at Linde identified primary soil contaminant as thorium-230
- 1988–92 — Remedial investigation at Tonawanda Site properties
- 1993 — RI/FS report and proposed plan for Tonawanda issued
- 1994 — Environmental review process for Tonawanda put on hold; characterization of Town of Tonawanda Landfill completed
- 1996 — Interim remedial action began at Linde; no remedial action at other Tonawanda sites to date

Regulatory Drivers and Other Requirements

- CERCLA (SARA)/NEPA; NESHAPs; NPDES; Safe Drinking Water Act; Clean Water Act; Clean Air Act
- DOE Orders; DOE ER Strategic Plan
- Executive Order 12580; state and local regulations

Key Regulators and Other Stakeholders

- EPA Region II
- New York State Department of Environmental Conservation (NYSDEC)
- CANiT
- FACTS
- Environmental Management Advisory Board (EMAB)
- Property owners
- Town of Tonawanda

Key Issues

- Projected waterfront development (Ashland 1, Ashland 2, and Seaway properties) along Niagara River [7.1]
- Current and future risk management options [7.1]
- Community and regulator acceptance of cost-effective, protective remedies [7.1]
- Opposition by CANiT to proposed plan to construct an onsite waste containment structure at Ashland 1 [7.1]
- Decision-making process suspended April 1994 [7.1]

Risk

- See Tables 4.1 and 4.2

Environmental Restoration Strategy

- 2 key elements — relative risk prioritization and expediting remediation of non-DOE-owned sites and VPs [5.0]
- DOE developed RI/FS for Tonawanda per CERCLA [5.4]
- FUSRAP National Stakeholder Summit (May 1995) attended by Tonawanda stakeholders; identified 5 major issues:
  - Funding – Cleanup criteria – Risk management – Remedy selection – Community acceptance [5.2]
- Interim action at Linde initiated 1996 — includes decontamination of Buildings 14, 30, and 31 and demolition of Building 38 [5.6, 6.1]

Contacts

- **Ronald Kirk** — DOE Site Manager, New York Sites
- **George Randels, Jennifer Martella** — representatives for **Congressman John LaFalce**
- **Carl Calabrese** — Town of Tonawanda Supervisor
- **Mike Raab** — Deputy Commissioner for Erie County Department of Environment and Planning
- **Richard Tobe** — Commissioner, Department of Environment and Planning and CANiT Chairman
- **Alice Roth** — Mayor, City of Tonawanda; **James McGinnis** — Mayor, City of North Tonawanda
- **Don Finch, Jim Rauch, Ralph Krieger** — members of FACTS
- **Mary Lou Rath** — State Senator; **Richard Anderson, Sam Hoyt** — State Assembly

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Formerly Utilized Sites Remedial Action Program (FUSRAP)

MANAGEMENT ACTION PROCESS (MAP) DOCUMENT

FOR THE TONAWANDA, NEW YORK, FUSRAP SITE

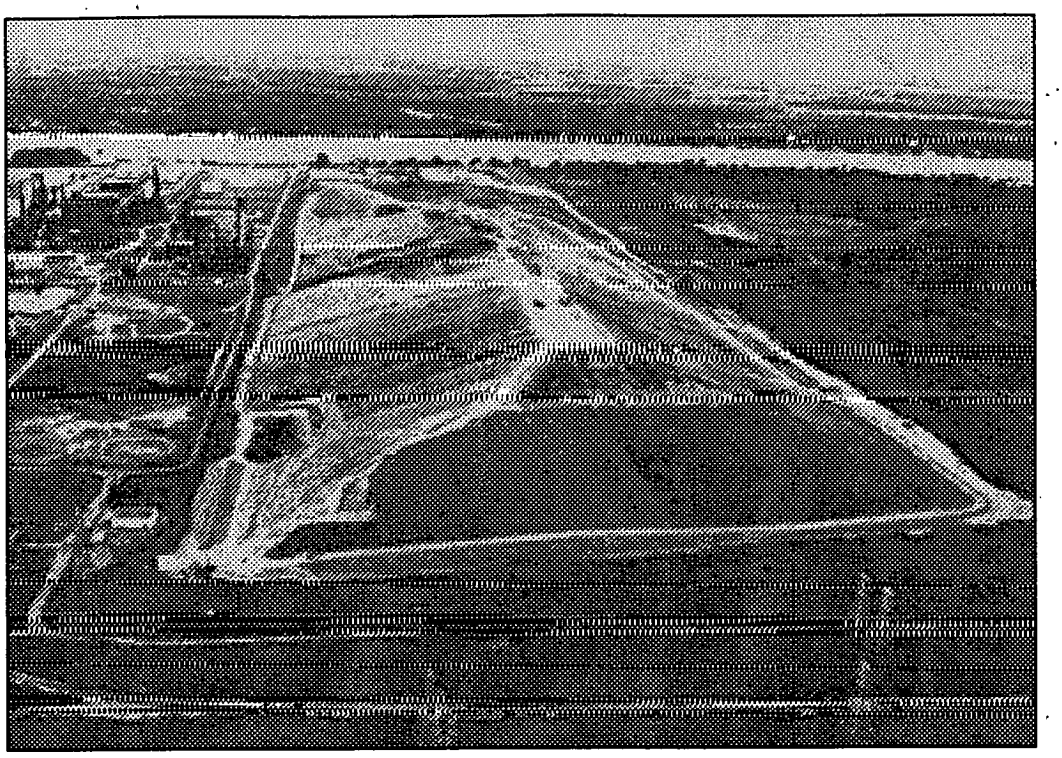
MANAGEMENT ACTION PROCESS (MAP) DOCUMENT
FOR THE TONAWANDA, NEW YORK FUSRAP SITE

FIGURES

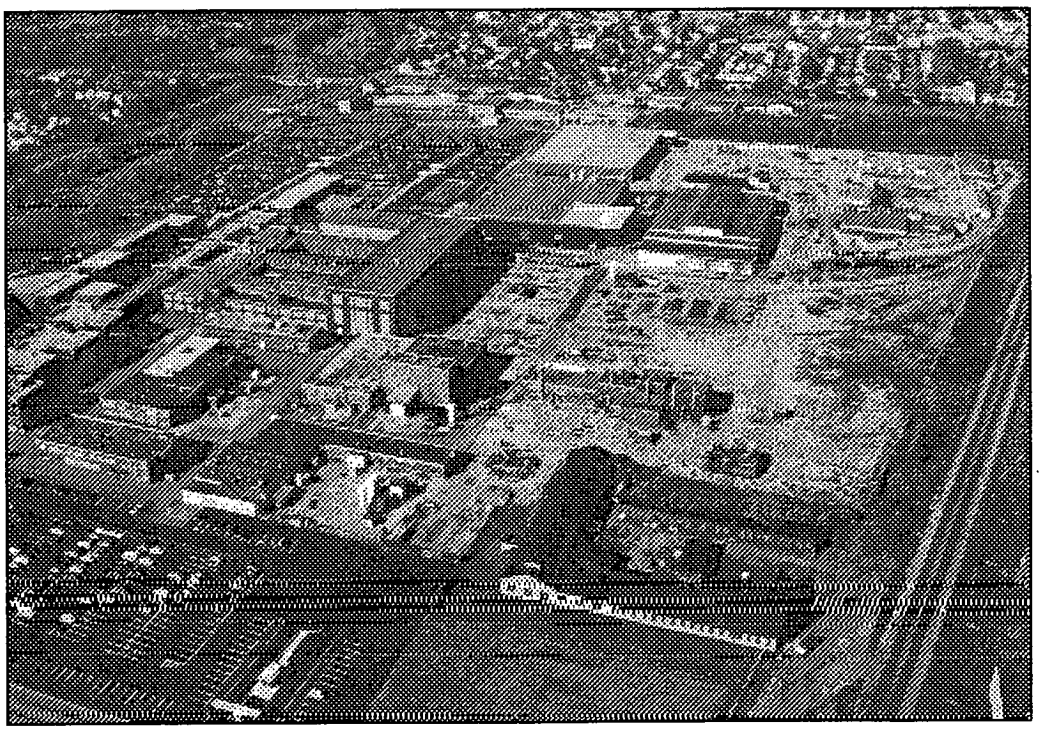
TABLES

ACRONYMS

ADS	activity data sheet
AEC	Atomic Energy Commission
BNI	Bechtel National, Inc.
CANiT	Coalition Against Nuclear Materials in Tonawanda
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EE/CA	engineering evaluation/cost analysis
EMAB	Environmental Management Advisory Board
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ES&H	Environmental Safety and Health
FACTS	For a Clean Tonawanda Site
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	Fiscal Year
MAP	Management Action Process
MED	Manhattan Engineer District
NEPA	National Environmental Policy Act
NYSDEC	New York State Department of Environmental Conservation
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
PDCC	Project Document Control Center
PEIS	Programmatic Environmental Impact Statement
PF	pathway factor
QA	quality assurance
RCRA	Resource Conservation and Recovery Act
RDS	risk data sheet
RF	receptor factor
RI/FS-EIS	remedial investigation/feasibility study-environmental impact statement
SAIC	Science Applications International Corporation
SHF	source hazard factor
S/RID	Standards/Requirements Identification Document
WBS	work breakdown structure



Ashland/Seaway



Linde Site

1. INTRODUCTION

This Management Action Process (MAP) document covers environmental assessment and cleanup at the Formerly Utilized Sites Remedial Action Program (FUSRAP) Tonawanda site near Tonawanda, New York. This site consists of four properties: Ashland 1, Ashland 2, Linde Air Products, and Seaway Industrial Park; the Town of Tonawanda Landfill is an additional, vicinity property. This document summarizes the current status of the FUSRAP Environmental Restoration (ER) program at the site and presents a comprehensive strategy for remediation and management of contaminated environmental media and the decontamination of facilities and structures. Similar documents have been prepared for the Wayne and Maywood sites in New Jersey; the St. Louis sites in Missouri; and the remaining active FUSRAP sites, including four sites in New Jersey, four sites in Ohio, three sites in New York, two sites in Massachusetts, and one site each in Connecticut, Illinois, and Maryland.

1.1 PURPOSE OF MANAGEMENT ACTION PROCESS

The MAP document serves as a record of interaction among the community, regulators, other stakeholders, and the Department of Energy (DOE), which together make up the FUSRAP MAP team. The MAP document is not a decision document but a tool to facilitate decision making and facilitate ongoing stakeholder involvement through the Environmental Management Advisory Board (EMAB) process. FUSRAP will use the MAP as a tool to disseminate information and assist the ongoing stakeholder involvement process. A key component of the decision-making process is input from EMAB, which includes representatives of state and local governments, environmental and citizen groups, labor organizations, federal agencies, and the scientific and academic communities. National and local meetings provide a forum for public input to EMAB.

1.2 ORGANIZATION OF THE MANAGEMENT ACTION PROCESS DOCUMENT

The MAP document for the Tonawanda site is an information resource representing a concise "snapshot" of the FUSRAP ER program at the site. It summarizes past accomplishments; the current status of the ER program; future strategy, rationale, schedule, and funding requirements to meet program objectives; and FUSRAP's strategic course of action for completion of cleanup objectives. The contents of the document are summarized in Table 1.1.

Table 1.1 MAP Document Contents

Chapter	Title	Contents
1	Introduction	Purpose and organization of MAP document and FUSRAP ER objectives and strategies
2	Installation Description and Comprehensive Planning	Site operational history, environmental setting, site facilities, and factors affecting remediation strategy
3	Status of Environmental Restoration Activities	Status of ER activities at the site
4	Relative Risk	Relative risk to workers, the public, and the environment from materials at the site
5	Environmental Restoration Strategy	Key assumptions and process for formulating ER strategy
6	Master Schedule	Master schedule and compliance milestones for site ER
7	Issues and Initiatives	Issues affecting project performance
Appendix A	Fiscal Year Funding Requirements/Costs	Cost baseline for ER activities
Appendix B	Environmental Restoration Deliverables	ER documents for the site
Appendix C	Decision Document/ROD Summaries	Abstracts of decision documents for the site
Appendix D	Conceptual Model Data Summaries	Models identifying constituent sources, exposure routes and pathways, and receptors
Appendix E	Project Controls	Responsibility matrices, change control thresholds, and reporting requirements
Appendix F	Environmental Restoration Strategy for the Tonawanda Site	Summary of criteria for evaluating remedial alternatives

1.3 ENVIRONMENTAL RESTORATION OBJECTIVES

The mission of the ER Program is to protect human health and the environment from risks posed by inactive and surplus facilities and contaminated areas by remediating sites and facilities in the most cost-effective and responsible manner possible to optimize opportunities for future beneficial reuse. This mission is accomplished by adhering to the ER Program core values:

- Ensure protection of worker and public health and safety and the environment.
- Serve as a model steward of natural and cultural resources.
- Comply with federal, state, and local statutes.
- Prudently use taxpayers' money in achieving tangible results.
- Focus on customer satisfaction and collaborative decision making.
- Demonstrate a commitment to excellence.

ER activities for FUSRAP and other ER program areas are driven by eight program priorities [listed in order of emphasis (DOE 1995a)], which are used to determine budget priorities and to plan and sequence work activities:

- **Reduce offsite contamination** that may pose risk to the public and the environment.

- **Prevent contaminant migration** from sites of former weapons research and production activities through timely identification, reporting, assessment, application of best technologies, and safe storage.

- **Remediate non-DOE sites and facilities** formerly used by DOE and its contractors (most of these sites are included in FUSRAP and the Uranium Mill Tailings Remedial Action program).

- **Reduce onsite contamination** that may pose a risk to the public and the environment during future use of the site.

- **Cost-effectively maintain the essential infrastructure** by reducing conditions that create the need for unnecessary expenditures, thereby making funds available for other restoration activities.

- **Make prudent business decisions** such as investing in capital projects that upgrade efficiency of operations.

- **Release facilities and land for public beneficial use** and involve the public in land and facility reuse decisions.

- **Reduce uncertainty through characterization** to allow more accurate determination of relative risk, scope, cost, and schedule for site remediation activities.

The major objectives of FUSRAP are to

- Find and evaluate sites that supported Manhattan Engineer District/Atomic Energy Commission (MED/AEC) nuclear work (or other sites assigned by Congress) and determine whether they need cleanup and/or control.
- Clean up or manage these sites so that they meet current guidelines.
- Dispose of or stabilize radioactive material in a way that is safe for the public and the environment.
- Perform all work in compliance with appropriate federal laws and regulations and comply with state and local environmental laws and land-use requirements.
- Certify the sites for appropriate future use.

These objectives are in accordance with the mission, core values, and priorities of DOE's ER Program (DOE 1995a).

Strategic goals of the FUSRAP ER program, as stated in the Environmental Restoration Strategic Plan and the FUSRAP FY 1995 Year End Review (DOE 1995a, 1995b), are as follows:

- Address immediate risk concerns and prevent further increases in relative risk at all FUSRAP sites.
- Complete 50 percent of current FUSRAP sites (23 of 46) by the end of 1996.
- Reach agreement with regulators and stakeholders on the cleanup approach at large sites by FY 1998.
- Complete an aggressive interim action program at large sites by FY 2000.
- Complete cleanup at all small FUSRAP sites by FY 2008.
- Complete remediation of all FUSRAP sites and related vicinity properties by FY 2016.

The ultimate objective of the FUSRAP ER program is to remediate all contaminated sites in a safe, cost-effective, and timely manner to optimize opportunities for beneficial reuse. Subsidiary objectives established to accomplish this overall goal are linked to the Environmental Restoration Strategic Plan (DOE 1995a) and reflect health and safety, regulatory, technical, and operational performance goals.

Assumptions specific to the Tonawanda site are that

- no additional radioactive material will be brought to the site,
- no remedy will be implemented at the site without consideration of community concerns, and
- a proposed solution will be provided to the community by December 1996.

1.4 PROJECT TEAM

FUSRAP project organization is outlined and members of the MAP project team for the Tonawanda site are identified in Figure 1.1. Stakeholders are identified in Table 1.2.

The primary organization providing community input into the remedy selection for the site is the Coalition Against Nuclear Materials in Tonawanda (CANiT). CANiT opposed DOE's proposed remedy issued in 1993 that involved building a waste containment structure on the Ashland 1 property to contain the radioactive materials from the four Tonawanda properties. As a result of that opposition, the decision-making process was suspended in April 1994. CANiT includes the folowing elected officials: Congressman John LaFalce; Mary Lou Rath, State Senator; Richard Anderson, New York State Assembly; Sam Hoyt, New York State Assembly; Robin Schimminger, New York State Assembly; Leonard Lenihan, Erie County Legislature; Charles Swannick, Erie County Legislature; Dennis Gorski, Erie County Executive; James Pax, Grand Island Supervisor; Carl Calabrese, Town of Tonawanda Supervisor; Alice Roth, City of Tonawanda Mayor; and James McGinnis, City of North Tonawanda Mayor.

For a Clean Tonawanda Site (FACTS) is a recently formed group that supports the National Environmental Policy Act (NEPA) process. Members of the group include Don Finch, Jim Rauch, and Ralph Kreiger.

1.5 ORGANIZATIONAL INTERFACES

Table 1.3 outlines the organizational interfaces among levels of DOE organization, core and technical members of the MAP project team, regulatory agencies, and stakeholder groups and summarizes the relationships of these interfaces to ER at the Tonawanda site.

The remedy selection process will include working with community groups such as CANiT and FACTS to identify an alternative agreeable to the community and DOE.

1.6 MAP PROGRESS, ACCOMPLISHMENTS, AND STRATEGY

Table 1.4 summarizes progress toward a record of decision through an ongoing process involving stakeholder input.

On May 2-3, 1995, more than 60 FUSRAP stakeholders from communities throughout the United States convened in Washington, D.C., to attend the first annual FUSRAP National Stakeholder Summit. Representatives of the Tonawanda community who attended the summit were George Randels and Jennifer Martella from Congressman LaFalce's office; Carl Calabrese, Town of Tonawanda Supervisor; and Mike Raab, Deputy Commissioner for the Erie County Department of Environment and Planning. Property owners at the site were represented by Jay Hill of Ashland Oil and Tom Dugan of Praxair.

Future strategy for developing a remedy for the Tonawanda site is to continue discussions with the community through CANiT and input from the EMAB.

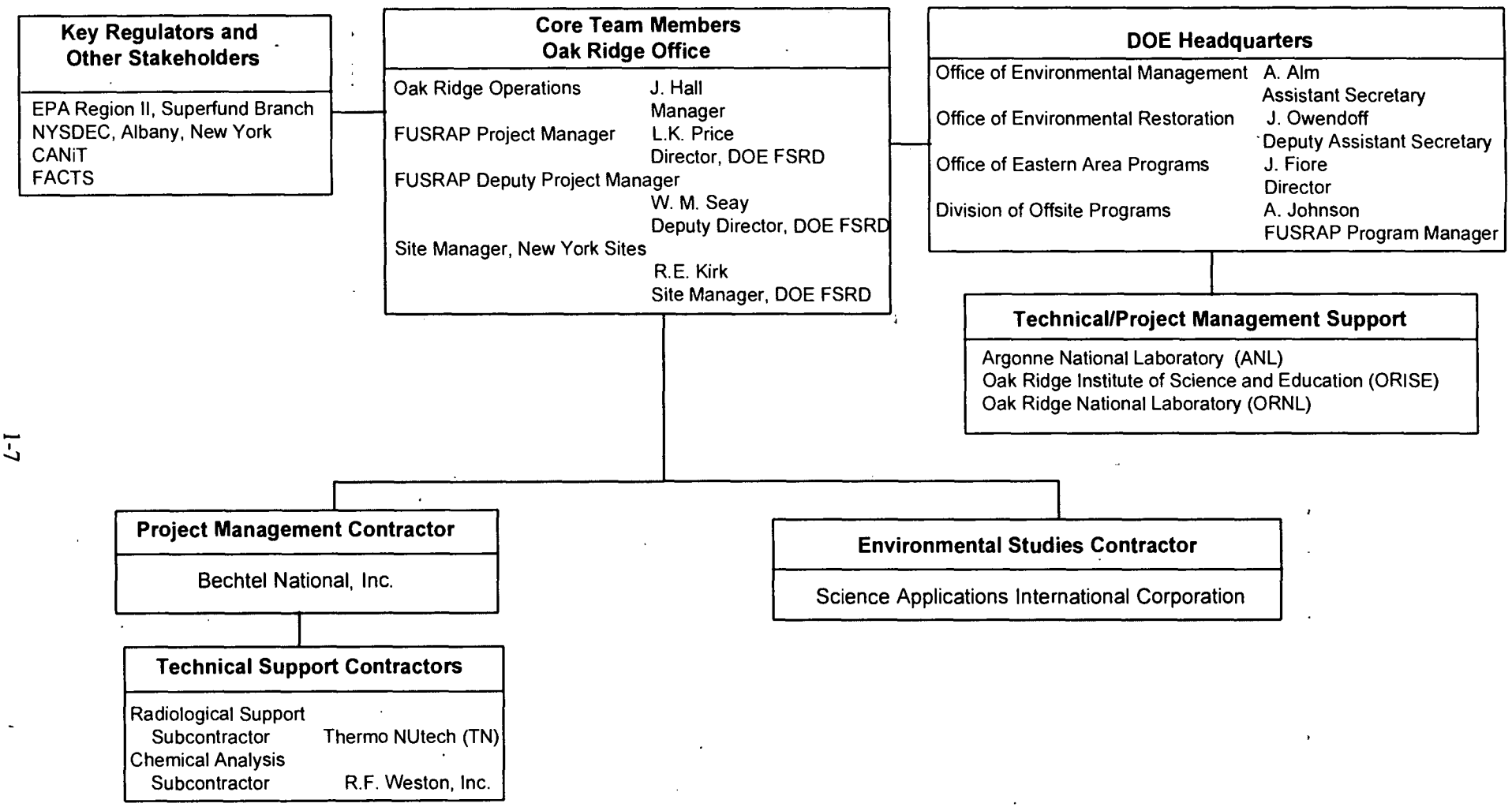


Figure 1.1
MAP Project Team and Organization Chart for the Tonawanda Site

Table 1.2 Stakeholders at the Tonawanda Site

Agency	Name/Position	Authority
NYSDEC	Paul Merges/Director, Division of Pesticides and Radiation	State agency
CANiT	Richard Tobe/Chairman	Community coalition
FACTS	Don Finch/Staff member Ralph Krieger/Staff member James Rauch/Staff member	Community coalition
EPA Region II	Robert Hargrove/Chief, Environmental Impact Branch	Federal agency
U.S. Congress	John LaFalce/Congressman George Randels/LaFalce staff Jennifer Martella/LaFalce staff	Elected official
State Senate	Mary Lou Rath/State Senator	Elected official
State Assembly	Richard Anderson/Assemblyman Sam Hoyt/Assemblyman	Elected officials
Erie County	Dennis Gorski/County Executive Leonard Lenihan/Erie County Legislator Charles Swannick/Erie County Legislator	Elected officials
Erie County Department of Environment and Planning	Richard Tobe/Deputy Commissioner	County agency
Tonawanda	Alice Roth/Mayor, City of Tonawanda James McGinnis/Mayor, City of North Tonawanda Carl Calabrese/Town of Tonawanda Supervisor	Elected officials

Table 1.3 Organizational Interfaces

Organization	Role/Responsibility
DOE-HQ, Office of Environmental Restoration (EM-40), within Office of Environmental Management	Oversight responsibility for attaining FUSRAP goals implemented through Office of Eastern Area Programs and designated Program Manager in Division of Off-Site Programs, who establish overall program direction, policies, milestones, and budget.
DOE Oak Ridge Operations Office, Former Sites Restoration Division	Responsibility for accomplishing FUSRAP ER mission; day-to-day technical, administrative, and financial management of FUSRAP activities; oversight and management of Bechtel National, Inc. and Science Applications International Corporation contracts.
Bechtel National, Inc.	Project Management Contractor. Manages field activities; administers subcontracts; defines and implements quality assurance procedures, environmental compliance activities, and safety programs to meet DOE and other applicable requirements; ensures completion of remedial action in accordance with DOE goals.
Science Applications International Corporation	Environmental Studies Contractor. Responsible for planning, managing, and executing CERCLA process, integrating NEPA values, and meeting RCRA requirements. Helps DOE plan site investigations and evaluates cleanup alternatives.
Oak Ridge National Laboratory	Provides technical support to DOE, including radiological scoping, designation, characterization, and verification, and conducts environmental audits of activities at FUSRAP sites.
Oak Ridge Institute for Science and Education	Provides technical support to DOE, including independent verification activities.
Argonne National Laboratory	Provides technical support to DOE, including technical review of analyses and documents and assistance to FUSRAP self-assessment.
DOE Waste Management Program	Oversees management of wastes generated during remediation projects, including notification of projected needs for waste treatment, storage, and disposal.
DOE Technology Development Program	Ensures use of safest, fastest, and most cost-effective remedial action technologies.
Environmental Protection Agency Region II	Observes and provides input on site activities.
New York State Department of Environmental Conservation	Key state regulatory agency; observes and provides input on site activities.

Table 1.4 Steps Taken Toward a Record of Decision

Year	Activity
1988	• Public scoping meeting for the remedial investigation/feasibility study-environmental impact staement (RI/FS-EIS) process (April) and follow-up informational meeting (June) conducted • DOE and the Coalition Against Nuclear Materials in Tonawanda (CANiT) reached agreement with moratorium on RI/FS-EIS work (August) • DOE agreed to end consideration of a plan to move material from the FUSRAP Colonie site to the Tonawanda site (October) • Moratorium on RI/FS-EIS work ended (October) • $50,000 provided to CANiT for hiring a technical consultant
1990	DOE agreed to include the Seaway property as part of the Tonawanda site
1992	Three availability sessions held to provide information on remedy selection process to members of the public and to answer questions
1993	• Remedial investigation/feasibility study-environmental impact statement report completed • DOE Public Information Center opened (March) • Series of workshops held throughout the year to discuss decision-making process and DOE's preferred remedy • Baseline risk assessment issued • Feasibility study issued • Proposed plan issued • Public meeting held to discuss DOE's proposed plan to build an onsite containment structure for materials at the Tonawanda site (December) • EMAB established
1994	• CANiT conducted its own public meeting (January) • DOE suspended the decision-making process (April) • During meeting with Admiral Guimond, Representative LaFalce, and stakeholders, commitment made for draft work plan for community collaboration in decision making and for a workshop on treatment technologies (July) • Treatment workshop held (September) • Work plan meeting conducted (October)
1995	• Work plan meeting held to discuss community involvement in remedial actions (February) • Meeting held with CANiT to discuss preliminary results of treatment studies (June) • Interim action options developed at the request of Representative LaFalce: demolition of one Praxair building, decontamination of three others, and removal of 1,200 cubic yards of soil stored at Praxair • EMAB committee meeting held in Tonawanda (August); papers presented and public meeting held • Meeting held with CANiT and Praxair employees to discuss scheduled interim actions (October) • Representative LaFalce and DOE Assistant Secretary met with local groups, including CANiT (October) • Interim action begun at Praxair (October)
1996	• Engineering evaluation/cost analysis (EE/CA) for Praxair interim actions issued for public comment (January) • At the request of CANiT, DOE extended the public comment period on the EE/CA • Briefing on Praxair interim actions conducted for Praxair employees • Briefing on Praxair interim actions conducted for CANiT

2. SITE DESCRIPTION AND COMPREHENSIVE PLANNING

The locations of the FUSRAP Tonawanda site properties are shown in Figure 2.1. Table 2.1 lists the location, land use category, and status of each of the properties.

2.1 OPERATIONAL HISTORY

The operational history of the Tonawanda site, including previous and current site ownership, historic site use, and origin of constituents of concern, is summarized in Table 2.2.

The Tonawanda site consists of four main properties and another small property, referred to as a vicinity property, that was also affected by MED material. The four main properties are the Linde property, Ashland 1, Ashland 2, and Seaway; the vicinity property is the Town of Tonawanda Landfill.

Linde

- Uranium was extracted from seven different types of ores (totalling about 28,300 tons) under contract to MED from 1942 to 1946.
- The work was conducted in five site buildings; these were originally decontaminated in 1949 to the standards of that time and again in 1981 to standards then in effect, and one of them was dismantled during 1981.
- The residues from the processing operation of some of the ores were transferred to a nearby property known as the Haist Property (Ashland 1) from 1944 to 1946.
- Currently, the buildings are owned by Praxair, Inc., an operating engineering and development concern with very limited industrial work.
- In addition to the four buildings, the remedial investigation also identified soil with radionuclide concentrations above guidelines.

Ashland 1

- Between 1944 and 1946, the site was used by MED for disposal of about 8,000 tons of ore refinery residues generated by Linde. The residues were spread over two-thirds of the property to depths from 0.3 to 1.5 m (1 to 5 ft).
- In 1949 the property was assigned to the General Services Administration.

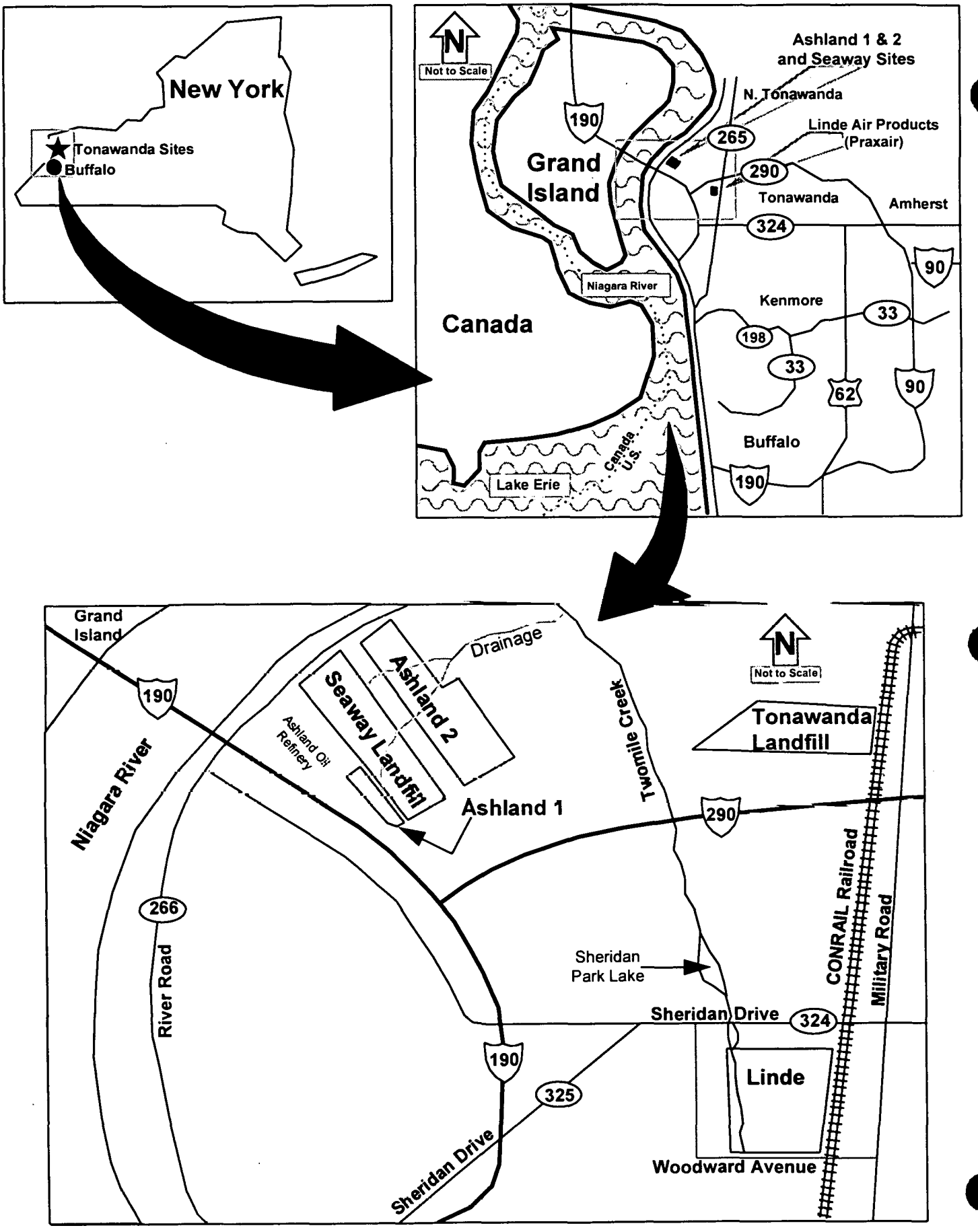


Figure 2.1 Tonawanda Sites, Site Location, and General Site Map

Table 2.1 Property Listing

Site	Owner	Location	Area	Type of Property	Status	Reference Documents
Ashland 1	Ashland Petroleum Company	Southeast of United Refining between I-190 and Seaway	11 acres	Industrial (vacant)	Radiological and chemical characterization complete	SAIC 1993a; BNI 1995a
Ashland 2	Ashland Petroleum Company	4545 River Rd.	115 acres	Industrial (vacant)	Radiological and chemical characterization complete	SAIC 1993a; BNI 1995a
Linde	Praxair, Inc.	East Park Drive and Woodward Ave.	135 acres	Industrial	Radiological and chemical characterization complete; interim actions planned	SAIC 1993a; BNI 1995a
Town of Tonawanda Landfill Vicinity Property	Town of Tonawanda	Adjacent to I-290, east of Military Rd., south of City of Tonawanda corporate limits	55 acres	Industrial (landfill)	Radiological and chemical characterization complete	BNI 1995a
Seaway Industrial Park	Seaway Industrial Park Development Company, Inc.	Northwest of Ashland 1, south of River Rd., and east of the United Refining property	93 acres	Industrial (landfill)	Radiological and chemical characterization complete	SAIC 1993a; BNI 1995a

Table 2.2 Operational History

Property	Activity	Period	Previous and Current Owners
Ashland 1	Disposal of ore refinery residues from Linde	1944-1946	Haist (until 1944); MED (1944-1949); General Services Administration (1949-1960); Ashland Oil Company (1960-present)
Ashland 2	Disposal of general plant refuse and chemical by-products, including Ashland Oil construction wastes	1957-1982	Ashland Oil (1957-present)
Linde	Uranium extraction;	1942-1946	Linde Air Products
	engineering and development	1994-present	Praxair, Inc.
Town of Tonawanda Landfill	Solid waste disposal;	1930s-present	Town of Tonawanda
	disposal of sludge containing radioactive material from Linde	unknown	
Seaway Industrial Park	Industrial waste disposal;	1930-present	Seaway Industrial Park Development Company; operated by Browning Ferris Industries
	disposal of materials from Ashland 1	1974	

- Following a radiological survey in 1958 by the Environmental Measurements Laboratory, AEC released the property for use without removal of the residues (ORNL 1978), and in 1960 ownership of the property was transferred to Ashland Oil Company.

- In 1974 Ashland Oil constructed bermed areas on the property to hold two petroleum product storage tanks. Most of the soil removed during construction of the bermed areas was deposited in the Ashland 2 and Seaway properties. The storage tanks were removed from the bermed area by Ashland Oil in 1989.

Ashland 2

- From 1957 to 1982, a portion of the property was used by Ashland Oil as a landfill for disposal of general plant refuse and industrial and chemical by-products. The landfill was closed in 1982 and covered with 0.6 m (2 ft) of clay.

- Construction wastes from building the tank berm at Ashland 1 were transported to Ashland 2.

Seaway Industrial Park

- The site is a sanitary landfill owned by the Seaway Industrial Park Development Company and operated by Browning Ferris Industries.

- In 1974, approximately 4,588 cubic meters (6,000 cubic yards) of soil containing construction wastes from Ashland 1 was disposed of on three areas of the Seaway landfill. Since then, some affected soil has been buried beneath approximately 12 m (40 ft) of refuse and fill.

- Radioactive material is also present in a fourth area of the landfill that adjoins Ashland 1.

2.2 ENVIRONMENTAL SETTING

2.2.1 Location

The four Tonawanda Site properties are located in an industrialized area in the Town of Tonawanda, New York, approximately 4.8 km (3 mi) northwest of Buffalo. The location of each property is listed in Table 2.1 and shown in Figure 2.1.

2.2.2 Geology, Hydrogeology, and Water Quality

The Tonawanda properties lie along or near the Niagara River in the Erie-Ontario Lowland (Muller 1965). The geologic features of the site are summarized in Table 2.3,

and Table 2.4 describes the site hydrogeology (SAIC 1993a). Figure 2.2 shows a geologic column for the site (BNI 1993a).

The Niagara River is the primary receiving water to which the Tonawanda properties drain via Rattlesnake Creek and Twomile Creek. Because Twomile Creek and its tributaries are classified as Class B "primary contact recreation" waters, some activities in the water and along the banks require special state permits. Figure 2.3 shows the Twomile Creek drainage area.

Because of high salinity and high levels of total dissolved solids, groundwater in the area is restricted to primarily industrial uses. More than 30 wells are known to exist within a 4.8-km (3-mi) radius of the site, but a 1989 well canvass disclosed no record of any wells used for drinking water (BNI 1989).

2.2.3 Ecological Resources

The Tonawanda region is located in the Eastern Lake section of the Central Lowland physiographic province. The vegetation at Ashland 1 and Seaway is sparse because of the extensive industrial activity conducted on the properties. The primary flora are indigenous shrubs and grasses. At Seaway, New York state regulations require seeding with native grasses to prevent erosion and promote evapotranspiration.

Ashland 2 is vegetated with a mixture of grasses, forbs, thick bushes, and small trees. The site varies from areas with almost no vegetation to areas with dense stands of woody shrubs and trees.

The vegetation at Linde is dominated by clipped grasses and some common tree species.

In 1976, a wetland delineation was performed to determine the size and affected areas of the floodplains at Twomile and Rattlesnake creeks. A more conclusive delineation will need to be conducted before remediation begins. Wetlands identified at Ashland 2 are shown in Figure 2.4. No threatened or endangered species have been identified at the site (BNI 1993a).

2.2.4 Climate and Meteorology

The mean annual precipitation in the Tonawanda area is 96 cm (37.5 in.), with average snowfall of 238 cm (93 in.). Winds in the area are predominantly from the southwest or west-southwest, across Lake Erie (FBDU 1981) at an annual average wind speed of 19 km/h (12 mph).

2.3 CURRENT LAND USE

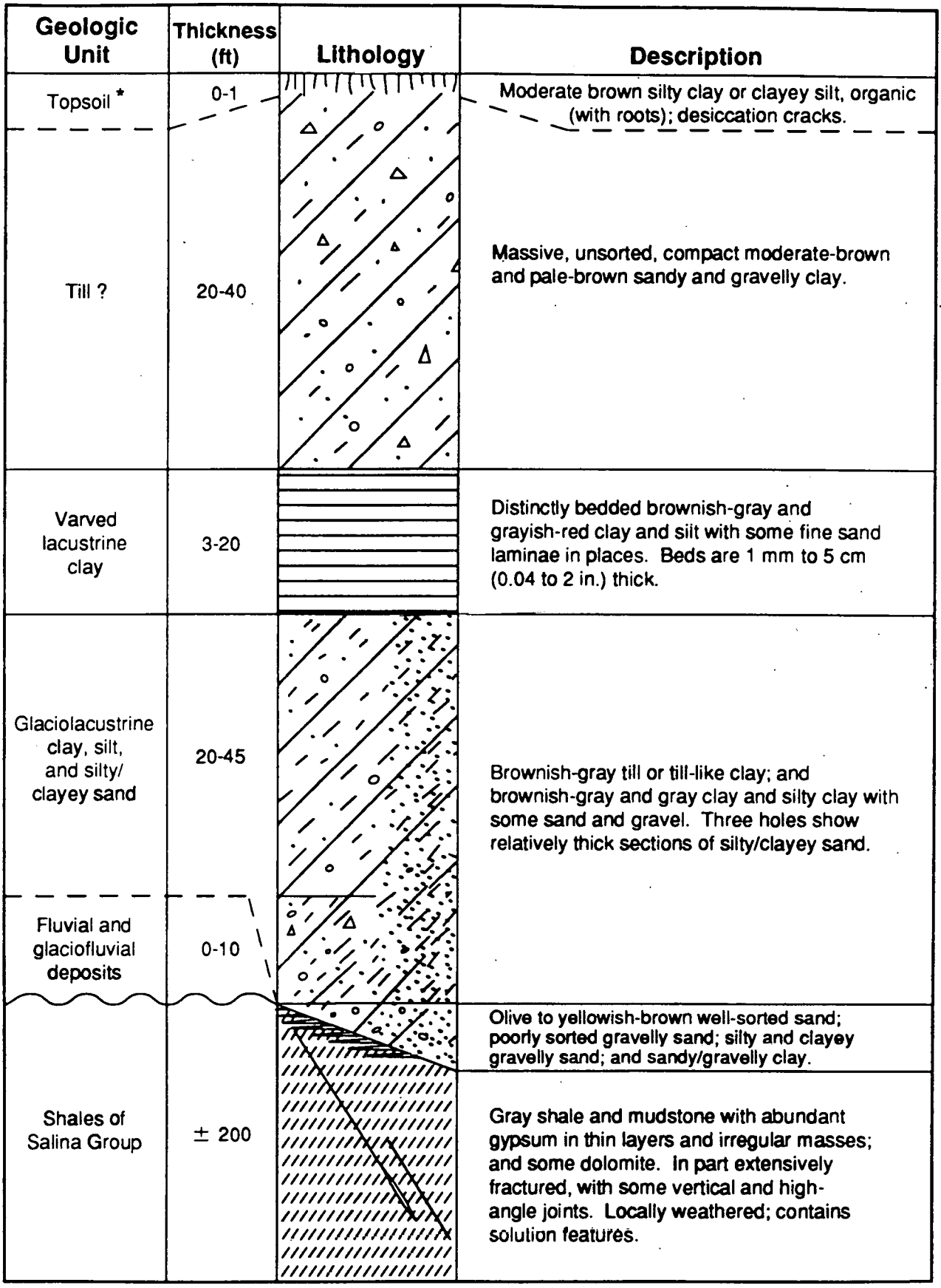
The Tonawanda site is in an urban population center in the Town of Tonawanda in northern Erie County, a primarily industrial setting. Figure 2.5 shows land use in the

Table 2.3 Geology of the Tonawanda Site

Site	Topography	Soil Condition	Subsurface Geology	Seismic Activity
Ashland 1	Generally flat except for areas where construction was conducted; elevation about 600 ft above MSL	Fill	Till or lake clay overlies varved lacustrine clays and silts, which in turn overlie glaciolacustrine lake clay, silt, sandy clay, and clayey sand. The layer immediately above fractured bedrock is coarser grained and represents a hydrogeologic zone at the site.	The site is in a tectonically stable region, and most earthquakes have been magnitude 5.25 or lower.
Ashland 2	Flat with small depressions; average basin slope of 2 percent	Silt loam with Castille gravelly loam and fill from Ashland 1	As above	As above
Linde	Generally flat, with buildings; average basin slope of 0.63 percent	Half the site is covered by roofs or paved surfaces; the other half is covered by packed gravel.	As above	As above
Seaway	The landfill pile is steep, with side slopes of about 30 percent	Fill	As above	As above
Town of Tonawanda Landfill	The landfill is elevated about 15 ft above ground surface. The surface is smooth and slopes west to east.	Fill	As above	As above

Table 2.4 Hydrogeologic Conditions at the Tonawanda Site

Site	Aquifer	Groundwater Flow, Discharge, and Recharge	Surface Water
Ashland 1	Erie-Niagara Basin. Groundwater occurs in unconsolidated materials, soluble limestones and dolomites, and shales	Ground surface infiltration rate is 0.9 in./yr; flow is primarily through perched groundwater system. Underlying glacial till and clays allow very little infiltration to shallow system. A semiconfined shallow system is present in sand lenses 16 to 40 ft deep.	A large area in the center of the property captures precipitation; the water is pumped into an open channel, which drains northeastward. Site drainage is to the main ditch that forms the headwaters of Rattlesnake Creek.
Ashland 2	As above	Ground surface infiltration rate is 0.9 in./yr; flow is primarily through perched groundwater system. Underlying glacial till and clays allow very little infiltration to shallow system. A semiconfined shallow system is present in sand lenses 16 to 40 ft deep.	Northwestern portion is drained by Rattlesnake Creek that reduce surface water velocity and may be active groundwater discharge and recharge areas. The central and southern regions of the site are drained by an unnamed tributary of Twomile creek.
Linde	As above	Ground surface infiltration rate is 3.7 in./yr; flow is primarily through perched groundwater system. Underlying glacial till and clays allow very little infiltration to shallow system.	Most surface area is paved. Runoff collects in storm sewer system and drains into Twomile Creek conduits.
Seaway	As above	Ground surface infiltration rate is 7.3 in./yr; flow is primarily through perched groundwater system. Underlying glacial till and clays allow very little infiltration to shallow system.	Half the stormwater unoff flows to the southwest; the other half flows to the northeast.
Town of Tonawanda Landfill	As above	Underlying glacial till and clays allow very little infiltration to shallow system.	Stormwater runoff flows into Twomile Creek, to the west.



* Fill material consisting of gravel, clay, brick fragments, and slag up to 8-ft thick exists at Ashland 1. Approximately 2 ft of organic-rich clay and silt alluvium likely underlies surface drainages.

Figure 2.2
Geologic Column for the Tonawanda Site

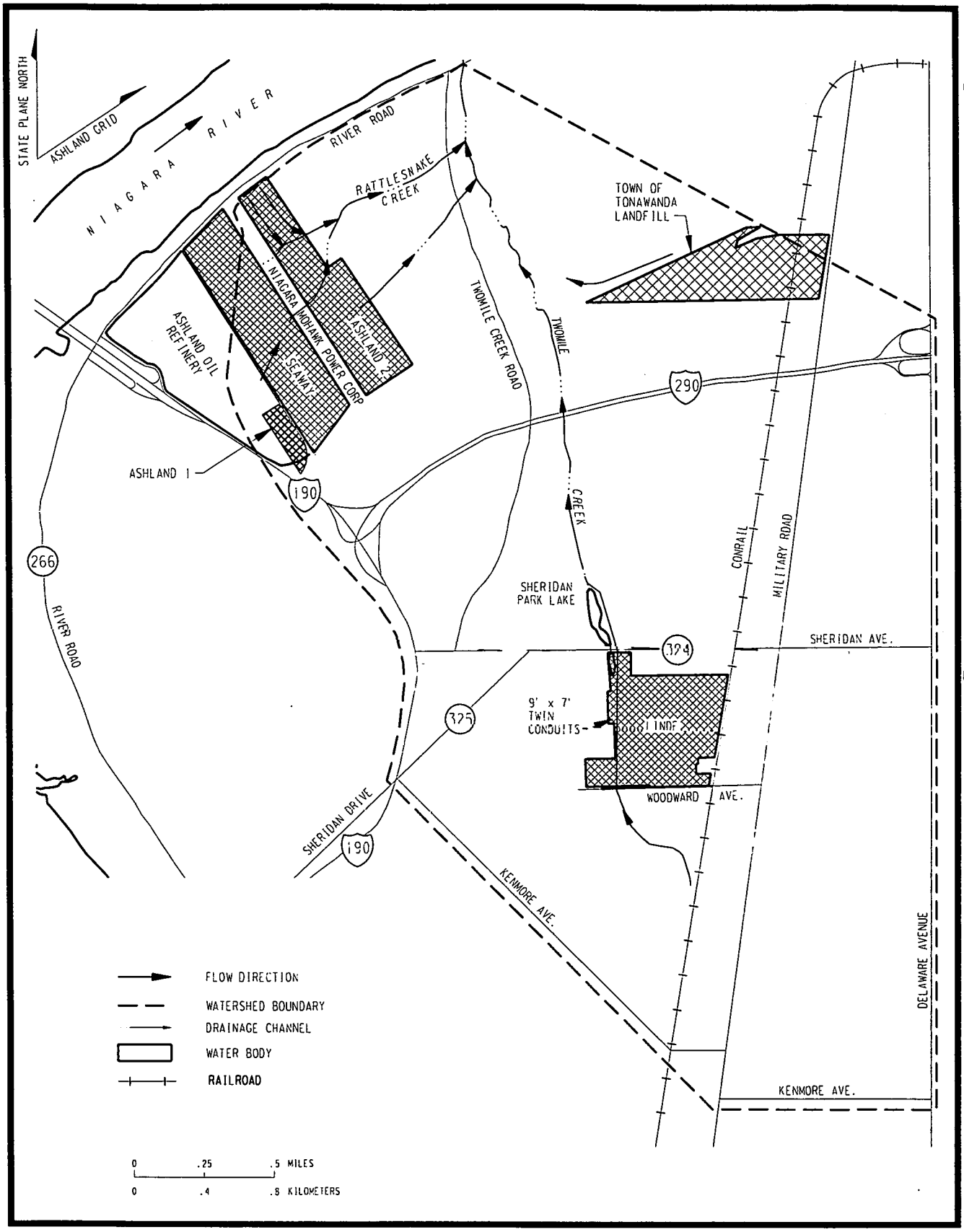


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Figure 2.3
Drainage Area of Twomile Creek

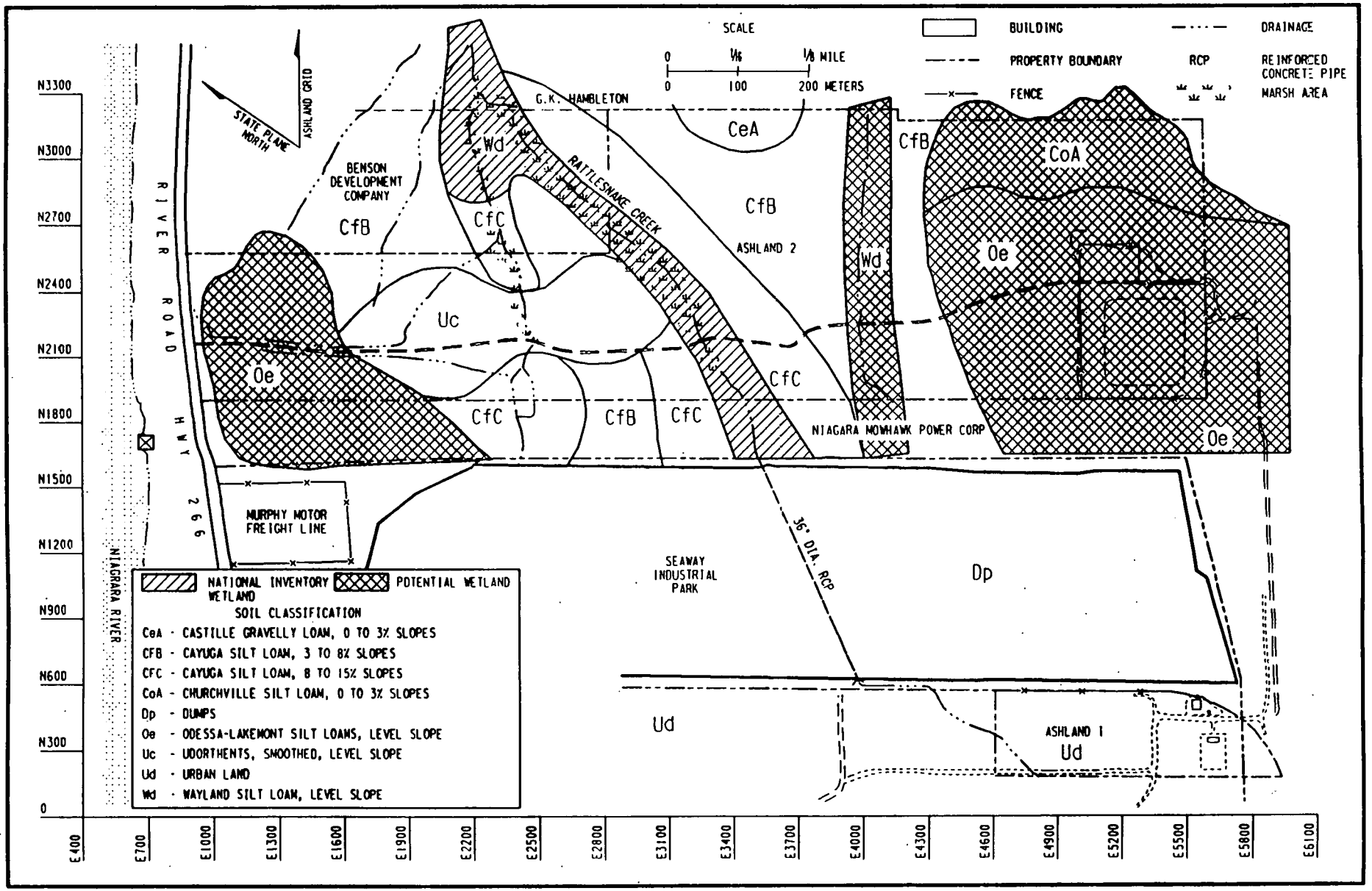

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Figure 2.4
Wetland Areas at Ashland 2

vicinity of Ashland 1, Ashland 2, and Seaway. Figure 2.6 shows land use near the Linde property.

The Ashland 1 property is currently unused. The adjacent property is a former refinery that is now being dismantled (SAIC 1993a). The tanks from refining operations are being used for storage and transfer of petroleum products. The property is entirely fenced, and the access at River Road is controlled by an entry gate that is locked after hours.

Ashland 2 is an open, currently unused area. Portions of it were previously used as an industrial landfill and as a petroleum storage facility in a bermed tank formerly located in the southwestern corner of the property. The site is not entirely fenced, although locked gates control entry via the access road. The site is separated from Seaway by a chain link fence and by the Niagara Mohawk property. The site is bordered by privately and publicly owned undeveloped property.

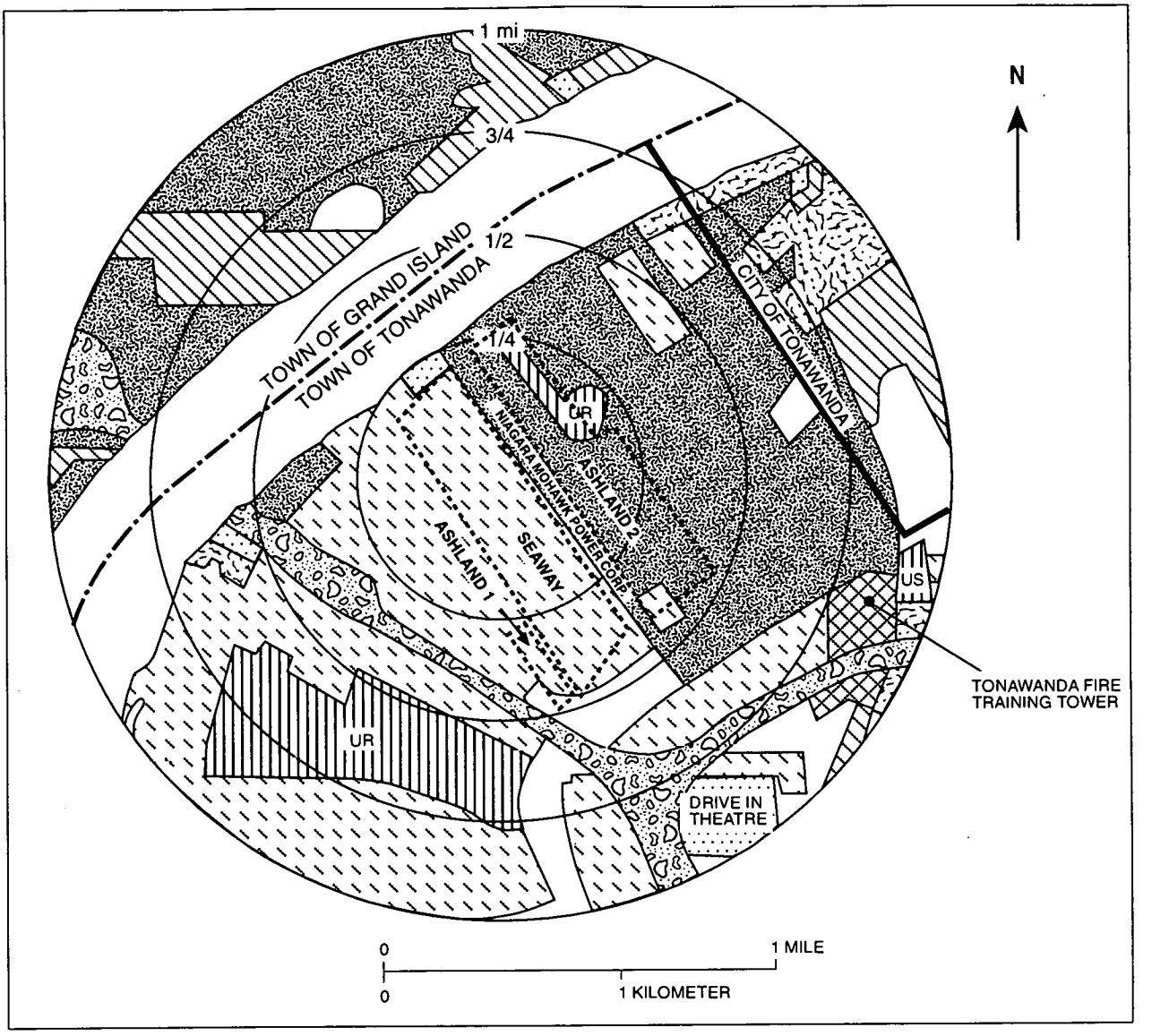
The former Linde site is now an engineering and development facility currently operated by Praxair, Inc. The surrounding area is used for a mixture of industrial, commercial, recreational, public, and residential purposes; there are six schools, a hospital, two recreational areas, two community buildings, and a senior citizens center within 1.6 km (1 mi) of the site (SAIC 1993a). The site buildings are fenced, and access is controlled by entry gates. More than 18,000 people live within a 1.6-km (1-mi) radius of the site, and more than 16,000 work in that area.

Seaway is a sanitary landfill that was used since 1930 until very recently for the disposal of municipal, industrial, and construction solid wastes. The site is entirely fenced, and access is controlled by an entry gate. The nearest residences are located about 0.8 km (0.5 mi) from the site; approximately 1,300 people live within 1.6 km (1 mi).

The Town of Tonawanda Landfill, a vicinity property of the Linde site, was used from the 1930s through 1989 for disposal of household waste, construction and demolition material, leaves, and other materials. Adjacent properties include a residential area, a Conrail spur line, a Niagara Mohawk Power corporation right-of-way, and a municipal incinerator that is no longer in use.

2.4 LOCAL AND REGIONAL FACTORS INFLUENCING REMEDIATION STRATEGY

Efficient and cost-effective remediation of the Tonawanda site to ensure protection of the public and the environment and release the properties for beneficial reuse depends on recognizing and appropriately addressing socioeconomic, cultural, environmental, and other factors.

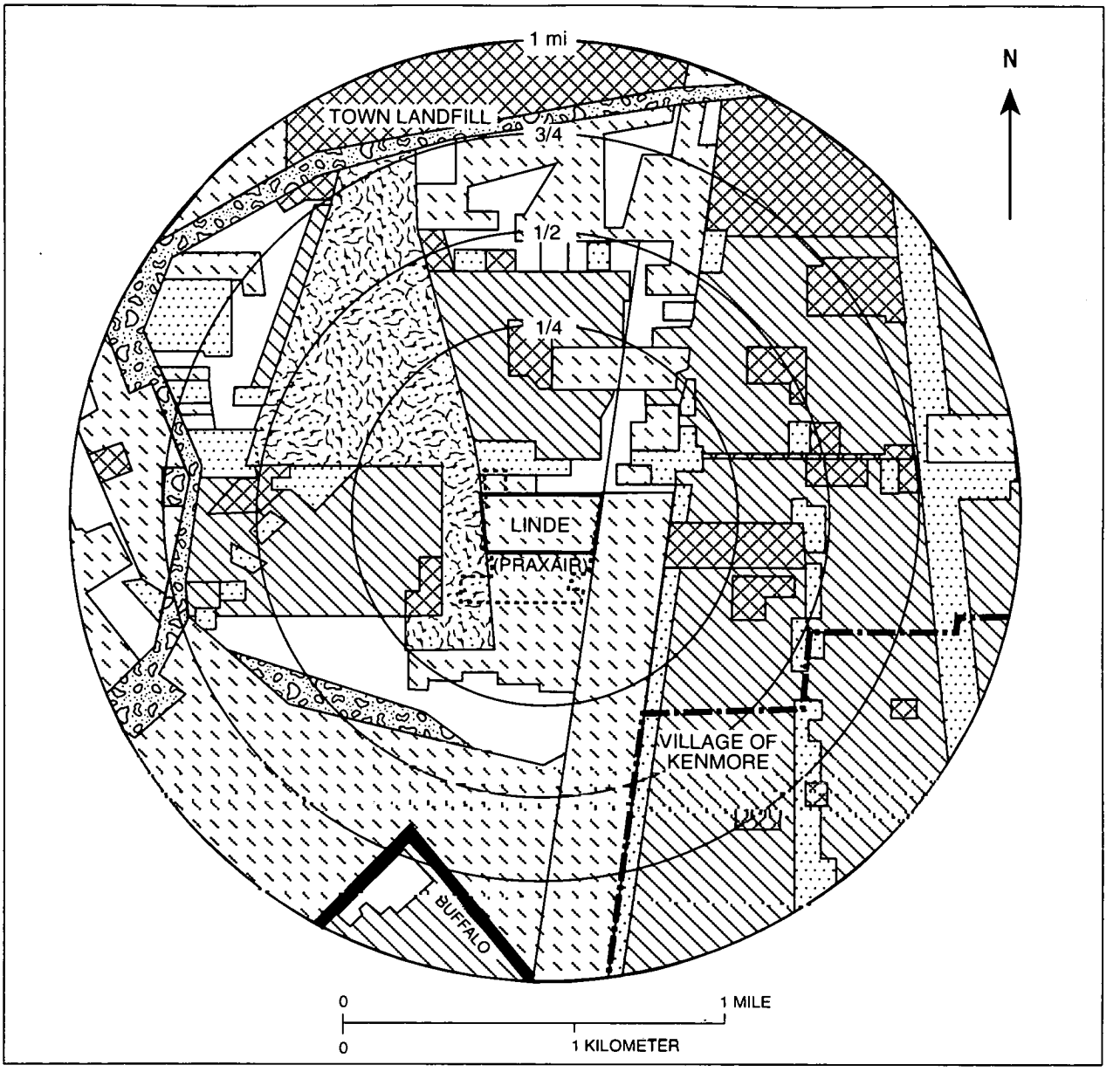


Source: FBDU 1981b.

EXPLANATION

- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- PUBLIC
- RECREATIONAL
- TRANSPORTATIONAL
- BUSHLAND
- UTILITIES
  - US - SEWAGE TREATMENT
  - UR - SOLID WASTE
- VACANT
- CITY LIMITS
- TOWN BOUNDARIES
- —1/4— APPROXIMATE DISTANCE FROM CONTAMINATED AREA (MILES)
- ..... SITE BOUNDARIES

Figure 2-5
Map of Land Use in the Vicinity of Ashland 1, Ashland 2, and Seaway



Source: FBDU 1981a.

EXPLANATION

- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- PUBLIC
- RECREATIONAL
- TRANSPORTATION
- VACANT
- ..... LINDE (PRAXAIR) BOUNDARY
- CITY LIMITS
- VILLAGE BOUNDARIES
- BOUNDARY OF CONTAMINATED AREA
- – 1/4 – APPROXIMATE DISTANCE FROM CONTAMINATED AREA (MILES)

Figure 2.6
Map of Land Use in the Vicinity of Linde

2.4.1 Socioeconomic Factors

Table 2.5 lists significant characteristics of the population near the Tonawanda site (SAIC 1993a).

2.4.2 Historical, Archaeological, and Cultural Factors

No resources protected under the Antiquity Act, the Historic Sites Act, or the National Historic Preservation Act have been identified at the Tonawanda site.

2.4.3 Environmental Factors

No endangered species is known to inhabit the FUSRAP Tonawanda site, and no critical habitat has been identified.

Executive Order 11988 (Floodplain Management) requires federal agencies to determine whether any proposed actions will occur in a floodplain. Floodplains associated with Twomile and Rattlesnake creeks were identified at the Ashland 1 and 2 sites. No DOE actions have affected a floodplain at the site. Any proposed action will be evaluated to determine whether it will affect a floodplain.

Executive Order 11990 (Protection of Wetlands) requires federal agencies to determine whether any proposed action will affect the integrity and quality of wetlands. A previous wetland delineation recommended the 17-acre floodplain of Twomile and Rattlesnake creeks for protective status under the New York State Freshwater Wetlands Act, but an uncontested fill in Rattlesnake Creek divided the wetland into two parts, each smaller than the 12.4-acre minimum required for state jurisdiction. A wetland associated with Rattlesnake Creek, which flows through Ashland 2, has been delineated on the National Wetlands Inventory Map for the Tonawanda area (BNI 1993a). To date, no DOE actions have affected wetlands at the Tonawanda site. Any action proposed will be evaluated to determine whether it will adversely affect a wetland. Wetland areas identified at Ashland 2 are shown in Figure 2.4.

2.5 FACILITIES, EQUIPMENT, AND INFRASTRUCTURE

Figure 2.7 is a plan view of Ashland 1, Ashland 2, and Seaway. Ashland 1 covers about 4.4 ha (10.8 acres) divided into three sections by berms. The only site building is a fuel gas distribution center occupied for only a few hours each month. Water lines run to a storage tank area and to a fire hydrant in that area. The area is drained through a pipe that empties into a drain box and then into a drainage ditch. An electrical substation in the southwestern corner of the property is connected to a power line along the western boundary. A gas line from the fuel gas distribution center runs along the eastern edge of the property.

Table 2.5 Socioeconomic Factors at the Tonawanda Site

	Town of Tonawanda	Erie County	Niagara County
Population (1990)	82,464	964,700	216,900
Population Density (per square mile)	4,386.4	927.1	422.1
Housing Units	34,589	402,131	90,385
Farming and Agriculture Employees/Avg. Income (1989)	NA	4,879/$14,297	2,302/$11,128
Manufacturing Employees/Avg. Income (1989)	NA	78,343/$33,048	24,366/$36,381
Retail Employees/Avg. Income (1989)	NA	99,920/$11,230	20,116/$10,289
Services Employees/Avg. Income (1989)	NA	154,930/ $19,286	24,253/$15,924
Government Employees/Avg. Income (1989)	NA	76,240/$28,139	13,017/$25,213

NA - Not available

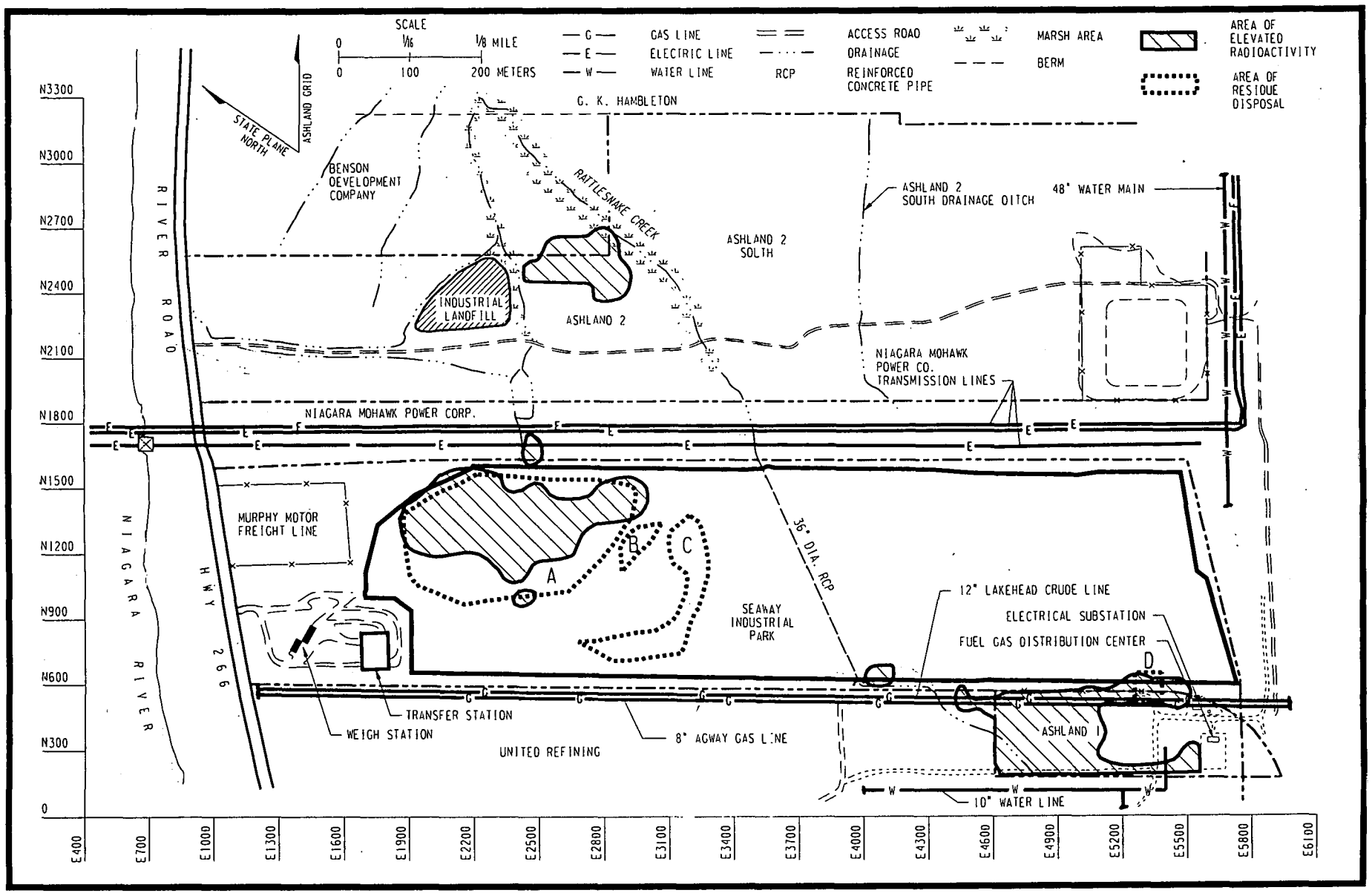


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Figure 2.7
Plan View of Ashland 1, Ashland 2, and Seaway

Ashland 2 is a roughly rectangular 47-ha (115-acre) site. The property is vacant and largely overgrown with grass and weeds. No utilities service the site. A petroleum product storage site is located in a fenced area in the southwestern corner of the property.

The 55-ha (135-acre) Linde site includes several buildings currently used by Praxair, Inc., as offices, research laboratories, fabrication facilities, and storage areas. Figure 2.8 is a plan view of the site. The site is served by city water, electricity, natural gas, and sewage systems. Underground tunnels are used for pipes supplying compressed air, electricity, oxygen, nitrogen, natural gas, and telephone lines. The tunnels also collect condensation. There are also extensive networks of storm sewers, sanitary sewers, and potable water lines beneath the site (BNI 1993a).

Seaway Industrial Park is a 38-ha (93-acre) operating sanitary landfill. Two small buildings used as check-in and weigh-in stations for entering trucks are located in the northwestern corner of the property. These buildings are served by water, sewage, electricity, and phone lines. A reinforced concrete pipe line beneath the site conducts stormwater from ditches at Ashland 1 to ditches at Ashland 2.

2.6 PROJECTED FUTURE USE OF LAND, FACILITIES, AND EQUIPMENT

The current status of the lands at the Tonawanda site is summarized in Table 2.6.

Ashland 1 is currently owned by the Ashland Petroleum Company. Ashland retained the property where radioactive material is present and sold the balance of the production and storage tank areas to United Refining, which plans to use the property as a tank farm and transfer station. Future use of the property depends on the final remedy selected for the site.

Ashland 2 is currently owned by Ashland Petroleum Company, and its future use after site remediation has not yet been determined. The local community has included the area in a waterfront development master plan, and the plan's stated future use of the land is for commercial and light industrial development.

After remediation, the Linde property is expected to continue as an engineering and development facility owned by Praxair, Inc. The Seaway property is expected to continue to be a closed industrial landfill.

Stakeholders have consistently expressed an interest in appropriate development of the Niagara River waterfront as a vital part of community plans for maintaining quality of life in the area. A plan for the waterfront development has been published and is illustrated in Figure 2.9. Part of the plan for that development involves realignment of River Road 305 m (1,000 ft) east of its present location. It will cross the present location of Ashland 2 and Seaway and will separate land used for light industrial purposes from planned residential areas along the riverfront. The existing River Road is intended for use as a walking and bicycling path along the residential area.

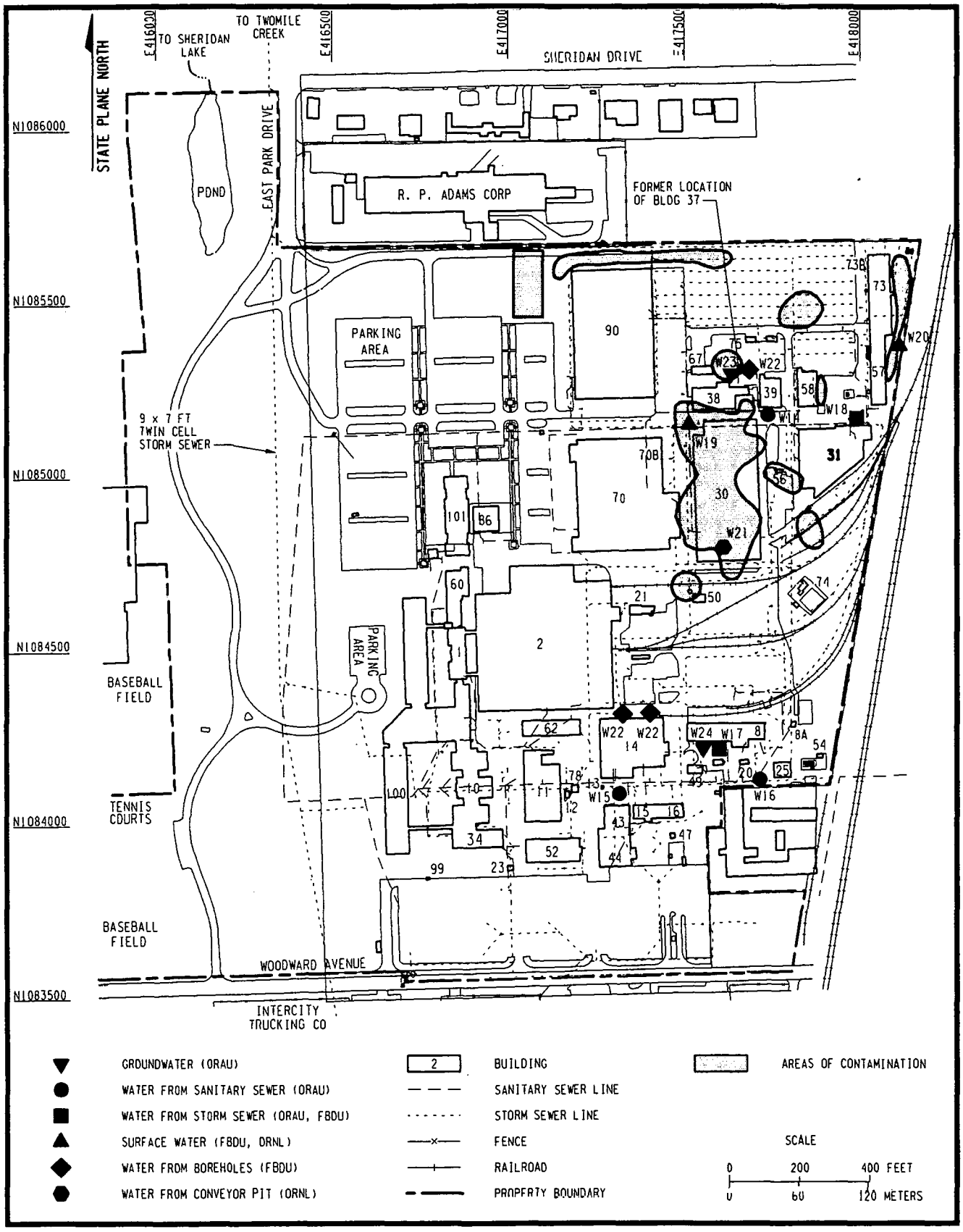

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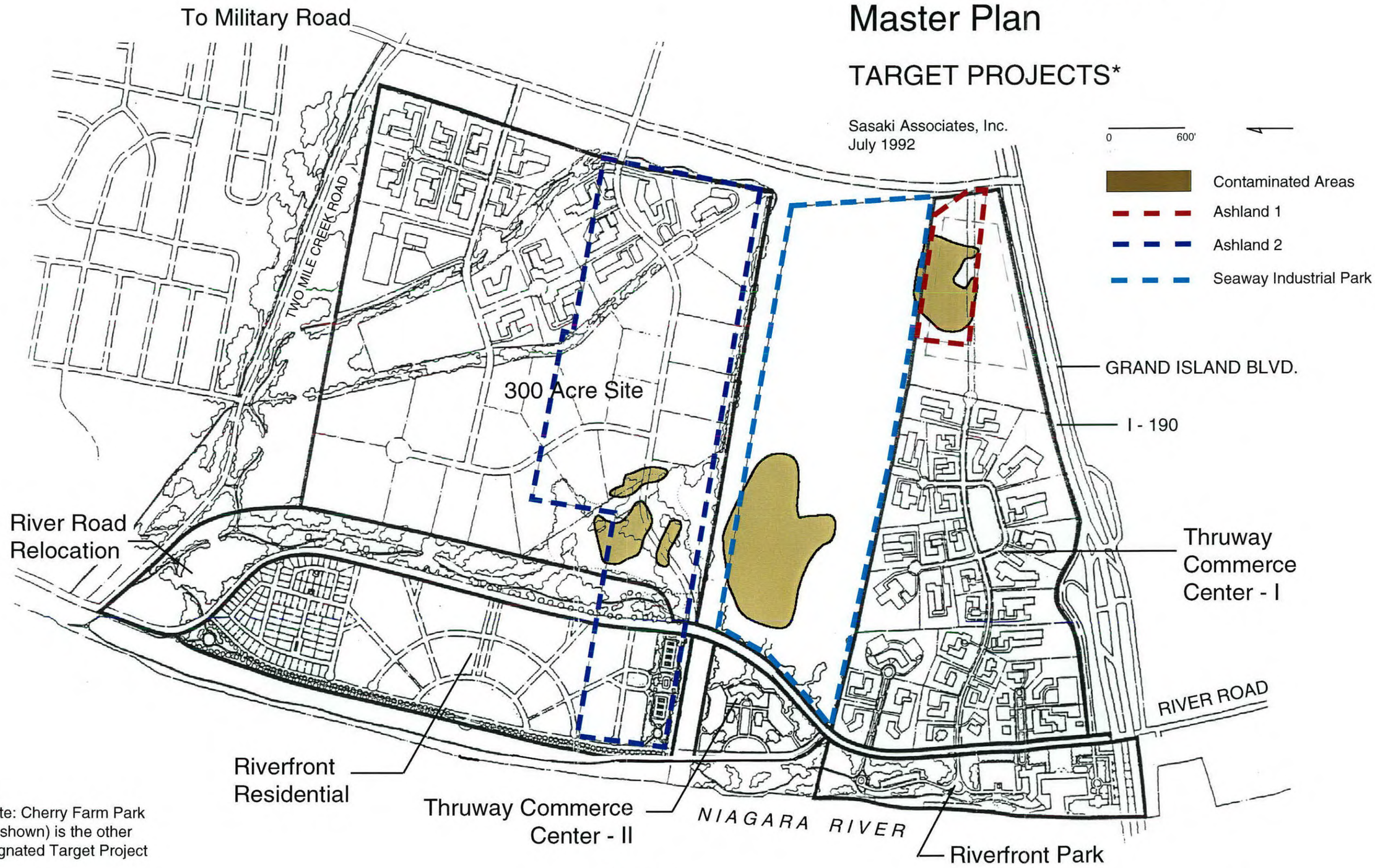
Figure 2.8
Plan View of Linde

Table 2.6 Status of Lands

Fiscal Year	Private Lands		DOE Lands				
	Total to Be Addressed (acres)	Total Completed and Released	Total Owned by DOE (acres)	DOE Land to Be Retained	Land That Has Been Released	Remediated and Available for Release	Not Ready to Be Released
Pre-FY95	0	0	0	0	0	0	0
FY 1995	0	0	0	0	0	0	0
FY 1996	0	0	0	0	0	0	0
FY 1997	1	1	0	0	0	0	0
FY 1998	72	72	0	0	0	0	0
FY 1999	49	49	0	0	0	0	0
FY 2000	1	1	0	0	0	0	0
FY 2001	2	2	0	0	0	0	0
FY 2002	2	2	0	0	0	0	0
FY 2003	0	0	0	0	0	0	0
FY 2004	0	0	0	0	0	0	0
FY 2005	0	0	0	0	0	0	0
FY 2006	0	0	0	0	0	0	0

Tonawanda Waterfront Master Plan

TARGET PROJECTS*



* Note: Cherry Farm Park (not shown) is the other designated Target Project

Figure 2.9

3. STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

This section summarizes the status of efforts to remediate the Tonawanda site, including buildings where residual radioactivity has been detected and areas where soils, sediments, and other environmental media contain radioactive residues.

3.1 CURRENT ENVIRONMENTAL RESTORATION ACTIVITIES

3.1.1 Site Remediation Activity Summary

Radiological and chemical characterization activities have been completed at all Tonawanda site properties, and interim remedial actions in buildings at Linde have been started. Characterization and environmental restoration activities conducted at the Tonawanda site are summarized in Table 3.1.

3.1.2 Environmental Condition of Property

Table 3.2 lists the materials of concern, quantities, and concentrations at the Tonawanda site. Figures 2.7 and 2.8 show the areal extent of radioactive constituents at the site.

3.1.3 Interim Removal Actions

Interim response actions (removal actions conducted before completion of the RI/FS-EIS process) are being conducted at the Tonawanda site. These actions include decontamination of Linde site buildings 14, 30, and 31. Building 38 will be dismantled, and 912 cubic meters (1,200 cubic yards) of soil stored next to Building 90 will be disposed of offsite. These actions began during FY 1996.

3.2 REGULATORY AGREEMENTS, PERMITS, AND OTHER DRIVERS

There arc no permits or regulatory drivers in effect at the Tonawanda site. FUSRAP must comply with the applicable or relevant and appropriate requirements of federal, state, and local environmental laws and regulations, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLA is the principal statutory authority for inactive sites that have been designated for remedial action.

The remedial action objectives for the Tonawanda site are summarized in Appendix F of this MAP document. However, evaluation of cleanup and disposal operations for the site is still in progress and will incorporate stakeholder input. The decision-making process for the site will culminate with the issuance of the record of decision, expected in FY 1997.

Table 3.1 Remediation Activity Summary for the Tonawanda Site

1976	Radiological survey of surface water and soil conducted at Ashland 2, Linde, and Seaway. Building surfaces also surveyed at Linde.
1978	Radiological characterization conducted at Ashland 1
1980	Radiological survey of surface water and soil conducted at Ashland 2.
1981	Radiological survey of surface water, soil, and building surfaces conducted at Linde.
1986	Walkover survey conducted at Ashland 2.
1988	Hydrogeological charcaterization of Ashland 2 area and radiological and chemical characterization of surface water, sediment, and groundwater conducted. Walkover gamma scan conducted at Seaway.
1988-1989	Radiological survey at Linde identified primary soil contaminant as thorium-230.
1988-1992	Remedial investigation conducted at Tonawanda site properties.
1989	Remedial investigation completed at Ashland 1, Ashland 2, and Seaway revealed soil containing radioactivity above guidelines.
1990-1992	Second-phase investigation conducted at Tonawanda.
1991	Linde remedial investigation completed.
1993	RI/FS-EIS report and proposed plan for Tonawanda issued.
1994	Environmental review process for Tonawanda put on hold. Characterization of Town of Tonawanda Landfill (a Linde vicinity property) completed.
1996	Interim action begun in Linde buildings.

3.3 WASTE MANAGEMENT AND DISPOSITION ACTIVITIES IMPACTING SITE REMEDIATION

Waste at the Tonawanda site is classified as 11(e)2 material; there is no hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) that affects FUSRAP work. An inventory identifying quantity, location, and scheduled disposition of wastes at the Tonawanda site is provided in Table 3.2. Strategies for waste management, waste minimization, and pollution prevention are discussed in Section 5.3.

3.4 NON-REGULATORY ACTIVITIES AFFECTING SITE REMEDIATION

Public Participation Program

DOE is committed to a program of public participation in the remedial action process for the site. FUSRAP maintains an ongoing community relations program as part of the CERCLA/NEPA remedial action process (BNI 1995b). The program includes conducting community interviews to identify local concerns and determine the information needs of the community, providing briefings to local officials and media, working with citizen interest groups, issuing news releases, maintaining information repositories, and holding public meetings and hearings. An information center at the site provides site-related documents and other information resources and serves as a meeting place for stakeholder workshops. The Environmental Management Advisory Board, established in 1993 to set boundaries for remedy selection and decision making, is discussed in detail in Section 5.

Table 3.2 Materials of Concern at the Tonawanda Site

Site	Total Waste Volume (yd^3)	Waste Type	Primary Constituents	Concentration Avg /Max. (pCi/g)	Origin of Waste	Affected Media	Waste Locations
Ashland 1	120,000	11(e)2	Uranium-238 Radium-226 Thorium-230	35/1,500 9/750 129/4,400	Disposal of material from uranium separation conducted for MED at Linde	Surface and subsurface soil	North and west of property, in and along drainage ditches
Ashland 2	52,000	11(e)2	Uranium-238 Radium-226 Thorium-230	13/263 4/189 61/2,200	Material from uranium separation at Linde disposed of at Ashland 1 and later transported to Ashland 2	Surface and subsurface soil	Area between two drainage ditches and access road, along the drainage ditch floodplains, and in smaller areas throughout the property
Linde	71,000	11(e)2	Uranium-238 Radium-226 Thorium-230	15/930 5/240 11/320	Uranium ore processing for MED	Surface and subsurface soil and building materials	Walls, floors, ceilings, and soil in and around buildings 14, 30, 31, and 38; Area 1, northwestern corner of the main parking area; Area 2, northeastern corner of parking area; Area 3, northeastern corner of property, including railroad spur; Area 4, around Buildings 38 and 58 and in and around Building 30
Seaway	117,000	11(e)2	Uranium-238 Radium-226 Thorium-230	11.52 7/51 84'880	Material from ore processing at Linde disposed of at Ashland 1 and then moved to Seaway	Surface and subsurface soil	Four areas (A-D)
Town of Tonawanda Landfill	15,200	11(e)2	Uranium-238 Radium-226 Thorium-230	93/1,800 119/2,000 299/4,300	Material originally from ore processing at Linde	Surface and subsurface soil	Along northern border.

4. SITE RELATIVE RANKING

The remedial investigation/feasibility study process for the Tonawanda site is nearing completion. As a result, three separate evaluations have been performed:

- DOE HQ relative ranking evaluation,
- DOE risk data sheet (RDS) evaluation, and
- assessment driven by regulatory requirements of CERCLA. This includes the baseline risk assessment, which evaluates risk to human health and the environment from radioactive and chemical constituents, and the feasibility study alternatives assessment, which evaluates remedial action alternatives.

4.1 DOE HQ RELATIVE RANKING

The EM-40 ranking process ranks each Tonawanda release site as high, medium, or low to describe conditions to which the public and site workers are exposed. The ranking assesses four different media as potential sources of risk: groundwater, surface water/sediments, soil, and facility conditions. The ranking considers the significance and concentration of the source [source hazard factor (SHF)], the existence or potential for a contaminant migration/exposure pathway [pathway factor (PF)], and the potential for receptors to have access to the contaminated media [receptor factor (RF)].

The relative ranking for the four Tonawanda release sites is summarized in Table 4.1; the basis for each ranking category is provided in Table 4.2.

4.2 RISK DATA SHEET EVALUATION

The RDS evaluation process provides information to the EM program that assists in budget development decisions. It does this by providing data that allow the assessment of the possible effects of various budget levels on a given site's or program's ability to manage activities in comparison with other EM programs. The site is evaluated in seven categories:

- public safety and health;
- site personnel safety and health;
- environmental impact;
- compliance with laws, regulations and agreements;
- mission impact to stated goals and mission of DOE;
- mortgage reduction (i.e., reducing long-term DOE financial liabilities); and
- social/cultural/economic impacts in the affected community/state.

Within each category, the site is evaluated in terms of the conditions associated with the site/activity before spending a fiscal year's budget ("Before" conditions), the risk associated with undertaking the budgeted activity ("During" conditions), and the conditions that remain after completing the budgeted activity ("After" conditions). The RDS ratings in each category are defined as high, medium, or low.

Table 4.1 EM-40 Relative Ranking for the Tonawanda Sites

	Groundwater	Surface water/sediment	Soils	Facility	Overall ranking
Ashland 1	Low	Medium	High	N/A	HIGH
Seaway	N/A	Medium	High	N/A	HIGH
Linde	Low	High	High	High	HIGH
Ashland 2	Low	Medium	High	N/A	HIGH

Table 4.2 Basis for Relative Ranking Categories

Property	Media	Hazard factor	Explanation
Ashland 1	Groundwater	SHF	Concentrations of contaminants are low and represent a minimal source hazard
		PF	Contaminant movement from the source is confined
		RF	There is limited potential for public or site worker access to the groundwater
	Surface water/sediment	SHF	Concentrations of radium, thorium, and uranium in surface water and sediment represent a moderate source hazard
		PF	Potential is present for contaminated sediment or surface water to move from site
		RF	Potential is present for onsite workers to have access to surface water and sediment
	Soil	SHF	Concentrations of radium, thorium, and uranium in soil are significant
		PF	Potential exists for contaminated soil to be present in accessible areas undergoing facility maintenance
		RF	Potential exists for site worker contact with contaminated soils
	Facility		Not Applicable - there are no contaminated structures onsite
Seaway	Groundwater		Not applicable - groundwater conditions under the landfill have been evaluated as part of the local conditions between Ashland 1 and Ashland 2.
	Surface water/sediment	SHF	Concentrations of uranium and thorium in surface water and sediment represent a moderate source hazard
		PF	Potential exists for surface water containing radionuclides to move from the site
		RF	Potential exists for public and onsite workers to have access to surface water and sediment containing radionuclides
	Soil	SHF	Concentrations of radium, thorium, and uranium in soil are significant
		PF	Potential exists for contaminated soil to be present in areas accessible to site workers
		RF	Potential exists for site worker contact with contaminated soils
	Facility		Not Applicable - there are no contaminated structures onsite
Linde	Groundwater	SHF	Concentrations of contaminants in sampling wells represent a low source hazard
		PF	Contaminant movement from the source is confined
		RF	There is limited potential for public or site worker access to the groundwater
	Surface Water/Sediment	SHF	Concentrations of radium, thorium, and uranium in sediment represent a significant source hazard
		PF	Potential exists for surface water and sediment to move from site
		RF	Potential exists for public and site worker access to surface water and sediment

Table 4.2 (Continued)

Property	Media	Hazard factor	Explanation
Linde (cont.)	Soil	SHF	Concentrations of radium, thorium and uranium in soil are significant
		PF	Potential exists for contaminated soil in accessible areas undergoing facility improvement/maintenance to be moved
		RF	Potential exists for site worker contact with contaminated soils
	Facility	SHF	Radium, thorium, and uranium on building structures represent a significant source hazard
		PF	Potential exists for site worker access to areas of contamination
		RF	Potential exists for site worker contact with contaminated building structures
Ashland 2	Groundwater	SHF	Concentrations of contaminants are low and represent a minimal source hazard
		PF	Contaminant movement from the source is confined
		RF	There is limited potential for site worker or public access to the groundwater
	Surface Water/Sediment	SHF	Concentrations of uranium in surface water and sediment represent a moderate source hazard
		PF	Potential exists for surface water and erosional sediments containing radionuclides to move from the site
		RF	Potential exists for members of the public and onsite workers to have access to surface water and sediment containing radionuclides
	Soil	SHF	Concentrations of radium, thorium and uranium in soil are significant
		PF	Potential exists for contaminated soil in publicly accessible areas
		RF	Potential exists for site workers and members of the public to have contact with contaminated soils
	Facility		Not Applicable - there are no contaminated structures on the site

The RDS ratings and rationale for the Tonawanda sites are provided in Table 4.3. Detailed explanations of the basis for each rating are provided in the EM RDS database. The ratings indicate that based on these management criteria for assessing the site in order to assign funding priority, the Tonawanda site currently ranks high. In all cases, the residual risk following the completion of the activities being funded is low, indicating a significant net risk reduction benefit associated with funding the activity.

4.3 CERCLA-BASED RISK ASSESSMENTS

A baseline risk assessment was conducted to evaluate potential risks to human health and the environment from all radionuclides and chemicals of concern at the Tonawanda site (SAIC 1993a). The results of that assessment were incorporated into a feasibility study for the site (SAIC 1993b).

Potential receptors identified for the Tonawanda site under current site use scenarios include nearby residents, workers at commercial facilities near the site, and onsite workers at Linde (Praxair). Radiological exposures and chemical intake were also estimated for remediation workers at the site who are assumed to be wearing protective clothing but not necessarily respiratory protection equipment. Soil is the principal source of radioactive materials of concern at the site. Remedial activities such as excavation could provide a mechanism for contaminant release, especially through fugitive dust emissions.

Potential routes for human exposure considered in the baseline risk assessment are inhalation of radon and its decay products, direct exposure to gamma radiation, inhalation of dust containing radioactive and chemical materials, and inadvertent ingestion of soil containing radioactive and chemical materials. If airborne materials released during site remediation settle on the ground, additional pathways could result from exposure to gamma radiation, inadvertent ingestion of soil containing these material, and consumption of food grown in soil containing these materials. These additional pathways were evaluated and found to be insignificant.

The estimated dose to the maximally exposed member of the general public is 4×10^{-4} mrem/year. The results of this analysis indicate that under current site conditions and during remedial action, no member of the public would receive a dose from the combined exposure pathways from the site that would exceed the exposure guideline of 100 mrem/year. The risk factor associated with exposures as a result of remediation activities would be less than 1×10^{-6} for all receptors.

If respiratory protection is not used, an onsite worker engaged in site remediation could receive a dose of 500 mrem/year, which is significantly below the occupational dose limit of 5 rem/year (DOE Order 5480.11). The estimated annual risk to the maximally exposed worker from radiation is about 5×10^{-5}.

The hazard index is a scale used by EPA to measure the potential for adverse noncarcinogenic health effects from exposure to site-related chemicals. The hazard indices for current

employees and transients at Linde, Ashland 1, and Ashland 2 were all less than one. Mean and reasonable maximum exposure values for surface water ingestion at the local creek were 2×10^{-2} and 7×10^{-2}, respectively. These values do not exceed unity and do not indicate a concern for potential adverse health effects.

Table 4.3 Summary of RDS Ratings and Rationale for Tonawanda Sites

Category	Rating Period	RDS Rating	Rationale
Public Safety & Health	Before	High	All sites have the potential for public exposures greater than 15-100 mR/yr if funding for cleanup/maintenance/monitoring is eliminated.
	During	Medium	There is a small possibility of below-guideline public exposure during cleanup activities.
	After	Low	There is very low risk of public exposure or injury following cleanup from either residual contamination or a potential onsite disposal cell.
Site Personnel Safety & Health	Before	Medium	Non-DOE, onsite workers or members of the public could receive radiation exposures in excess of 15-100 mR/yr if site cleanup/maintenance/monitoring were discontinued.
	During	Medium	There is a likelihood of moderate site worker injury (greater than a first aid case, but, less than 3 months disability) during the course of remedial action work.
	After	Low	Following remedial action, onsite risk of injury or radiation exposure at all sites is very low.
Environmental Impact	Before	High	There is a significant possibility of the redistribution of contaminated soils/debris is publicly accessible areas if site cleanup/monitoring activities are discontinued.
	During	Medium	There is a small possibility of localized, onsite releases resulting from storm water redistribution of contamination, small fuel spills, etc. during remediation
	After	Low	Following remedial action, the possibility of environmental releases from residual contamination have either been eliminated or are very small (e.g., radon release from a capped disposal cell with EPA regulated limits, etc.).
Compliance*	Before	High	Work on the Tonawanda sites is being performed in accordance with requirements of DOE Orders specific to mitigation of public hazards and cleanup of sites to approved criteria. Lack of program funding for this work would result in noncompliance with these requirements.
	After	Low	Completing budgeted work in accordance with requirements would permit compliance with objectives in DOE Orders.
Mission Impact*	Before	High	Not undertaking the funded work would directly affect fundamental DOE missions such as protection of environmental safety and health (ES&H) and environmental restoration (ER).
	After	Low	Undertaking the planned, budgeted work would allow DOE to meet its ER and ES&H missions.

* Compliance, Mission Impact, and Mortgage Reduction are not evaluated in the "During" category

Table 4.3 Summary of RDS Ratings and Rationale for Tonawanda Sites (continued)

Category	Period	Rating Rating	RDS	Rationale
Mortgage Reduction*		Before	High	Not undertaking the planned work would result in an increase in the total cleanup cost of the Tonawanda sites as a result of continued program support requirements and escalation during the time cleanup work is unfunded.
		After		Expenditure of the planned budget would avoid an increase in the site's total estimated cost resulting from added program support costs for the year(s) that the project is unfunded.
Social/Cultural/Economic		Before	High	Not undertaking the work as budgeted and planned would be expected to result in organized public outcry and unfavorable media attention.
		During	High	During the execution of the cleanup work, periodic public outcry from a limited number of stakeholders is possible.
		After	Low	Following cleanup, it is expected that any further social, cultural, or economic impact would be very low.

* Compliance, Mission Impact, and Mortgage Reduction are not evaluated in the "During" category

5. ENVIRONMENTAL RESTORATION STRATEGY

In accordance with strategic goals and program priorities outlined in the ER Strategic Plan (DOE 1995a), environmental restoration strategy for remediation of FUSRAP sites currently focuses on two key interrelated elements: relative risk prioritization (assigning higher priority to remediation of high-relative-risk sites) and expediting the remediation of non-DOE-owned sites and vicinity properties. Emphasis on these strategic elements allows DOE to channel available resources in a manner that most efficiently and cost-effectively accomplishes the overall objective of protection of human health and the environment.

5.1 KEY ASSUMPTIONS

Assumptions on which the environmental restoration strategy for the Tonawanda site is based are discussed in Section 1.3.

5.2 REMEDY SELECTION STRATEGY

The remedy selection process will include working with community groups such as CANiT and FACTS to identify an alternative agreeable to DOE and the community.

A crucial element of the remedy selection process for FUSRAP sites is the guidance offered by the Environmental Management Advisory Board (EMAB). EMAB was established as a framework to set general boundaries within which DOE will work in remedy selection and decision making. National Stakeholder Summits provide a forum for public input to EMAB.

EMAB began in January 1992 as the Environmental Restoration and Waste Management Advisory Committee, established in accordance with the Federal Advisory Committee Act. EMAB continues the committee's original charter of providing recommendations to the Assistant Secretary for Environmental Management on the Programmatic Environmental Impact Statement (PEIS) and other issues. The PEIS for the Environmental Management Program will evaluate alternatives for implementing an integrated program-wide approach to NEPA issues.

EMAB operates as a "board of directors" to the Assistant Secretary for Environmental Management and provides advice and recommendations on a wide range of issues confronting the program. Members of EMAB include representatives of state and local governments, environmental and citizen activist groups, labor organizations, federal agencies, and the scientific and academic communities. EMAB includes several committees, including the FUSRAP committee, to address key issues affecting both DOE and the Office of Environmental Management. The EMAB FUSRAP Committee, working with the National FUSRAP Stakeholders forum, will propose a set of general guiding principles for implementation of DOE's FUSRAP efforts. These guiding principles will help to ensure consistency and cost-effectiveness of remedies for FUSRAP

sites. Five major issues that have been identified are funding, cleanup criteria, risk management, remedy selection, and community acceptance.

5.3 PROGRAM MANAGEMENT STRATEGY

The waste management units at the Tonawanda site are the five release sites addressed in this MAP document: Ashland 1 and 2, Linde, Seaway, and the Town of Tonawanda Landfill. The waste streams at these sites are soil and building debris (from Linde). All the radioactive material at the sites is classified as 11(e)2 by-product waste.

The management strategy consists of remediating the Tonawanda sites collectively as a single site rather than individually (so that, for example, only one feasibility study and one record of decision will be issued). However, each property will be released individually as it is remediated.

5.4 REGULATORY ACTIVITIES

Remedial and removal actions conducted by DOE at the Tonawanda site are being coordinated with the Environmental Protection Agency (EPA) Region II under CERCLA and with the New York State Department of Environmental Conservation (NYSDEC). It is DOE policy to integrate the requirements of CERCLA with the values of NEPA for remedial actions at sites for which it has responsibility. The RI/FS-EIS process conducted under CERCLA is the primary process for environmental compliance associated with DOE remedial actions at the Tonawanda site. Under this integrated policy, the CERCLA process is supplemented as appropriate to incorporate NEPA values. There are no other regulatory activities at the site, and none are anticipated.

Permits typically required under the Clean Air Act, Clean Water Act, wetland protection legislation, and other federal and state environmental laws and statutes are not expected to be impediments to site cleanup because of the exemption granted to DOE under CERCLA section 121(e).

The NYSDEC cleanup level of 10 mrem/yr, as listed in Technical Administrative Guidance Memorandum 4013: Cleanup Guidelines for Soils Contaminated with Radioactive Materials, will be considered in the remedy selection process.

5.5 PROJECT SUPPORT ACTIVITIES

Because the Tonawanda site properties are not owned by DOE, obtaining access agreements is one support activity that may affect cleanup progress. Attempts will be made to complete any agreements needed to conduct work at the site far enough in advance to prevent any schedule disruptions.

FUSRAP has developed a Standards/Requirements Identification Document (S/RID) using a selection process that resulted in the identification and development of a set of

standards/requirements that maintains protection of the safety and health of workers, the public, and the environment; provides a balance between costs and benefits; and is reasonable, tailored to the work to be performed, and defensible. The S/RID meets an objective laid out in the Secretary of Energy's August 3, 1995, "Roll Out," in which she identified in an "Honor Roll" certain initiatives that were expected to reduce DOE expenditures. One was that the *"use of commercial standards for non-nuclear facilities will save millions throughout the DOE complex."*

In the development of the S/RID, DOE directives deemed non-applicable and those deemed applicable but duplicative of other federal requirements were not selected for inclusion. Instead, the substantive value of the applicable yet duplicative DOE directives will be maintained through direct recognition and adherence to the federal requirements and through the use of commercial codes, standards, and best management practices. The applicability of common codes and standards for FUSRAP matches other agency processes for similar work.

The selection process recognized the important variations in the hazards, work, and other circumstances for FUSRAP and, therefore, provided a systematic and disciplined application of the graded approach. The FUSRAP S/RID contains the requirements necessary for the conduct of an effective program and sufficient for protection of human health and the environment, and it represents efficient use of financial resources.

No impediments to site remediation are anticipated; S/RID implementation is expected to actually facilitate progress.

5.6 PERFORMANCE MEASURES

FUSRAP will use performance measures derived from the strategic measures outlined in the EM-40 Environmental Restoration Strategic Plan (DOE 1995a) to track overall accomplishment of the mission and vision of the ER program at the site. These measures examine macro-level long-term trends and are part of a larger body of performance measures used for shorter-term management and external reporting purposes. The EM-40 major milestones performance measure is being addressed by continuing interim remedial actions at Linde site buildings:

- decontamination of Building 31—planned completion in March 1996;
- decontamination of Building 14—planned completion in September 1996;
- demolition of Building 38—planned completion in September 1996.

Other measures will be developed as agreements on the site remedy are reached.

5.6.1 Relative Risk Reduction

FUSRAP will track all FUSRAP sites, including the Tonawanda site and vicinity properties, by relative risk to human health, the environment, and worker safety. Relative risk categories will include high-, moderate-, and low-relative-risk sites. As program priorities are implemented and program goals are attained, it is expected that higher-relative-risk sites and properties will move to a lower-risk classification or to the "Completed Site" category. Similarly, the general trending of moderate- and low-relative-risk sites and properties should be toward the Completed Site category.

5.6.2 Program Efficiency

Cost-effectiveness and program efficiency will be achieved through reductions in infrastructure costs, elimination of unnecessary management and oversight costs, and use of cost-effective technologies. Indicators such as infrastructure costs and program management costs will be used in measuring effectiveness and efficiency trends.

5.6.3 Land and Facility Status

FUSRAP will track trending patterns in the status of land and facilities (including buildings and other structures) at the Tonawanda site with regard to remediation of site soils and decontamination of buildings so that they are ready to be transferred for future beneficial use.

5.6.4 Resource Distribution

FUSRAP will track overall trending in distribution of funds committed to core activities, assessment activities, and remediation progress. The desired trend would be a steady decline in funding requirements for core activities and assessment, with a corresponding increase in funds allocated to remedial action.

6. MASTER SCHEDULE

6.1 MASTER SCHEDULE FOR ENVIRONMENTAL RESTORATION

The master schedule for environmental compliance and restoration activities planned for the Tonawanda site is provided in Table 6.1 and shown in Figure 6.1. The schedule was developed in accordance with FUSRAP budget planning as of fiscal year 1996 and shows the events projected through the point at which the record of decision is issued. Remedial design and remedial action consistent with the National Contingency Plan will be initiated following issuance of the record of decision. The schedule shows the relationships between the tasks and their projected durations. Specific dates beyond 1996 are taken from budget approval documents such as the Activity Data Sheets (or ADSs) submitted to Congress; these dates should not be considered as firmly established because funding is allocated on a yearly basis by congressional action.

6.2 COMPLIANCE MILESTONES

There are no compliance agreements or milestones for the Tonawanda site. Table 6.2 lists the major activity milestones for FUSRAP.

Table 6.1 Schedule of Activities at the Tonawanda Site

Site	Activity	Completion Date
Tonawanda	Demolish Building 38 at Linde	9/96
	Present action plan to community	12/96
	Complete decontamination of Buildings 14, 30, and 31 at Linde	9/97
	Issue Record of Decision	9/97
	Complete Ashland 2 remedial action	9/98
	Complete Ashland 1 remedial action	9/99
	Remove Linde soils	9/02
	Complete Seaway remedial action	9/02

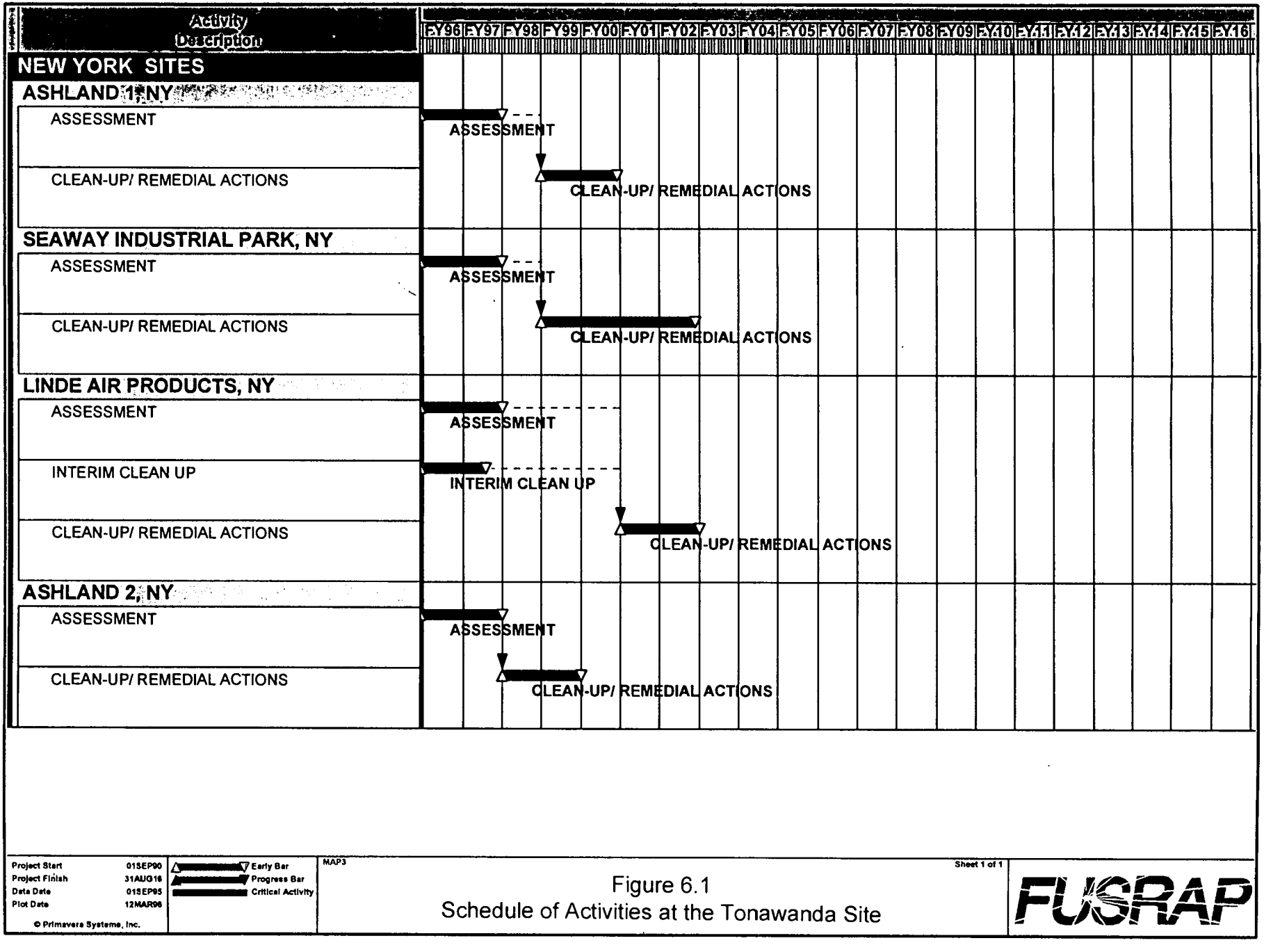


Figure 6.1
Schedule of Activities at the Tonawanda Site

Table 6.2 Major Activity Milestones

Site	Activity	Completion Date (Fiscal Year)
St. Louis Downtown Site (SLDS)	• Record of Decision Signed by EPA	1998
	• Complete Remedial Action	2016
SLAPS Vicinity Properties	• Record of Decision Signed by EPA	1998
	• Complete Remedial Action	2016
Latty Avenue Properties	• Record of Decision Signed by EPA	1998
	• Complete Remedial Action	2012
St. Louis Airport Site (SLAPS)	• Record of Decision Signed by EPA	1998
	• Complete Remedial Action	2006
Wayne	• Record of Decision Signed by EPA	1998
	• Complete Remedial Action	2009
Maywood	• Record of Decision Signed by EPA	1998
	• Complete Remedial Action	2010

Table 6.2 Major Activity Milestones (Continued)

Tonawanda	• Complete Remedial Action	2000
Ashland 1		1999
Ashland 2		2002
Linde		2002
Seaway		
DuPont & Company, NJ	• Complete Remedial Action	2005
Middlesex Sampling Plant , NJ	• Complete Remedial Action	2001
New Brunswick Site, NJ	• Complete Remedial Action	1996
Bliss & Laughlin Steel, NY	• Complete Remedial Action	1997
Colonie NY	• Complete Remedial Action	2000
Niagara Falls Storage Site, NY	• Complete Final Closure	2007
Madison , IL	• Complete Remedial Action	2002
WR Grace & Company, MD	• Complete Remedial Action	2008
Luckey, OH	• Complete Remedial Action	2002
Painesville, OH	• Complete Remedial Action	2004
B & T Metals, OH	• Complete Remedial Action	1996
Shpack Landfill, MA	• Complete Assessment	1999
Ventron , MA	• Complete Remedial Action	1997
CE, CT	• Complete Remedial Action	2004

Source: BNI 1995a

7. ISSUES AND INITIATIVES

7.1 ISSUES AFFECTING PROJECT PERFORMANCE

Several issues related to remediation of the Tonawanda site have the potential to impede progress of the environmental restoration process and drive costs upward. FUSRAP must focus attention on these issues to quickly, safely, and cost-effectively complete its mission at these sites.

Key issues affecting project performance in remediation are as follows:

- Role of commercial disposal facilities
- Current and future risk management options
- Community and regulator acceptance of cost-effective, protective remedies
- Community opposition to onsite remedies
- Future land use

Socioeconomic factors that can affect site remediation and risk management strategies include effects on land use, perceived health risks, effects on property values, and other concerns expressed in community interviews and public comment and scoping meetings.

These factors are especially important determinants of remediation strategies at the Tonawanda site properties. Residents near the Tonawanda site have expressed concerns about the disposition of materials at the site since 1988, when CANiT organized opposition to the transport of materials from the FUSRAP Colonie site to Tonawanda. As a result of congressional support for that opposition, the proposal was dropped in August 1988. Beginning in 1992, DOE met frequently with area residents to discuss the remedial options for the site and the preferred remedy and to address community questions and concerns. In March 1993, DOE opened a public information center in Tonawanda to serve as an information repository and to provide a meeting place for workshops and availability sessions, which were conducted frequently throughout the year.

On December 1, 1993, DOE held a public meeting to solicit public comment on the proposed plan to build a containment structure at Ashland 1 to contain materials onsite. Opposition voiced by CANiT and most commenters at the meeting led to suspension of the decision-making process in April 1994. Discussions with the community will continue until a process for reaching consensus and a remedy for the site are agreed upon by stakeholders and DOE.

Some of the issues underlying opposition to a permanent disposal site in Tonawanda are

- concerns regarding land values;
- adverse effects on industrial, residential, and waterfront development;

- possible consequences of natural events such as a significant earthquake or flood in the area; and
- possible risks to public health and the environment.

Stakeholders have also consistently expressed an interest in appropriate development of the Niagara River waterfront as a vital part of community plans for maintaining quality of life in the area.

Members of the community also insisted that Seaway be included in the same environmental study as the other three Tonawanda properties rather than as a separate action, as DOE originally proposed. DOE agreed in 1989 to include Seaway in the Tonawanda study. DOE also resolved a community concern over the need for technical expertise to assist in evaluating information provided by DOE; in 1988, DOE provided $50,000 to CANiT to hire a technical consultant. The group selected ENSA, Inc., a local firm with radiological expertise (BNI 1995b and BNI 1993b). Because of the suspension of the decision-making process and the commitment to reevaluate alternatives, another $50,000 was provided to CANiT in March 1996 to assist the group in working with DOE to identify an acceptable solution.

Project performance is also affected by a number of key program issues, including

- remedy selection at large sites,
- fostering productive stakeholder involvement,
- integrating cost-effective soil treatment technologies,
- role of commercial diposal facilities, and
- cost-saving initiatives.

7.2 INITIATIVES IMPLEMENTED TO IMPROVE PROJECT PERFORMANCE

New York Stakeholder Involvement

- Ongoing meetings with CANiT and other concerned community members
- Continuing progress toward consensus among divergent community interests
- Establishment of a public information center in Tonawanda
- Provision of resources to the Tonawanda community for technical consulting services
- Establishment of EMAB, including scientists and stakeholders, to provide input for management of FUSRAP sites
- Stakeholders summit meeting

APPENDIX A: FISCAL YEAR FUNDING REQUIREMENTS/COSTS

The cost baseline for the Tonawanda site is provided in Table A.1.

Table A.1 Tonawanda Site Cost Baseline

Activity	Phase	FY 89-95 (000$)	FY96 (000$)	FY97 (000$)	FY98 (000$)	FY99 (000$)	FY2000-Complete (000$)
High Relative Ranking							
Ashland 1	Assessment	[redacted]	333	393	334	[redacted]	
	Remediation		11	0	692		
Seaway	Assessment		0	429	319		
	Remediation		0	0	693		
Linde	Assessment		334	357	0		
	Remediation		6,222	9,776	1,255		
Ashland 2	Assessment		0	375	21		
	Remediation		15	92	5,684		
Subtotal	Assessment		667	1,554	674	423	23
	Remediation		6,248	9,868	8,324	8,324	66,575
Medium Relative Ranking - None							
Low Relative Ranking - None							
Program Management		[redacted]	Included Above				
Other	None						
Total			6,925	11,422	8,998	21,238	66,598

APPENDIX B: ENVIRONMENTAL RESTORATION DELIVERABLES

A listing of major ER documents developed for the Tonawanda site is provided in Table B.1. The documents listed are available at the DOE Public Information Center in Tonawanda or may be requested by calling the FUSRAP toll-free public access line, 1-800-253-9759.

Table B.1 Environmental Restoration Deliverables

Title	Date	Document No.	Phase	Developing Contractor
Radiological Characterization Plan for Area A of the Seaway Industrial Park	1987	DOE/OR/20722-166	Assessment	BNI
Preliminary Geological and Hydrogeological Characterization Report for the Southern Portion of the Ashland 2 Site	1987	DOE/OR/20722-181	Assessment	BNI
Phase II Geological and Hydro-geological Characterization Plan for the Southern Portion of the Ashland 2 Site	1988	DOE/OR/20722-202	Assessment	BNI
Characterization Plan for the Linde Air Products, Ashland 1, and Ashland 2 Sites	1989	DOE/OR/20722-257	Assessment	BNI
Work Plan-Implementation Plan for the Remedial Investigation/Feasibility Study-Environmental Impact Statement for the Tonawanda Site	1992	DOE/OR/20722-209.1	Assessment	BNI
Remedial Investigation Report for the Tonawanda Site	1993	DOE/OR/21949-300	Assessment	BNI
Field Sampling Plan for the Remedial Investigation/Feasibility Study-Environmental Impact Statement for the Tonawanda Site	1993	DOE/OR/20722-209.3	Assessment	BNI
Quality Assurance Project Plan for the Remedial Investigation/Feasibility Study-Environmental Impact Statement for the Tonawanda Site	1993	DOE/OR/20722-209.4	Assessment	BNI
Baseline Risk Assessment for the Tonawanda Site	1993	DOE/OR/21950-100	Assessment	SAIC
Feasibility Study for the Tonawanda Site	1993	DOE/OR/21950-234	Assessment	SAIC
Proposed Plan for the Tonawanda Site	1993	DOE/OR/21950-233	Assessment	SAIC
Community Relations Plan for the Remedial Investigation/Feasibility Study-Environmental Impact Statement for the Tonawanda Site	1995	DOE/OR/21949-209.2	Assessment	BNI

APPENDIX C: DECISION DOCUMENT/ROD SUMMARIES

A CERCLA Engineering Evaluation/Cost Analysis (EE/CA) has been issued for public comments; after the comment period, comments will be incorporated and an approval memorandum will be signed implementing the EE/CA. The EE/CA covers remediation of Building 38 and the soil pile at Linde.

A proposed plan issued in November 1993 provided background information about the site, described the remedial alternatives, presented the rationale for selection of the preferred remedy, and outlined the public's role in helping DOE to reach a final decision on a cleanup approach. The feasibility study issued in November 1993 identified, developed, and evaluated remedial action alternatives and their potential consequences for the Tonawanda site (SAIC 1993a). A remedial investigation report, completed in November 1993, summarized the findings of investigation activities conducted at the site from 1988 through 1992 to determine the nature, extent, and potential for migration of the radioactive and associated chemical constituents resulting from past MED operations (BNI 1993a). As part of the ongoing analysis of site conditions, a baseline risk assessment was completed in August 1993 to evaluate the risk to human health and the environment from radioactive and chemical constituents at the site (SAIC 1993b). These documents are available at the DOE Public Information Center in Tonawanda or may be requested by calling the FUSRAP toll-free public access line, 1-800-253-9759.

No records of decision have been issued for the Tonawanda site.

APPENDIX D: CONCEPTUAL MODEL DATA SUMMARIES

D.1 POTENTIAL CONTAMINANTS OF CONCERN

At the Tonawanda site, the primary contaminants of concern are radionuclides in the uranium and thorium decay series such as uranium-235, uranium-238, and thorium-230. Radium-226 is also present at the site.

D.2 POTENTIAL CONTAMINANT RELEASE AND TRANSPORT

The primary sources of contamination at the site are surface and subsurface soil, building material (at Linde), and process water. Potential release mechanisms are infiltration with subsequent leaching, surface water runoff, and particulate or gaseous emissions. Figures D.1 through D.4 provide models of these sources and release mechanisms.

D.3 POTENTIAL RECEPTORS AND EXPOSURE ROUTES

The properties around the Tonawanda site are used for industrial, commercial, public, and residential purposes. Potential receptors therefore include area residents, onsite industrial workers and remediation workers, workers on vicinity properties, and site trespassers. Exposures can occur through six potential pathways: groundwater, surface water, sediment, air, direct contact with contaminated material, and external exposure to gamma rays and possibly beta particles. These receptors and exposure routes are shown in Figures D.1 through D.4 (BNI 1993b).

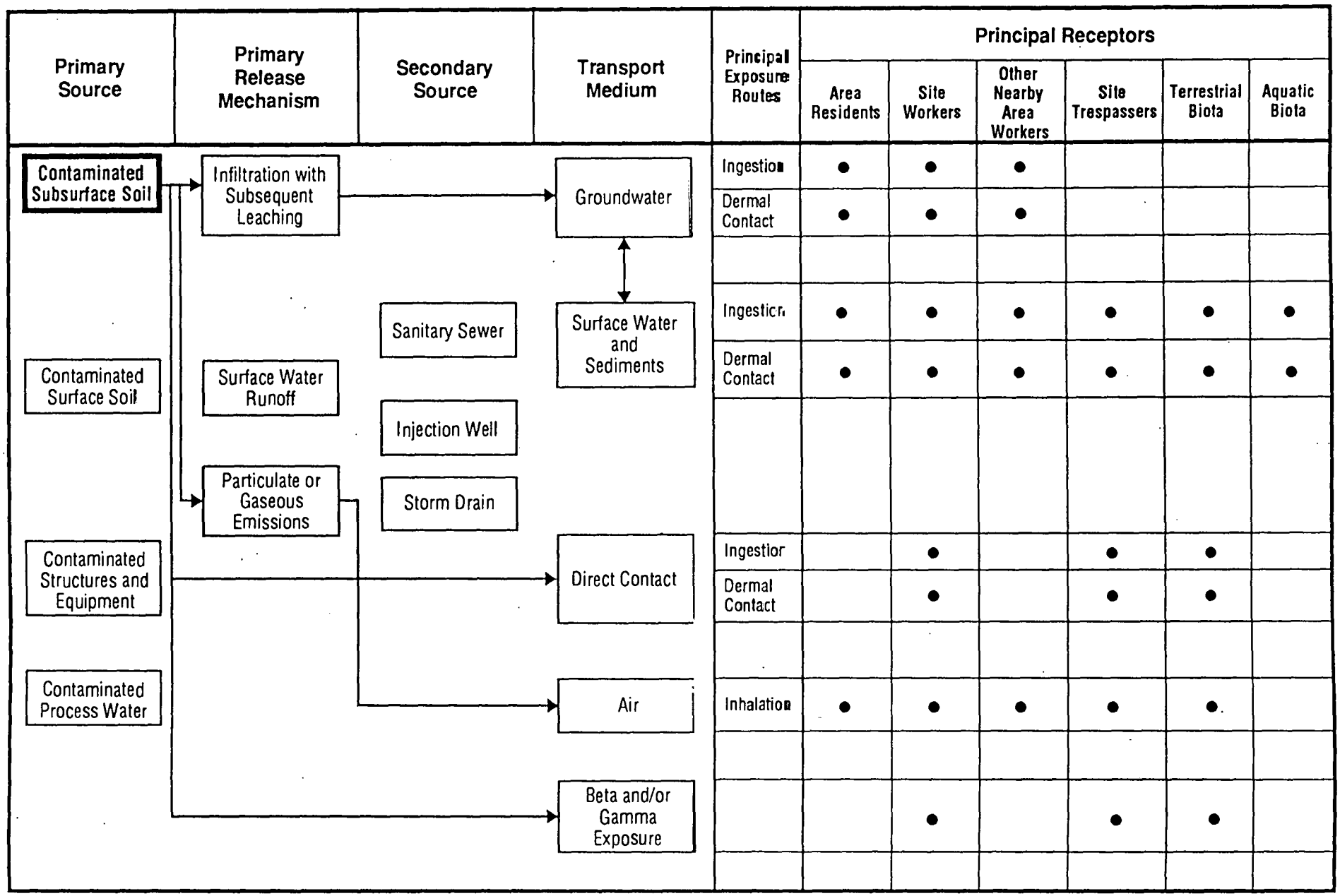


Figure D.1
Conceptual Site Model for Tonawanda Subsurface Soil

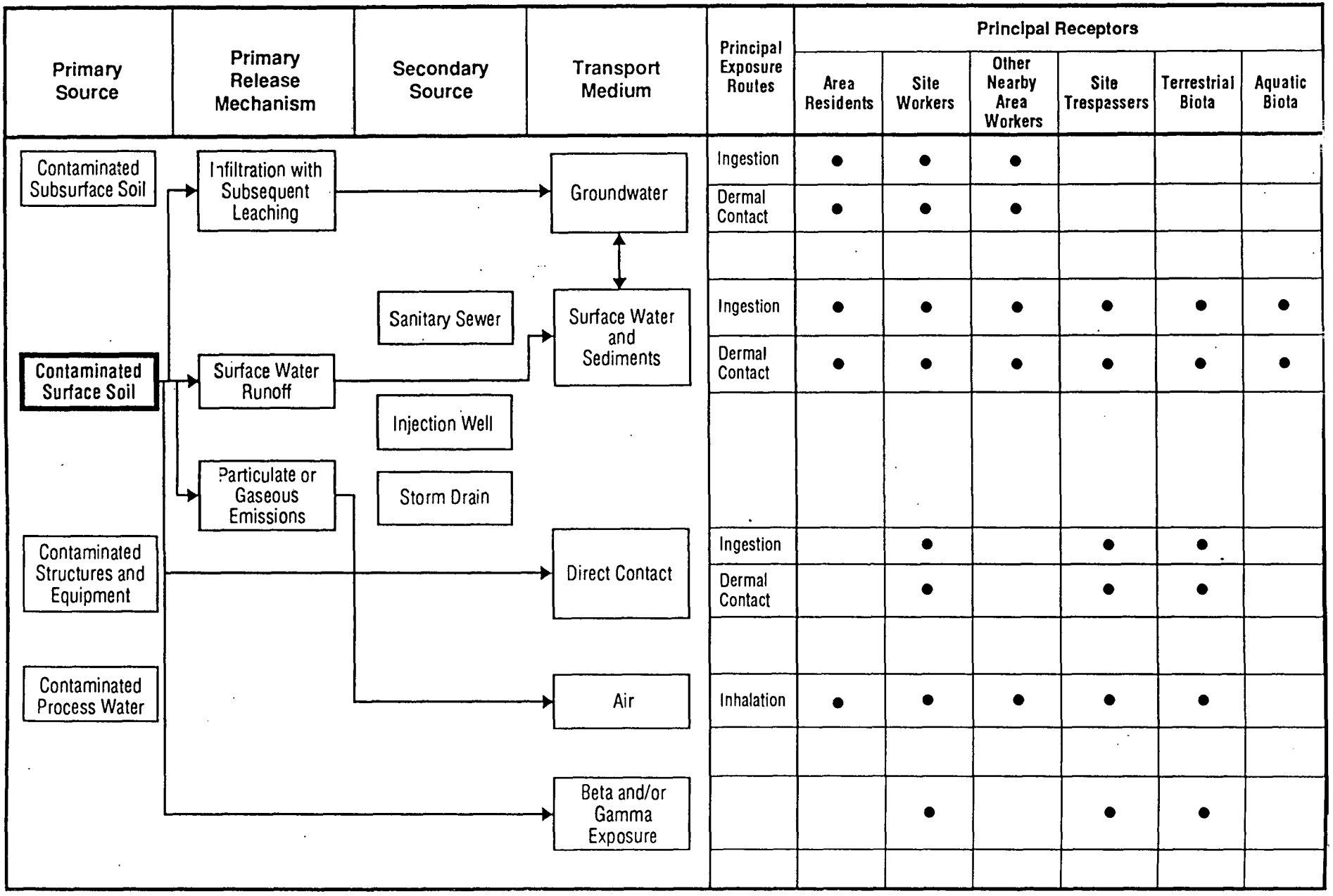


Figure D.2
Conceptual Site Model for Tonawanda Surface Soil

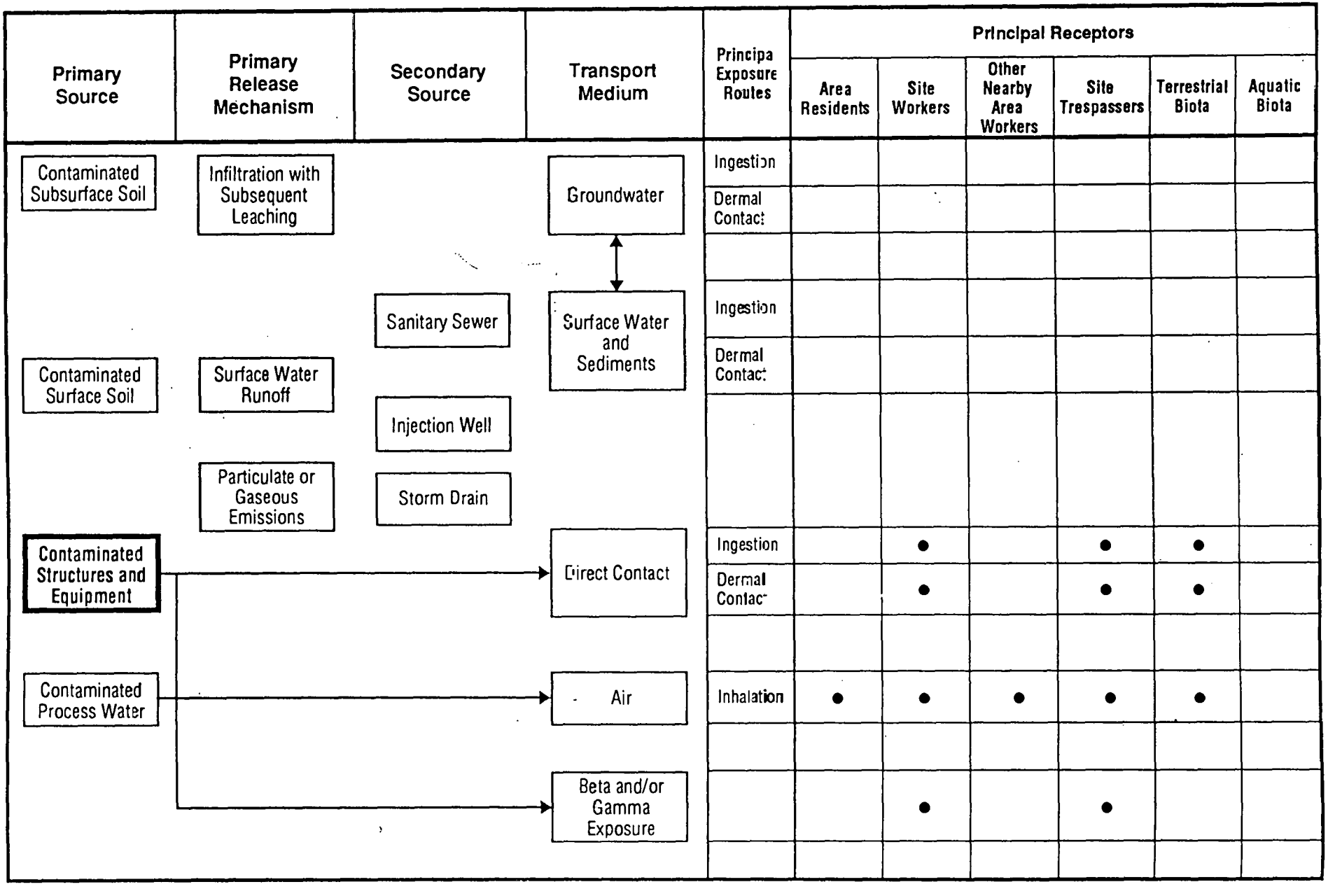


Figure D.3
Conceptual Site Mode for Tonawanda Structures and Equipment

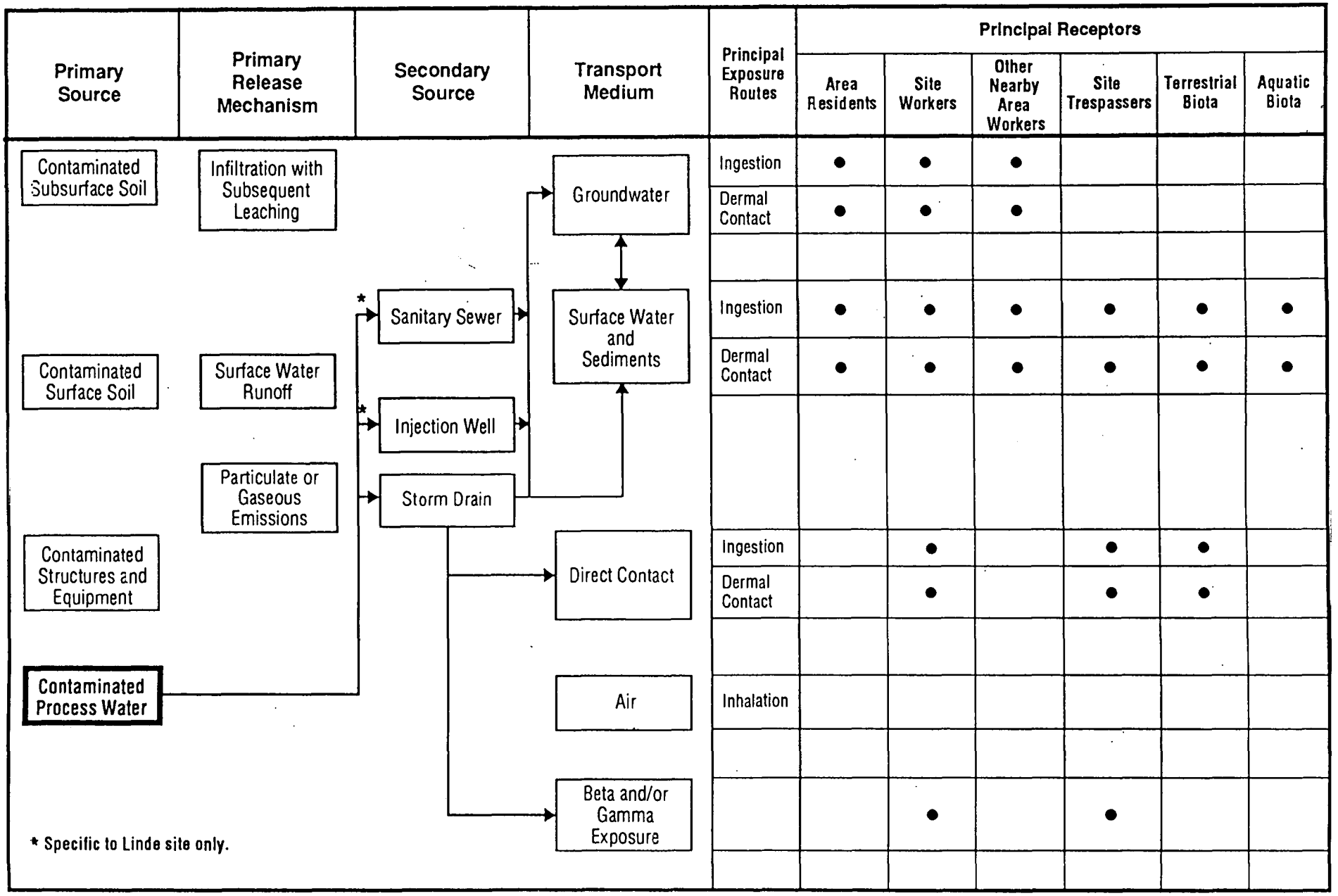


Figure D.4
Conceptual Site Model for Tonawanda Process Water

APPENDIX E: PROJECT CONTROLS

The FUSRAP Project Controls department provides cost and schedule support, including budgeting, monitoring, variance analysis, and trend analysis. Project controls are implemented to provide detailed planning for cost, schedule, and technical performance to maximize efforts toward achievement of project goals. Project controls are implemented for FUSRAP as a whole because there are 46 sites in 14 states for which costs and schedules must be tracked and controlled. Bechtel National, Inc. (BNI) has established and DOE has validated a system that conforms to the criteria for cost and schedule control systems developed by the U.S. Department of Defense. This system provides a basis for assessing the quality of the cost and schedule controls used by the project participants; aids in ensuring effective planning, management, and control of project work; and provides a quick and effective means of measuring cost, schedule, and technical performance. This cost and schedule control system uses a work breakdown structure (WBS) to divide FUSRAP into distinct sites and then into discrete work packages that can be effectively managed. The WBS also provides the framework for integrating budget requirements with schedule and technical performance. Finally, it establishes the management analysis and reporting structure to permit data presentation to various levels of management.

A Project Document Control Center (PDCC) is maintained in the BNI office in Oak Ridge, Tennessee, to collect, register, distribute, and retain all project documents. Each document related to a New York site is coded with a unique WBS number to associate the document with the specific site. Subject codes are also assigned from predetermined categories that can be used to organize the documents. The PDCC system provides for rapid identification and retrieval of all project documents by allowing documents to be searched and sorted by WBS number, subject code, author, recipient, transmittal date, a unique identification number, or any combination of the above.

All relevant information obtained during the site investigation process for the Tonawanda site is retained by PDCC: aerial photographs, topographic maps, reports on features of the site and surrounding area, correspondence involving the site, findings of previous surveys, and analytical data obtained during site characterization. Types of characterization data on file include radiological and chemical data based on analyses of soil, groundwater, and surface water; borehole logging data; air sampling data; and information about geological and soil properties. Well construction data and field notebooks and documentation (e.g., chain-of-custody forms) are also on file in PDCC.

APPENDIX F

ENVIRONMENTAL RESTORATION STRATEGY FOR THE TONAWANDA SITE

Remedial action objectives for the Tonawanda site were developed for soils and sediments and for buildings with residual radioactive material. The objectives are designed to be specific for media, contaminant type, and routes of exposure but general enough to allow for a range of treatment and containment alternatives to be developed.

The remedial action objectives for soils and sediments at the Tonawanda site are to

- Prevent or reduce the release of constituents to the groundwater below the site by leaching and into the surface water by surface runoff;

- Reduce risks to human health associated with contact, inhalation, and incidental ingestion of radioactive and chemical materials in soils and sediments and surface sediments of the wetland area; and

- Eliminate or minimize volume, toxicity, and mobility of radioactive and chemical constituents in site soils and sediments.

The remedial action objectives for the buildings and structures on the Linde property involve eliminating the potential for direct contact with radioactive materials and preventing those materials from migrating into the environment through air or ground surfaces. Health-based applicable or relevant and appropriate requirements establish the cleanup goals for these buildings and structures.

Containment and excavation actions have been evaluated for Tonawanda site soils as well as treatment options for in situ, onsite, and offsite actions. Disposal is a major consideration for each excavation and response action. Similar general response actions have been considered for sediments in wetland areas and in sumps and drain lines at Linde. Actions evaluated for sediments in drainage channels and in Rattlesnake Creek include revegetation, grading, erosion control measures, and temporary diversion of surface water to access and remove sediments. Activities related to closure of wetland areas will need to be modified to allow the wetland conditions to be restored.

For site buildings, containment and decontamination, removal actions in conjunction with treatment and disposal, no action, and other alternatives involving institutional controls have been evaluated.

A comparative evaluation of sitewide alternatives for the Tonawanda site was presented in the feasibility study (SAIC 1993a). Alternatives were evaluated separately for accessible soils, access-restricted soils, sediments, and buildings and structures. The evaluation considered the relative effectiveness, implementability, and cost of the alternatives.

Interim Removal Actions

Interim response actions (removal actions conducted before completion of the RI/FS-EIS process) for the Tonawanda site will include decontamination of Buildings 14, 30, and 31. Building 38 will be dismantled and disposed of offsite. These actions began during fiscal year 1996.

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