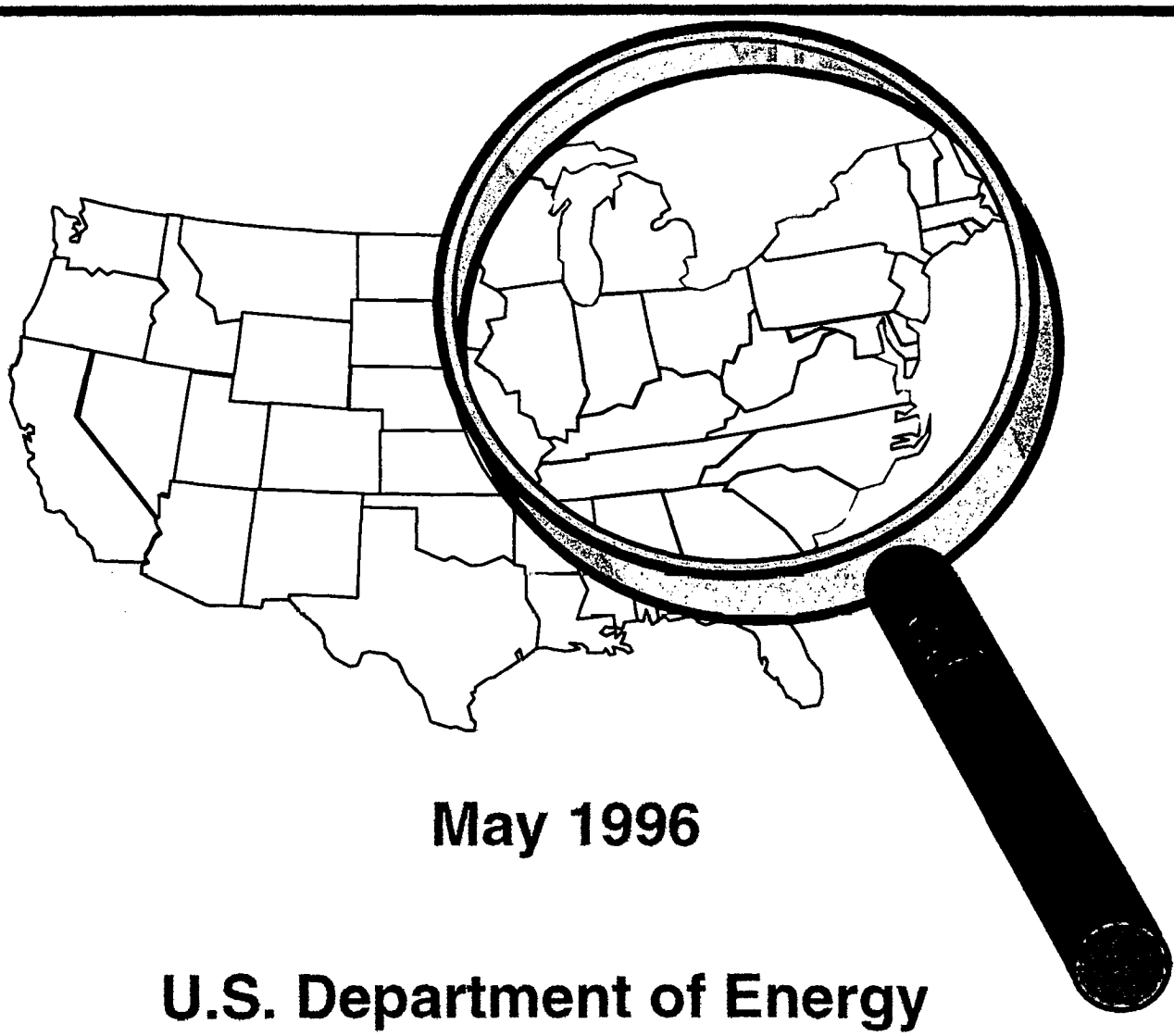
Management Action Process Document for FUSRAP Sites in Connecticut, Illinois, Maryland, Massachusetts, and Ohio and Smaller Sites in New Jersey and New York

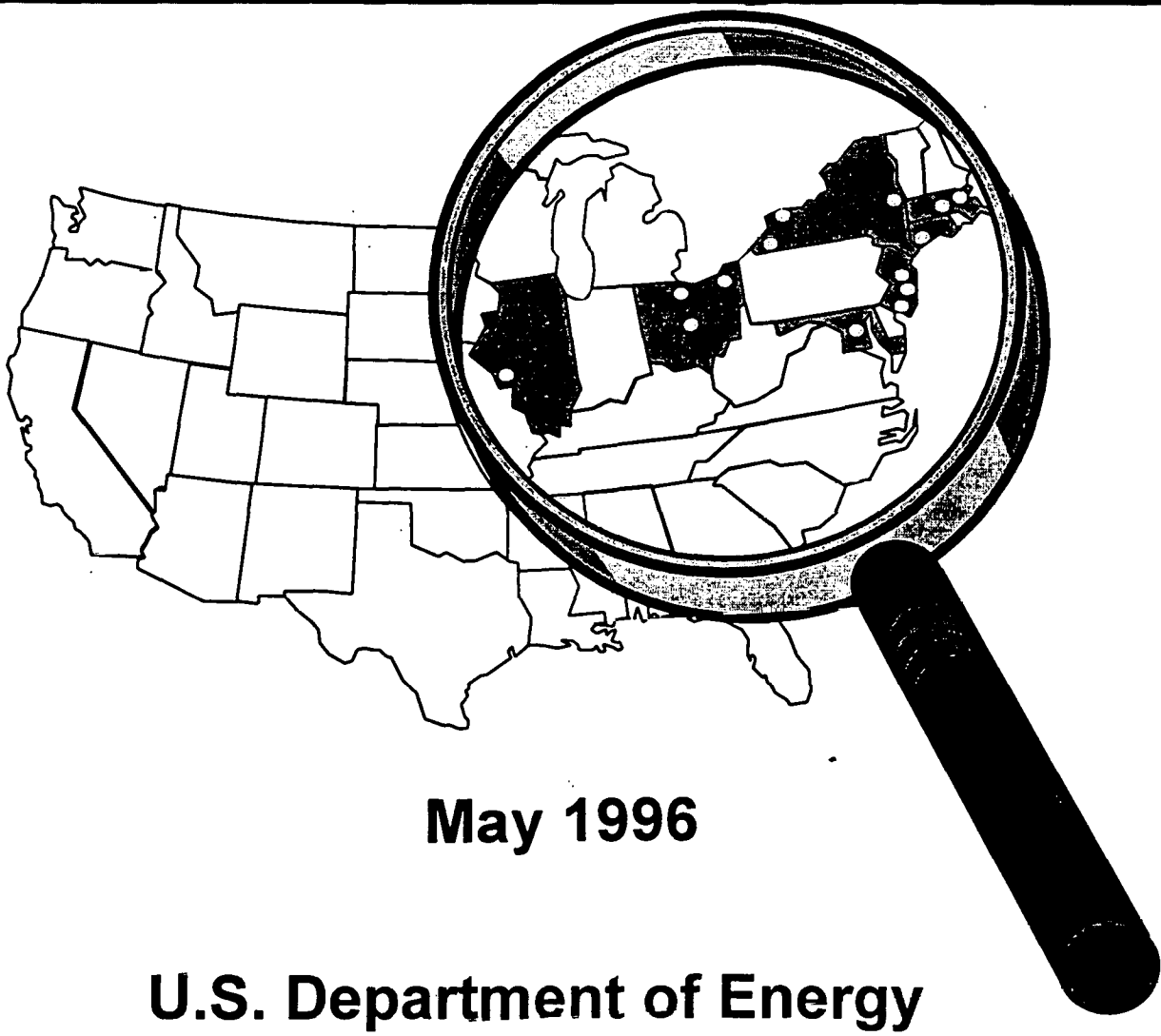


May 1996

U.S. Department of Energy

Formerly Utilized Sites Remedial Action Program (FUSRAP)

Management Action Process Document for FUSRAP Sites in Connecticut, Illinois, Maryland, Massachusetts, and Ohio and Smaller Sites in New Jersey and New York



May 1996

U.S. Department of Energy

Formerly Utilized Sites Remedial Action Program (FUSRAP)

DOE/OR/21949-399

MANAGEMENT ACTION PROCESS (MAP) DOCUMENT FOR FUSRAP SITES IN CONNECTICUT, ILLINOIS, MARYLAND, MASSACHUSETTS, AND OHIO AND SMALLER SITES IN NEW JERSEY AND NEW YORK

MANAGEMENT ACTION PROCESS (MAP) DOCUMENT FOR FUSRAP SITES IN CONNECTICUT, ILLINOIS, MARYLAND, MASSACHUSETTS, AND OHIO AND SMALLER SITES IN NEW JERSEY AND NEW YORK

TABLES

FIGURES

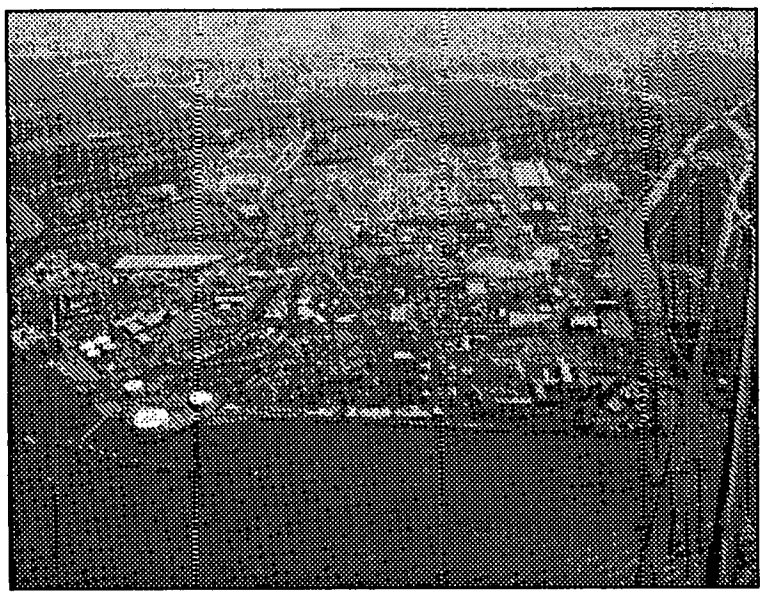
ACRONYMS

AEC	Atomic Energy Commission
ANL	Argonne National Laboratory
ARAR	applicable or relevant and appropriate requirement
BEMR	Baseline Environmental Management Report
BNI	Bechtel National, Inc.
CE	Combustion Engineering
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DOE-HQ	U.S. Department of Energy-Headquarters
DOE-OR	U.S. Department of Energy-Oak Ridge Operations
EE/CA	engineering evaluation/cost analysis
EM	Environmental Management
EMAB	Environmental Management Advisory Board
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
FEMA	Federal Emergency Management Agency
FFA	federal facilities agreement
FFCA	Federal Facilities Compliance Act
FSRD	Former Sites Restoration Division
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	Fiscal Year
LRAD	long-range alpha detection
LLRW	low-level radioactive waste
MAP	Management Action Process
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MED	Manhattan Engineer District
MML	Middlesex Municipal Landfill
MSP	Middlesex Sampling Plant
NBS	New Brunswick Site
NEPA	National Environmental Policy Act
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NFSS	Niagara Falls Storage Site
NJDEP	New Jersey Department of Environmental Protection
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NYSDEC	New York State Department of Environmental Conservation
ORAU	Oak Ridge Associated Universities
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
PAH	polyaromatic hydrocarbon
PDCC	Project Document Control Center
PEIS	Programmatic Environmental Impact Statement
PRP	potentially responsible party
QA	quality assurance
RCRA	Resource Conservation and Recovery Act
RDS	Risk Data Sheet
RI/FS-EIS	remedial investigation/feasibility study-environmental impact statement
ROD	record of decision

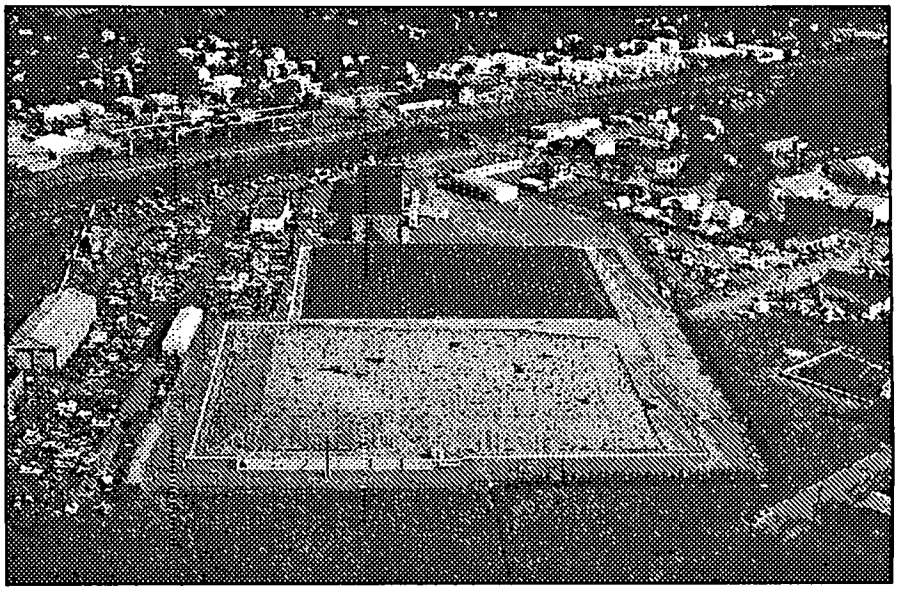
SAIC	Science Applications International Corporation
SARA	Superfund Amendments and Reauthorization Act
SGS	segmented gate system
S/RID	Standards/Requirements Identification Document
TBC	to-be-considered (requirements)
TSCA	Toxic Substances Control Act
VPs	vicinity properties
WBS	work breakdown structure
WCS	waste containment structure

UNITS OF MEASURE

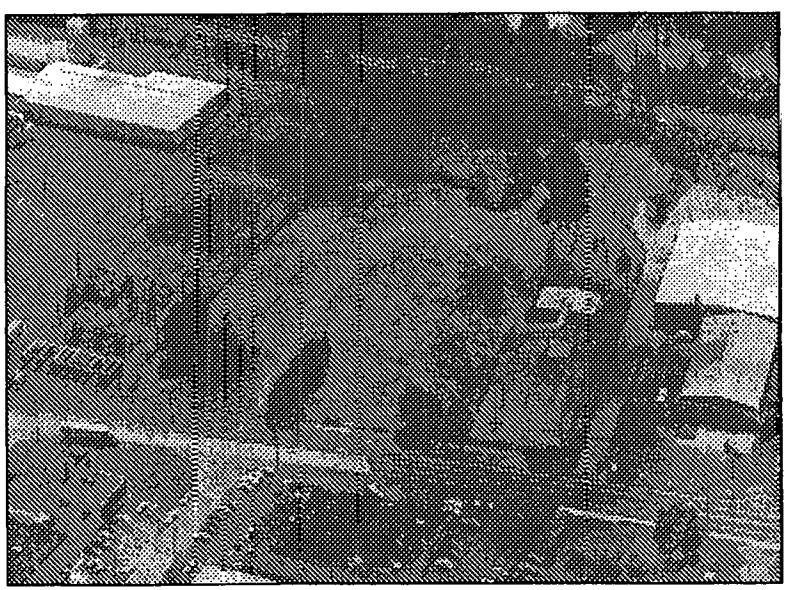
°C	degrees Celsius (Centigrade)
cm	centimeter
dpm	disintegrations per minute
°F	degrees Fahrenheit
ft	foot
ft^2	square foot
ft^3	cubic foot
g	gram
gal	gallon
gpm	gallons per minute
ha	hectare
in.	inch
km	kilometer
L	liter
m	meter
m^2	square meter
m^3	cubic meter
µR/h	microroentgens per hour
$mile^2$	square mile
nCi	nanocurie
pCi	picocurie
s	second
yd^3	cubic yard



DuPont & Company



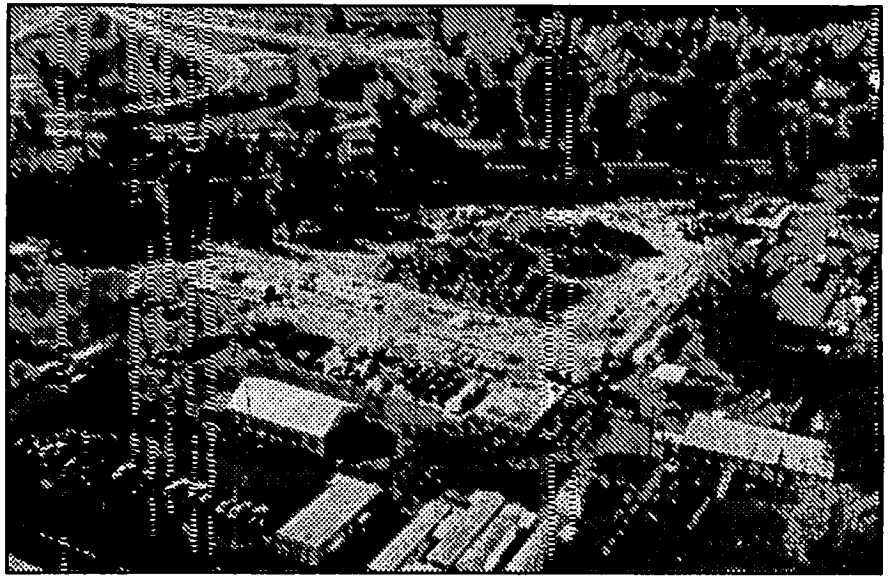
Middlesex Sampling Plant



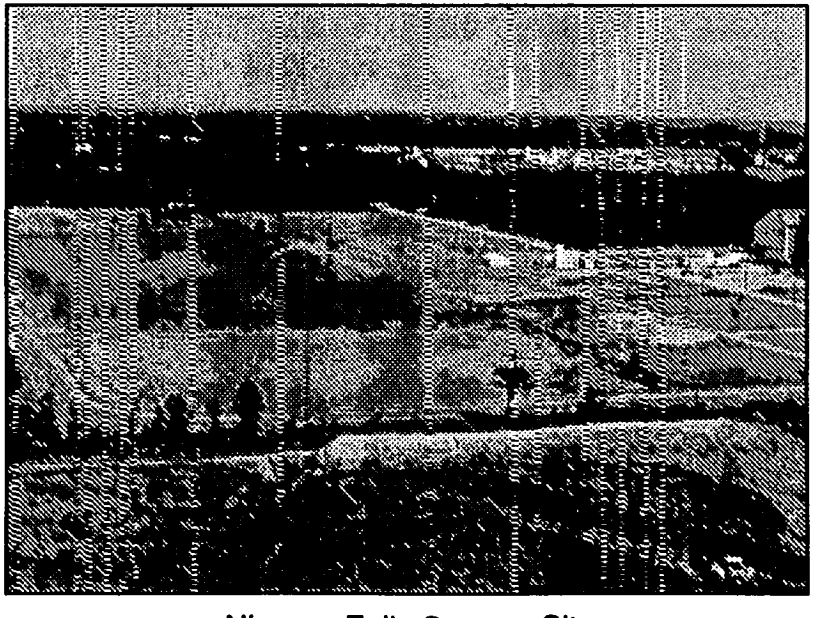
New Brunswick Site

New Jersey Sites

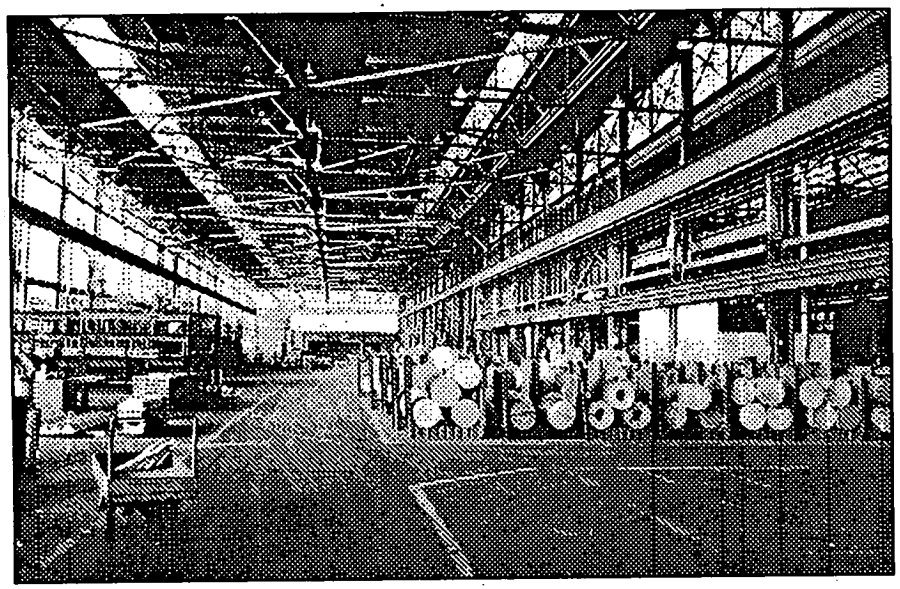
Bliss and Laughlin Steel



Colonie

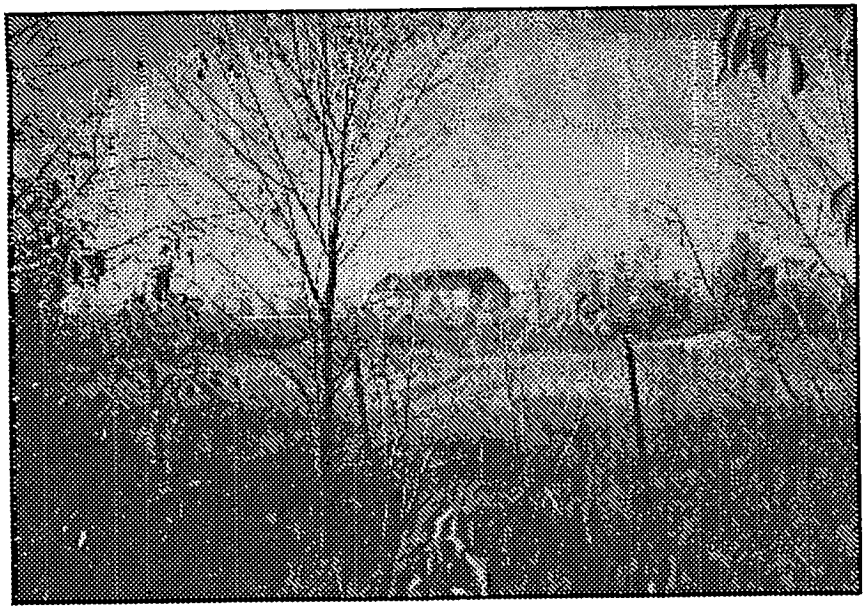


Niagara Falls Storage Site

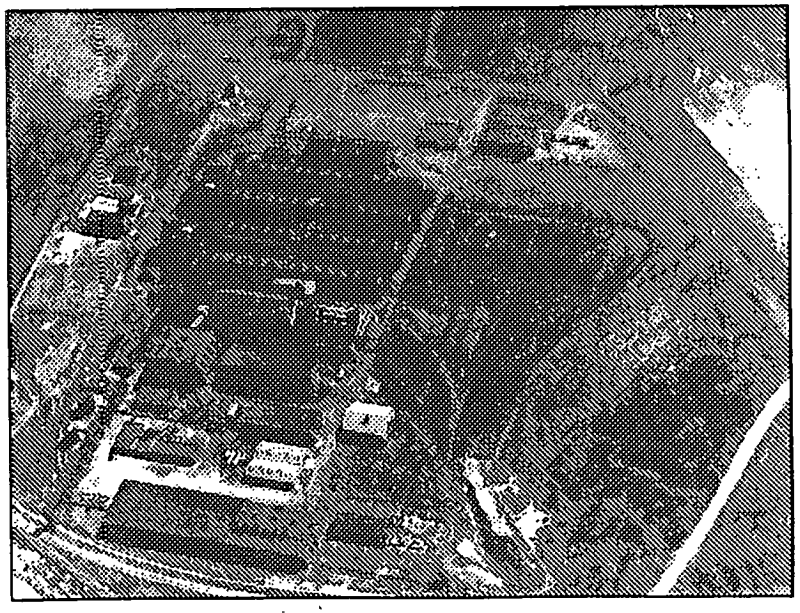


Madison (Illinois)

B&T Metals (Ohio)



Luckey (Ohio)



Painesville (Ohio)

Illinois and Ohio Sites

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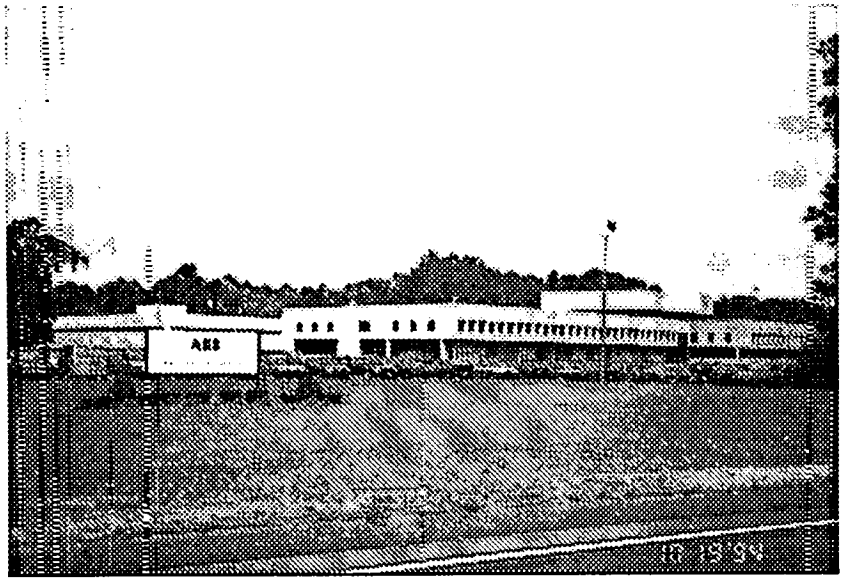
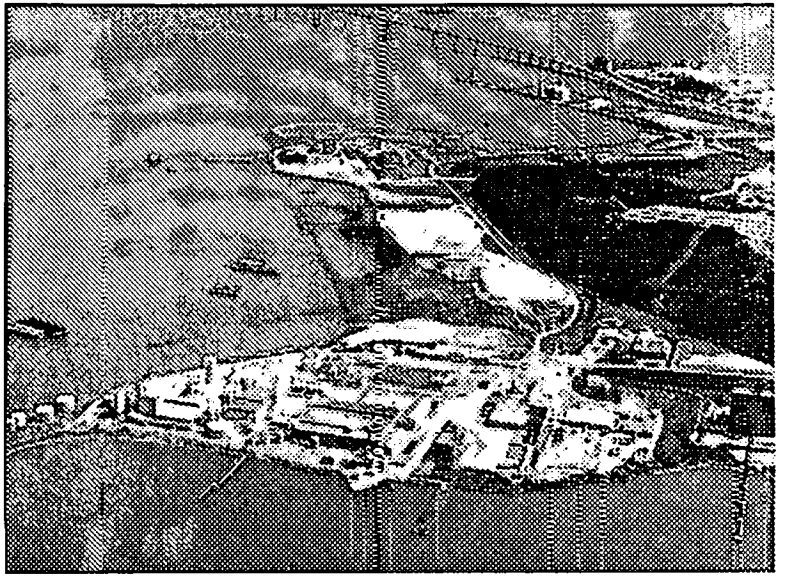
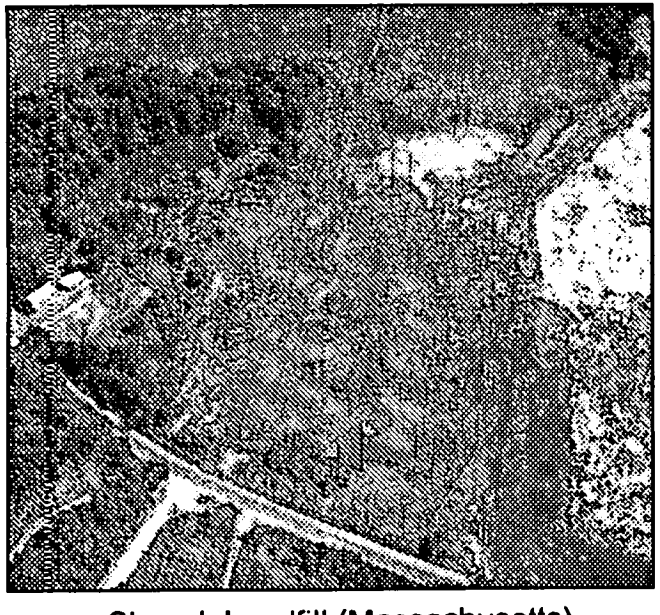


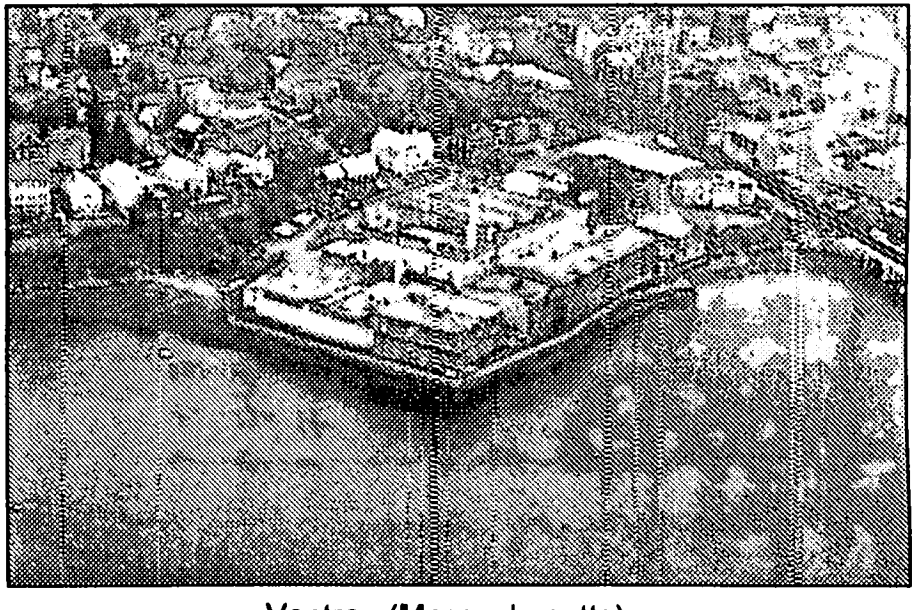
CE (Connecticut)



W.R. Grace & Company (Maryland)



Shpack Landfill (Massachusetts)



Ventron (Massachusetts)

Connecticut, Maryland and Massachusetts Sites

1. INTRODUCTION

The Formerly Utilized Sites Remedial Action Program (FUSRAP) was established in 1974 by the U.S. Atomic Energy Commission (AEC) under authorities granted by the Atomic Energy Act of 1954, as amended. FUSRAP encompasses 46 sites in 14 states and is funded through the U.S. Department of Energy (DOE) Oak Ridge Operations Office. Its mission is to identify, investigate, and clean up or control sites where residual radioactivity exceeding current guidelines remains from the early years of the nation's atomic energy program or other sites assigned to DOE by Congress. Of the 46 FUSRAP sites, 22 sites in 12 states have been completed.

This Management Action Process (MAP) document describes environmental assessment and cleanup at 14 FUSRAP sites in 7 states:

- DuPont & Company, Middlesex Sampling Plant, and the New Brunswick Site in New Jersey
- Bliss and Laughlin Steel, Colonie, and Niagara Falls Storage Site in New York
- B&T Metals, Luckey, and Painesville in Ohio
- Madison in Illinois
- CE in Connecticut
- W.R. Grace & Company in Maryland
- Shpack Landfill and Ventron in Massachusetts

Except at the Shpack Landfill and Colonie, residual radioactive contamination at these sites is related to former site activities conducted for DOE predecessor agencies [the Manhattan Engineer District (MED) and AEC]. This MAP document summarizes the current remedial action status of these sites. It also presents strategies for remediation and management of contaminated environmental media and buildings and for stakeholder involvement in the remedy selection and decision-making process. Similar documents have been prepared for the four FUSRAP sites in St. Louis, Missouri; Wayne and Maywood in New Jersey; and the Tonawanda Site in New York.

1.1 PURPOSE OF MANAGEMENT ACTION PROCESS

The MAP is intended to improve communication and facilitate stakeholder involvement in the remedy selection and decision-making process by clarifying the assumptions and strategies that will lead FUSRAP forward. At large sites, DOE works with stakeholders in remedy selection and decision making through the Environmental Management Advisory Board (EMAB), which includes representatives of regulatory agencies, state and local governments, citizen groups, labor organizations, and the scientific community. National and local stakeholder meetings provide a forum for public input to EMAB. In addition, at both large and smaller sites, DOE works directly with property owners, local officials, and regulators to reach consensus on the selected remedies and disposal options. The MAP document serves as a tool for interaction among the community, regulators, other stakeholders, and DOE, which together make up the FUSRAP MAP team. The MAP document is not a decision document but will be used as a resource tool to encourage stakeholder involvement in remedy selection and decision making.

1.2 ORGANIZATION OF THE MANAGEMENT ACTION PROCESS DOCUMENT

The organization of this MAP document is outlined in Table 1.1.

1.3 ENVIRONMENTAL RESTORATION OBJECTIVES

The mission of DOE's Environmental Restoration (ER) Program is to protect human health and the environment by remediating sites and facilities in a manner that is responsible and cost-effective and

Table 1.1 Organization of the MAP Document

Chapter 1	Introduction	• Purpose of the MAP and organization of the MAP document • FUSRAP ER objectives, mission, vision, goals, and priorities • Core MAP team members and FUSRAP interfaces with other DOE organizations, regulators, stakeholder organizations, and the public • Strategy for future MAP implementation and improvements
Chapter 2	Site Description and Comprehensive Planning	• Operational history (including historic origin of contamination) • Environmental setting (location, geology and hydrogeology, ecological resources) • Current onsite and adjacent offsite land use • Local and regional socioeconomic, environmental, and cultural factors influencing project strategy and implementation • Site facilities, equipment, and infrastructure • Projected future use of land, facilities, and equipment
Chapter 3	Status of Environmental Restoration Activities	• Current status in remedial action process • Nature and extent of contamination • Regulatory status • Waste management/disposition activities affecting site remediation schedules
Chapter 4	Relative Ranking	• Relative ranking based on risk to the public, workers, and the environment
Chapter 5	Environmental Restoration Strategy	• Key assumptions used in ER strategy formulation • Key technical and administrative elements of remedy selection strategy • Strategies for program management, regulatory compliance, and stakeholder involvement • Performance measures used to track progress
Chapter 6	Master Schedule for Environmental Restoration	• Master schedule • Compliance milestones
Chapter 7	Issues and Initiatives	• Issues affecting project performance • Initiatives implemented to address issues and improve performance
Appendix A	Fiscal Year Funding Requirements/Costs	• Cost baseline for ER activities
Appendix B	Environmental Restoration Deliverables	• Site documents developed for and funded by ER (1989-present)
Appendix C	Decision Document/ROD Summaries	• Abstracts of decision documents
Appendix D	Conceptual Model Data Summaries	• Conceptual site models depicting contaminant sources and transport mechanisms, exposure routes and pathways, and receptors
Appendix E	Project Controls	• Summary of Project Controls, including responsibility matrices, change control thresholds, and reporting requirements
Bibliography	References and Bibliography	• Literature cited/Source references

optimizes opportunities for land and facility reuse (DOE 1995a). 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

The major objectives of FUSRAP, which are in accordance with the mission, core values, and priorities of the ER Program, are to

- Identify and evaluate sites that supported 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

ER Program strategic goals and program priorities are discussed in relation to FUSRAP release site management strategy in Section 5.3.

1.4 PROJECT TEAM

The MAP project team includes key DOE and contractor personnel as well as representatives of regulators and other stakeholders (EPA, state regulatory agencies, and various community and regional stakeholder groups). MAP project team organization is outlined in Figure 1.1. Key regulators and other stakeholders are identified in Table 1.2.

1.5 ORGANIZATIONAL INTERFACES

Table 1.3 outlines organizational interfaces and describes roles of DOE, contractors, regulatory agencies, and stakeholder groups in ER at the sites covered by this MAP document.

1.6 MAP PROGRESS, ACCOMPLISHMENTS, AND STRATEGY

Table 1.4 identifies FUSRAP efforts to promote stakeholder involvement in remedy selection and decision making and summarizes progress toward consensus through the EMAB process and CERCLA/NEPA community relations activities.

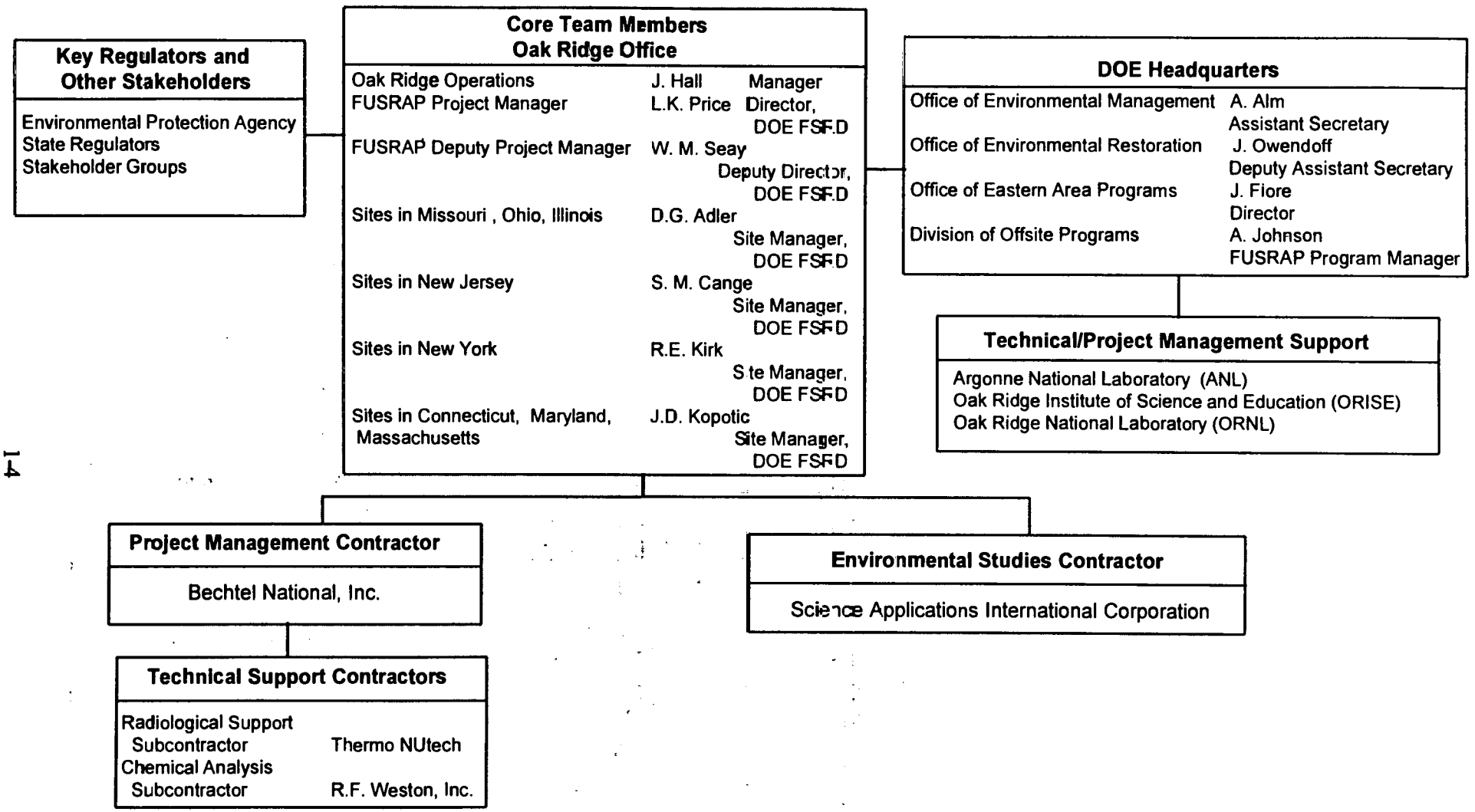


Figure 1.1
MAP Project Team and Organization Chart

Table 1.2 Key Regulators and Other Stakeholders

Sites in New Jersey	Sites in New York	Sites in Illinois and Ohio	Sites in Connecticut, Maryland, and Massachusetts
KEY REGULATORS			
EPA Region II	EPA Region II	EPA Region V	EPA Region I (CE, Shpack, Ventron) EPA Region III (W.R. Grace & Company)
			Nuclear Regulatory Commission (CE)
New Jersey Department of Environmental Protection (NJDEP)	New York State Department of Environmental Conservation (NYSDEC)	Illinois Environmental Protection Agency (Madison) Ohio Environmental Protection Agency (B&T Metals, Luckey, Painesville) Ohio Department of Health (B&T Metals, Luckey, Painesville)	Connecticut Department of Environmental Protection (CE) Connecticut Department of Health Services (CE) Maryland State Department of the Environment (W.R. Grace & Company) Massachusetts Department of Environmental Protection (Shpack, Ventron)
OTHER STAKEHOLDERS			
Property owners DuPont & Company: E.I. du Pont de Nemours & Company MSP: (DOE-owned) New Brunswick Site: (DOE-owned)	Property owners Bliss and Laughlin Steel: Niagara Cold Drawn Steel Corporation Colonie: (DOE-owned) NFSS: (DOE-owned)	Property Owners Madison: Spectrulite Consortium B&T Metals: B&T Metals Luckey: Uretech International Painesville: Uniroyal Chemical Company Lonza Chemical Company	Property owners CE: Combustion Engineering W.R. Grace & Company: W.R. Grace & Company Shpack Landfill: Town of Norton, MA Ventron: Morton International
Owners of commercial and residential properties near sites	Owners of commercial and residential properties near sites	Owners of commercial and residential properties near sites	Owners of commercial and residential properties near sites Shpack Landfill: New England Power Company
Local health departments	Local health departments	Local health departments	Local health departments

Table 1.2 (continued)

Sites in New Jersey	Sites in New York	Sites in Illinois and Ohio	Sites in Connecticut, Maryland, and Massachusetts
OTHER STAKEHOLDERS (continued)			
Mayors/city councils/county executives, and other representatives of local governments DuPont & Company: Mayor and Town Committee, Township of Pennsville; Mayor and Council, Borough of Penns Grove; Director, Salem County Board of Freeholders MSP: Mayor and Council, Borough of Middlesex; Middlesex County Administrator New Brunswick Site: Mayor and Council, City of New Brunswick; Middlesex County Administrator	Mayors/city councils/county executives, and other representatives of local governments Bliss and Laughlin Steel: Mayor and Council, City of Lackawanna; Mayor and Council, City of Buffalo; Erie County Executive Colonie: Town Supervisor and Council, Town of Colonie; Mayor and Board of Aldermen, City of Albany; Albany County Executive NFSS: Town Supervisors and Councils, Towns of Lewiston and Pendleton; Mayors, Villages of Lewiston and Youngstown; Niagara County Legislature Chairperson	Mayors/city councils/county executives, and other representatives of local governments Madison: Mayor and Board of Aldermen, City of Madison; Madison County Board Chairperson B&T Metals: Mayor and Council, City of Columbus; President, Franklin County Commission Luckey: Mayor and Council, Village of Luckey; Board of Trustees Chairperson, Township of Troy; President, Wood County Commission Painesville: Council President, City of Painesville; Trustees and Administrator, Township of Painesville; President, Lake County Commission	Mayors/city councils/county executives, and other representatives of local governments CE: Mayor and Council, City of Windsor (Hartford County has no central government) W.R. Grace & Company: Mayor and Council, City of Baltimore; Baltimore County Executive Shpack Landfill: Town Manager and Board of Selectmen, Town of Norton; Mayor and Council, City of Attleboro; Chairperson, Bristol County Commission Ventron: Mayor and Council, City of Beverly; Director of County Operations, Essex County; Chairperson, Essex County Commission
Other Stakeholders DuPont & Company: MSP: Nearby commercial property owners and residents New Brunswick Site: Nearby commercial property owners	Other Stakeholders Bliss and Laughlin Steel: Colonie: Citizens Concerned about National Lead Eastern New York Coalition on Occupational Safety and Health (ENYCOSH) New York Environmental Institute's Superfund Monitoring Project Citizens' Environmental Coalition NFSS: Residents Organized for Lewiston-Porter's Environment (ROLE)	Other Stakeholders Madison: B&T Metals: Luckey: Painesville	Other Stakeholders CE: Nuclear Regulatory Commission W.R. Grace & Company: Shpack Landfill: Ventron: Harbor Commission; Ward 2 Civic Association
Congressional Contacts New Jersey: Sen. Bill Bradley (202) 224-3224 Sen. Frank Lautenberg (202) 224-4744 DuPont & Company: Rep. Frank LoBiondo (202) 225-6572 (2nd) MSP: Rep. Bob Franks (202) 225-5361 (7th) NBS: Rep. Frank Pallone (202) 225-4671 (6th)	Congressional Contacts New York: Sen. Alfonse D'Amato (202) 224-6542 Sen. Daniel Moynihan (202) 224-4451 Bliss and Laughlin Steel: Rep. Jack Quinn (202) 225-3306 (30th) Colonie: Rep. Michael McNulty (202) 225-5076 (21st) NFSS: Rep. John LaFalce (202) 225-3231 (29th)	Congressional Contacts Illinois: Sen. Paul Simon (202) 224-2152; Sen. Carol Mosley-Braun (202) 224-2854 Madison: Rep. Jerry Costello (202) 255-5661 (12th) Ohio: Sen. Mike DeWine (202) 224-2315; Sen. John Glenn (202) 224-3353 B&T Metals: Rep. John Kasich (202) 225-5355 (12th) Luckey: Rep. Marcy Kaptur (202) 225-4146 (9th) Painesville: Rep. Steven LaTourette (202) 225-5731 (19th)	Congressional Contacts Connecticut: Sen. Christopher Dodd (202) 224-2823; Sen. J.I. Lieberman (202) 224-4041 CE: Rep. Barbara Kennelly (202) 225-2265 (1st) Maryland: Sen. Barbara Kulski (202) 224-4654; Sen. Paul Sarbanes (202) 224-4524 W.R. Grace & Co.: Rep. Wayne Gilchrest (202) 225-5311 (2nd) Massachusetts: Sen. Edward Kennedy (202) 224-4543; Sen. John Kerry (202) 224-8525 Shpack: Rep. Peter Blute (202) 225-5931 (4th) Ventron: Rep. Peter Torkildsen (202) 225-8020 (6th)

Table 1.3 Organizational Interfaces

Organization	Role/Responsibility
DOE	
DOE-HQ, Office of Environmental Restoration (EM-40), within Office of Environmental Management	Oversight responsibility for achieving approved FUSRAP goals and objectives (executed through DOE 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 (OR), Former Sites Restoration Division (FSRD)	Responsibility for accomplishing the FUSRAP ER mission; day-to-day technical, administrative, and financial management of FUSRAP activities; oversight and management of BNI and SAIC contracts. Director is FUSRAP Program Manager
CONTRACTORS	
Bechtel National, Inc. (BNI)	Project Management Contractor. Manages field activities and construction required for remedial action; administers subcontracts; coordinates sequence of operations; executes response actions as required; defines/implements QA procedures, environmental compliance activities, and safety programs to meet DOE requirements; ensures completion of remedial action in accordance with DOE goals
Science Applications International Corporation (SAIC)	Environmental Studies Contractor. Responsible for planning, managing, and executing the CERCLA process, integrating NEPA values, and meeting RCRA requirements. Helps DOE plan site investigations, evaluates cleanup alternatives, and coordinates laboratory treatability studies and treatment strategy
Oak Ridge National Laboratory (ORNL)	Technical support to DOE-HQ and FSRD including radiological scoping, designation, characterization, and verification services; conducts environmental audits of activities at FUSRAP sites
Oak Ridge Institute for Science and Education (ORISE)	Technical support to DOE-HQ including independent verification activities
Argonne National Laboratory (ANL)	Technical support to DOE-HQ and FSRD including technical review of analyses and documents and assistance to the FUSRAP self-assessment program
DOE SUPPORT PROGRAMS	
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	Develops and facilitates use of safest and most expeditious and cost-effective remedial action technologies
REGULATORS	
U.S. Environmental Protection Agency (EPA)	Regulatory oversight of remedial actions at FUSRAP sites under CERCLA
Region I	Massachusetts (Shpack Landfill, Ventron)
Region II	New York (Bliss and Laughlin Steel, Colonie, NFSS) New Jersey (DuPont & Company, Middlesex Sampling Plant, New Brunswick Site)
Region III	Maryland (W.R. Grace & Company)
Region V	Illinois (Madison) and Ohio (B&T Metals, Luckey, Painesville)

Table 1.3 (continued)

Organization	Role/Responsibility
REGULATORS (continued)	
Nuclear Regulatory Commission (NRC)	Regulatory oversight/radioactive materials licensing at CE
State Regulators:	Key state regulatory agencies with oversight role in remedial action at FUSRAP sites
Connecticut Department of Environmental Protection Connecticut Department of Health Services	CE
Illinois Environmental Protection Agency	Madison
Maryland Department of the Environment	W.R. Grace & Company
Massachusetts Department of Environmental Protection	Shpack Landfill and Ventron
Ohio Environmental Protection Agency Ohio Department of Health	B&T Metals, Luckey, Painesville
New York State Department of Environmental Conservation	Bliss and Laughlin Steel, Colonie, NFSS
New Jersey Department of Environmental Protection	DuPont & Company, Middlesex Sampling Plant, New Brunswick Site
OTHER STAKEHOLDERS	
Combustion Engineering	Property owner, CE
Spectrulite Consortium	Property owner, Madison
W.R. Grace & Company	Property owner, W.R. Grace & Company
Town of Norton, MA	Property owner, Shpack Landfill
New England Power Company	Power company and Town of Norton strictly control public access to Shpack Landfill by fencing and posting
Morton International	Property owner, Ventron
Harbor and Conservation Commissions and local residents, Beverly, MA	Other stakeholders, Ventron
Uretech International	Property owner, Luckey
Uniroyal Chemical Company	Property owner, Painesville
Lonza Chemical Company	Owner of property adjacent to Uniroyal Painesville facility
Niagara Cold Drawn Steel Corporation	Property owner, Bliss and Laughlin Steel
E.I. du Pont de Nemours & Company	Property owner, DuPont & Company
Local Stakeholder Groups	See Table 1.2
Owners of commercial and residential properties near sites	
Local health departments	
Mayors/city councils/county executives and other representatives of local governments	See Table 1.2

Table 1.4 Review of Stakeholder Involvement and MAP Progress

Fiscal Year	Activities			
	Sites in New Jersey	Sites in New York	Sites in Illinois and Ohio	Sites in Connecticut, Maryland, and Massachusetts
1980	• Middlesex Sampling Plant designated for cleanup under FUSRAP			• W.R. Grace & Company (4-acre radioactive waste burial area) designated for cleanup under FUSRAP • Shpack Landfill designated for cleanup under FUSRAP
1984		• Public Meetings in Albany and Colonie to discuss cleanup plans with property owners and the public • DOE met individually with residential and commercial property owners during interim cleanup actions in Colonie in 1984, 1985, and 1988. Also issued news releases, conducted media tours, and answered media inquiries.		
1986				• Ventron designated for inclusion in FUSRAP • FUSRAP provided radiological support (including removal of underground storage tank) to Ventron during renovation activities
1988		• DOE issued Notice of Intent to conduct an EIS for all New York FUSRAP sites including Colonie and held a public meeting to receive public comments (April) • Colonie was removed from New York EIS process (September) (Congressional Record H 8508) • DOE held several meetings with local officials, congressional staff, and concerned citizens to exchange information on public concerns and DOE progress at Colonie (December)		

Table 1.4 (continued)

Fiscal Year	Activities			
	Sites in New Jersey	Sites in New York	Sites in Illinois and Ohio	Sites in Connecticut, Maryland, and Massachusetts
1992		• DOE held public meetings in Colonie to discuss cleanup progress with stakeholders (April, June, September)	• Madison, B&T Metals, Luckey, and Painesville designated for cleanup under FUSRAP	• FUSRAP provided health physics support at Shpack Landfill during potentially responsible party (PRP) site investigation
1993		• EE/CA for building cleanup and demolition at Colonie main building issued for public comment (June). Comments received indicated support for DOE's preferred alternative.		• Continued support to PRPs at Shpack Landfill • Provided additional radiological support at Ventron during Morton International's investigations of mercury contamination in the harbor adjacent to the site
1994		• DOE held open house and site tour at Colonie to demonstrate cleanup progress to public (August) • DOE began public distribution of Colonie site newsletter highlighting recent site activities (November)		• CE designated for cleanup under FUSRAP
1995	• Meeting of EMAB in Secaucus to discuss New Jersey sites • Meetings with mayor of New Brunswick and Middlesex mayors and councils in December to discuss remedial actions planned for FY 1996			
1995 FUSRAP-WIDE	• First annual National Stakeholder Summit in Washington, D.C., attended by >60 stakeholders from communities throughout US with large FUSRAP sites (May) • Presented workshop on FUSRAP's innovative community relations strategic planning process at international conference • Conducted conflict resolution training for program,, site, and project managers • First use of Innovator (a computer-assisted decision-making tool) by a FUSRAP citizens' group to prioritize remedial alternative evaluation criteria			

Table 1.4 (continued)

Fiscal Year	Activities			
	Sites in New Jersey	Sites in New York	Sites in Illinois and Ohio	Sites in Connecticut, Maryland, and Massachusetts
1996	• DOE met in February with City of New Brunswick business manager to discuss remedial action planned at New Brunswick Site in summer 1996. Discussion indicated that city fully supports the planned remedial action. • EE/CA for process building demolition and cleanup of ditches at Middlesex Sampling Plant issued for public comment (February) • Established Middlesex Administrative Record at Middlesex Borough Library • Established New Brunswick Site Administrative Record and information repository at New Brunswick Public Library (January) • Issued EE/CA for New Brunswick Site cleanup for public/state comment (January) • Meeting with DuPont and regulators on cleanup of process water drainage system at DuPont & Company	• National Academy of Sciences review of K-65 residues at NFSS	• Cleanup of B&T Metals in progress with Ohio EPA concurrence -- Expected completion June 1996 • DOE and Ohio EPA are discussing strategic goals for Luckey and Painesville characterization and remediation	• DOE and Ventron property owner are coordinating and beginning site remediation

2. SITE DESCRIPTION AND COMPREHENSIVE PLANNING

Summary site descriptions, including information on operational history, environmental setting, current and projected future land use, and facilities and infrastructure, are provided in Tables 2.1 through 2.4 and accompanying figures. Table 2.1 covers the three sites in New Jersey (DuPont & Company, Middlesex Sampling Plant, and the New Brunswick Site); Table 2.2 covers the three sites in New York [Bliss and Laughlin Steel, Colonie, and the Niagara Falls Storage Site (NFSS)]; Table 2.3 covers the four sites in Illinois and Ohio (Madison, B&T Metals, Luckey, and Painesville); and Table 2.4 covers the four sites in Connecticut, Maryland, and Massachusetts (CE, W.R. Grace & Company, Shpack Landfill, and Ventron).

2.1 SITES IN NEW JERSEY

2.1.1 Operational History

The operational history of the New Jersey sites covered by this MAP document, including previous and current site ownership, historic site use, and historic origin of contamination, is summarized in Table 2.1 and discussed briefly below.

DuPont & Company

The DuPont Chambers Works plant is an active chemical plant that manufactures primarily organic chemicals. During the 1940s, DuPont conducted research involving uranium hexafluoride, first for the U.S. Office of Scientific Research and Development and later under contract to MED/AEC. Operations involving uranium began in 1942; research for AEC continued until late 1947. MED/AEC activities were conducted in six separate areas onsite. Of three buildings used for MED/AEC activities, only Building 845 remains; it is used as a warehouse for miscellaneous storage.

In 1948 and 1949, AEC conducted radiological surveys and decontamination activities at the site. Decontamination included the use of sandblasting, vacuuming, and washing building surfaces. After these surveys and based on existing criteria, AEC released the buildings to DuPont in 1949. A burial area at the site contains some equipment used in building demolition, various chemical wastes, and small amounts of state-approved low-level radioactive material. Today, the site is an operating chemical plant, and DOE has no onsite presence.

Middlesex Sampling Plant

MED established the sampling plant in 1943 for use in sampling, storing, and shipping uranium, thorium, and beryllium ores. MED operations at the Middlesex Sampling Plant (MSP) ceased in 1955, but AEC later used the site for storage and sampling of thorium residues. All AEC activities at MSP ended in 1967. Onsite structures were decontaminated to levels acceptable at the time. From 1969 to 1979, MSP served as a training center for the U.S. Marine Corps. In 1980, the site was returned to DOE, as AEC's successor agency, and designated for cleanup under FUSRAP.

Today, DOE monitors and maintains the site, which includes two soil storage piles containing approximately 66,300 yd^3 of material. The larger pile, constructed in 1981, contains approximately 35,100 yd^3 of radioactively contaminated soil and debris from past residential property cleanups. The second pile, built between 1984 and 1986, contains about 31,200 yd^3 of waste from cleanup of the Middlesex Municipal Landfill. In addition to radioactive material, the landfill storage pile also contains some nonradioactive chemical contaminants of concern (e.g., lead and arsenic). The site also includes an office building, an old boiler house, a garage, and the former process building. The former process building is scheduled for demolition in 1996. Approximately 22,000 yd^3 of building rubble and contaminated in situ soil and asphalt are also present at MSP, bringing the total site waste volume to an estimated 89,000 yd^3.

Table 2.1 Site Description: FUSRAP Sites in New Jersey

State	New Jersey		
Release Site	**DuPont & Company**	**Middlesex Sampling Plant**	**New Brunswick Site**
ADS No.	OR-1300-AA	OR-1300-AA	OR-1300-AA
WBS No.	1.4.11.1.3 (108)	1.4.11.1.3 (118)	1.4.11.1.3 (144)
Remedial Action Status	Partial characterization	Partial characterization Partial RA scheduled for 1996	Partial characterization Partial RA Both characterization and RA scheduled for completion during FY 1996.
Vicinity Properties	None	33 (all completed)	None
OPERATIONAL HISTORY			
Historic Origin of Contamination	Research using uranium hexafluoride by DuPont for Office of Scientific Research and Development and MED/AEC (1940s)	1943-67: MED/AEC sampling/storage/shipment of uranium, thorium, and beryllium ores and sampling of thorium residues 1981-present: Storage of wastes in landfill and VP piles	MED/AEC/DOE nuclear chemistry lab using uranium and thorium ores, plutonium, and enriched uranium (1948-77); pitchblende-contaminated soil was moved to the site from a nearby landfill in 1960.
Owner/Landlord			
Historic	E.I. du Pont de Nemours & Company	1943-67: MED/AEC (used for sampling/storage/shipment of uranium ores) 1969-79: U.S. Marine Corps training center	MED/AEC/DOE (1948-present)
Current	E.I. du Pont de Nemours & Company	DOE (1980-present)	DOE
ENVIRONMENTAL SETTING			
Location	Deepwater, NJ (Salem County) Located in townships of Pennsville and Carneys Point on southeastern shore of Delaware River, adjacent to residential community of Deepwater near the Delaware Memorial Bridge. Bordered on east by US-130, on south by Salem Canal, and on west by Delaware River, across from Wilmington, DE (see Figure 2.1)	239 Mountain Ave., Middlesex, NJ (Middlesex County) Northeastern New Jersey, ~35 miles northeast of Trenton and 26 miles southwest of Newark. Bordered on east by residential properties on Mountain Ave., on south by William St., and on north by Lehigh Valley Railroad line (see Figure 2.2)	986 Jersey Avenue, New Brunswick, NJ (Middlesex County) Located in industrial area <2 miles from downtown New Brunswick. Bordered on north by Jersey Ave., on south by an Amtrak railway, and on east and west by industrial development (see Figure 2.3)
Site Area	700 acres	9.6 acres	5.6 acres
Topography	Topography generally level. Elevation ranges from 10 to 20 ft MSL.	Topography is level and slopes gently to south. Elevation ranges from 50 to 60 ft MSL	Topography is level and slopes gently to north. Elevation ranges from 95 to 114 ft MSL.
Geology	Soils primarily peat sediments. Subsurface characterized by silts and sands overlying interbedded sands and clays with mica schist bedrock layer. Manmade fill underlies most of property. Low soil organic content.	Soils are silty to sandy loams. Subsurface characterized by silty, sandy clay overlying clayey, silty sand. Bedrock is red shale of Triassic Brunswick Formation and occurs at depth of ~1.5-8 ft.	Soils are silty to sandy clays with high organic content. Subsurface geology characterized by clayey, silty sand overlying shale bedrock (Passaic Formation of the Brunswick Group), which occurs at depth of ~2-9 ft.
Hydrogeology and Water Quality			
Aquifers	Primary groundwater aquifer in area is Cape May formation (an unconfined aquifer hydraulically connected to Delaware River).	Unconsolidated sediments reportedly yield water of good quality. Quality of water from Brunswick Formation bedrock aquifer varies with locality and depth (generally very hard, alkaline, and high in total dissolved solids content).	Groundwater occurs in both bedrock and unconsolidated sediments. Depth ranges from 2 to 18 ft below ground surface and fluctuates with seasonal precipitation patterns.

Table 2.1 (continued)

State	New Jersey		
Release Site	**DuPont & Company**	**Middlesex Sampling Plant**	**New Brunswick Site**
Potable Water Sources		Principal sources are surface water from Raritan River and groundwater wells [~74 wells within 3 miles of MSP, public well field (Sebrings Mill) ~1.3 mile northwest, and surface water intake ~3 miles downstream of site]. These sources supply ~100% of the Borough of Middlesex.	Passaic Formation underlying site is used for domestic, municipal, and industrial water supply in Middlesex County. Reported yields for 60 wells (majority <150 ft deep) within a 1-mile radius of NBS range from 2 to 125 gpm.
Groundwater Flow		Groundwater flows from north to south beneath site.	Groundwater flow across site is generally from southeast to northwest.
Dominant Surface Water Features	Delaware River, Salem Canal	Raritan River, Bound Brook	Raritan River, Mile Run Creek, small unnamed tributary to creek ~500 ft NE of site across Jersey Avenue
Site Drainage	Portion of property drains into Delaware River; remainder drains into Henby or Bouttown creeks. Central drainage ditch carrying wastes from chemical operations flows toward northeast, adjacent to northwest corner of Building 845, and drains into eastern corner of Lagoon A. Lagoon contents pumped to onsite water treatment facility.	All onsite surface water moves through an underground drainage system to a settling basin and then to the drainage ditch at southern end of site. The ditch discharges to Main Stream, Ambrose Brook, and Green Brook, and subsequently to the Raritan River.	No point- source discharge from site. Stormwater either ponds and evaporates from onsite depressions or drains offsite as sheet flow. Site surface water drains northward into storm drainage system of Jersey Avenue, which discharges to a small unnamed tributary of Mile Run Creek, a tributary of the Raritan River.
Ecological Resources			
Terrestrial Habitats and Biota	Surface vegetation including trees, shrubs, and grasses Wildlife including birds, mammals, and other vertebrates Invertebrates	Surface vegetation including trees, shrubs, and grasses Wildlife including birds, mammals, and other vertebrates Invertebrates	Located within Appalachian Oak Forest section of Eastern Deciduous Forest. Surface vegetation includes trees (oak, hickory, maple, basswood, elm, ash), shrubs, and grasses Wildlife includes birds (house sparrow, robin, starling, rock dove, common crow, redwing blackbird); mammals (Norway rat, raccoon, opossum, woodchuck, house mouse, eastern cottontail rabbit, eastern gray squirrel, shorttail shrew); and reptiles and amphibians (eastern garter snake, American toad). Invertebrates
Aquatic Habitats and Biota	Aquatic habitats supporting fish and invertebrates (Delaware River, Henby and Bouttown creeks)	None onsite	None onsite
Threatened/Endangered Species	None identified	None identified.	None identified
Critical Habitats	None	None	None
Wetlands	Wetlands present onsite	A drainage area south of MSP is an NJDEP designated wetland.	No designated wetlands on or near the property
Floodplains	Site is within 100-year floodplain of Delaware River		
Climate and Meteorology	Normal monthly temperature range for nearby Wilmington, DE is 31-76°F. Mean annual temperature is 54°F. Average annual precipitation: ~41 in. Prevailing winds from northwest at average wind speed of 9 mph.	Average annual daily temperature ranges from 7 to 63°F. Average annual precipitation is 42 in., with average annual snowfall of 27.5 in. Winds predominantly from west at average wind speeds of 9-11 mph.	Temperature extremes for 1992 ranged from 10 to 97°F. Winds predominantly from west at average wind speeds of 9-11 mph.

Table 2.1 (continued)

State	New Jersey		
Release Site	**DuPont & Company**	**Middlesex Sampling Plant**	**New Brunswick Site**
		LAND USE	
Historic Site Use	Chemical manufacturing plant [Research using uranium hexafluoride by DuPont for Office of Scientific Research and Development and MED/AEC (1940s)]	1943-67: MED/AEC sampling/storage/shipment of uranium, thorium, and beryllium ores and sampling of thorium residues 1981-present: Storage of wastes in landfill and VP piles	MED/AEC/DOE nuclear chemistry lab using uranium and thorium ores, plutonium, and enriched uranium (1948-77)
Current Site Use	Industrial (chemical manufacturing plant)	Interim storage of waste from cleanup of residential VPs (1980-81) and MML (1984-86). DOE monitors and maintains the site.	Site is currently vacant and fenced to prevent public access.
Current Zoning	Industrial	Industrial	Industrial
Current Adjacent Property Use	Industrial and residential (Deepwater)	Predominantly industrial/residential with some forest and meadow land (see Figure 2.4) Bordered by Lehigh Valley Railroad to north, vacant land to south, residential/commercial property to east, and a salvage yard to west.	Primarily commercial/industrial (see Figure 2.5) No residential housing within 0.25-mile radius of site.
Projected Future Site Use (Post-RA) [See also future use assumptions in Section 5.1 (Table 5.1)]	Industrial	Future use depends on final remedy for site. If remedy is capping in place, future use would include long-term monitoring/maintenance. If remedy is excavation with offsite disposal, land would be transferred to GSA for disposition as surplus.	Future use depends on disposition by GSA. If released for private use, commercial/industrial use is likely, based on current zoning and use of surrounding property.
		LOCAL/REGIONAL SOCIOECONOMIC AND CULTURAL FACTORS INFLUENCING SITE REMEDIATION STRATEGY	
Demography and Socioeconomics	Wilmington, DE, 1990 population: 592,200 Salem County 1990 population: 65,600 Pennsville/Deepwater 1990 population: 12,467	Population within 50 miles of Middlesex ~ 15 million Middlesex 1990 population: 13,000 Piscataway 1990 population: 46,298 Both expected to increase over next 10-15 years	Total population within 50 miles: ~15 million Middlesex County 1990 population: 683,100 New Brunswick 1990 population: 41,711
Transportation			
Interstate Highways	I-295, I-95, I-495	I-287, I-95	I-287, I-95
Air	Greater Wilmington Airport	Newark Internaticnal Airport	Newark International Airport
Rail		Lehigh Valley Railroad, Central Railroad of NJ, Reading Railroad	Penn Central Railroad, Amtrak
Water	Delaware River, Salem Canal	Raritan River, Raritan Bay, Atlantic Ocean	Raritan River, Raritan Bay, Atlantic Ocean
Historical Resources		Determined to be in compliance with requirements of National Historic Preservation Act	
Archaeological Resources		No expected impacts on archaeological resources	No expected impacts on archaeological resources
		FACILITIES AND INFRASTRUCTURE	
Buildings & Structures	Building 845 (See Table 3.2 for radiological status)	Process building, boiler house, garage, administration building (See Table 3.2 for radiological status)	None

Table 2.1 (continued)

State	New Jersey		
Release Site	**DuPont & Company**	**Middlesex Sampling Plant**	**New Brunswick Site**
Onsite Storage Piles	None	2 (MML and VP piles)	None
Major Roads	US-40/I-295 (Delaware Memorial Bridge), US-130, I-95, I-495	I-287, I-95, US-22, US-1, Bound Brook Road, Lincoln Boulevard, William Street, Mountain Avenue, Wood Avenue, State Routes 28, 529, 18	I-287, I-95, US-1, US-130, State Routes 31, 26, 27, 91, Jersey Avenue, Livingston Avenue, How Lane
Railroads		Lehigh Valley Railroad, Reading Railroad, Central Railroad of New Jersey	Penn Central Railroad, Amtrak
Utilities	Electric, water, gas, sewer, telephone	Electric, water, gas, sewer, telephone	Water is currently only onsite utility. There are no electric sewer, or telephone lines.
Erosion Controls	Contaminated soils on site grounds covered by asphalt, concrete, or grass.	Contaminated soils on site grounds covered by asphalt, concrete, or grass. Storage piles covered with synthetic liners that are sealed, secured around edges, and fastened with helical anchors. Cover on older pile replaced 1992. Concrete berm surrounding storage piles directs runoff to drains feeding settling basin at site outfall that allows sediments to precipitate from water before it leaves site. Outfall discharges to drainage ditch exiting southern end of site.	Covered with vegetation to inhibit runoff.
Site Security	Security provided by chain-link fence surrounding property to restrict access and 24-hour surveillance.	Security provided by 10-ft chain-link fence with locked gate and 24-hour surveillance.	Security provided by locked chain-link fence surrounding property and 24-hour surveillance.
REFERENCES	BNI 1985h, 1986t, 1991i, 1991j, 1995a; EPA 1988d; NOAA 1985	BNI 1985l, 1986v, 1987i, 1989n, 1989o, 1989p, 1991k, 1991l, 1995a, 1995f	ANL 1984b, 1989, 1990a, 1990b; BNI 1991n, 1995a, 1995g

New Brunswick Site

From 1948 through 1977, the New Brunswick Site was used as a general nuclear chemistry laboratory by DOE and its predecessor agencies for work related to the reactor and weapons programs. During its 29 years of operation, New Brunswick Laboratory provided a variety of services that used nuclear materials. Throughout this period, liquid waste containing various radionuclides was discharged into the sanitary sewer system as permitted by AEC guidelines then in effect. In 1960, soil contaminated with pitchblende was moved to the site from a landfill in a nearby town. The material was mixed with clean soil and used to fill an unused rail siding that once entered the property from the southern side. The total volume of contaminated soil placed in this area was approximately 4,500 yd^3.

In 1977, all laboratory operations and personnel were relocated to Illinois, and the New Jersey facility was declared surplus. Partial remediation of the site was performed during the late 1970s and early 1980s. Most contaminated areas (exposed plumbing, contaminated equipment, and portions of building interiors) were cleaned up in 1978. Additional cleanup activities between 1981 and 1983 included removal of all aboveground structures, concrete foundations, onsite drain lines, and radioactively contaminated soil and shipment of the wastes to the Nevada Test Site for disposal.

2.1.2 Environmental Setting

The environmental setting of each New Jersey site, including geology, hydrogeology, and water quality; ecological resources; and climate and meteorology, is summarized in Table 2.1. Site locations are shown in Figures 2.1 through 2.3.

2.1.3 Current Land Use

Table 2.1 includes a summary of current onsite and adjacent land use. Maps showing current land use in the vicinity of the Middlesex Sampling Plant and the New Brunswick Site are provided in Figures 2.4 and 2.5.

2.1.4 Local and Regional Factors Influencing Remediation Strategy

Socioeconomic, cultural, environmental, and other factors that may influence strategies for site remediation and risk management and stakeholder-based decisions regarding long-term land use are summarized in Table 2.1.

2.1.5 Facilities, Equipment, and Infrastructure

Facilities and infrastructure at the New Jersey sites are identified in Table 2.1 and shown on site maps in Figures 2.1 through 2.3. The radiological status of buildings at DuPont & Company and Middlesex Sampling Plant is summarized in Section 3 (see Table 3.2). No onsite buildings remain at the New Brunswick Site.

2.1.6 Projected Future Use of Land, Facilities, and Equipment

Projected future use of each property after site remediation is summarized in Table 2.1.

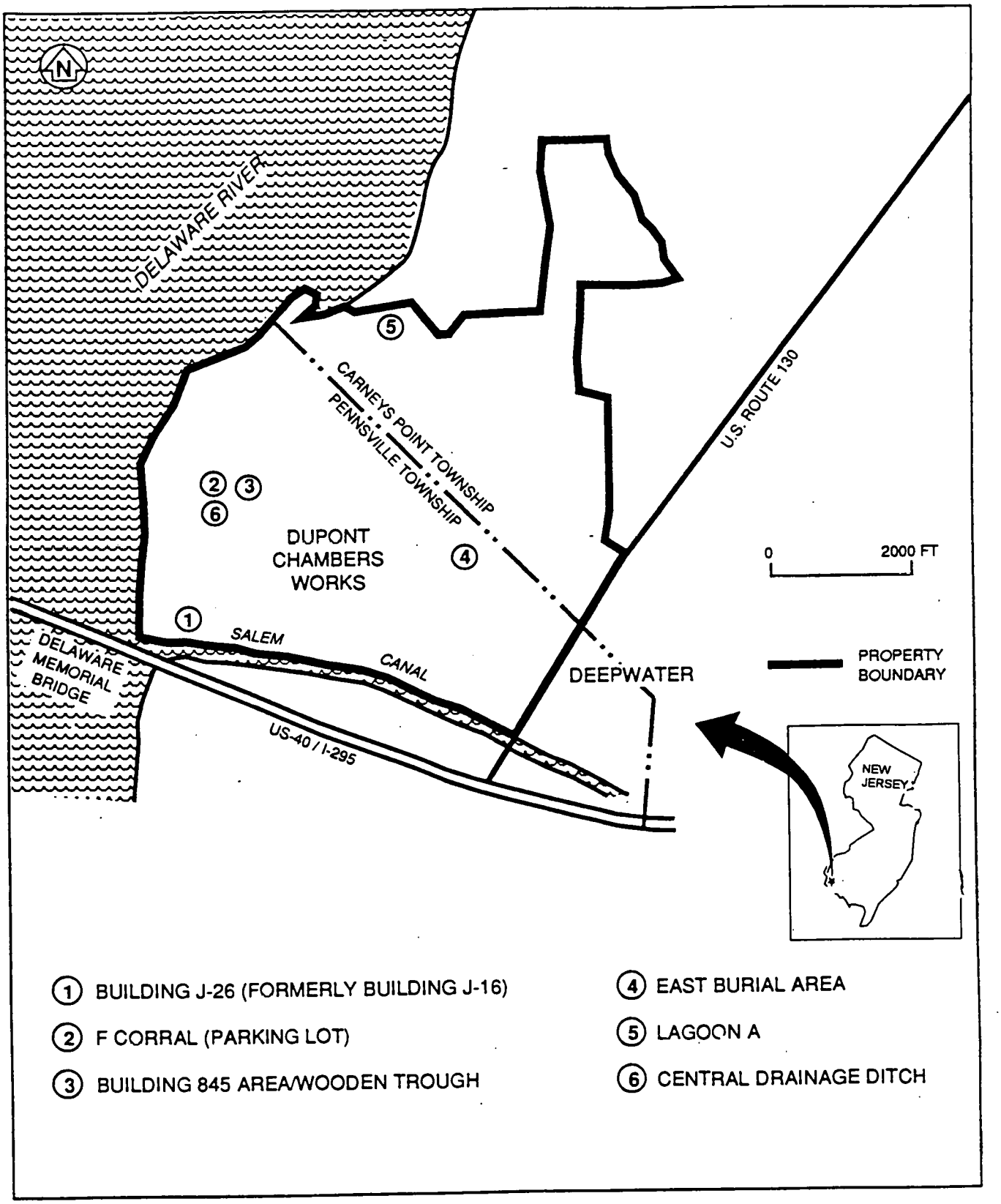


Figure 2.1 Location of DuPont & Company, Deepwater, New Jersey

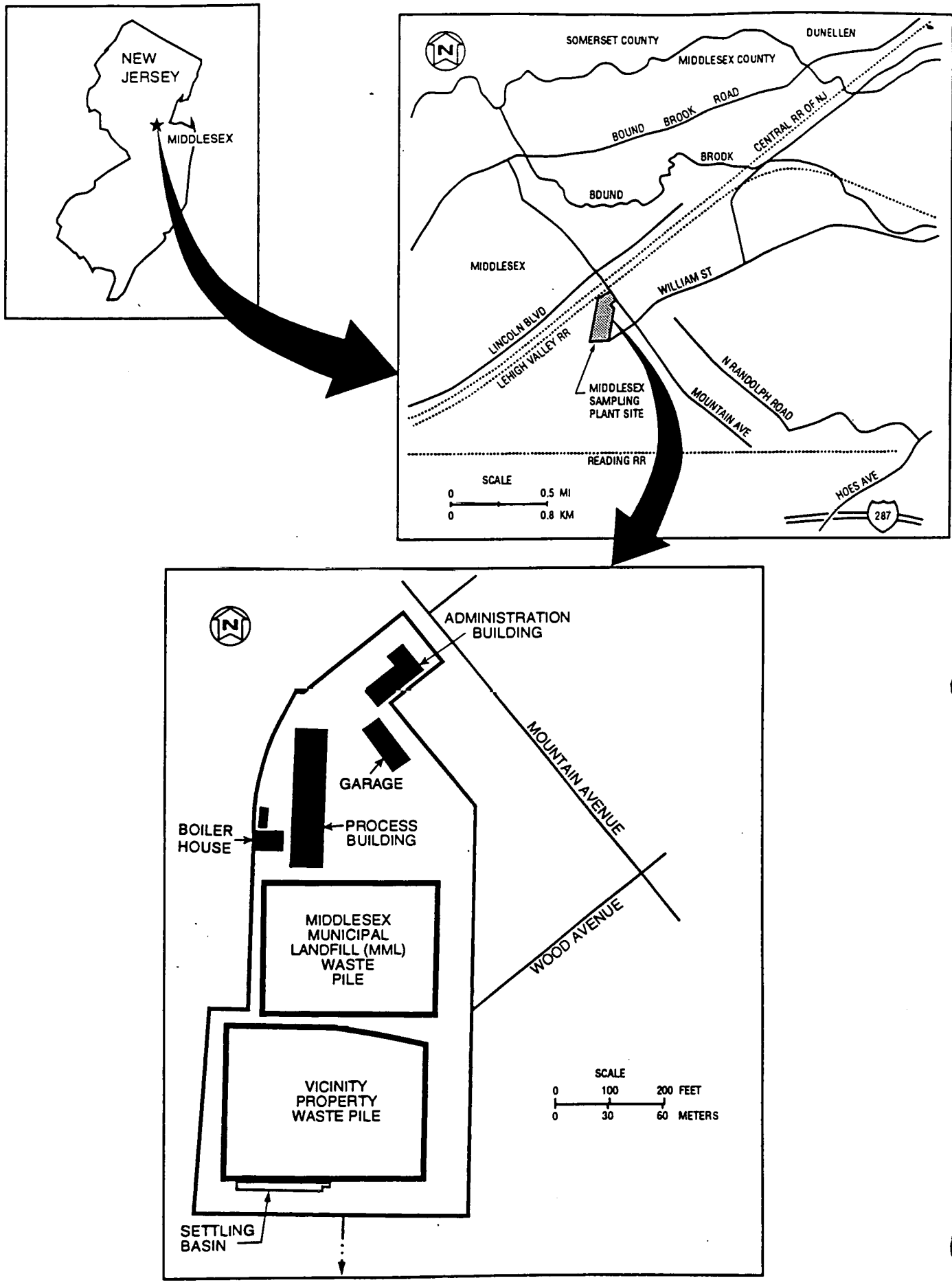


Figure 2.2 Location of Middlesex Sampling Plant, Middlesex, New Jersey

H2 4.6479.8

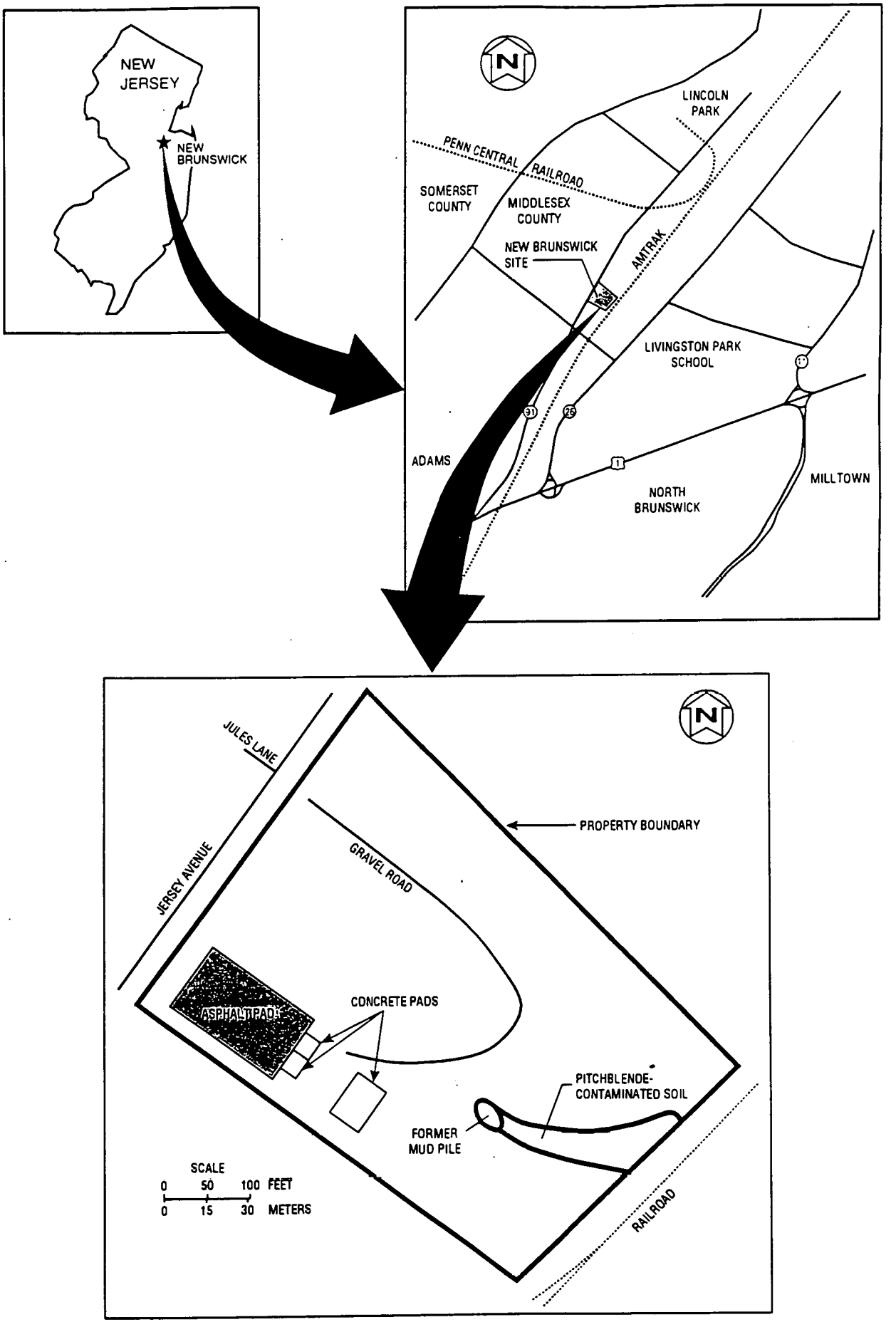
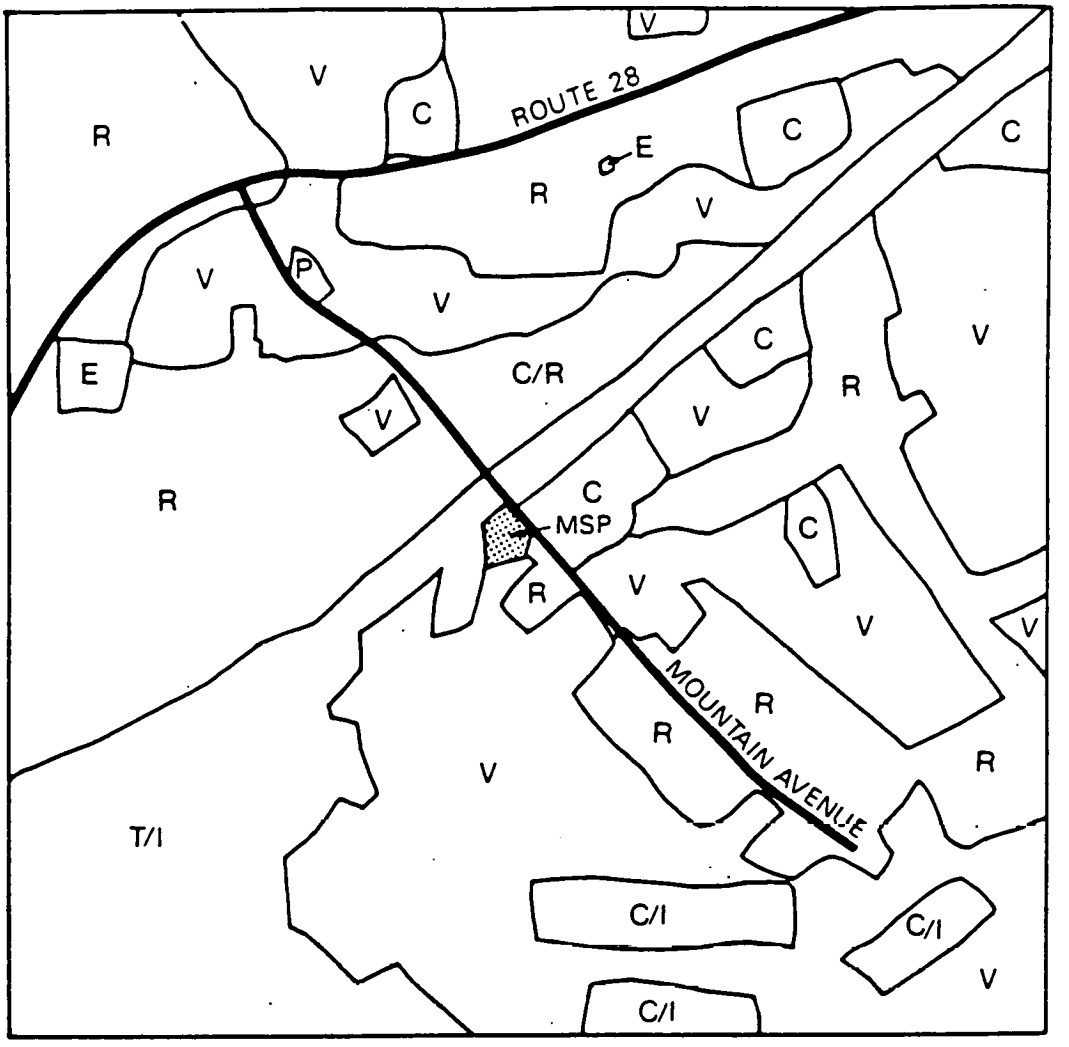


Figure 2.3 Location of New Brunswick Site, New Brunswick, New Jersey

H2 4.6479.1



BASED ON AERIAL PHOTOGRAPHS, SITE VISITS, AND USGS TOPOGRAPHIC MAPS, 1:24000 SCALE, PLAINFIELD NJ QUADRANGLE, (PHOTO REVISED 1981) AND BOUND BROOK, (PHOTO REVISED 1970)

R RESIDENTIAL	C/I COMMERCIAL/INDUSTRIAL
C COMMERCIAL	T/I TRANSPORTATION/INDUSTRIAL
C/R MIXED COMMERCIAL/RESIDENTIAL	V VACANT
P PUBLIC	E EDUCATIONAL

0 0.5 MI
0 0.8 KM

N

Figure 2.4 Generalized Land Use in the Vicinity of the Middlesex Sampling Plant

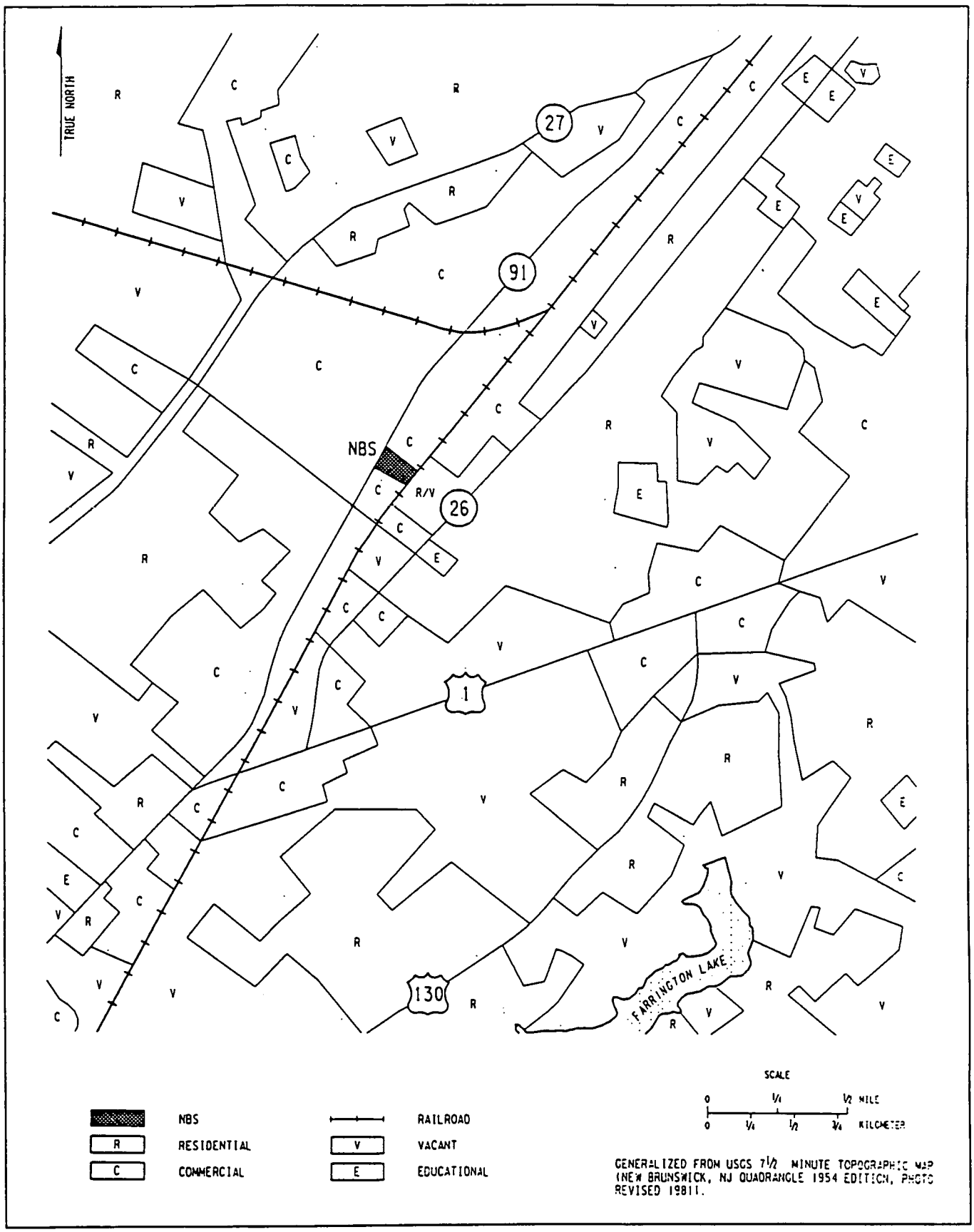


Figure 2.5 Generalized Land Use in the Vicinity of the New Brunswick Site

2.2 SITES IN NEW YORK

2.2.1 Operational History

The operational history of the New York sites covered by this MAP document, including previous and current site ownership, historic site use, and historic origin of contamination, is summarized in Table 2.2 and discussed briefly below.

Bliss and Laughlin Steel

During September and October 1952, Bliss and Laughlin performed machining and straightening operations on uranium rods under subcontract to National Lead Industries of Ohio in support of work for AEC. In addition to the finished rods, 53 drums of turnings were removed from the site for disposal. The current owner is Niagara Cold Drawn Corporation. A designation survey of interior and exterior portions of the building performed by the Oak Ridge Institute for Science and Education in March 1992 confirmed the presence of fixed residual natural uranium on the floor, columns, and ceiling of a localized portion of the building called the special finishing area (ORISE 1992). The source of radioactive constituents was processed natural uranium metal, and the primary radionuclide of concern is uranium-238.

Colonie

The Colonie site was owned and operated by National Lead Industries from 1937 to 1984, first as a foundry and later for manufacturing various components using uranium and thorium. During the manufacturing operations, the plant released radioactive materials from its exhaust stacks. As a result, radioactive constituents were spread to 56 commercial and residential properties near the site. Fifty-three of these properties have been cleaned up. The other three properties are adjacent to the site and will be cleaned up during grounds remediation. National Lead also buried radioactive and hazardous wastes while backfilling an onsite lake. Radiological and chemical characterization indicated areas where radionuclides and chemicals (primarily heavy metals) were present at levels above guidelines. The National Lead building contained radioactive and chemical constituents at levels exceeding guidelines. Gross decontamination and demolition of this building were completed during fiscal year 1995.

In 1984, Congress authorized the transfer of ownership of the Colonie Site from National Lead, Inc., to the federal government. Congress also authorized the cleanup of residual radioactive waste from the site and nearby private properties. The work was assigned to DOE to be performed under FUSRAP.

Before DOE assumed ownership, waste regulated under RCRA was stored onsite by National Lead. As a result, a RCRA Part A interim status permit application was on file with the New York State Department of Environmental Conservation (NYSDEC). This permit was assumed by DOE. On November 8, 1992, NYSDEC terminated RCRA interim status for all facilities; therefore, DOE submitted a RCRA facility closure plan to the state. On January 5, 1993, NYSDEC approved the closure plan, and closure activities were successfully completed on October 26, 1995.

NFSS

NFSS and adjacent vicinity properties were part of the U.S. Army's original 7,500-acre Lake Ontario Ordnance Works. From 1944 to 1947, MED used the Ordnance Works area to store uranium ore processing residues and radioactive materials from MED operations. By 1948, 6,000 acres of the Ordnance Works had been transferred or sold, and 1,500 acres had been given to AEC. AEC continued the use of the site to store uranium ore processing residues. In the late 1940s and 1950s, additional residues and other radioactive wastes were transported to the site from eastern and midwestern states. By 1968, most of the property acquired by AEC had been disposed of as surplus, leaving 213 acres. In 1975, 22 acres were transferred to the Town of Lewiston.

Table 2.2 Site Description: FUSRAP Sites in New York

State	New York		
Release Site	**Bliss and Laughlin Steel**	**Colonie**	**Niagara Falls Storage Site**
ADS No.	OR-1300-AA	OR-1300-AA	OR-1300-AA
WBS No.	1.4.11.1.2 (128)	1.4.11.1.2 (139)	1.4.11.1.2 (159)
Remedial Action Status	Characterization completed 1995 RA postponed at owner's request, to be reconsidered for FY 1997	Characterization completed 1995 Partial RA	Characterization complete Residual radioactive materials remediated 1955-92 are stored in engineered waste containment structure onsite. Interim cap completed 1986; permanent cap to be installed after decision on final disposition of K-65 residues.
Vicinity Properties	None	56 (53 remediated; 3 to be remediated with site grounds)	33 (30 remediated; remaining 3 are associated with hazardous waste storage operations)
OPERATIONAL HISTORY			
Historic Origin of Contamination	Uranium metal rod machining/straightening operations in support of work for AEC (1952)	National Lead manufacturing operations using uranium and thorium (foundry operations, reactor fuel fabrication and processing, electroplating) (1958-84). Plant stack emissions spread radioactive material to VPs.	Storage of uranium processing residues (primarily pitchblende residues) and other radioactive wastes from other MED/AEC sites (1944-68)
Owner/Landlord			
Historic	Bliss and Laughlin Steel; sold to Ramco Steel in 1972 and later to current owner	National Lead Industries (1937-84)	U.S. Army (NFSS and VPs were originally part of 7500-acre Lake Ontario Ordnance Works) AEC/DOE (Most of property was sold, transferred, or surplused. By 1968 AEC retained 213 acres; 22 acres was transferred to Town of Lewiston.)
Current	Niagara Cold Drawn Steel Corporation	DOE (1984-present)	DOE
ENVIRONMENTAL SETTING			
Location	110 Hopkins Street, Buffalo, NY (Erie County) Bordered on south and west by railroad right-of-way and on east by Hopkins Street. See Figure 2.6	1130 Central Avenue, Colonie, NY (Albany County) ~4 miles northwest of downtown Albany See Figure 2.7	1397 Pletcher Road, Town of Lewiston, NY (Niagara County) See Figure 2.8
Site Area	~8.5 acres [204,440-ft^2 building (4.5 acres) surrounded by ~3.7 acres of grounds]	11.2 acres	191 acres
Topography	Not applicable. All contamination is within building.	Located in Pine Bush sand plain area within Mohawk-Hudson lowland, on relatively flat to gently rolling terrain. Elevation ~230 ft MSL on SW end of site and ~215 ft MSL at low point on NW side where a drainage channel enters the site.	Except for WCS and central and western drainage ditches, site is essentially flat with slight slope to NW at elevations between 318 and 321 ft MSL.

Table 2.2 (continued)

State	New York		
Release Site	**Bliss and Laughlin Steel**	**Colonie**	**Niagara Falls Storage Site**
Geology	Not applicable. All contamination is within building.	Site is underlain by ~200 ft of unconsolidated Quaternary glaciolacustrine and fluvial sediments; upper portion reworked by wind action and redeposited as dune deposits. Bedrock occurs at >160 ft below ground surface.	40-50 ft of unconsolidated deposits (glaciofluvial sands and gravel, dense tills, and glaciolacustrine clays) overlie thick sequence of sedimentary rocks (Ordovician Queenston formation). Bedrock occurs at ~30-50 ft below ground surface.
Hydrogeology and Water Quality			
Aquifers	Not applicable	Bedrock wells yield only ~5 gpm, and water is of poor quality. Unconsolidated surficial deposits (upper and lower sands aquifers) yield moderate to large quantities of groundwater with a generally lower mineral content than water from bedrock.	Lockport dolomite aquifer (absent north of Niagara escarpment) Groundwater from shallow unconsolidated sediments is highly mineralized and unsuitable for drinking.
Potable Water Sources	Not applicable	Colonie receives Albany city water pumped from reservoirs ~20 miles south of site. Patroon Creek is not used as a source of potable water.	Lake Erie (65%) Niagara River (25%) Groundwater from Lockport dolomite aquifer (~10% of population of Niagara and Erie Counties south of the Niagara escarpment, primarily in rural areas). Groundwater is not a local source of drinking water within 3 miles of NFSS.
Groundwater Flow	Not applicable	Groundwater flows to SE or E in vicinity of the site. Recharge is from precipitation percolating into surface soil. ~38% of precipitation recharges surficial aquifers.	General groundwater flow direction is to NW with dominant influence from dewatering in central drainage ditch on shallow groundwater system.
Dominant Surface Water Features	Not applicable	Patroon Creek, Hudson River, Renssalaer Lake, Sand Creek Surface water at Colonie was significantly altered by filling of former Patroon Lake. Today, only an open drainage basin of an unnamed tributary remains in the western portion of the former lake. Unnamed stream empties to Patroon Creek (a tributary of Hudson River).	Fourmile Creek, Niagara River, Lake Ontario
Site Drainage	Not applicable	Located within Patroon Creek drainage basin ~1.6 miles east of Rensselaer Lake. Small unnamed stream enters site through a culvert, passes beneath site in concrete-lined storm drain, and exits through another culvert on the south side. Stream empties into Patroon Creek ~0.25 mile south of site. Surface drainage from site is controlled through system of drain inlets and conduits transporting surface water to same conduit that drains the former lake.	Site drains poorly because of low soil permeability and flatness of terrain. Precipitation drains to west and central drainage ditches (often dry during summer). Ditches empty to Fourmile Creek, which discharges into Lake Ontario ~4 miles north of site. Ponding in some areas including marshy area east of Building 401.

Table 2.2 (continued)

State	New York		
Release Site	**Bliss and Laughlin Steel**	**Colonie**	**Niagara Falls Storage Site**
Ecological Resources			
Terrestrial Habitats and Biota	Not applicable	Colonie is within northern hardwood forest section of Laurentian mixed forest. Because of urban/industrial setting, little or no forest habitat is present. Flora in residential areas are primarily species common to landscaped lawns (grasses, evergreen shrubs, trees including oak, maple, elm, spruce). Flora at industrial and railroad properties are primarily grasses and weeds. Lack of suitable habitat limits variety of fauna to species adapted to urban encroachment. Birds include blue jay, northern flicker, killdeer, house sparrow, northern cardinal, American robin, pigeon, mourning dove, European starling, and common grackle. Mammals include Norway rat, house mouse, eastern cottontail rabbit, and eastern gray squirrel.	Site vegetation includes dense growth of trees and shrubs in northern and eastern portions. Remainder is covered by grass, buildings, and a paved parking lot. Trees include elm, red maple, hickory, hemlock, poplar. Wildlife consists of species associated with reverting farmland including white-tailed deer, cottontail rabbit, raccoon, opossum, songbirds. Reptiles and amphibians include turtles, salamanders, frogs, toads.
Aquatic Habitats and Biota	Not applicable	Aquatic habitats limited to small unnamed stream that flows onsite and enters a subsurface conduit passing beneath the property. Biota in unnamed creek are primarily insect larvae and other invertebrates. Similar species are present in Patroon Creek together with fish species tolerant of water quality conditions typical of urban streams.	Central drainage ditch is intermittent drainage system and supports no significant aquatic biota. Lower estuaries of Fourmile and Sixmile Creek watersheds support a variety of fish and aquatic invertebrate species.
Threatened/Endangered Species	Not applicable	None inhabit Colonie property or its vicinity, although bald eagle and peregrine falcon may occur as occasional transients.	None
Critical Habitats	Not applicable	None	None
Wetlands	Not applicable	None	A state-designated wetlands area was identified on one of the NFSS VPs remediated between 1983 and 1986 (Property C). A wetlands delineation will be conducted at NFSS before the long-term cap is installed.
Floodplains	Not applicable	100-year flood boundary of Patroon Creek is south of Yardboro Avenue (water level of 200 ft). Colonie and its vicinity properties are not located within the 100-year floodplain of the creek.	None
Climate and Meteorology	Mean annual precipitation is 37.5 in., with average snowfall of 93 in. Winds predominantly from SW or W-SW across Lake Erie at average speed of 12 mph.	Typical of upstate New York. Average annual daily maximum temperature is 57.6°F; average daily minimum is 36.8°F. Average annual precipitation is 35.7 in.; average annual snowfall is 65.1 in. Area winds are predominantly from the S-SE to S and from the W to W-NW at a mean speed of 10 mph. Few air quality problems; most parameters well within NYS and federal ambient air quality standards.	Humid continental climate moderated by Lake Erie and Lake Ontario. Normal temperature range is 25-76°F with mean annual temperature of 48°F. Average annual precipitation is 33 in., with ~56 in. of snow. Wind predominantly from SW at 10-14 mph. Few high-intensity storm events.

Table 2.2 (continued)

State	New York		
Release Site	**Bliss and Laughlin Steel**	**Colonie**	**Niagara Falls Storage Site**
LAND USE			
Historic Site Use	Uranium metal rod machining/straightening operations in support of work for AEC (1952)	National Lead manufacturing operations using uranium and thorium (foundry operations, reactor fuel fabrication and processing, electroplating) (1958-84).	Storage of uranium processing residues (primarily pitchblende residues) and other radioactive wastes from other MED/AEC sites (1944-68)
Current Site Use	Industrial (cold-rolled steel processing facility)	Storage of radioactive materials from cleanup of vicinity properties. Prior to RCRA closure (1995), site was also used for storage of chemicals under RCRA Part A permit.	Long-term storage of radioactive residues, soils, and rubble within engineered waste containment structure (WCS)
Current Zoning	Industrial	Industrial	Industrial
Current Adjacent Property Use	Industrial	Mixed residential, commercial, and light industrial (see Figure 2.9). Small businesses along Central Avenue. Land use north of site primarily residential. Residential and commercial properties to south and east. Mixed commercial/industrial areas west and east. Conrail and Town of Colonie properties and a Niagara Mohawk Power Corp. electrical substation are immediately adjacent to site.	Varied uses including federal, municipal, rural/agricultural, residential, industrial, (see Figure 2.10) Bordered on north by chemical waste disposal facility, on east and south by solid waste disposal facility, and on west by Niagara Mohawk Power Corp. right-of-way. Nearest residential areas ~2/3 mile SW of site (primarily single-family dwellings).
Projected Future Site Use (Post-RA) [See also future use assumptions in Section 5.1 (Table 5.1)]	Industrial	Commercial, light industrial, recreational; consistent with current land use in surrounding area	Future use expected to remain long-term storage of radioactive material within engineered WCS
LOCAL/REGIONAL SOCIOECONOMIC AND CULTURAL FACTORS INFLUENCING SITE REMEDIATION STRATEGY			
Demography and Socioeconomics	Not applicable	Town of Colonie population ~76,500 (1990 census) Albany population 101,721 (1980 census)	Population Town of Lewiston: 16,200 (1980 census) Niagara County: 220,756 (1990 census). Total within 50-mile radius of site: >250,000 About 3/4 of Niagara County residents live in urban areas. Nearest major population centers are Niagara Falls and Buffalo metropolitan area.
Transportation			
Interstate Highways	I-90, I-290	I-87, I-90	I-90
Air	Buffalo Airport	Albany County Airport	Buffalo Airport
Rail	Conrail (no immediate site access)	Two main-line Conrail tracks immediately adjacent to southern site boundary.	Conrail
Water	Lake Erie	Hudson River	Lake Ontario

Table 2.2 (continued)

State	New York		
Release Site	**Bliss and Laughlin Steel**	**Colonie**	**Niagara Falls Storage Site**
Historical Resources	Not applicable	No structures onsite or in vicinity are potentially eligible for inclusion in National Register of Historic Places. Also, NYS Division of Historic Preservation determined that activities similar to proposed remedial action would not impact historic structures or archaeological sites.	NYS Division of Historic Preservation determined that structures proposed for demolition were not historically significant.
Archaeological Resources	No expected impacts on archaeological resources	No expected impacts on archaeological resources	No expected impacts on archaeological resources
FACILITIES AND INFRASTRUCTURE			
Buildings & Structures	Single large building (204,440-ft^2 floor area); special finishing area is ~2000 ft^2	Dismantlement of main plant building (former NL facility) virtually complete. (storage buildings???)	Buildings 401 (with adjacent silos), 403 (office building), small storage shed, storage building. Predominant onsite structure is 10-acre engineered WCS.
Onsite Storage Piles	None	None	None
Major Roads	I-90, I-290, US-62, State Routes 219, 198, 33, 400, Hopkins Street, Ridge Road	Central Avenue (State Route 5), I-87, I-90 (New York State Thruway), Western Avenue (US-20), Washington Avenue	I-90, U.S. Highway 104, State Routes 93, 18 (Creek Road), 61, 265, 31, Robert Moses Parkway, Pletcher Road, Lutts Road
Railroads	Conrail (no immediate site access)	Two main-line Conrail tracks and out-of-use siding track immediately adjacent to southern site boundary.	Conrail
Utilities	City water, electricity, and sewer	City water, electricity, natural gas. Decon water is collected in a tank, sampled for uranium, and hauled to a sewage treatment facility.	City water, electricity, and sewer
Erosion Controls	Not applicable	Underground storm drains that discharge to Patroon Creek. Stormwater regulated via a stormwater discharge permit	Onsite drainage ditches regulated via a stormwater discharge permit
Site Security	Building security provided by owner	Enclosed by chain-link fence; public access restricted.	Site is fenced and access is strictly controlled
REFERENCES	DOE 1992h, 1992i, 1992j; BNI 1995a, 1995i; ORISE 1992	ANL 1984a, 1988; Atcor 1978; BNI 1985c, 1985d, 1986d, 1986f, 1986g, 1988c, 1988d, 1989e, 1989f, 1989g, 1989h, 1989i, 1990d, 1990h, 1995a; SAIC 1993, 1995	Battelle 1981; BNI 1983b, 1984c, 1984d, 1985e, 1986j, 1986k, 1986l, 1986m, 1986n, 1986o, 1986p, 1986q, 1986r, 1986s, 1987d, 1987e, 1987g, 1989j, 1990j, 1991f, 1991g, 1992f, 1994d, 1995a, 1995d; ORISE 1995

The NFSS property currently includes a three-story building (Building 401) with three adjacent silos, an office building (Building 403), a small storage shed, and a storage building. All onsite and offsite areas of residual radioactivity above current guidelines were remediated between 1955 and 1992. Materials generated during remedial actions (approximately 255,000 yd^3) are encapsulated in an onsite waste containment structure (WCS) that covers 10 acres.

A portion of the wastes encapsulated in the WCS consisted of pitchblende residues from uranium processing operations. The wastes also included rubble and scrap from decommissioning activities, miscellaneous waste from the University of Rochester and Knolls Atomic Power laboratory, waste from Union Carbide's electrometallurgical operations, and residual radioactivity in soil from the site and vicinity properties. The most highly radioactive material included in the structure was K-65 residues, which resulted from the processing of high-grade African pitchblende ores. The average concentrations of radium-226 and thorium-230 in these residues are 520,000 pCi/g and 54,000 pCi/g, respectively. These wastes (approximately 4,000 yd^3) were placed in a former water treatment building specially prepared for the residues and were subsequently entombed as the waste containment structure was built around the building. These residues represent about 90 percent of the total radioactivity in the structure. The waste storage area currently has an interim cap with a design life of up to 50 years and is being used pending a decision on the permanent disposition of the K-65 residues.

2.2.2 Environmental Setting

The environmental setting of each New York site, including geology, hydrogeology, and water quality; ecological resources; and climate and meteorology, is summarized in Table 2.2. Site locations are shown in Figures 2.6 through 2.8.

2.2.3 Current Land Use

Table 2.2 includes a summary of current onsite and adjacent land use. Maps showing current land use in the vicinity of Colonie and the Niagara Falls Storage Site are provided in Figures 2.9 and 2.10.

2.2.4 Local and Regional Factors Influencing Remediation Strategy

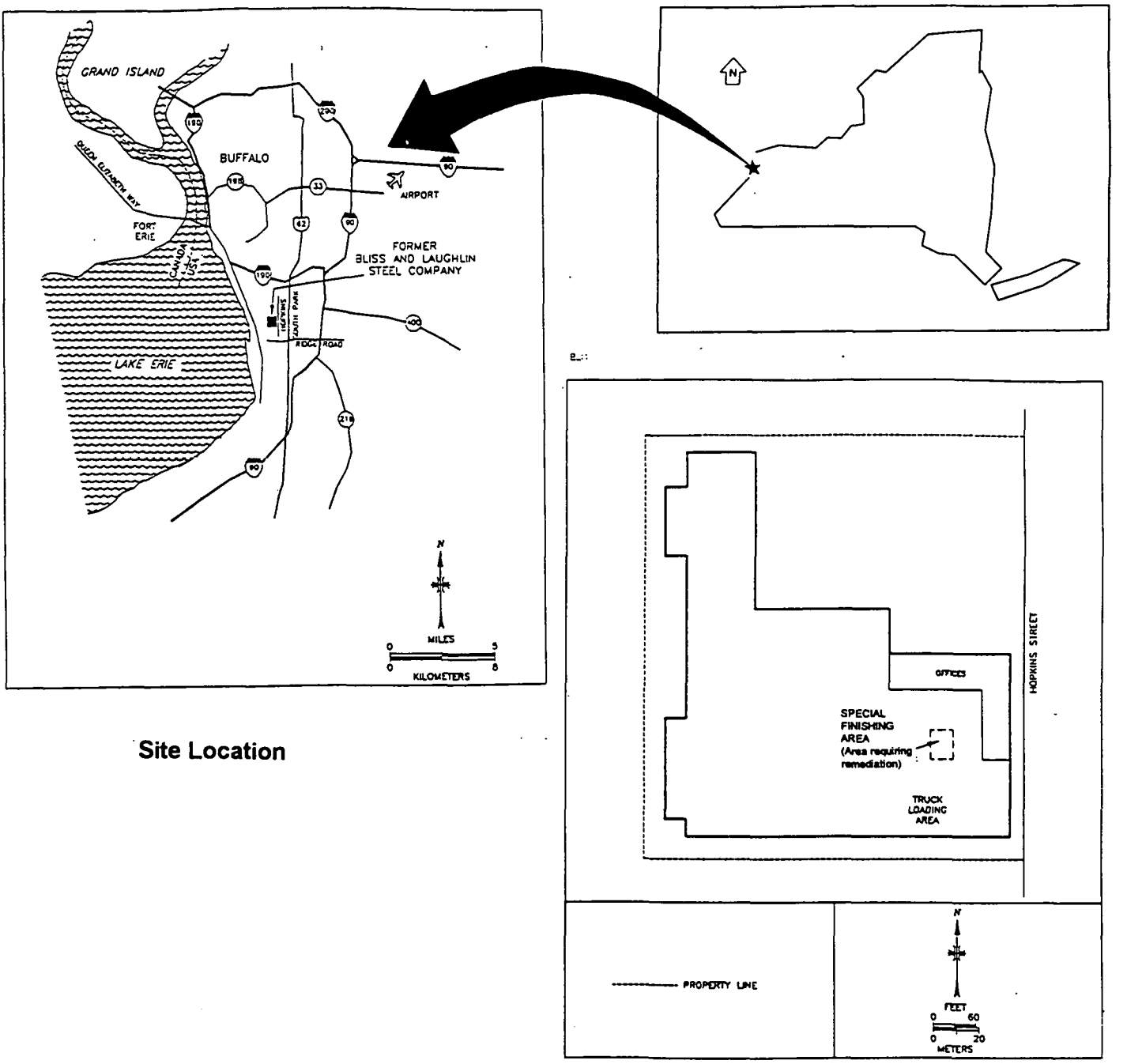
Socioeconomic, cultural, environmental, and other factors that may influence strategies for site remediation and risk management and stakeholder-based decisions regarding long-term land use are summarized in Table 2.2.

2.2.5 Facilities, Equipment, and Infrastructure

Facilities and infrastructure at the New York sites are identified in Table 2.2 and shown on site maps in Figures 2.6 through 2.8. The radiological status of buildings at these sites is summarized in Section 3 (see Table 3.3).

2.2.6 Projected Future Use of Land, Facilities, and Equipment

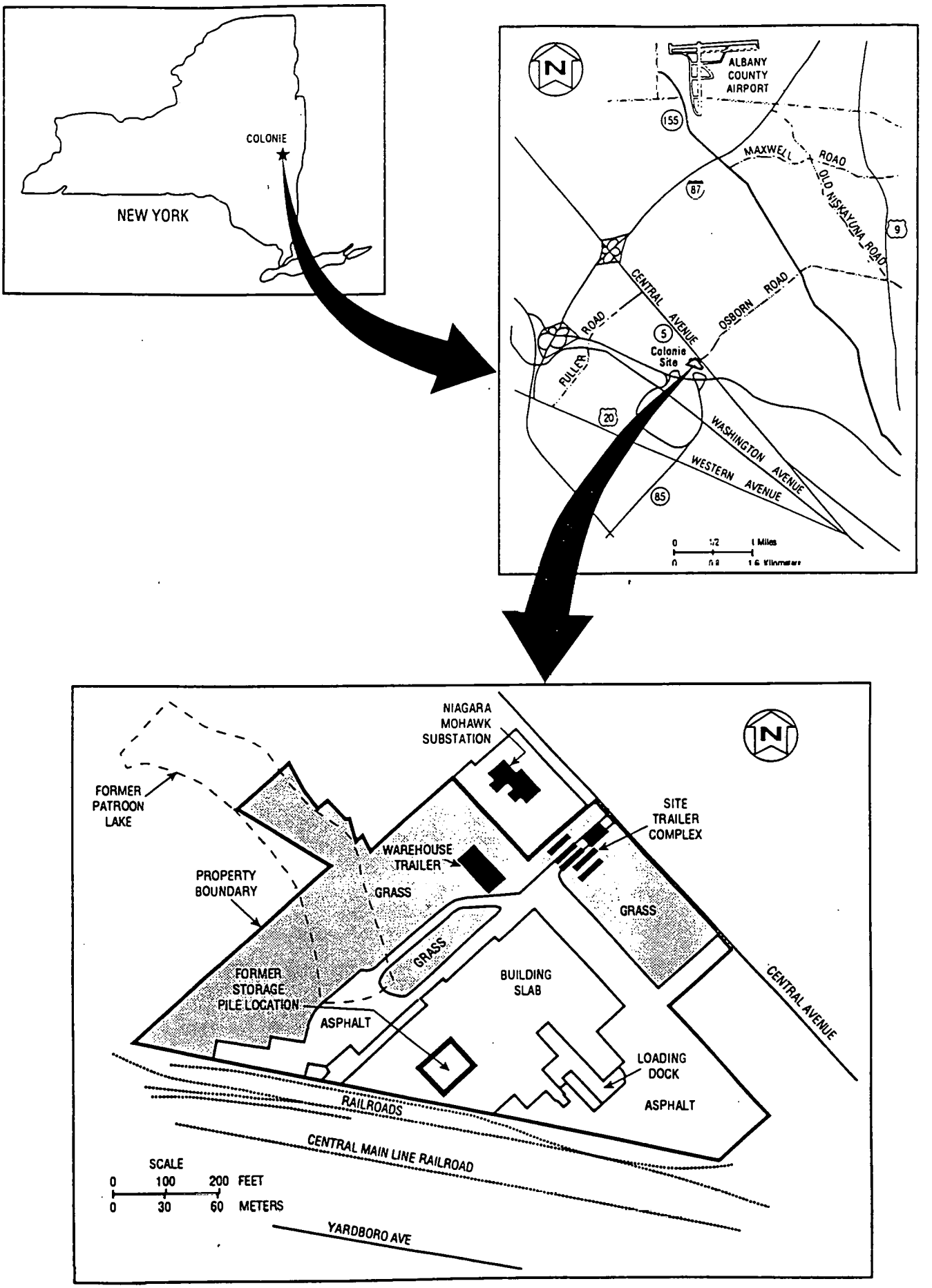
Projected future use of each property after site remediation is summarized in Table 2.2.



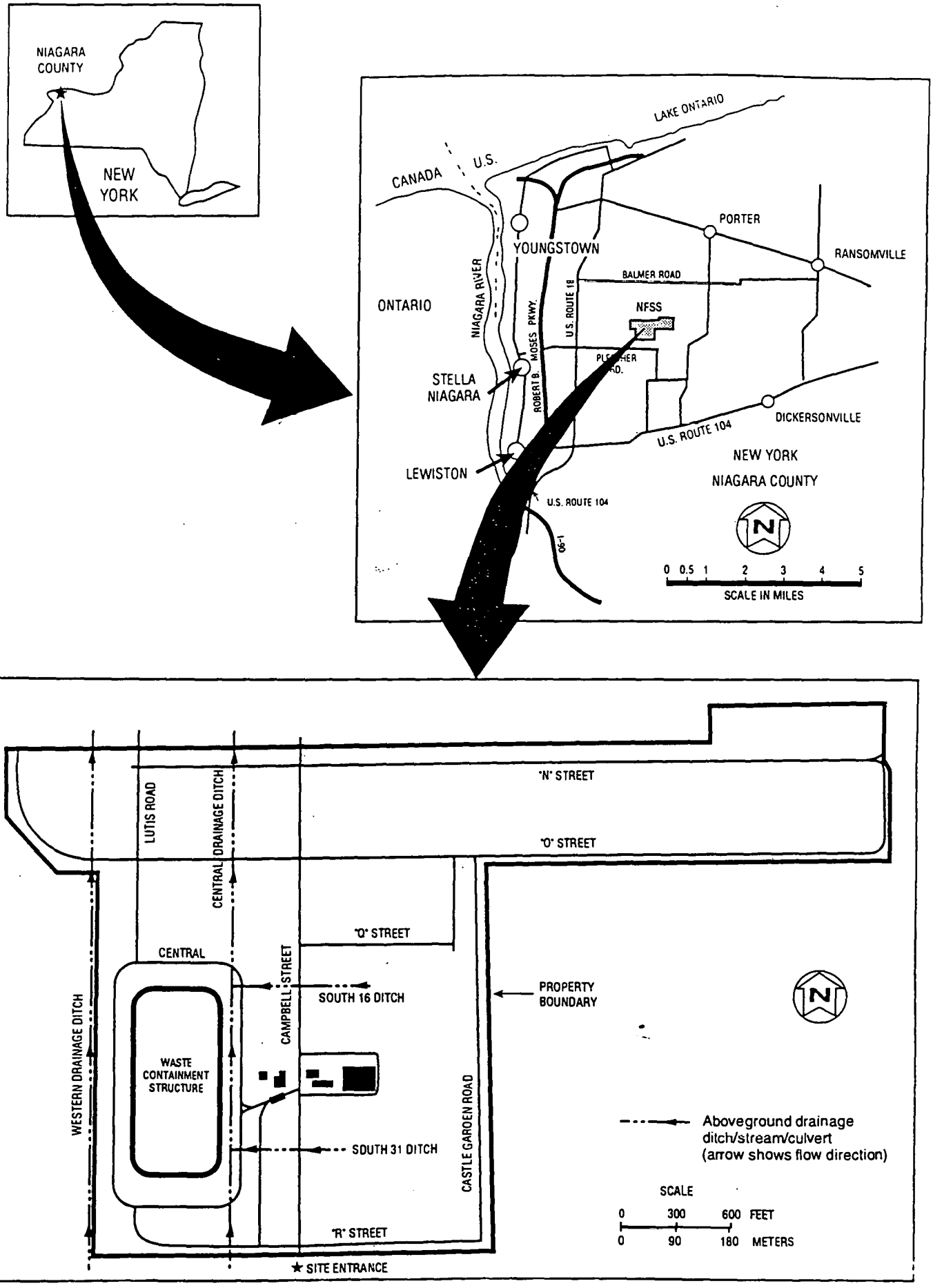
Site Location

Plot Plan

Figure 2.6 Location of Bliss and Laughlin Steel, Buffalo, New York



H2 4.6479.3A **Figure 2.7 Location of Colonie, Colonie, New York**



H2 4.6479.4

Figure 2.8 Location of Niagara Falls Storage Site Lewiston, New York

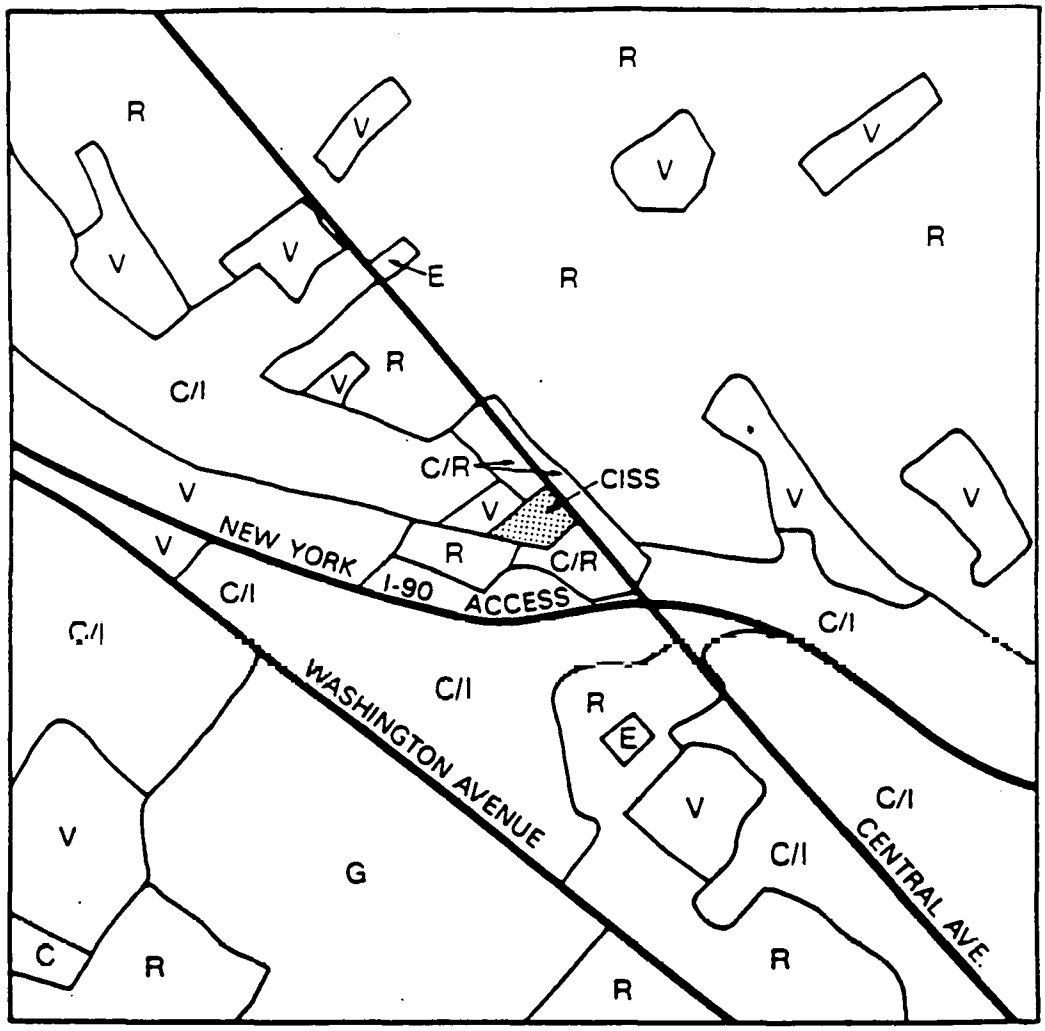
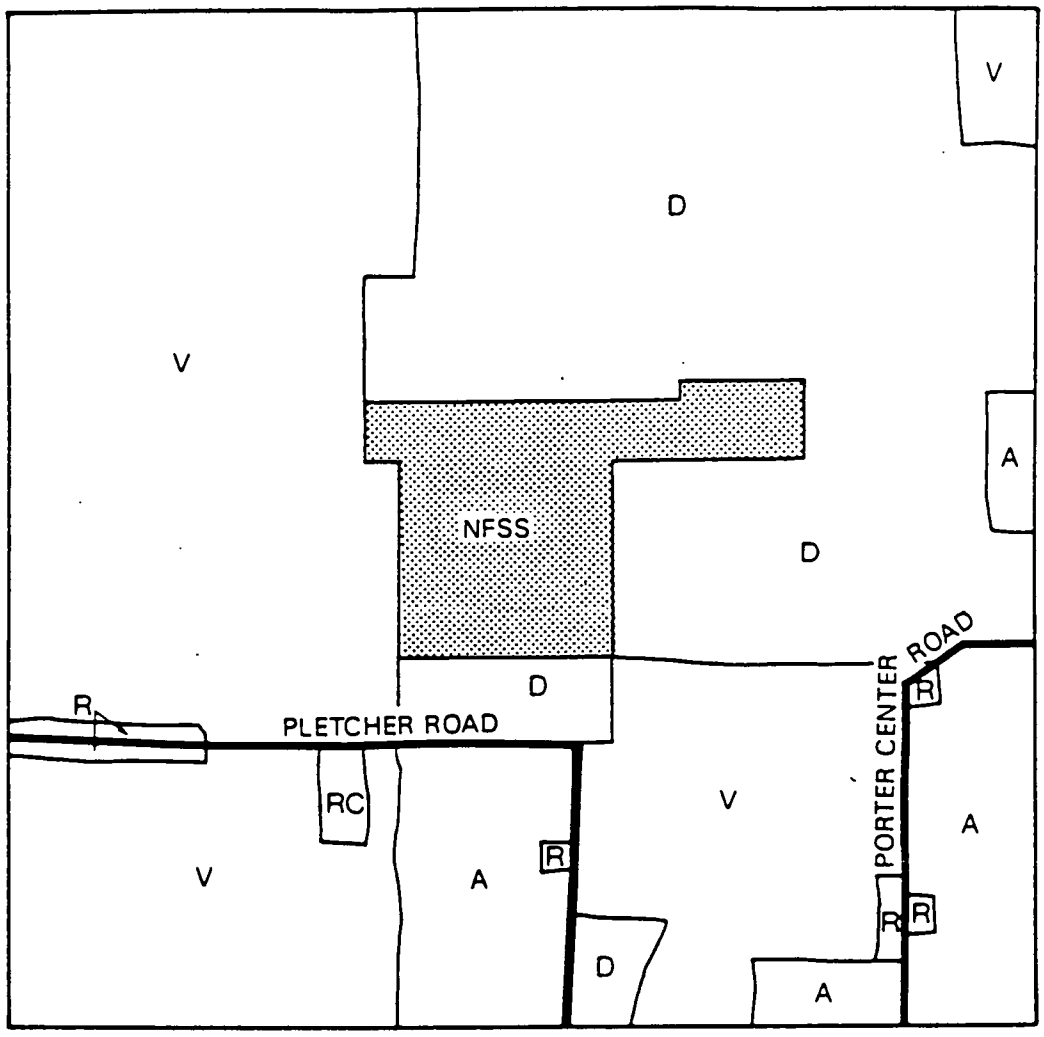


Figure 2.9 Generalized Land Use in the Vicinity of Colonie



BASED ON AERIAL PHOTOGRAPHS, SITE VISITS, AND USGS TOPOGRAPHIC MAP, 1:24000 SCALE, RANSOMVILLE QUADRANGLE, (PHOTO REVISED 1980)

R RESIDENTIAL
RC RECREATIONAL
A AGRICULTURAL
D WASTE DISPOSAL
V VACANT

N

0 0.5 MI
0 0.8 KM

Figure 2.10 Generalized Land Use in the Vicinity of the Niagara Falls Storage Site (NFSS)

2.3 SITES IN ILLINOIS AND OHIO

2.3.1 Operational History

The operational history of the sites in Illinois and Ohio covered by this MAP document, including previous and current site ownership, historic site use, and historic origin of contamination, is summarized in Table 2.3 and discussed briefly below.

Madison

Low-level radioactive contamination (estimated at 10 yd^3) found in dust on roof support beams at the Madison site originated from uranium extrusion and rod-straightening work conducted by the Dow Metal Products Division of Dow Chemical Company during the 1950s and 1960s. Dow operated under subcontract to Mallinckrodt Chemical Company, a prime AEC contractor, and supplied materials (chemicals, induction heating equipment, and magnesium metal products) and services under purchase orders issued by Mallinckrodt. The site was included in FUSRAP in 1992.

B&T Metals

In February 1943, B&T Metals was contracted by DuPont, acting as an agent for MED, to extrude rods from uranium metal billets. Production-scale extrusion began in March and continued through August 1943. The work for MED was conducted in the northwestern corner of the main office building. Equipment used in uranium processing was sold or removed. The site was included in FUSRAP in 1992 based on identification of uranium-238 onsite during the designation survey (ORNL 1990b; BNI 1995a).

Luckey

Chemical and low-level radioactive contamination at the Luckey site consists of beryllium ore and production residues and traces of radium and uranium. The estimated total waste volume is 34,500 yd^3. The site was formerly occupied by the plants of the Magnesium Reduction Corporation, the Diamond Magnesium Company, and the Brush Beryllium Company. Contamination originated from beryllium processing operations conducted by Brush Beryllium under contract to AEC from 1942 to 1959. It is estimated that the plant produced between 40,000 and 144,000 lb of beryllium during this period. Waste solutions and precipitated sludges from beryllium processing were impounded in three lagoons, formed by excavating the top layer of soil and using the soil to construct dikes. During processing of magnesium by Diamond Magnesium Company, approximately 1,000 tons of scrap steel contaminated with fission products was received at the site. After the plant closed in 1959, hazardous sludge and contaminated soils from the lagoons were moved to an 8.5-acre dike-enclosed onsite landfill that was later capped, graded, and seeded. The facility changed ownership several times before it was transferred to the present owner, Uretech Corporation. The Luckey site was designated for cleanup under FUSRAP in 1992.

Painesville

About one-third of the Painesville site, formerly owned by the Diamond Magnesium Company, was originally covered by large buildings and rail lines. Some of the original buildings have been removed, but others are still in use by the current owners, the Uniroyal Chemical Company and the Lonza Chemical Company. The property also contains a waste lake west of the buildings and several lagoons formerly used for sludge and equalization. Low-level radioactive contamination at the Painesville site originated from approximately 800 tons of radioactively contaminated scrap steel that was shipped by AEC from the Lake Ontario Storage Area to Diamond Magnesium for use in magnesium production processes.

Table 2.3 Site Description: FUSRAP Sites in Illinois and Ohio

State	Illinois	Ohio		
Release Site	**Madison**	**B&T Metals**	**Luckey**	**Painesville**
ADS No.	OR-1300-AA	OR-1300-AA	OR-1300-AA	OR-1300-AA
WBS No.	1.4.11.1.4 (107)	1.4.11.1.4 (113)	1.4.11.1.4 (111)	1.4.11.1.4 (112)
Remedial Action Status	Planning/Preliminary survey	Characterization completed ahead of schedule in December 1995. Remedial action to be initiated in March 1996 and completed before end of fiscal year.	Planning/Preliminary characterization	Planning/Preliminary characterization
Vicinity Properties	None	None	None	None
OPERATIONAL HISTORY				
Historic Origin of Contamination	Uranium extrusion/rod straightening operations for MED/AEC (AEC work subcontracted by Mallinckrodt) (1950s-1960s)	Uranium rod extrusion (MED work subcontracted by DuPont) (1943)	Beryllium ore and production residues and traces of uranium from beryllium and uranium processing under MED/AEC contract (1942-49)	Uranium-contaminated scrap steel shipped by AEC from Lake Ontario Storage Area for use in magnesium production processes (1950s)
Owner/Landlord				
Historic	Dow Chemical Company	B&T Metals	Brush Beryllium Company (1942-49); Diamond Magnesium Company, Magnesium Reduction Corporation, Motor Wheel Corporation (Goodyear subsidiary)	Diamond Magnesium Company
Current	Spectrulite Consortium	B&T Metals	Uretech International	Uniroyal Chemical Company
ENVIRONMENTAL SETTING				
Location	College and Weaver Streets, Madison, IL (Madison County) Located across Mississippi River from St. Louis, Missouri See Figure 2.11.	425 West Town Street, Columbus, OH (Franklin County) Southwestern side of Columbus See Figure 2.12.	21200 Luckey Road, Luckey, OH (Wood County) ~22 miles SE of Toledo, ~1 mile N of Luckey town center See Figure 2.13.	720 Fairport-Nursery Road, Painesville, OH (Lake County) ~22 miles NE of Cleveland See Figure 2.14
Site Area	735 acres (building complex ~33.5 acres)	1 acre (~1 city block)	~40 acres	150 acres
Topography	Flat, urban industrial area	Flat, urban city block	Flat, rural farmland area	Industrial area overlooking Lake Erie
Geology	Not determined	Not determined	Not determined	Not determined
Hydrogeology and Water Quality				
Aquifers	Not determined	Not determined	Not determined	Not determined
Potable Water Sources	City water	City water	Not determined	Not determined
Groundwater Flow	Not determined	Not determined	Not determined	Not determined
Dominant Surface Water Features	Mississippi River, Chain of Rocks Canal, Horseshoe Lake	Scioto River	Toussaint Creek borders site on north Sandusky River, Lake Erie	Lake Erie

Table 2.3 (continued)

State	Illinois	Ohio		
Release Site	**Madison**	**B&T Metals**	**Luckey**	**Painesville**
Site Drainage	Stormwater runoff to municipal sewer	Stormwater runoff to municipal sewer	Stormwater flow to adjacent creek	Surface soil and fill have low water retention.
Ecological Resources				
Terrestrial Habitats and Biota	Industrial area -- small mammals, birds, etc.	Urban setting -- biota limited to species adapted to urban encroachment	Numerous open areas are vegetated, mostly with grasses and brush.	Industrial area -- small mammals, birds, etc.
Aquatic Habitats and Biota	None	None	Not determined	Not determined
Threatened/Endangered Species	None	None	Not determined	Not determined
Critical Habitats	None	None	Not determined	Not determined
Wetlands	Not determined	None	Not determined	Not determined
Floodplains	None	None	Not determined	Not determined
Climate and Meteorology	Moderate	Moderate	Moderate	Moderate
LAND USE				
Historic Site Use	Uranium extrusion/rod straightening operations for MED/AEC (AEC work subcontracted by Mallinckrodt, 1950s-1960s)	Metal extrusion operations including uranium rod extrusion (MED work subcontracted by DuPont, 1943)	Beryllium and uranium processing under MED/AEC contract (1942-49)	Magnesium processing including work for AEC (1950s)
Current Site Use	Industrial (metal extrusion and machining facility)	Industrial (metal extrusion and machining facility)	Industrial facility	Industrial (chemical processing facility)
Current Zoning	Industrial	Industrial	Industrial	Industrial
Current Adjacent Property Use	Industrial	Industrial	Industrial/agricultural (Adjacent property on north leased for farming)	Industrial
Projected Future Site Use (Post-RA) [See also future use assumptions in Section 5.1 (Table 5.1)]	Industrial	Industrial	Industrial	Industrial/commercial
LOCAL/REGIONAL SOCIOECONOMIC AND CULTURAL FACTORS INFLUENCING SITE REMEDIATION STRATEGY				
Demography and Socioeconomics				
Transportation				
Interstate Highways	I-70, I-40, I-270	I-70, I-71, I-270	I-75, I-80/90	I-90
Air	Lambert-St. Louis International Airport			
Rail				
Water	Mississippi River			

Table 2.3 (continued)

State	Illinois	Ohio		
Release Site	**Madison**	**B&T Metals**	**Luckey**	**Painesville**
Historical Resources	Not determined	Not determined	Not determined	Not determined
Archaeological Resources	Not determined	Not determined	Not determined	Not determined
FACILITIES AND INFRASTRUCTURE				
Buildings & Structures	Large, multisectioned complex of 10 interconnecting buildings with total area under roof ~ 33.5 acres. Uranium extrusion occurred in Building 6 (large multistory metal building currently used in aluminum and magnesium metal extrusion processes). Much of building area is used for equipment and parts storage. See Table 3.4 for radiological status of Building 6.	Buildings and property cover most of a city block. Buildings include main office, storage building, extrusion building. Work for MED was in northwest corner of main office building. See Table 3.4 for radiological status of buildings.	Facility structures include large production building, warehouse, and related buildings; rail lines, and utility buildings. See Table 3.4 for radiological status of buildings.	Several large buildings cover ~1/3 of property. Some of original Diamond Magnesium Company plant facilities still used by Uniroyal. Waste lake is west of buildings. Butadiene storage tank surrounded by earthen dike is west of buildings. Overhead pipe rack system leads eastward from butadiene tank to railroad tank cars and then to other storage tanks nearer buildings. Spill containment area along railroad tracks between butadiene tank and sewer ditch. Fire water lines buried to depth of ~3 ft in grassy area between dike and spill containment area. See Table 3.4 for radiological status of Buildings 420, 421, and 422.
Onsite Storage Piles	None	None	None	None
Major Roads	I-70, I-40, I-270, US-40, State Routes 3, 203, College Street, Weaver Street, State Street	I-70, I-71, I-270, US-62, US-23	I-75, I-80/90, I-280, US-20, US-6, US-23, Luckey Road (State Route 583), Gilbert Road	I-90, US-20, State Route 2
Railroads	No	No	Bordered on east by Conrail (formerly New York Central Railroad)	F.P.&E. Railroad tracks onsite
Utilities	Gas, electric, telephone, sewer	Gas, electric, telephone, sewer	Gas, electric, telephone, sewer	Gas, electric, telephone, sewer
Erosion Controls	Not applicable	Not applicable	Vegetation	Vegetation
Site Security	Fence surrounding site	Facility building security	Fence separating site from adjacent property leased for farming	Chain-link fence with barbed wire
REFERENCES	ORNL 1990a; BNI 1995a	ORNL 1990b; BNI 1995a, 1995b; DOE 1991a, 1991b	Ohio EPA 1984; Ohio Dept. of Health 1988; ORNL 1990c; DOE 1991c, 1991d, 1992d; BNI 1995a; Brush Wellman 1983; Goodyear 1988; Mansdorf 1987a, 1987b; Weston 1989, 1990	ORNL 1990d, 1991; DOE 1992e, 1992f, 1992g; BNI 1995a

Scrap steel that was not used immediately was stored in an area on the western side of the property, near the railroad tracks, and possibly at other onsite locations. The radioactive contamination was incidental to the use of the scrap metal, which was generated from discarded iron drums previously used to store uranium compounds associated with pitchblende operations. The site was included in FUSRAP in 1992.

2.3.2 Environmental Setting

The environmental setting of each site, including geology, hydrogeology, and water quality; ecological resources; and climate and meteorology, is summarized in Table 2.3. Site locations are shown in Figures 2.11 through 2.14.

2.3.3 Current Land Use

Table 2.3 includes a summary of current onsite and adjacent land use. Maps showing current land use are not currently available for these sites.

2.3.4 Local and Regional Factors Influencing Remediation Strategy

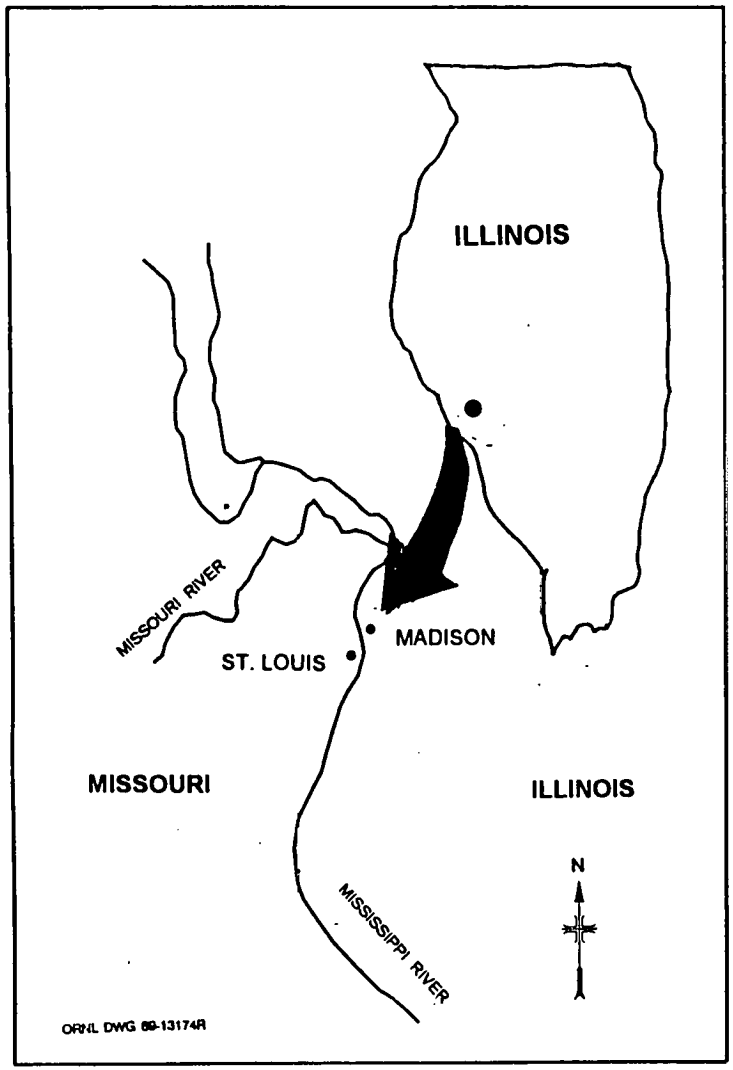
Socioeconomic, cultural, environmental, and other factors that may influence strategies for site remediation and risk management and stakeholder-based decisions regarding long-term land use are summarized in Table 2.3.

2.3.5 Facilities, Equipment, and Infrastructure

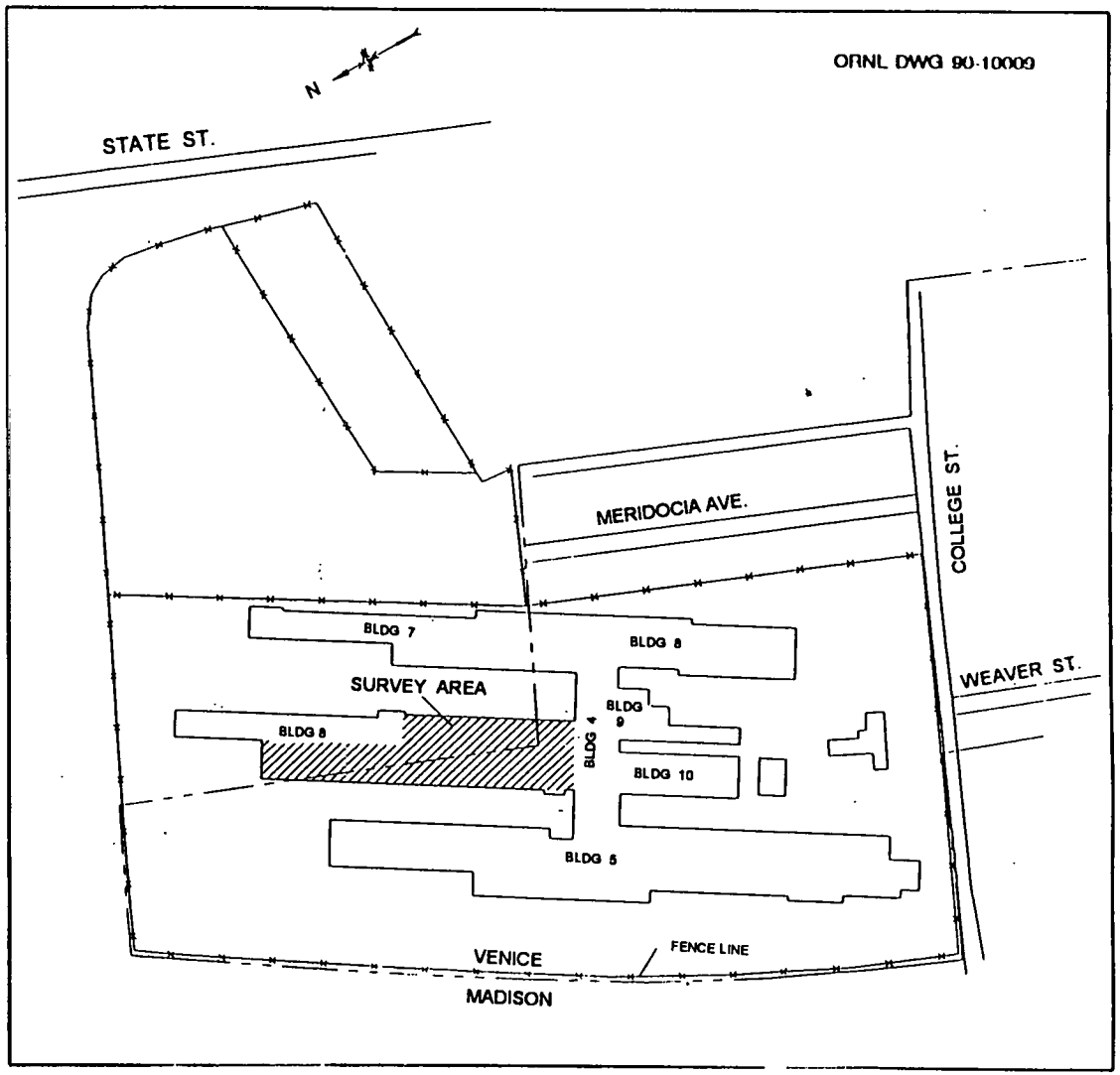
Facilities and infrastructure are identified in Table 2.3 and shown on site maps in Figures 2.11 through 2.14. The radiological status of buildings at these sites is summarized in Section 3 (see Table 3.4).

2.3.6 Projected Future Use of Land, Facilities, and Equipment

Projected future use of each property after site remediation is summarized in Table 2.3.



Geographic Location of the Madison Site
[Spectrulite Consortium, Inc. (formerly Dow Chemical Company Site)]



Plan View of the Madison Site
(Shading indicates area surveyed in Building 6)

Figure 2.11 Location of Madison, Madison, Illinois

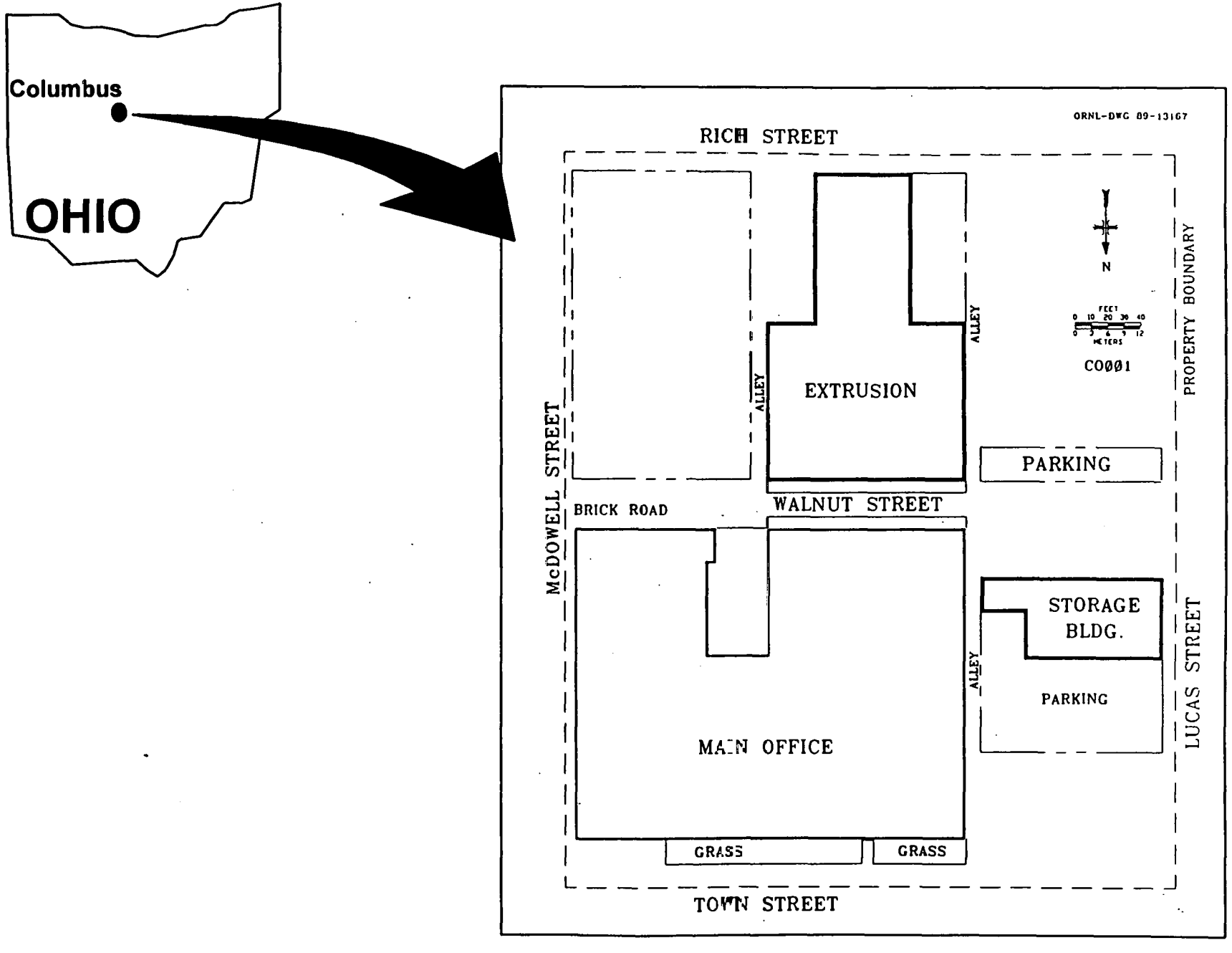


Figure 2.12 Location of B&T Metals, Columbus, Ohio

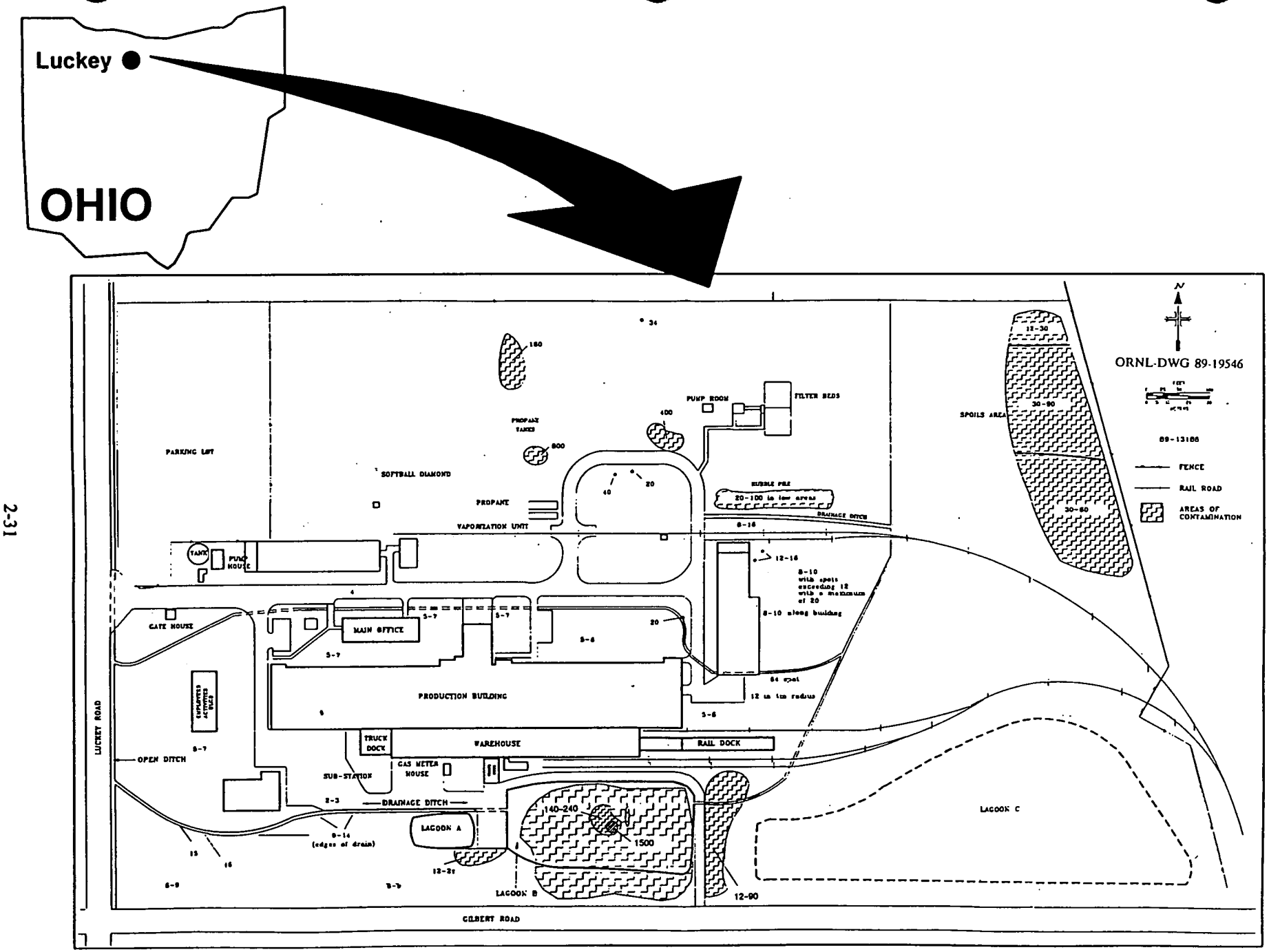


Figure 2.13 Location of Luckey, Luckey, Ohio

Q.MAP_DOCU.8

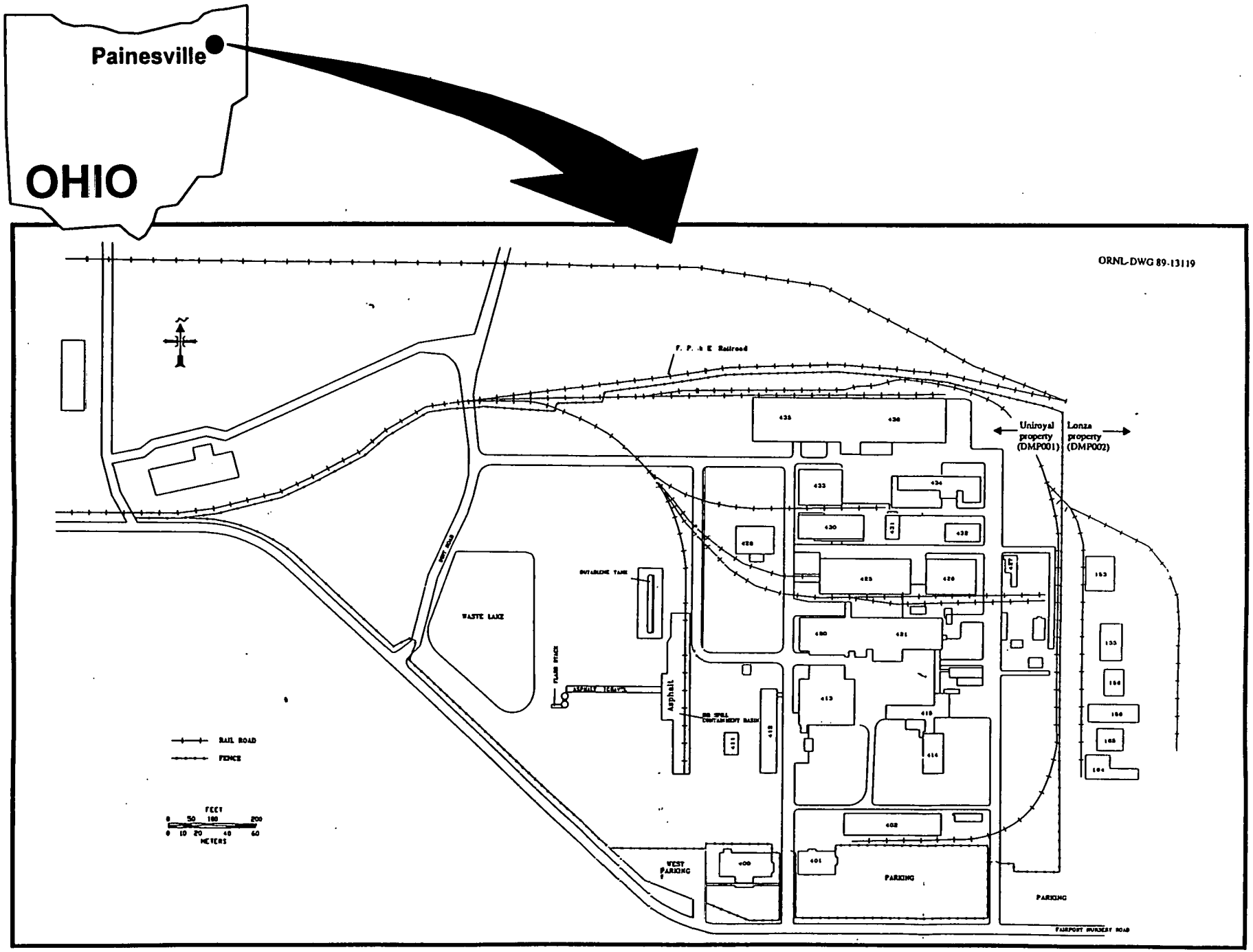


Figure 2.14 Location of Painesville, Painesville, Ohio

2.4 SITES IN CONNECTICUT, MARYLAND, AND MASSACHUSETTS

2.4.1 Operational History

The operational history of the sites in Connecticut, Maryland, and Massachusetts covered by this MAP document, including previous and current site ownership, historic site use, and historic origin of contamination, is summarized in Table 2.4 and discussed briefly below.

CE

During the 1940s and 1950s, the CE facility supplied non-nuclear components for reactor projects managed by AEC. In 1955, new contracts led to the use of highly enriched uranium (i.e., uranium enriched to more than 20% in the isotope uranium-235). Since the 1960s, the facility has been authorized under license to the Nuclear Regulatory Commission (NRC) to fabricate low-enriched uranium for light-water moderated power reactors and to conduct research and development activities on light-water reactor fuel. The facility's fuel production operations were shut down in 1993, but research and development activities continue (BNI 1995a). The site was included in FUSRAP in 1994. CE is currently undergoing decontamination and decommissioning of plant facilities where fuel production took place and has submitted a plan for these activities to NRC. Although the site is designated for cleanup under FUSRAP, the extent of DOE's responsibility for site cleanup is limited to uranium enrichments of 20% or greater.

W.R. Grace & Company

Chemical processing operations have been conducted at the W.R. Grace site since 1909 (BNI 1990). During World War II, the facility participated in the Manhattan Project and manufactured explosives. Radioactive residues generated as a result of these activities were excavated under order of the Maryland Water Resources Administration and transported to Barnwell, South Carolina, for disposal (NUS 1984; BNI 1989). Processing of radioactive materials at the site began in July 1955, when Rare Earths, Inc. (the predecessor of W.R. Grace & Company), contracted with AEC to process approximately 8,000 tons of AEC-owned monazite sand ore to recover thorium.

In 1956, the AEC contract and Rare Earths' license to possess, transfer, and use radioactive thorium were transferred to W.R. Grace & Company. The facility where thorium processing took place (Building 23) operated until late spring of 1957, when W.R. Grace and AEC agreed to terminate the contract, effective January 31, 1958. The remaining unprocessed monazite sand ore was shipped to another W.R. Grace facility in Wayne, New Jersey. AEC retained title to the monazite ore for the duration of the contract (BNI 1989).

Thorium processing resulted in approximately 36,000 yd^3 of radioactively contaminated material including process residues containing traces of thorium and uranium compounds. These wastes and other contaminated materials such as filter cloths and miscellaneous equipment were buried onsite at various depths over a 4-acre area used as a landfill for radioactive waste and for general waste including rock, refuse, and dredge soil. The 4-acre radioactive waste disposal area was designated for remedial action under FUSRAP in 1980. Access to the designated cleanup area is controlled (BNI 1995a).

Shpack Landfill

The Shpack Landfill began operating as a private landfill in the early 1960s and received both industrial and domestic wastes. The landfill was closed in 1965 under court order. In 1978, NRC was contacted by a concerned citizen who had detected elevated radiation levels at the site. NRC investigated and confirmed the presence of radioactivity in excess of natural background levels for the area. Exactly when radioactive materials were deposited at the site is not known; however, NRC determined that the Texas Instruments Plant (formerly M&C Nuclear, Inc.) of the adjacent Town of Attleboro had used the landfill

Table 2.4 Site Description: FUSRAP Sites in Connecticut, Maryland, and Massachusetts

State	Connecticut	Maryland	Massachusetts	
Release Site	**CE**	**W.R. Grace & Company**	**Shpack Landfill**	**Ventron**
ADS No.	OR-1300-AA	OR-1300-AA	OR-1300-AA	OR-1300-AA
WBS No.	1.4.11.1.4 (136)	1.4.11.1.4 (110)	1.4.11.1.4 (125)	1.4.11.1.4 (127)
Remedial Action Status	Planning/Preliminary characterization	Planning/Preliminary characterization	Partial characterization Partial RA Characterization and remedial action to be completed during FY 1996	Partial characterization Partial RA Characterization and remedial action to be completed during FY 1996
Vicinity Properties	None	None	None	None
OPERATIONAL HISTORY				
Historic Origin of Contamination	Highly enriched uranium (HEU) machining/ fabrication for AEC (1940s-60s) Supplied non-nuclear components for AEC nuclear projects 1940s-50s HEU fuel fabrication work 1955-67	Processing/recovery of thorium and rare earth elements from AEC-owned monazite ore (1955-58)	Radioactive materials disposal in private landfill (early 1960s). Landfill closed 1965.	Conversion of uranium oxide to uranium metal powder; uranium recovery from fuel fabrication plant scrap/turnings by Metal Hydrides Corporation under contract to MED/AEC (1942-48)
Owner/Landlord				
Historic	CE (Combustion Engineering)	Rare Earths, Inc./W.R. Grace & Company	Mrs. Isadore Shpack (sold to Town of Norton 1981)	Metal Hydrides Corporation (became Ventron Corporation 1965; sold to Morton Thiokol 1976)
Current	CE	W.R. Grace & Company (Davison Chemical Division)	Town of Norton, Massachusetts	Morton International (formerly Morton Thiokol)
ENVIRONMENTAL SETTING				
Location	Prospect Hill Road, Windsor, CT (Hartford County) Located in mixed industrial and residential area ~3 miles southwest of Bradley International Airport and ~10 miles north of Hartford. Bordered on the east by I-91. See Figure 2.15	5500 Chemical Road, Baltimore, MD (Curtis Bay) (Baltimore County) Located on an industrialized peninsula in south Baltimore. Bordered on north by Curtis Bay, on west by Curtis Creek, on east by Patapsco River, and on south by Baltimore Municipal Landfill. See Figure 2.16	Peckham and Union Roads, Norton, MA (Bristol County) Located in corporate limits of Norton and Attleboro, ~40 miles southwest of Boston. Bordered on northwest by Peckham Road, on north by Union Road, on south and west by Attleboro Landfill, and on east by open fields. See Figure 2.17	Congress Street, Beverly, MA (Essex County) Located at confluence of Bass and Danvers Rivers, ~15 miles northeast of Boston. Adjoins residential area to north and Boston and Maine Railroad to east. See Figure 2.18
Site Area	1,100 acres	90 acres	8 acres	3 acres
Topography	Waste storage pad area at interior of site has slightly sloping terrain. Drum burial pit has level terrain located between two steep embankments	Gently sloping from southeast to northwest; southern end of disposal area is ~30 ft above northern end.	Gently sloping from southeast to northwest; southern end of disposal area is ~30 ft above northern end	Granitic bedrock beneath site slopes sharply from 5 to 30 ft (depth ~5 ft beneath office buildings and ~ 25-30 ft at sea wall.
Geology		Extensive fill from past facility operations overlies original terrain to depths up to 25 ft.	Area is dominated by glacial deposits (15-25 ft in thickness) overlying bedrock. Organic deposits overlie glacial deposits in some areas.	Site soil consists mainly of imported fill, primarily coarse gravel and sand, overlying granitic bedrock.

Table 2.4 (continued)

State	Connecticut	Maryland	Massachusetts	
Release Site	**CE**	**W.R. Grace & Company**	**Shpack Landfill**	**Ventron**
Hydrogeology and Water Quality				
Aquifers		Patapsco aquifer; Patpapsco formation supplies water for industrial uses in Annapolis and five other neighboring towns.	Area groundwater produced from both bedrock and superficial aquifers.	Groundwater is brackish to salty; level is determined by the tide.
Potable Water Sources				
Groundwater Flow		Patapsco aquifer separated from contaminated fill in 40-aere waste management area by a sand layer overlying a clay layer that is believed to prevent groundwater recharge from the contaminated area. Perched water table ~15 ft below surface flows laterally into Curtis Bay. Proximity to Curtis Bay also makes area susceptible to tidal effects.		
Dominant Surface Water Features	An onsite brook runs east to west along north side of site, eventually joining Farmington River.	Curtis Bay borders site on north Curtis Creek borders site on west Patapsco River borders site on east	Chartley Brook, Chartley Pond	Bass River, Danvers River, Beverly Harbor, Massachusetts Bay, Atlantic Ocean
Site Drainage		Little potential for lateral or vertical contaminant migration to adjacent soil or water because of nature of underlying soils and topography. Rocky, barren substrate of the area makes erosion unlikely.	Area is swampy and partially covered with water part of the year. Surface water runoff drains offsite into Chartley Pond.	
Ecological Resources				
Terrestrial Habitats and Biota	Site includes various wooded areas and three ponds. Waste storage pad area in interior of site is lightly wooded.	4-acre radioactive waste disposal area is overgrown with sapling trees, grasses, and weeds. Bordered on the west by dense woods and heavy undergrowth and on north by woods with heavy undergrowth and drop-off to marshy plateau where rocks and debris from sunken ships form a seawall.		
Aquatic Habitats and Biota				
Threatened/Endangered Species				
Critical Habitats				
Wetlands				
Floodplains				
Climate and Meteorology		Normal monthly temperature range is 33-77°F; mean annual temperature is 55°F. Average annual precipitation 42 in. Winds predominantly from west at 8-11 mph.		

Table 2.4 (continued)

State	Connecticut	Maryland	Massachusetts	
Release Site	**CE**	**W.R. Grace & Company**	**Shpack Landfill**	**Ventron**
LAND USE				
Historic Site Use	Highly enriched uranium (HEU) machining/ fabrication for AEC (1940s-60s) Supplied non-nuclear components for AEC nuclear projects 1940s-50s HEU fuel fabrication work 1955-67	Processing/recovery of thorium and rare earth elements from AEC-owned monazite ore (1955-58)	Radioactive materials disposal in private landfill (early 1960s). Landfill closed 1965.	Conversion of uranium oxide to uranium metal powder; uranium recovery from fuel fabrication plant scrap/turnings by Metal Hydrides Corporation under contract to MED/AEC (1942-48)
Current Site Use	Industrial (research and development facility)	Industrial (operating chemical processing facility)	No longer used as landfill; unused pending remediation by other PRPs	Industrial (operating research and development facility undergoing closure)
Current Zoning	Industrial	Industrial	Industrial	Industrial
Current Adjacent Property Use	Located in mixed industrial and residential area ~3 miles southwest of Bradley International Airport. Bordered on the east by I-91.	Located on an industrialized peninsula in south Baltimore. Bordered on north by Curtis Bay, on west by Curtis Creek, on east by Patapsco River, and on south by Baltimore Municipal Landfill.	Area is undeveloped. Adjacent properties include Attleboro Landfill and open fields. No commercial, industrial, or major residential areas in vicinity of site.	Adjacent properties include residential area to north and Boston and Maine Railroad to east.
Projected Future Site Use (Post-RA) [See also future use assumptions in Section 5.1 (Table 5.1)]	Industrial	Industrial	Depends on record of decision (expected 1999). Industrial use is likely based on current zoning.	Not yet determined. Industrial use is probable, although residential use is possible. Site owner wants property decontaminated for use with no radiological restrictions.
LOCAL/REGIONAL SOCIOECONOMIC AND CULTURAL FACTORS INFLUENCING SITE REMEDIATION STRATEGY				
Demography and Socioeconomics				
Transportation				
Interstate Highways	I-91	I-695 is 0.5 mile south of contaminated area onsite. I-95, I-70	I-95, I-93, I-495	I-95, I-93
Air	Bradley International Airport	Baltimore International Airport	Logan International Airport	Logan International Airport
Rail				Boston and Maine Railroad
Water	Connecticut River	Patapsco River, Chesapeake Bay	Atlantic Ocean (~40 miles)	Bass and Danvers Rivers, Beverly Harbor, Massachusetts Bay, Atlantic Ocean
Historical Resources				
Archaeological Resources				

Table 2.4 (continued)

State	Connecticut	Maryland	Massachusetts	
Release Site	**CE**	**W.R. Grace & Company**	**Shpack Landfill**	**Ventron**
		FACILITIES AND INFRASTRUCTURE		
Buildings & Structures	More than a dozen onsite buildings with several smaller support facilities. Building 3 historically was used for uranium fuel fabrication. Building 5 was used for AEC contract work, and Building 6 was used as a waste dilution and pumping facility for monitoring and treatment of liquid radwaste streams from Buildings 3 and 5. Buildings 3 and 5 currently support research and development projects; no radioactive waste systems are in use. See Table 3.5 for radiological status of buildings.	Northwest section of Grace property contains chemical processing facilities including Building 23 (used for thorium processing; only known radioactively contaminated building onsite). See Table 3.5 for radiological status of Building 23.	No onsite structures. Surface is covered with debris including metal scrap, brick, concrete blocks, metal drums, and plastics.	Buildings and other structures cover ~2/3 of site. Three buildings used for MED/AEC work; 2 wooden foundry facilities demolished 1948-50 and replaced. Remaining original building contained furnace and leaching facilities, mixing room, drying room, and analytical laboratory. See Table 3.5 for radiological status of buildings.
Onsite Storage Piles	None	None	None	None
Major Roads	I-91, I-84, US-5, US-44, State Routes 20, 168	I-695, I-95, I-83, I-70, State Route 45, Chemical Road, Hawkins Point Road	I-95, I-93, I-90, US-1, State Road 123, Peckham Street, Union Street, North Worchester Street	I-95, I-495, I-93, US-1, State Roads 128, 97, 127, 114, Congress Street
Railroads		2 railroad spurs separate northern and southern portions of site		Boston and Maine Railroad tracks border property on southeast
Utilities	3 separate drain lines (old sanitary and old and new industrial) run north from Buildings 3, 5, and 6 to sewage treatment facility and site brook. Other underground lines remain but have been removed from service.		Three sets of high-voltage power transmission lines owned by New England Power traverse the site.	
Erosion Controls		Berms south and east of radioactive waste disposal area. Natural erosion control provided by rocky, barren substrate of the area.		
Site Security		Site is surrounded by security fencing; guards patrol W.R. Grace property	Fenced in 1981 to control access	Site is fenced; entrance controlled by Morton International
REFERENCES	BNI 1995a; DOE 1994a, 1994b, 1994c; ORAU 1989; ORISE 1993, 1994; Borawski 1968	BNI 1985a, 1985b, 1986a, 1988a, 1989a, 1990a, 1990b, 1995a; Aerospace Corp. 1984a, 1984b; RMC 1978; EG&G 1979; ORNL 1984a, 1984b, 1989; NUS 1984; DOE 1985; W.R. Grace 1978, 1985, 1990; Geraghty & Miller 1980; NOAA 1985	BNI 1984a, 1990c, 1995a; ORNL 1981a; EPA 1982a	BNI 1986b, 1986c, 1987a, 1989b, 1995a; ORNL 1985, 1986, 1988a

for disposal of trash and other materials and concluded that the contaminants probably resulted from this waste stream. Radiological characterization in 1980 confirmed the NRC findings and defined the general areas of contamination (ORNL 1980); based on the results of this survey, the former Shpack Landfill was designated for inclusion in FUSRAP. However, DOE-Headquarters has determined that the Texas Instruments Plant is excluded from FUSRAP because the activities at the plant were licensed (BNI 1995a).
The site was purchased by the Town of Norton in 1981 and is no longer used as a landfill. It is fenced and posted with "no trespassing" signs, and access is controlled by the Town of Norton and the New England Power Company. The Shpack Landfill site was added to EPA's National Priorities List in 1986.

Ventron

From 1942 to 1948, the Metal Hydrides Corporation, then located at the Ventron site, was under contract to MED and AEC to convert uranium oxide to uranium metal powder. This process, as well as later operations to recover uranium from scrap and turnings from a fuel fabrication plant at Hanford, Washington, were conducted at a foundry at the site. During the MED/AEC contract period, three buildings were used for uranium processing and recovery operations. A radiological survey of the facility conducted by AEC in 1948 identified radioactive contamination in two foundry buildings and on various pieces of equipment. The two wooden buildings that housed the foundry facilities were decontaminated and demolished between 1948 and 1950, and two additional buildings have since been erected in these locations. The remaining original building (Alpha Building) contained furnace and leaching facilities, a mixing room, a drying room, and an analytical laboratory. The Metal Hydrides Corporation became the Ventron Corporation in 1965. Morton Thiokol, Inc., acquired control of the company in 1976. Ventron was included in FUSRAP in 1986 based on results of radiological surveys of the site grounds, buildings, and other structures (ORNL 1985, 1986, 1988a). The site is currently owned and operated by Morton International (formerly Morton Thiokol) as a research and development facility; closure actions and extensive renovation activities by the property owner are in progress and are being coordinated with remedial action by FUSRAP (BNI 1995a).

2.4.2 Environmental Setting

The environmental setting of each site, including geology, hydrogeology, and water quality; ecological resources; and climate and meteorology, is summarized in Table 2.4. Site locations are shown in Figures 2.15 through 2.18.

2.4.3 Current Land Use

Table 2.4 includes a summary of current onsite and adjacent land use. Maps showing current land use in the vicinity of these sites are not currently available.

2.4.4 Local and Regional Factors Influencing Remediation Strategy

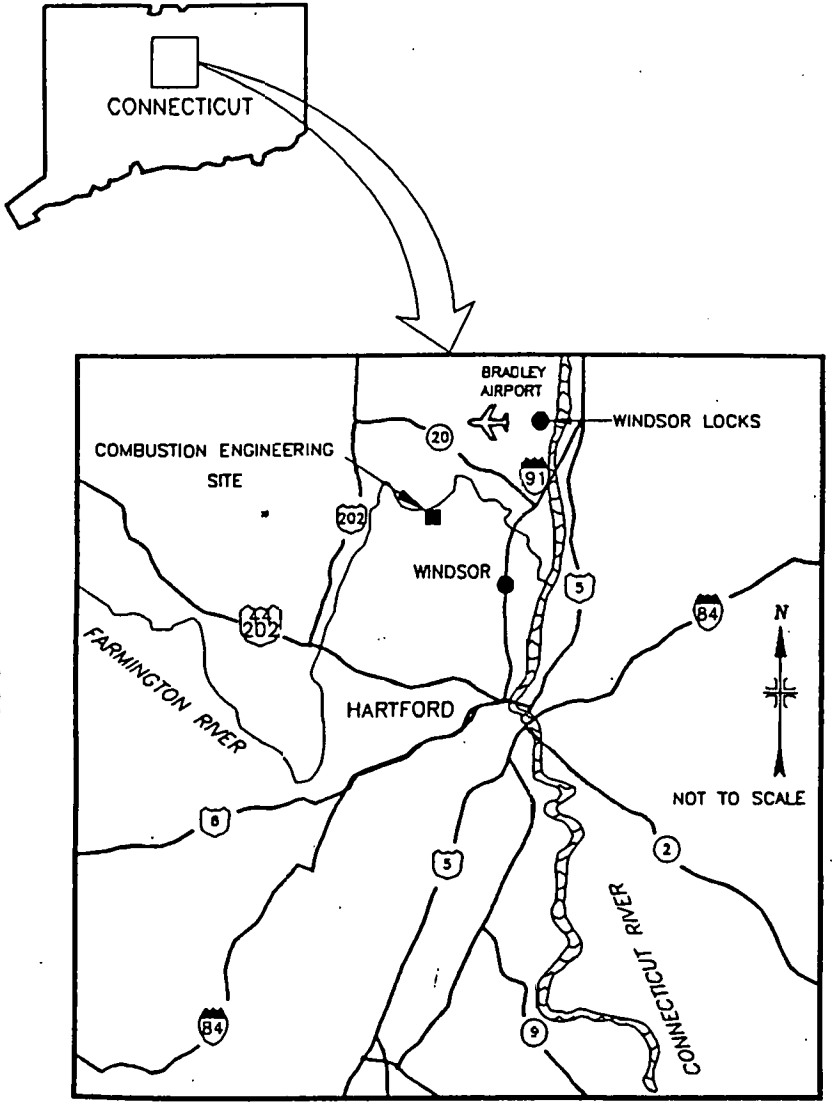
Socioeconomic, cultural, environmental, and other factors that may influence strategies for site remediation and risk management and stakeholder-based decisions regarding long-term land use are summarized in Table 2.4.

2.4.5 Facilities, Equipment, and Infrastructure

Facilities and infrastructure at these sites are identified in Table 2.4 and shown on site maps in Figures 2.15 through 2.18. The radiological status of buildings at CE, W.R. Grace & Company, and Ventron is summarized in Section 3 (see Table 3.5). There are no onsite buildings at Shpack Landfill.

2.4.6 Projected Future Use of Land, Facilities, and Equipment

Projected future use of each property after site remediation is summarized in Table 2.4.



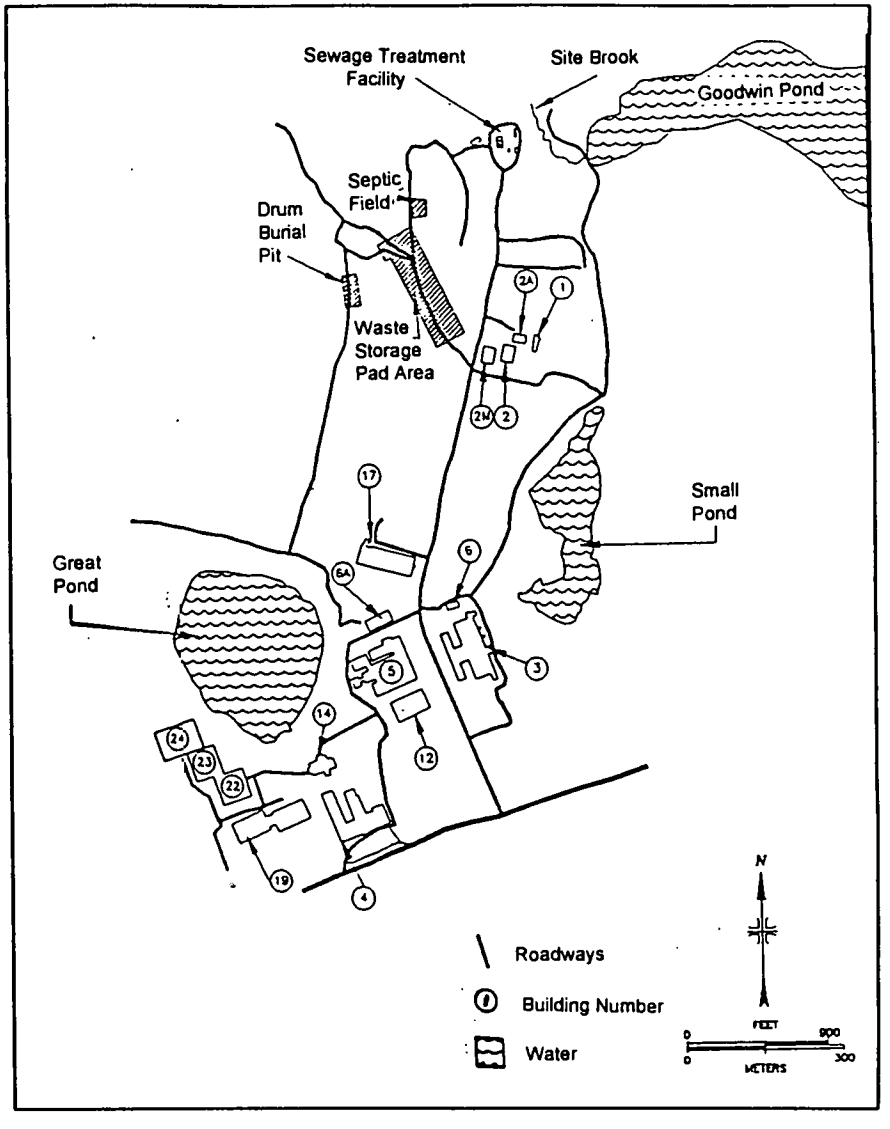
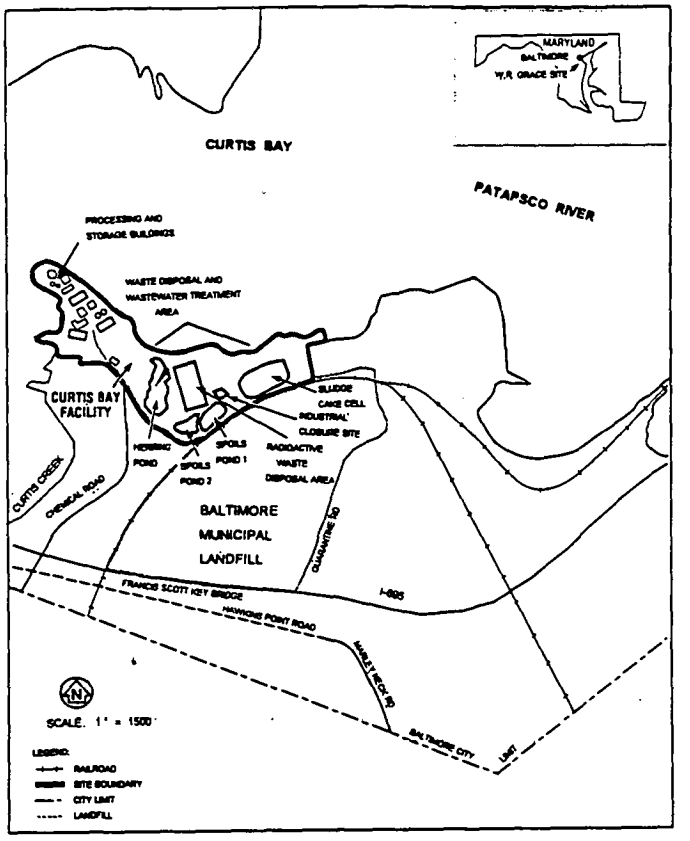


Figure 2.15 Location of CE, Windsor, Connecticut



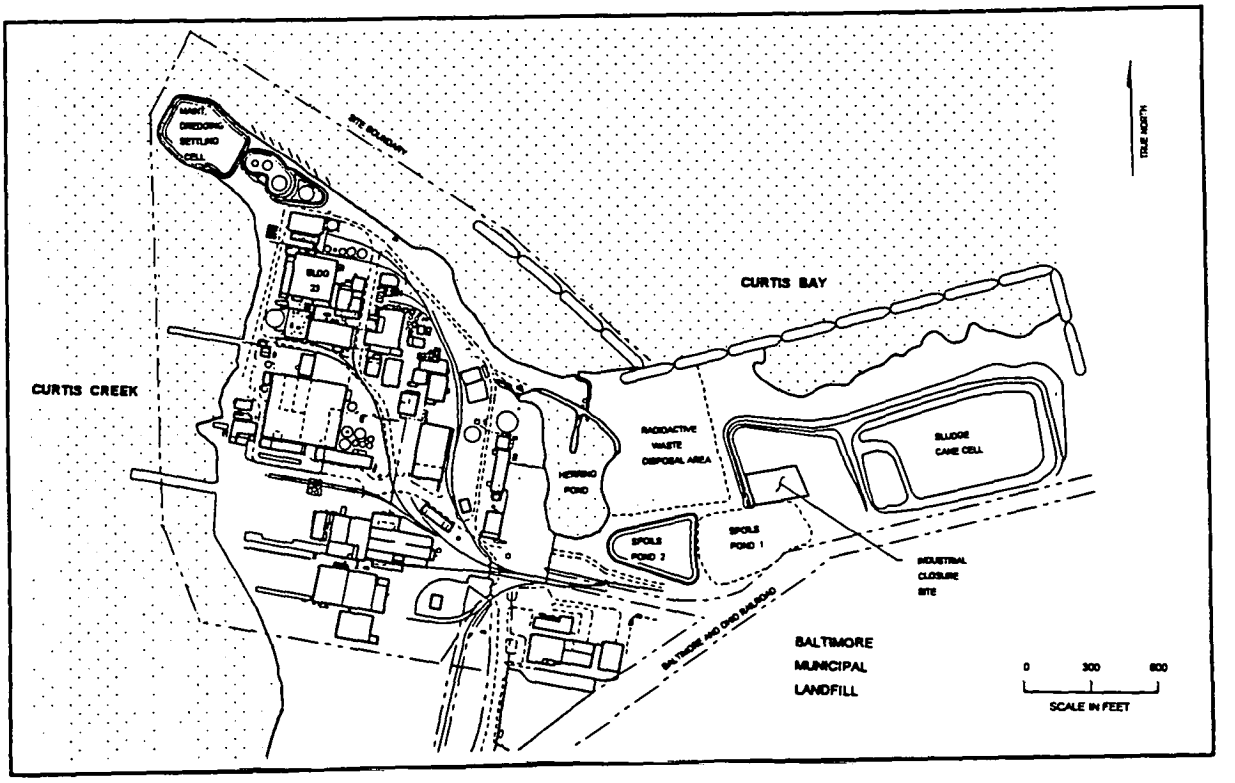


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Figure 2.16 Location of W.R. Grace & Company, Baltimore, Maryland

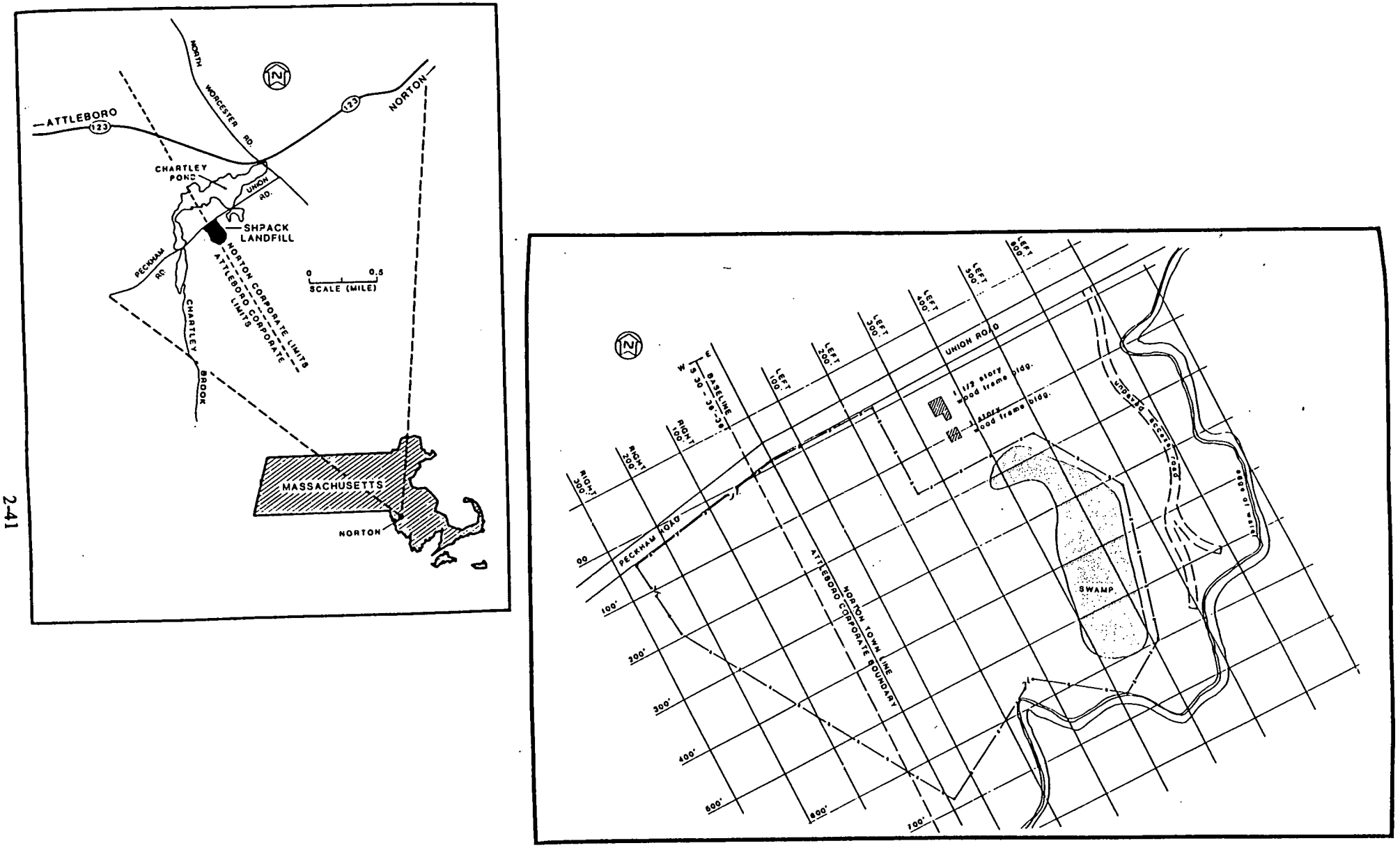


Figure 2.17 Location of Shpack Landfill, Norton, Massachusetts

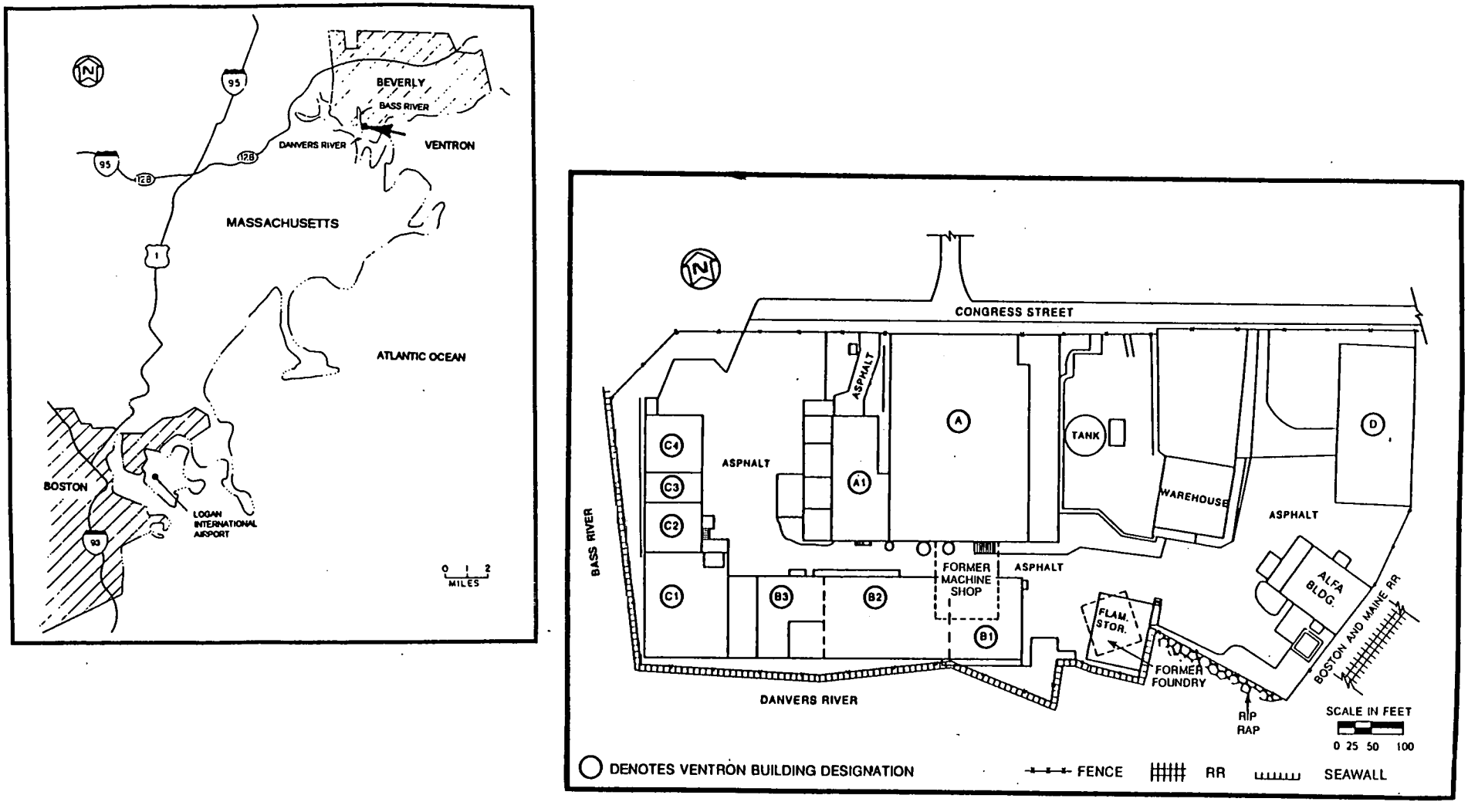


Figure 2.18 Location of Ventron, Beverly, Massachusetts

3. SITE ENVIRONMENTAL RESTORATION STATUS

This section summarizes the status of environmental restoration at the FUSRAP sites covered by this MAP document. Table 3.1 reviews site remediation progress to date.

3.1 CURRENT ENVIRONMENTAL RESTORATION STATUS

Some of the sites covered by this document were only recently added to FUSRAP and are still in preliminary stages of the remedial action process. With the exception of the three sites in New York and B&T Metals in Ohio, radiological characterization has not yet been completed. Because the amount of information currently available varies from site to site, the level of detail presented in this document also varies. As additional site information needed for remedy selection becomes available from further characterization, it will be incorporated in future revisions of this MAP document

3.1.1 Site Remediation Activity Summary

Tables 3.2 through 3.5 summarize site remediation activities and current environmental restoration status at the sites covered by this MAP document.

3.1.2 Environmental Condition of Property: Nature and Extent of Contamination

Radiological characterization results for environmental media and buildings are summarized in Tables 3.2 through 3.5 and discussed briefly below. Areas of soil and/or building contamination are shown in Figures 3.1 through 3.14. Current estimates of contaminated soil and sediment volumes are included in Tables 3.2 through 3.5.

Sites in New Jersey

DuPont & Company. Although AEC conducted limited remedial action during the 1948-1949 decontamination effort, additional cleanup will be required for the site to meet current guidelines. A radiological survey in 1977 under FUSRAP revealed elevated uranium concentrations in rubble from the operations building and in surface and subsurface soil (ORNL 1978). Alpha and beta-gamma levels in some areas of Building 845 also exceeded current guidelines. A FUSRAP survey in 1983 identified radioactive contamination exceeding guidelines in Building 845, the central drainage ditch, the F Corral parking area, and the east burial area (BNI 1985h). In some areas, subsurface contamination was detected at depths greater than 9 ft. Based on these radiological surveys, DOE determined in 1989 that the DuPont & Company site warranted further remedial action. Additional characterization will be required before remedial action begins. Previous characterization results are summarized in Table 3.2. Areas of radioactive contamination are shown in Figure 3.1.

Middlesex Sampling Plant. After initial decontamination In 1967, AEC determined the site to be suitable for release according to standards then in effect. A subsequent survey in 1976 identified both onsite and offsite contamination above current guidelines. DOE remediated offsite residential properties in 1980 and 1981 and cleaned up the Middlesex Municipal Landfill between 1984 and 1986. A third radiological survey in 1983 supported an engineering evaluation for future cleanup of the site in its entirety (BNI 1985l). Areas of contamination identified by this survey are shown in Figure 3.2. In 1991, NJDEP requested further radiological and chemical characterization of the storage piles and in situ onsite soils. The results of this study confirmed the presence of uranium-238, radium-226, and thorium-232 at levels above guidelines and indicated that the piles do not contain RCRA characteristic waste, although samples from the landfill pile exceeded the regulatory limit for lead, and two samples exceeded the regulatory limit for cadmium (BNI 1991p). An intensive phased sediment investigation in and along the drainage ditch exiting the southern end of the site was conducted in 1990-1991, supplemented by limited sampling in 1992. Sediment samples showed elevated activity downstream for a distance of nearly 200 ft

Table 3.1 Review of Site Remediation Progress and Accomplishments

Fiscal Year	Activities Completed/Accomplishments
1977	• Radiological screening survey at Ventron identified need for survey of entire site
1978-1979	• Radiological surveys at W.R. Grace & Company identified radioactive contamination in Building 23, within the 4-acre radioactive waste burial area, and at several locations within surrounding 40-acre waste management area • Removal of exposed plumbing, contaminated equipment, portions of floors, walls, and ceilings in buildings at New Brunswick Site (NBS)
1980	• W.R. Grace & Company (4-acre radioactive waste burial area) designated by DOE for cleanup under FUSRAP • Radiological survey of site grounds at Ventron by ORNL • Radiological surveys at Shpack Landfill, designation for inclusion in FUSRAP, and removal of principal sources of uranium-235 surface radioactive contamination • Middlesex Sampling Plant (MSP) designated for cleanup under FUSRAP • Cleanup of residential/commercial VPs in Middlesex (1980-81); wastes placed in interim storage pile at MSP (VP pile) • Capped vent at top of K-65 residue storage building at Niagara Falls Storage Site (NFSS) to reduce radon emissions
1981	• Removal of aboveground structures, contaminated concrete foundations, onsite drain lines, and contaminated soil at NBS (1981-83)
1982	• Radiological survey of buildings and structures at Ventron • Conducted radiological survey to delineate areal and vertical extent of radioactive contamination and installed groundwater monitoring wells at Shpack Landfill • Upgraded and sealed two buildings at future location of WCS at NFSS; constructed dike and cutoff wall and covered storage pile with synthetic liner
1983	• Remediated west and central drainage ditches at NFSS. Also extended dike around an onsite building, and consolidated K-65 and other residues into building surrounded by dike and cutoff wall. • Radiological survey at MSP to support EE/CA for site cleanup
1984	• Colonie designated for cleanup under FUSRAP • Cleanup of Middlesex Municipal Landfill (1984 & 1986), wastes placed in 2nd interim storage pile at MSP (MML pile)
1985	• Completed residue consolidation in WCS at NFSS and installed short-term cap of clays, topsoil, and sod. Also dismantled 2 buildings and conducted VP cleanups.
1986	• Ventron designated for cleanup under FUSRAP • Provided radiological support (including removal of underground storage tank) to Ventron during renovation activities • Closed interim cap of WCS at NFSS. Completed dewatering of residues, installed geotechnical instrumentation in waste containment area, and installed 36 monitoring wells. Also completed decon/dismantlement of several buildings.
1987	• Issued Radiological and Limited Chemical Characterization Plan for Ventron • Demolished two holding ponds at NFSS
1988	• Completed cleanup of 53 VPs at Colonie (1985-88); wastes stored in main plant building
1989	• Radiological survey at Madison
1990	• Conducted Environmental Compliance Assessment for W.R. Grace & Company and issued report
1991	• Radiological and chemical characterization of storage piles at MSP
1992	• Completed intensive phased sediment investigation in and along drainage ditch exiting southern end of site at MSP (1990-92) • FUSRAP provided health physics support at Shpack Landfill during potentially responsible party (PRP) site investigation • Radiological characterization at Ventron employing as a pilot project the Streamlined Approach for Environmental Restoration (SAFER), which achieved substantial cost savings • Luckey designated for cleanup under FUSRAP • Painesville designated for cleanup under FUSRAP • B&T Metals designated for cleanup under FUSRAP • Madison designated for cleanup under FUSRAP • Issued draft EE/CA for Colonie main plant building; started major field work including offsite disposal of mixed waste, building preparation, and interior asbestos removal

Table 3.1 (continued)

Fiscal Year	Activities Completed/Accomplishments
1993	• Completed pile cover replacement at MSP • Continued work on Colonie building EE/CA; started site grounds EE/CA. Also continued building preparation including metal-shredding operations and treatment of drums containing RCRA waste • Continued support to PRPs at Shpack Landfill • Completed radiological and chemical characterization field work at Ventron • Provided additional radiological support at Ventron during Morton International's investigations of mercury contamination in the harbor adjacent to the site • Survey detected highly enriched uranium residues at CE in areas formerly used for AEC activities • Site scoping visit at Madison
1994	• Issued 2nd draft characterization report for Ventron • CE designated for cleanup under FUSRAP • Started Colonie building decontamination. Disposed of 1.3 million lb metal for recycling and 3200 gal mixed oils for incineration • Issued draft MSP characterization report • Replaced MSP groundwater monitoring well network for environmental surveillance and site maintenance
1995	**Assessment and Remedial Action:** • Completed Colonie building decon/dismantlement; offsite disposal of asbestos waste and 1000 yd^3 of VP soils • Completed RCRA closure at Colonie • Released equipment in support of Morton International's Ventron plant closure • Provided radiological support during mercury remediation at Ventron • Completed characterization activities at B&T Metals ahead of schedule (December) • Civil survey at Middlesex Sampling Plant in preparation for ditch cleanup in summer 1996 **Transportation and Disposal:** • Issued a waste moisture control design basis document • Sponsored a comprehensive transportation and disposal planning meeting with transporters and Envirocare for FY 1995 shipping campaigns • Reached agreement with Envirocare on method for determining densities for bulk shipments of FUSRAP waste • Coordinated FUSRAP waste shipping and disposal campaigns through teleconferences with Envirocare, transportation contractors, and field and home office personnel (BNI) • Awarded 11(e)2 disposal subcontract to dispose of 100,000 yd^3 of FUSRAP waste • Awarded mixed waste treatment subcontract to Envirocare • Executed Low-Level Waste Disposal Subcontract Amendment lowering unit disposal rates **Technology Initiatives:** • Use of rock crusher generating cost savings of >$500,000 in Ohio and Missouri • Use of field gamma spectroscopy to reduce analytical costs, saving $150,000 in Ohio and Missouri • Design/construction of mobile wet chemistry lab and deployment in Missouri • Developed GIS modeling for data interpretation and visual communication • Bench-scale demonstration and field testing of soil treatment using VORCE soil-washing machine in New Jersey • Completed initial development and testing of Long Range Alpha Detection (LRAD) system for use in cleanup activities • Continued soil treatment studies at Colonie • Initiated treatability studies for MSP **Productivity Improvement and Cost-Savings Initiatives:** • Achieved $1.2 million in cost savings through Productivity Improvement Program and cost savings initiatives • Developed a protocol for use as project-wide guidance for expedited actions at FUSRAP sites where contamination is minimal and generally limited to indoor areas **Stakeholder Involvement/Community Relations:** • Interviewed former workers at Luckey site to support community-assisted site characterization • First use of Innovator (a computer-assisted decision-making tool) by a FUSRAP citizens' group to prioritize remedial alternative evaluation criteria • Presented workshop on FUSRAP's innovative community relations strategic planning process at international conference • Conducted conflict resolution training for program, site, and project managers • Meetings with New Brunswick and Middlesex mayors and councils to discuss remedial action planned for FY 1996

Table 3.1 (continued)

Fiscal Year	Activities Completed/Accomplishments
	Safety and Health: • 500,000 hours worked with zero lost-time accidents • Completed and issued annual Emergency Readiness Assurance Plan • Conducted emergency response exercises at six sites **Documentation** • Issued Colonie building EE/CA and comment resolution document and continued preparation of site grounds EE/CA • Submitted final RCRA closure plan for Colonie (9/95) • Issued draft EE/CA for Ventron (SAIC) • Published Characterization Report for Ventron (FSRD) • Issued draft post-remedial action report for NFSS • Started site EE/CAs for NBS and MSP • Revised manual developed by ANL for implementation of guidelines for allowable levels of residual radioactivity and RESRAD code for pathways analyses • Published RESRAD data collection handbook, RESRAD-BUILD code and manual, and RESRAD benchmarking report • Developed RESRAD-Chem code, RESRAD-Baseline code, RESRAD Probabilistic code, and RESRAD-Recycle code • Prepared post-remediation dose assessment reports, action description memoranda, work plans, EE/CAs, baseline risk assessments, and derivation of uranium guidelines • Prepared and issued Site Strategic Plan for FUSRAP (BNI) • Prepared Baseline Environmental Management Report submitted to Headquarters (BNI) • Prepared Health & Safety Plans and Activity Safety Envelopes for Ventron and eight other sites • Issued B&T Metals Health and Safety Plan
1996	• Completed ferrous sulfate stabilization of salt brick bath material at Colonie (January) • Completed data gap sampling to support remedial design for upcoming RA at Ventron (February) • Prebid meeting for Ventron RA subcontract (February) • Bench-scale studies of segmented gate system (SGS) treatment of soil from storage piles at MSP (March) • Test pit excavation and soil characterization to optimize SGS treatment of soils at NBS (March) • Data gap sampling at MSP process building (March) • Mobilization for remedial action at B&T Metals (March 8) • Decontamination /relocation of excess equipment at B&T Metals (March) • Ventron dose calculation and remedial action proposal for Buildings A and A-1 sent for state concurrence (March). Dose calculation will allow Morton International to dismantle both buildings without DOE involvement and will allow waste to be sent to commercial smelter and landfill, resulting in substantial cost savings

Table 3.2 Site Activity Summary: FUSRAP Sites in New Jersey

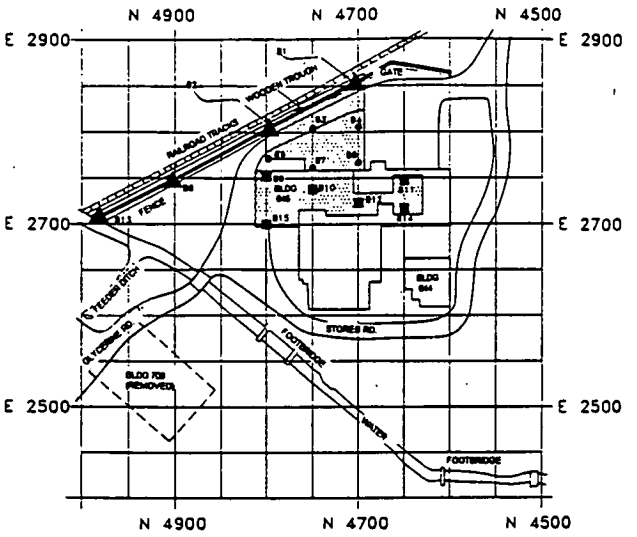
State	New Jersey		
Release Site	**DuPont & Company**	**Middlesex Sampling Plant**	**New Brunswick Site**
ADS No.	OR-1300-AA	OR-1300-AA	OR-1300-AA
WBS No.	1.4.11.1.3 (108)	1.4.11.1.3 (118)	1.4.11.1.3 (144)
Remedial Action Status	Partial characterization	Partial characterization Partial RA scheduled for FY 1996	Partial characterization Partial RA Both characterization and RA scheduled for completion during FY 1996.
Total Site Area	700 acres	9.6 acres	5.6 acres
Vicinity Properties	None	33 (all completed)	None
Vicinity Properties Remediated	Not applicable	33	Not applicable
Cleanup Actions Completed	None (except for limited building decontamination by AEC in 1948-49)	1980-81: Cleanup of residential/commercial VPs 1984, 1986: Cleanup at Middlesex Municipal Landfill (MML) Interim storage of waste from VP and MML cleanups in 2 storage piles onsite (See Table 3.1)	1978: Cleanup of most contaminated areas (exposed plumbing, contaminated equipment, portions of building interiors) 1981-83: Removal of all aboveground structures, concrete foundations, onsite drain lines, and radioactively contaminated soil (disposed of at Nevada Test Site) (See Table 3.1)
Cleanup Actions Remaining	Cleanup of Building 845, soil beneath and east of building and in east burial area and F Corral parking area, sediments in central drainage ditch	Decon garage and admin buildings, demolish process building and boiler house, remediate ditch exiting southern end of site, cleanup of contaminated soil in storage piles and on site grounds	Expedited removal action for contaminated soil in filled railroad spur near southwestern fenceline
REGULATORY STATUS			
EPA Region	II	II	II
NPL Site	No	No	No
Federal Facilities Agreement (FFA)	No	No	No
DOE-Owned/Leased Site	No	Yes	Yes
Designation Authority/Date	DOE-designated (1989)	DOE-designated (1980)	DOE-designated (1990) (formerly SFMP site)
Lead Agency for Remedial Action	DOE	DOE	DOE
Key Regulators	EPA Region II NJDEP Local health department	EPA Region II NJDEP Local health department	EPA Region II NJDEP Local health department
Regulatory Drivers	CERCLA, NEPA, state and local laws and regulations	CERCLA, NEPA, state and local laws and regulations NESHAPs Subparts H, M, Q NJDEP point-source stormwater discharge permit (1992) SDWA MCLs/NJ groundwater standards, Class IIA TSCA (state notification required for asbestos in process building) See Appendix F for listing of potential ARARs.	CERCLA, NEPA, state and local laws and regulations See Appendix F for listing of potential ARARs.

Table 3.2 (continued)

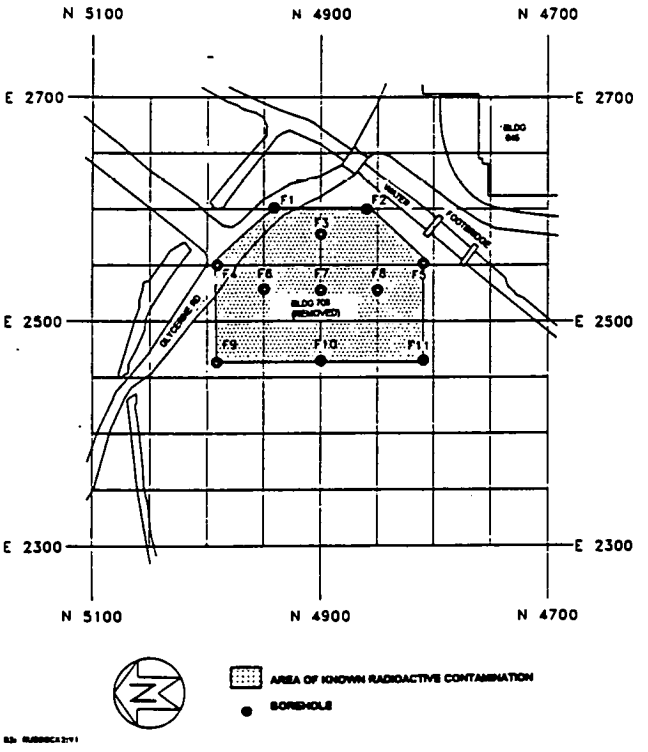
State	New Jersey		
Release Site	**DuPont & Company**	**Middlesex Sampling Plant**	**New Brunswick Site**
Level of CERCLA Documentation	Characterization Report EE/CA with Action Memorandum	Characterization Report EE/CA with Action Memorandum	Characterization Report EE/CA with Action Memorandum
Compliance Milestones	2003: Action Memorandum based on EE/CA 2005: Complete remedial action	1998: Action Memorandum based on EE/CA 2001: Complete remedial action	1996: Action Memorandum based on EE/CA 1996: Complete remedial action
OPERATIONAL HISTORY			
Historic Origin of Contamination	Research using uranium hexafluoride by DuPont for Office of Scientific Research and Development and MED/AEC (1940s)	1943-67: MED/AEC sampling/storage/shipment of uranium, thorium, and beryllium ores and sampling of thorium residues 1981-present: Storage of wastes in landfill and VP piles	MED/AEC/DOE nuclear chemistry lab using uranium and thorium ores, plutonium, and enriched uranium (1948-77); pitchblende-contaminated soil was moved to the site from a nearby landfill in 1980.
Owner/Landlord			
Historic	E.I. du Pont de Nemours & Company	1943-69: MED/AEC (used for sampling/storage/shipment of uranium ores) 1969-79: U.S. Marine Corps training center	MED/AEC/DOE (1948-present)
Current	E.I. du Pont de Nemours & Company	DOE (1980-present)	DOE
WASTE INVENTORY			
Site Total Waste Volume (yd^3)	8,270	89,000	4,500
Total Curies		5	
Waste Type	LLRW	11(e)2	LLRW
NATURE AND EXTENT OF CONTAMINATION			
Primary Contaminants	Uranium-238	Uranium-238, thorium-232, radium-226; lead and cadmium in MML pile	Uranium-238, radium-226, thorium-232
Areas/Locations of Contamination	Building 845, central drainage ditch, F Corral parking area, east burial area	MML and VP piles, sediments in drainage ditch exiting southern end of site, 4 buildings (process building, boiler house, garage, administration building)	Soil in filled railroad spur near southwestern fenceline
Site Map Reference	Figure 3.1	Figure 3.2	Figure 3.3
Contaminated Media	Soil, sediments, building	Soil, sediments, 4 buildings	Soil

Table 3.2 (continued)

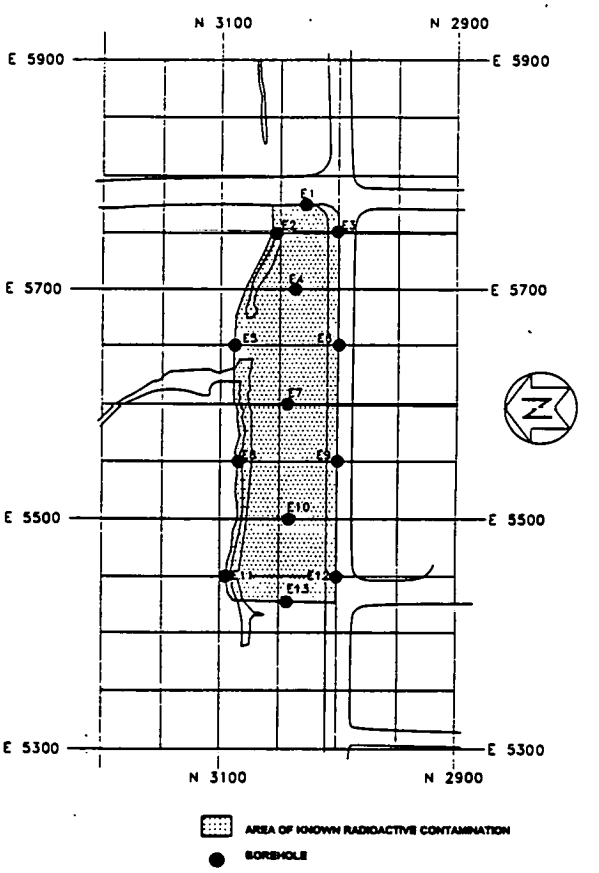
State	New Jersey		
Release Site	**DuPont & Company**	**Middlesex Sampling Plant**	**New Brunswick Site**
Soil and Sediments			
Primary Contaminants and Concentrations	Uranium-238 Bldg 845 area: 0.7-8,334 pCi/g East burial area: 297-20,810 pCi/g F Corral parking area: 0.9-4,347 pCi/g	MML pile (BNI 1991p) Uranium-238: <6.6-45.3 pCi/g (av. 19.5 pCi/g) Thorium-232: 1.4-<3.3 pCi/g (av. 1.9 pCi/g) Radium-226: 1.9-55.1 pCi/g (av. 18.9 pCi/g) TCLP lead: 5700-198,000 µg/L (46 samples) TCLP cadmium: 1540-3420 µg/L (2 samples) VP pile (BNI 1991p) Uranium-238: 8.0-30.5 pCi/g (av. 18.3 pCi/g) Thorium-232: <1.4-2.8 pCi/g (av. 2.0 pCi/g) Radium-226: 5.4-23 0 pCi/g (av. 11.3 pCi/g) Onsite soil (BNI 1985l) Uranium-238: 961 pCi/g (max. surface soil) 398 pCi/g (max subsurface soil) Thorium-232: 19.3 pCi/g (max. surface soil) Radium-226: 736 pCi/g (max. surface soil) 208 pCi/g (max subsurface soil)	Uranium-238: 116.22 pCi/g (av) 157.6 pCi/g (max) Radium-226: 13.62 pCi/g (av), 53.1 pCi/g (max) Uranium-235: 52.26 pCi/g (av), 53.3 pCi/g (max) Cesium-137: 3.02 pCi/g (av), 12.2 pCi/g (max)
Locations of Contamination > Guidelines	Surface/subsurface soil beneath and east of Building 845 and in east burial area and F Corral parking area. Sediments in central drainage ditch.	Soil, primarily in the 2 storage piles. Sediments in drainage ditch exiting southern end of site.	Soil in filled railroad spur near southwestern fenceline
Maximum Depth of Contamination	>9 ft	(Radiological analysis of composite samples from depths of 0-13 ft for MML pile and 0-8 ft for VP pile)	8-10 ft
Buildings and Structures			
Primary Contaminants	Uranium-238	Uranium-238, Thorium-232, Radium-226	No onsite buildings
Locations of Contamination > Guidelines	Building 845	Process building (floor, walls, roof, exterior walls) Boiler house (exterior walls, roof) Garage (floor) Administration building (floors, roof)	Not applicable
Groundwater			
Primary Contaminants		None detected above guidelines	None detected above guidelines
Locations of Contamination > Guidelines		Not applicable	Not applicable
RISK			
Potential Receptors and Exposure Pathways		See Appendix D.	See Appendix D.
RELATIVE RISK (RDS)	See Section 4.2 (Tables 4. 3 and 4.4)	See Section 4.2 (Tables 4. 3 and 4.4)	See Section 4.2 (Tables 4. 3 and 4.4)
RELATIVE RANKING (EM-40)	High See Section 4.1 (Tables 4.1 and 4.2)	High See Section 4.1 (Tables 4.1 and 4.2)	High See Section 4.1 (Tables 4.1 and 4.2)
REFERENCES	BNI 1985h, 1986t, 1991i, 1991j, 1995a; EPA 1988d; NOAA 1985	BNI 1985l, 1986v, 1987i, 1989n, 1989o, 1989p, 1991k, 1991l, 1991p, 1995a, 1995f	ANL 1984b, 1989, 1990a, 1990b; BNI 1991n, 1995a, 1995g



Building 845 and Wooden Drainage Trough



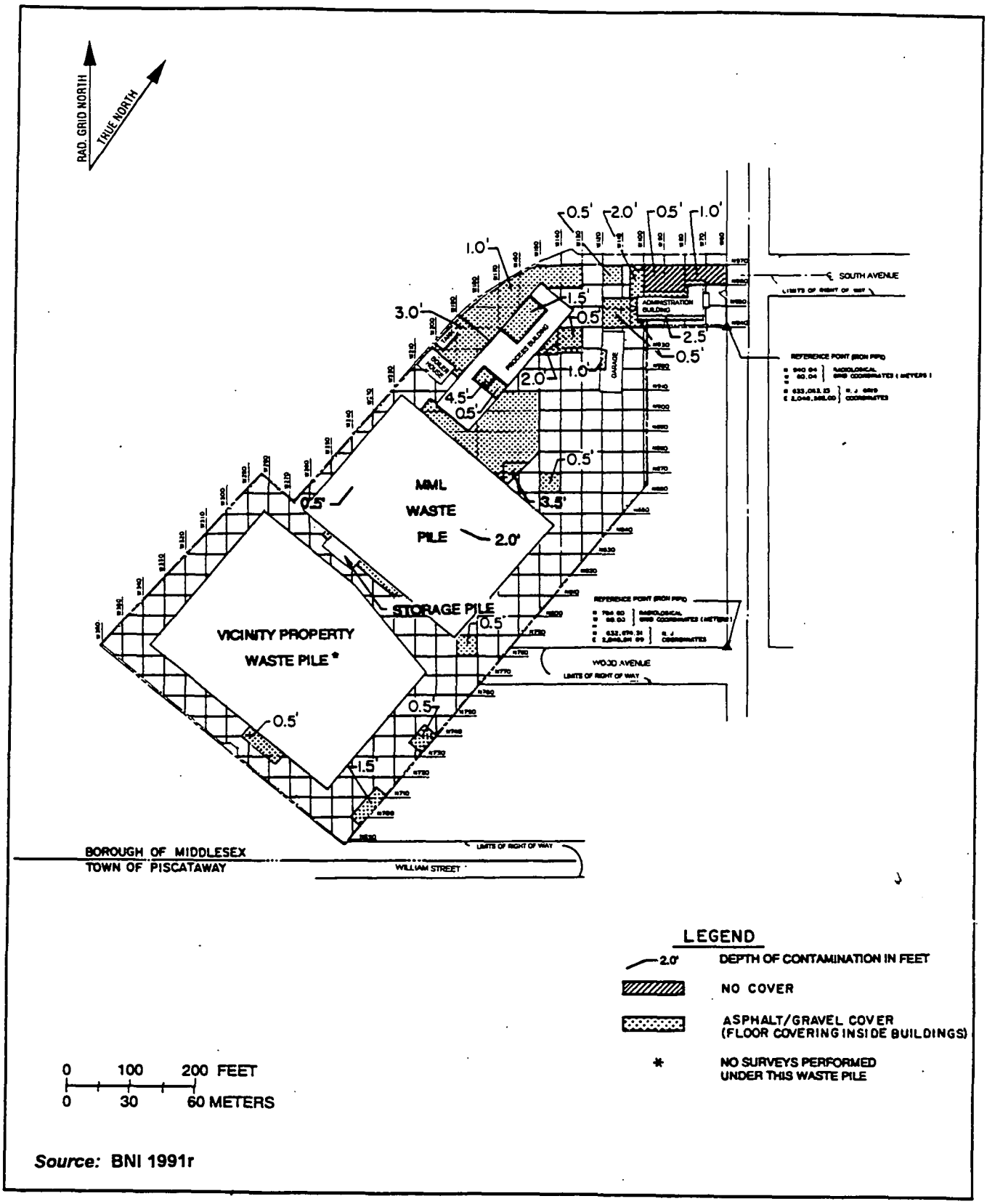
F Corral Parking Area



East Burial Area

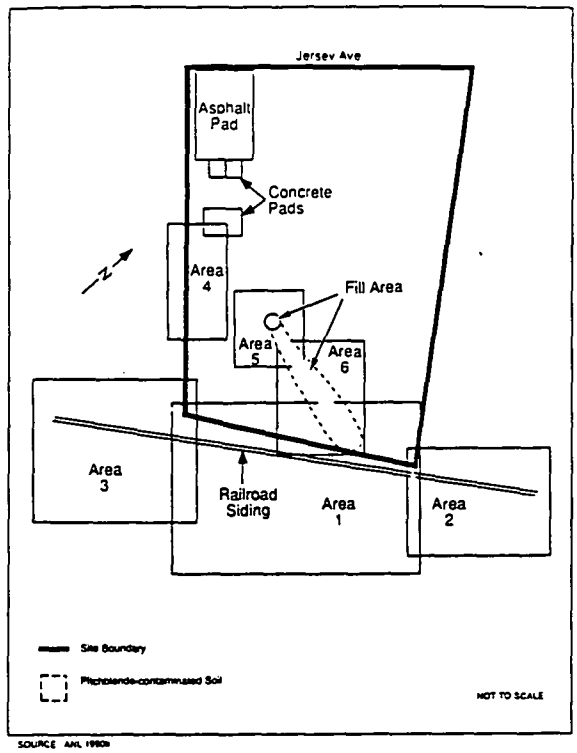
Source: **BNI 1991i**

Figure 3.1 Areas of Radioactive Contamination at DuPont & Company

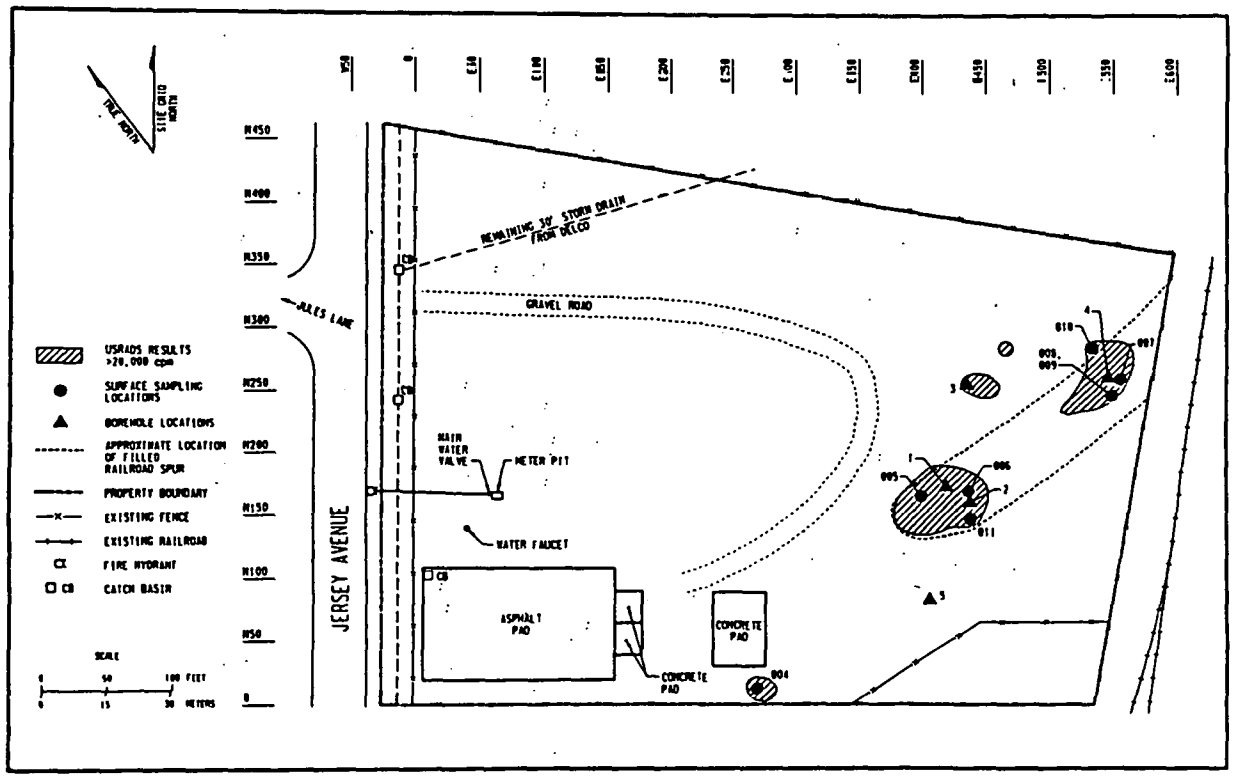


Source: BNI 1991r

Figure 3.2 Areas of Radioactive Contamination at Middlesex Sampling Plant



NBL Site Map Showing 1989 Survey Areas



R5GF002.DGN

Sampling Locations and USRADS Results

Figure 3.3 Areas of Radioactive Contamination at the New Brunswick Site

from the outfall. Current plans for interim removal actions include cleanup of isolated spots of elevated radioactivity along the ditch line, decontamination of the garage and administration building, and dismantlement of the process building and boiler house. Cleanup of the storage piles and site grounds is being planned through an EE/CA. A quarterly environmental monitoring/surveillance program has been in place since 1980.

New Brunswick Site. A first phase of remedial action was completed in 1978. Subsequent surveys revealed radioactive contamination (primarily uranium, thorium, and americium) on exterior and interior building surfaces and in onsite sewer lines and more precisely defined the extent of soil contamination. Results of a 1989 survey indicated that radioactivity at the offsite railroad property to the south did not exceed guidelines and that RCRA characteristic waste was not present in the filled rail siding. Levels of all chemical contaminants except mercury, copper, and zinc were below proposed soil cleanup levels. Additional onsite surveys and limited radiological and chemical sampling in 1992 confirmed that contamination was confined to the filled railroad spur at a small location along the southwestern fenceline (Table 3.2; Figure 3.3). An environmental surveillance program has been in place at the site since 1983. Results of routine chemical and radiological groundwater sampling since 1983 indicate that groundwater has been largely unaffected by site contamination.

Sites in New York

Bliss and Laughlin Steel. Surveys conducted by National Lead of Ohio during the early 1950s identified residual radioactivity on machinery. Radiological and chemical characterization under FUSRAP in 1995 included a survey of the floor area and overheads in and near the special finishing area and a less intensive survey performed throughout the rest of the building. Results indicated an affected surface area of approximately 2,000 ft^2. Elevated beta/gamma activity was found at 2 of 45 locations surveyed on overheads in the special finishing area (Table 3.3). Elevated surface radioactivity was detected on ~1,625 ft^2 (58 by 28 ft) of floor area in the special finishing area, some of it obstructed by machinery. The remainder of the building was surveyed as extensively as building conditions allowed and showed no evidence of residual radioactivity. Radioactive constituents were not detected in subsurface soil samples, and RCRA hazardous constituents were not detected in TCLP total analyses (BNI 1995i). Areas of radioactive contamination are shown in Figure 3.4.

Colonie. Site characterization activities have included surface features investigations, geological characterization, walkover surveys to detect gamma radiation, and sampling of surface and subsurface soil, sediment, surface water, groundwater, and air (Atcor 1978; BNI 1985c, 1989f, 1989g, 1989h, 1992b; ORNL 1987, 1988a; Teledyne Isotopes 1980, 1981). Radioactive constituents and metals were detected in surface and subsurface soils at levels above federal and state guidelines for use of the property with no radiological restrictions (Table 3.3). Areas of radioactive contamination are shown in Figure 3.5. Radionuclides, metals, and volatile organic compounds were detected in onsite groundwater at levels above federal and state drinking water standards, but these constituents are not migrating beyond the site boundaries. An environmental surveillance program has been in place at Colonie since 1984. Remedial action to date has included cleanup of 53 of 56 vicinity properties in 1984, RCRA closure completed in 1995, and decontamination/dismantlement of the main plant building in 1995-1996. Remaining work includes remediation of the site grounds and the three remaining vicinity properties owned by the Town of Colonie, Conrail, and Niagara-Mohawk Power Corporation.

Niagara Falls Storage Site. Characterization included surveys and sampling of surface residues, surface and subsurface soil, subsurface water, onsite drainage ditches, and onsite buildings. The primary radioactive constituents stored at NFSS are radium-226, thorium-230, and uranium-238. A comprehensive characterization and hazard assessment in 1979-1980 identified radioactive contamination in buildings, soils, sediments, vegetation, and groundwater and emanation of radon from stored and buried residues (Battelle 1981). Five onsite residue storage buildings, three associated buildings, and three additional buildings exhibited significant levels of surface radioactivity. Radium-226 levels

Table 3.3 Site Activity Summary: FUSRAP Sites in New York

State	New York		
Release Site	**Bliss and Laughlin Steel**	**Colonie**	**Niagara Falls Storage Site (NFSS)**
ADS No.	OR-1300-AA	OR-1300-AA	OR-1300-AA
WBS No.	1.4.11.1.2 (128)	1.4.11.1.2 (139)	1.4.11.1.2 (159)
Remedial Action Status	Characterization completed 1995 RA postponed at owner's request, to be reconsidered for FY 1997	Characterization completed 1995 Partial RA	Characterization complete (ROD signed 1986) Residual radioactive materials remediated 1955-92 are stored in engineered waste containment structure onsite Interim cap completed 1986; permanent cap to be installed after decision on final disposition of K-65 residues.
Total Site Area	~8.5 acres [204,440-ft^2 building (4.5 acres) surrounded by ~3.7 acres of grounds]	11.2 acres	191 acres
Vicinity Properties	None	56	33
Vicinity Properties Remediated	Not applicable	53 completed 1984-88 ; 3 to be remediated with site grounds	30 completed 1983-1986; remaining 3 are associated with hazardous waste storage operations
Cleanup Actions Completed	None	Cleanup of 53 VPs (1985-88); wastes stored in main plant building at Colonie Completed RCRA closure (1995) Decon/dismantlement of main plant building (1995-96) (See Table 3.1)	Remediation of all onsite residual radioactive material and consolidation of wastes from remedial action at NFSS and vicinity property cleanups completed by 1992; all wastes encapsulated within onsite engineered waste containment structure. (See Table 3.1)
Cleanup Actions Remaining	Cleanup of site building	Cleanup of site grounds and 3 unremediated VPs	Complete remaining interim actions Final closure of WCS including installation of permanent cap
REGULATORY STATUS			
EPA Region	II	II	II
NPL Site	No	No	No
Federal Facilities Agreement (FFA)	No	No	No
DOE-Owned/Leased Site	No	Yes	Yes
Designation Authority/Date	DOE-designated (1992)	Assigned by Congress (1984)	Transferred to FUSRAP from Surplus Facilities Management Program in 1991
Lead Agency for Remedial Action	DOE	DOE	DOE
Key Regulators	EPA Region II, NYSDEC	EPA Region II, NYSDEC	EPA Region II, NYSDEC
Regulatory Drivers	NEPA, state and local laws and regulations	CERCLA, NEPA, state and local laws and regulations RCRA (closure completed 1995) FFCA Clean Air Act (NESHAPs asbestos regulations) Clean Water Act (general stormwater discharge permit from NYSDEC); Safe Drinking Water Act MCLs and MCLGs adopted by NYSDEC and identified as ARARs for Colonie.	CERCLA, NEPA, state and local laws and regulations Clean Air Act [NESHAPs asbestos and radon regulations (asbestos removed from 4 buildings and disposed offsite in 1992; also buried onsite in New Naval Area)] Clean Water Act [NPDES permit issued 1986 (general stormwater discharge permit from NYSDEC)] Safe Drinking Water Act MCLs and MCLGs adopted by NYSDEC and identified as ARARs for NFSS
Level of CERCLA Documentation	Not applicable	2 EE/CAs (Building and Site Grounds)	Environmental Impact Statement (completed 1986) ROD signed September 1986

Table 3.3 (continued)

State	New York		
Release Site	**Bliss and Laughlin Steel**	**Colonie**	**Niagara Falls Storage Site (NFSS)**
Compliance Milestones	1997: Complete remedial action	1995: Action Memorandum for Building EE/CA 1996: Action Memorandum for Site Grounds EE/CA 2000: Complete remedial action	1996: Complete interim actions 2007: Complete final closure
OPERATIONAL HISTORY			
Historic Origin of Contamination	Uranium metal rod machining/straightening operations in support of work for AEC (1952)	National Lead manufacturing operations using uranium and thorium (foundry operations, reactor fuel fabrication and processing, electroplating) (1958-84). Plant stack emissions spread radioactive material to VPs.	Storage of uranium processing residues (primarily pitchblende residues) and other radioactive wastes from other MED/AEC sites (1944-68)
Owner/Landlord			
Historic	Bliss and Laughlin Steel; sold to Ramco Steel in 1972 and later to current owner	National Lead Industries (1937-84)	U.S. Army (NFSS and VPs were originally part of 7500-acre Lake Ontario Ordnance Works) AEC/DOE (Most of property was sold, transferred, or surplused. By 1968 AEC retained 213 acres; 22 acres was transferred to Town of Lewiston.)
Current	Niagara Cold Drawn Steel Corporation	DOE (1984-present)	DOE
WASTE INVENTORY			
Site Total Waste Volume (yd^3)	20	53,900	255,000 (205,000 from onsite cleanups; 50,000 from VP cleanups)
Total Curies			
Waste Type	LLRW	LLRW, Mixed/Chemical	11(e)2
NATURE AND EXTENT OF CONTAMINATION			
Primary Contaminants	Uranium-238	Uranium-238, thorium-232, copper, lead, zinc	Radium-226, uranium-238, thorium-230
Areas/Locations of Contamination	~2000 ft^2 within building including floor and overheads in special finishing area	Surface soil/asphalt; subsurface soil (primarily in 2 burial areas west of main building); surfaces in main building (dismantlement now essentially complete); containerized RCRA wastes in main building (addressed under RCRA closure completed 1995)	Onsite 10-acre engineered waste containment structure containing residues/soils/rubble from cleanup of NFSS and 30 VPs
Site Map Reference	Figure 3.4	Figure 3.5	Figure 3.6
Contaminated Media	Portion of main building	Surface/subsurface soil, sediments, groundwater, buildings (before remedial action)	Before remedial action: Buildings, soil, sediments, vegetation, groundwater; stored and buried residues
Soil and Sediments			
Primary Contaminants and Concentrations	None	Uranium-238: Surface soils: 410 pCi/g (av) Subsurface soils Waste burial area in former Patroon Lake: ~200 pCi/g (av) Area west of main building including 3 VPs: ~230 pCi/g (av)	Radium-226, thorium-230, uranium-238

Table 3.3 (continued)

State	New York		
Release Site	**Bliss and Laughlin Steel**	**Colonie**	**Niagara Falls Storage Site (NFSS)**
Locations of Contamination > Guidelines	None	Surface soils over essentially all of site grounds Subsurface soils in waste burial area and area west of main plant building including 3 VPs	Soil and residues in WCS Before remedial action: 79,300 yd^3 soil from 10 acres of 191-acre site 28,600 yd^3 sediment from onsite and offsite portions of west and central drainage ditches Wastes from cleanup of 11 buildings
Maximum Depth of Contamination	Not applicable	Waste burial area: 28 ft (most in first 12 ft) Area west of main building: <3 ft	
Buildings and Structures			
Primary Contaminants	Uranium-238 200,000 pCi/g in composite sample of metal chips and floor scrapings from special finishing area Up to 2.2 pCi/g in oil/sludge samples from floor trenches Up to 5.7 pCi/g in overhead beam dust	Before remedial action: Uranium-238, thorium-232	Before remedial action: Radium-226, uranium-238
Locations of Contamination > Guidelines	Floors and overheads in special finishing area within site building	Before remedial action: Essentially all of main plant building including floors, walls, and overheads in Bays 1, 2, 3, 3A, 4, 4A, and 5 1996: Building dismantlement essentially complete	Before remedial action: 5 onsite residue storage buildings, 3 associated buildings, 3 additional buildings
Groundwater			
Primary Contaminants	Not applicable	Radioactive constituents (uranium, thorium), metals, and volatile organics at levels above federal and state drinking water standards, but constituents are not migrating beyond site boundaries.	Before remedial action: Radium-226 Monitoring since 1986 indicates no onsite or offsite contamination in groundwater
Locations of Contamination > Guidelines	Not applicable	Onsite wells only	Not applicable
RISK			
Potential Receptors and Exposure Pathways		See Appendix D.	See Appendix D.
RELATIVE RISK (RDS)	See Section 4.2 (Tables 4.3 and 4.4)	See Section 4.2 (Tables 4.3 and 4.4)	See Section 4.2 (Tables 4.3 and 4.4)
RELATIVE RANKING (EM-40)	Medium See Section 4.1 (Tables 4.1 and 4.2)	High See Section 4.1 (Tables 4.1 and 4.2)	Low See Section 4.1 (Tables 4.1 and 4.2)
REFERENCES	DOE 1992h, 1992i, 1992j; BNI 1995a, 1995i; ORISE 1992	ANL 1984a, 1988; Atcor 1978; BNI 1985c, 1985d, 1986d, 1986f, 1986g, 1988c, 1988d, 1989e, 1989f, 1989g, 1989h, 1989i, 1990d, 1990h, 1995a; ORNL 1988b; SAIC 1993, 1995	Battelle 1981; BNI 1983b, 1984c, 1984d, 1985e, 1986j, 1986k, 1986l, 1986m, 1986n, 1986o, 1986p, 1986r, 1986s, 1987d, 1987e, 1987g, 1989j, 1990j, 1991f, 1991g, 1992f, 1994d, 1995a, 1995d; ORISE 1995

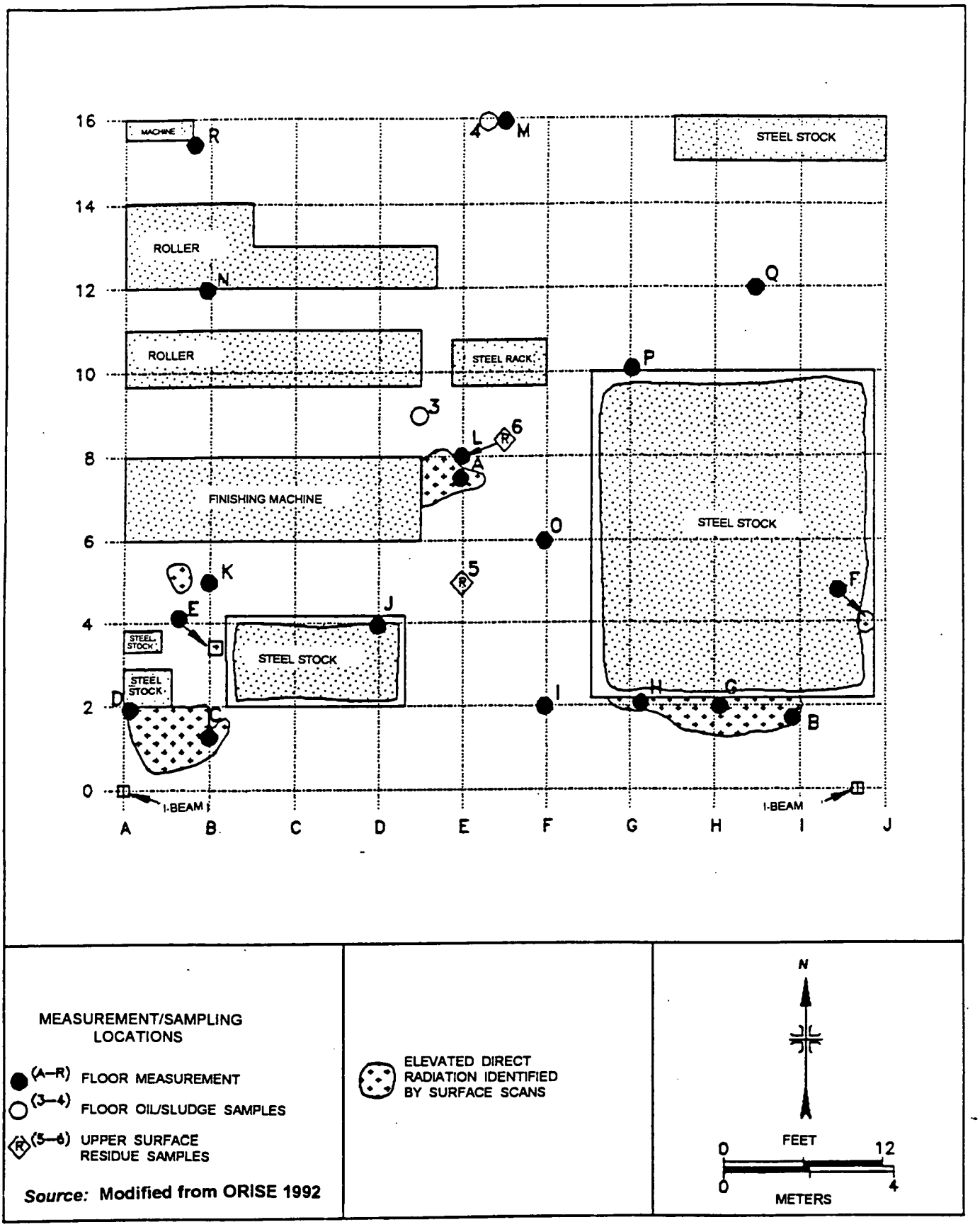
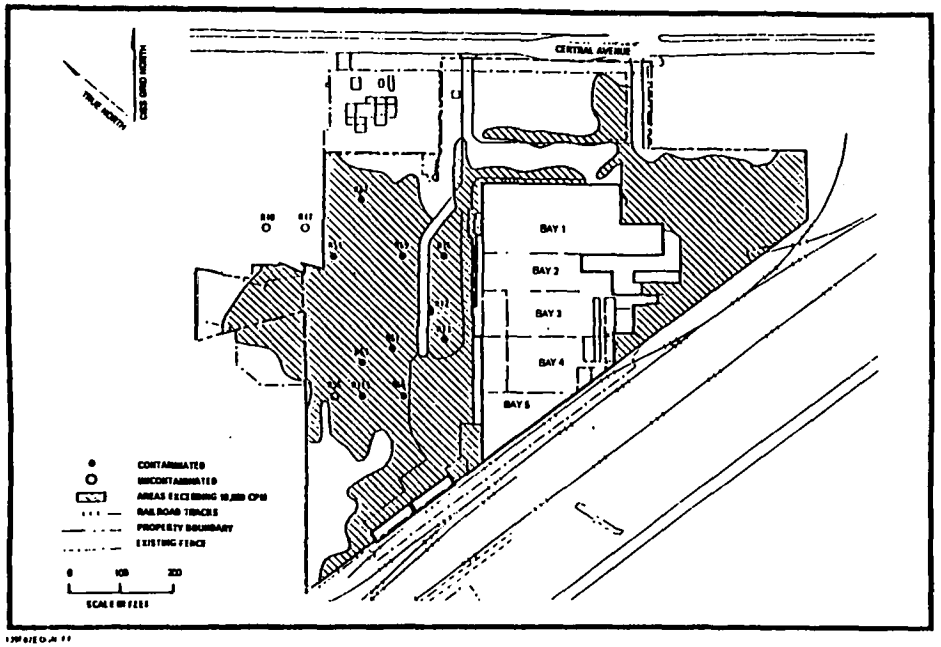
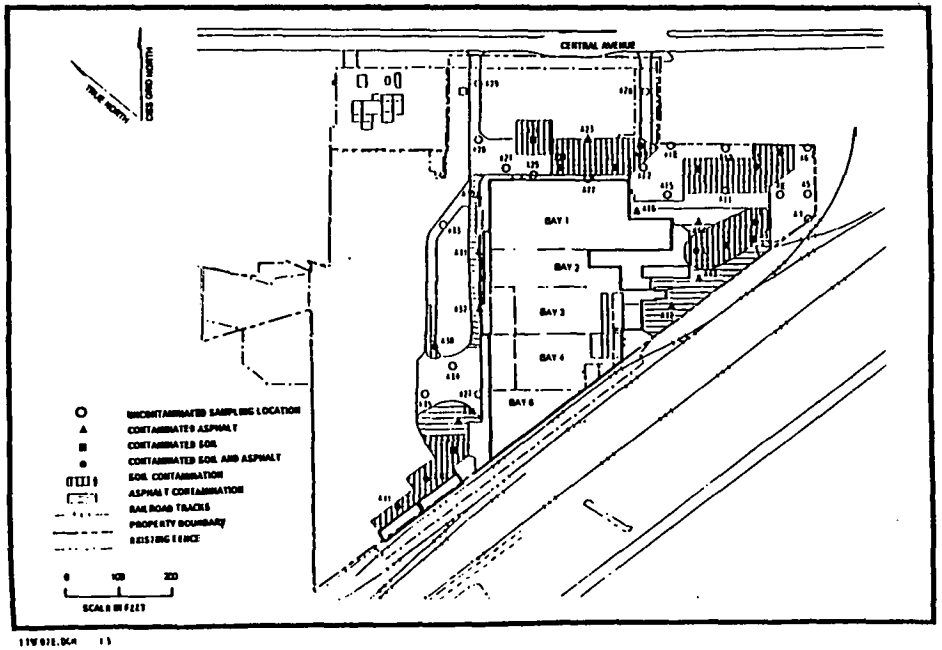


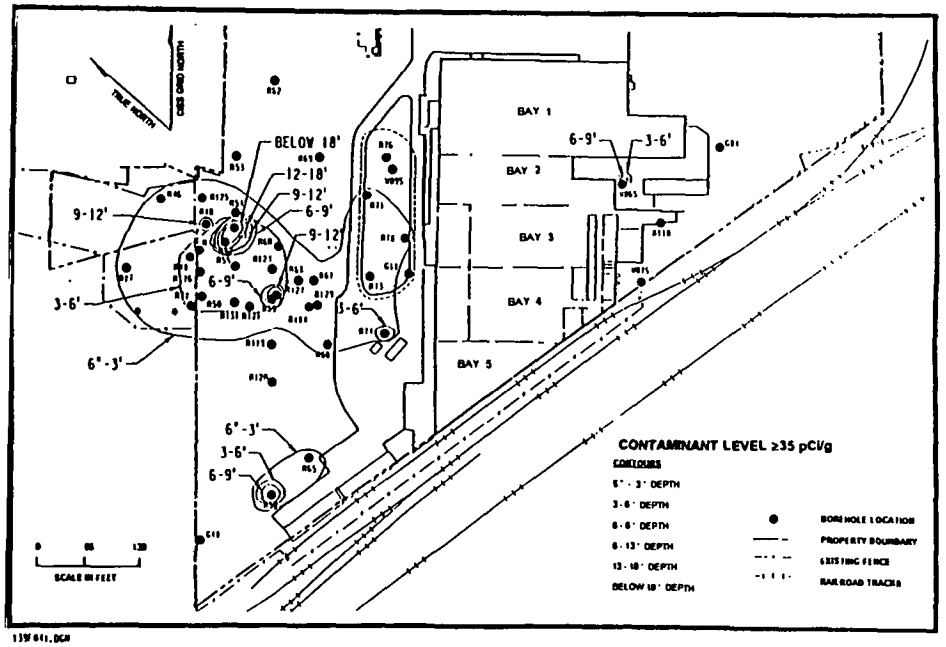
Figure 3.4 Areas of Radioactive Contamination at Bliss and Laughlin Steel



Results of Gamma Walkover Survey and Surface Soil Sampling



Radiological Results for Asphalt/Surface Soil Sampling

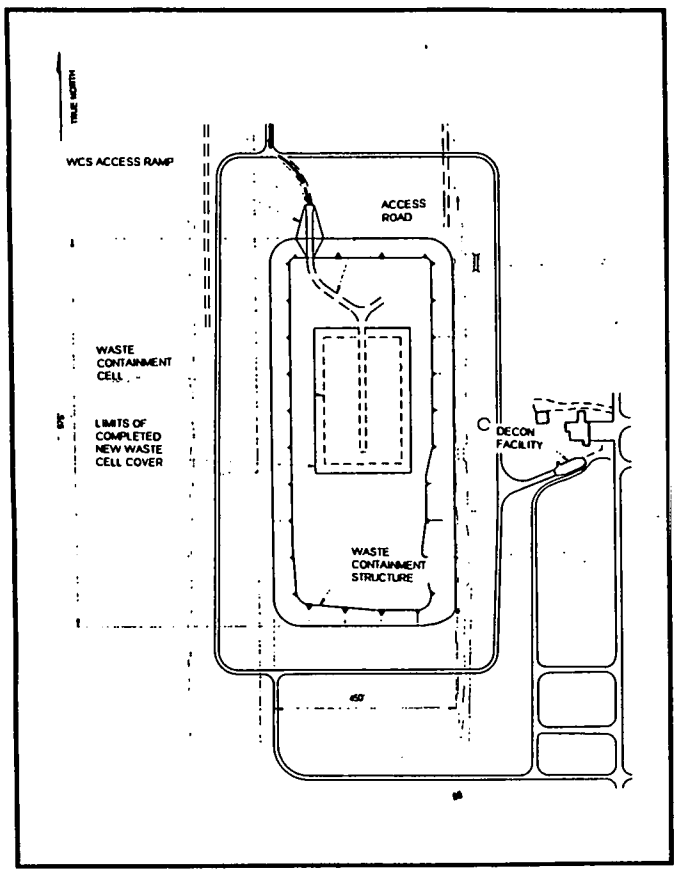


Subsurface Contamination Contours

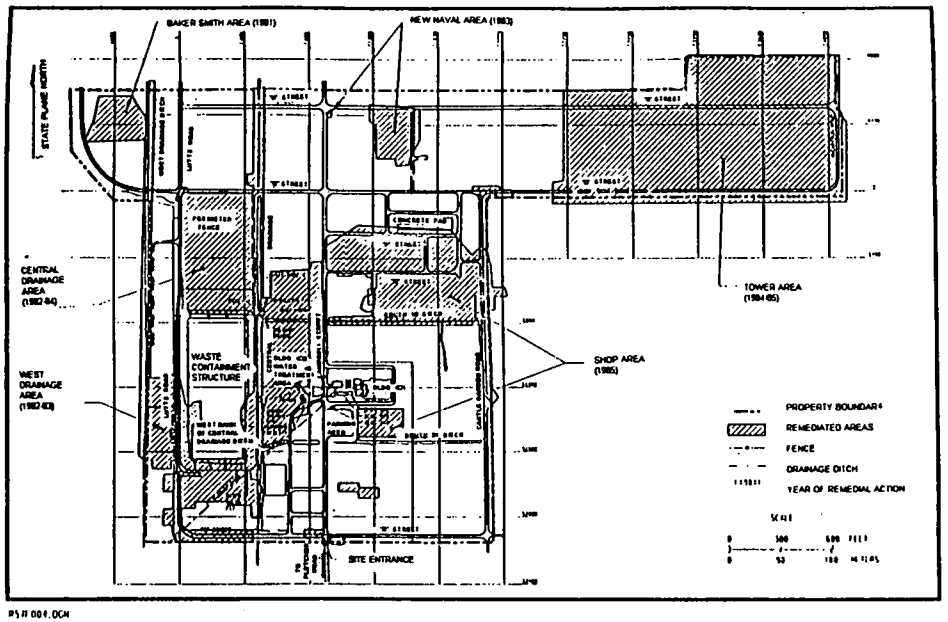
Source: Modified from BNI 1992b

Figure 3.5 Areas of Radioactive Contamination at Colonie

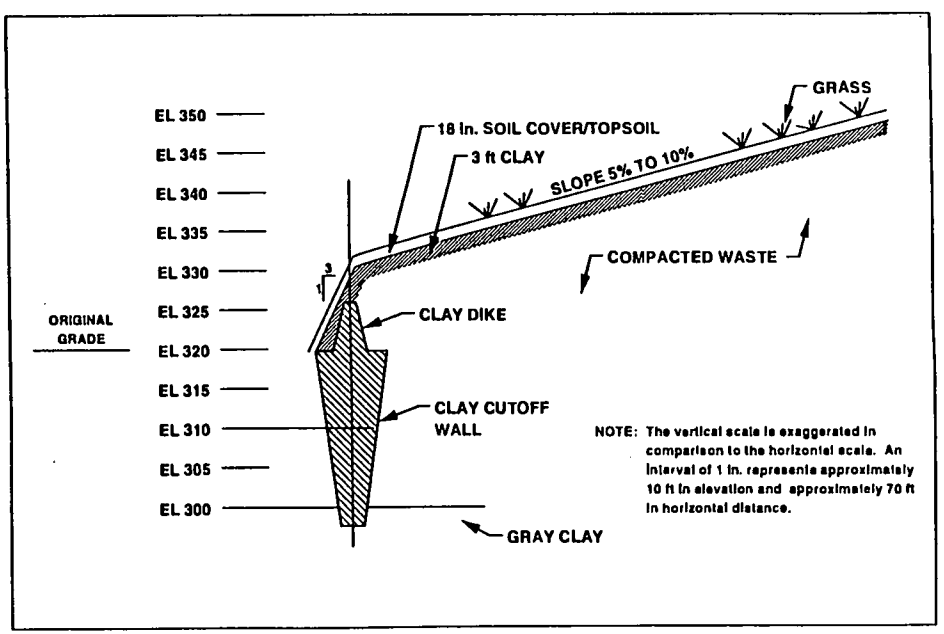
All wastes encapsulated within onsite engineered waste containment structure (WCS)



Plan View of the WCS



Areas Where Remedial Action Was Conducted



Cross Section of the WCS

Figure 3.6 Areas of Radioactive Contamination at Niagara Falls Storage Site

exceeded guidelines in ~79,300 yd^3 of soil over 10 acres of the 191-acre site and ~28,600 yd^3 of sediments in both onsite and offsite portions of the west and central drainage ditches. Before remedial action, radon emitted from stored and buried residues in the southwestern storage area and at the site perimeter exceeded the New York State standard for controlled areas (NYSDEC 1989). Consolidation of the wastes within the waste containment structure (WCS) has effectively controlled radon emissions. Radium-226 concentrations in groundwater did not exceed guidelines for uncontrolled-access sites at either onsite or offsite sampling locations.

Remedial action at the vicinity properties, which included cleaning and restoring offsite drainage ditches and excavating radioactive soils and rubble, was completed in 1986. Remediation of all onsite residual radioactive material and consolidation of 205,000 yd^3 of low-level waste from remedial action at NFSS and 50,000 yd^3 of wastes from vicinity property cleanups were also completed in 1986. All wastes were encapsulated within the onsite engineered WCS (Table 3.3). Remediated areas onsite and the configuration of the WCS are shown in Figure 3.6. The environmental surveillance program at NFSS includes sampling networks for radon concentrations in air, external gamma radiation exposure, and total uranium and radium-226 concentrations in surface water, sediments, and groundwater. Environmental surveillance data since 1988 have consistently confirmed normal background levels well below regulatory limits, indicating that there are no radon releases from the WCS (BNI 1989k, 1990i, 1991e, 1992d, 1993c, 1994b, 1995d).

Sites in Illinois and Ohio

Madison. Field investigations at Madison to date have consisted of a radiological survey in 1989 and a site scoping visit in 1993. The survey included gamma scanning of accessible floor and wall surfaces throughout Building 6 and on overhead beams; collection and radiological analysis of indoor dust and debris; and measurement of direct and removable alpha and beta-gamma activity on overhead beam surfaces (ORNL 1990a). The walkover survey and sampling from overhead beams identified uranium-238 and thorium-232 at concentrations exceeding current guidelines (Table 3.4). Areas of radioactive contamination are shown in Figure 3.7. No further characterization has yet been conducted because the contamination is within a building that is currently involved in daily production. During the site scoping visit, the overhead beams were found to be significantly more complex than originally thought, which will make cleanup more challenging. During the preliminary radiological survey, only the lower sections of the beam design were accessible for sampling, leaving large amounts of surface area unsurveyed. Conduit and piping that run through the overheads also are likely to be contaminated. The cleanup effort will require extensive scaffolding, and many areas are not easily accessible. Detailed characterization will be conducted before cleanup begins.

B&T Metals. The designation survey in 1990 indicated elevated uranium levels at several locations in the main office building, including three locations on the floor, in the drain system beneath the floor, and on support beams (Table 3.4). Levels of radium-226 and thorium-232 did not exceed current guidelines (ORNL 1990b; DOE 1991a, 1991b). Areas of radioactive contamination are shown in Figure 3.8. Additional characterization completed in December 1995 included surveying overhead beams and walls; sampling of expansion joints, sumps and drains, and sub slab floor areas; and sampling of surface and subsurface soil in the area of an abandoned drywell liquid disposal pit. Most of the radioactive contamination was found in Area A of the main office building, where most of the MED work took place (BNI 1995a, 1995b). No contamination above current guidelines was detected within the extrusion building; however, elevated radioactivity was found in the public sewer in the north-south alley between the extrusion building and row houses (BNI 1995c). A small amount of contaminated material and debris was found in the metal storage building; this material was remediated during characterization and was consolidated in Area A of the main office building. Full-scale remediation is scheduled to begin in March 1996.

Table 3.4 Site Activity Summary: FUSRAP Sites in Illinois and Ohio

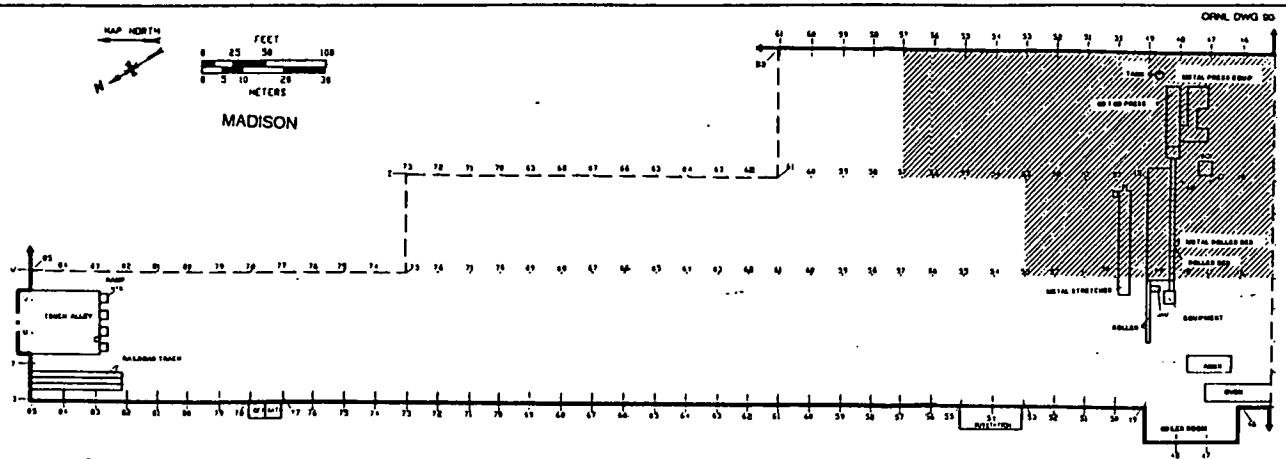
State	Illinois	Ohio		
Release Site	**Madison**	**B&T Metals**	**Luckey**	**Painesville**
ADS No.	OR-1300-AA	OR-1300-AA	OR-1300-AA	OR-1300-AA
WBS No.	1.4.11.1.4 (107)	1.4.11.1.4 (113)	1.4.11.1.4 (111)	1.4.11.1.4 (112)
Remedial Action Status	Planning/Preliminary survey	Characterization completed ahead of schedule in December 1995. RA to be initiated in March 1996 and completed before end of fiscal year.	Planning/Preliminary characterization	Planning/Preliminary characterization
Total Site Area	735 acres (building complex ~33.5 acres)	1 acre	~40 acres	150 acres
Vicinity Properties	None	None	None	None
Vicinity Properties Remediated	Not applicable	Not applicable	Not applicable	Not applicable
Cleanup Actions Completed	None	None. Remedial action is scheduled to begin in March 1996 and be completed before end of FY 1996.	None	None
Cleanup Actions Remaining	Removal of contaminated dust on overheads in Building 6	Cleanup of main building	RI/FS-EIS Cleanup of contaminated soils and sediments	RI/FS-EIS Cleanup of contaminated soils and sediments
REGULATORY STATUS				
EPA Region	V	V	V	V
NPL Site	No	No	No	No
Federal Facilities Agreement (FFA)	No	No	No	No
DOE-Owned/Leased Site	No	No	No	No
Designation Authority/Date	DOE-designated (1992)	DOE-designated (1992)	DOE-designated (1992)	DOE-designated (1992)
Lead Agency for Remedial Action	DOE	DOE	DOE	DOE
Key Regulators	DOE-OR, DOE EM-421, EPA Region V, Illinois Environmental Protection Agency, local health department	Ohio Environmental Protection Agency, local health department	DOE-OR, DOE EM-421, EPA Region V, Ohio Environmental Protection Agency, local health department	DOE-OR, DOE EM-421, EPA Region V, Ohio Environmental Protection Agency, Ohio Department of Health, local health department
Regulatory Drivers	CERCLA, NEPA, state and local laws and regulations	CERCLA, NEPA, state and local laws and regulations NESHAPs Subpart M	CERCLA, NEPA, state and local laws and regulations	CERCLA, NEPA, state and local laws and regulations
Level of CERCLA Documentation	Characterization Report EE/CA with Action Memorandum	Characterization Report EE/CA with Action Memorandum	RI/FS-EIS with ROD	RI/FS-EIS with ROD
Compliance Milestones	2001: Action Memorandum based on EE/CA 2002: Complete remedial action	1996: Action Memorandum based on EE/CA 1996: Complete remedial action	1999: ROD based on RI/FS-EIS 2002: Complete remedial action	1999: ROD based on RI/FS-EIS 2004: Complete remedial action
OPERATIONAL HISTORY				
Historic Origin of Contamination	Uranium extrusion/rod straightening operations for MED/AEC (AEC work subcontracted by Mallinckrodt) (1950s-1960s)	Uranium rod extrusion (MED work subcontracted by DuPont) (1943)	Beryllium ore and production residues and traces of uranium from beryllium and uranium processing under MED/AEC contract (1942-49)	Uranium-contaminated scrap steel shipped by AEC from Lake Ontario Storage Area for use in magnesium production processes (1950s)

Table 3.4 (continued)

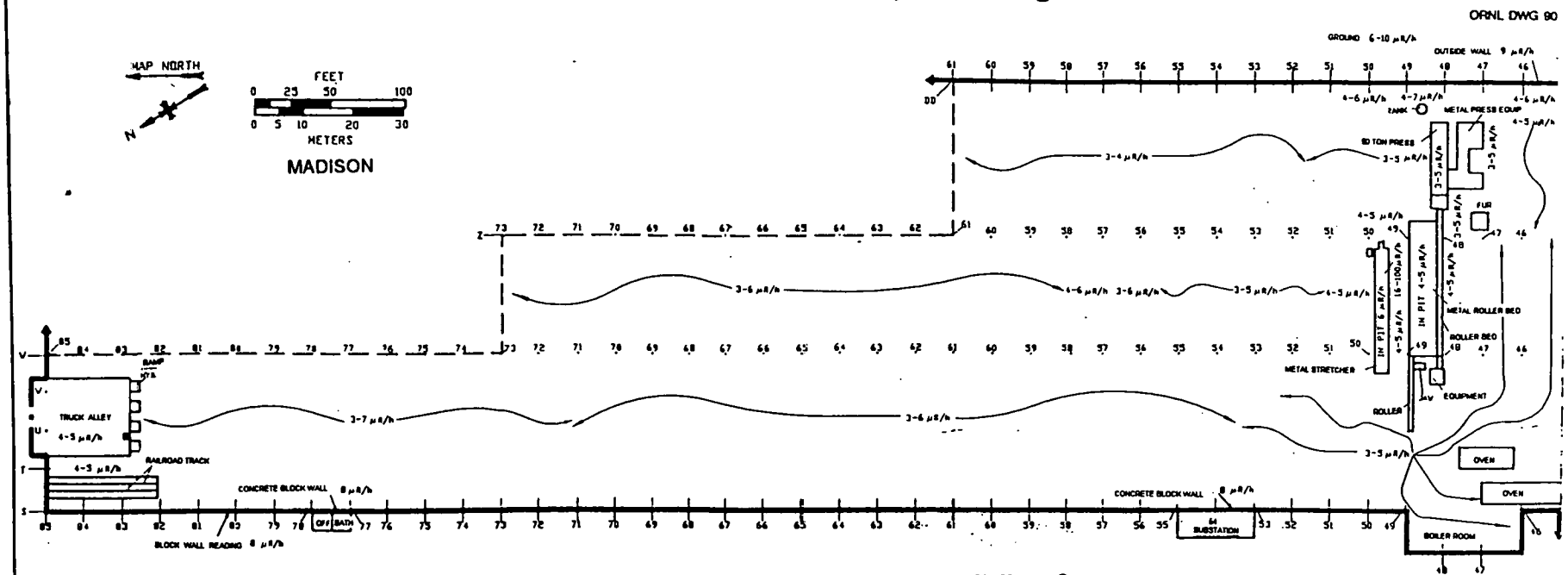
State	Illinois	Ohio		
Release Site	**Madison**	**B&T Metals**	**Luckey**	**Painesville**
Owner/Landlord				
Historic	Dow Chemical Company	B&T Metals	Brush Beryllium Company (1942-49); Diamond Magnesium Company, Magnesium Reduction Corporation, Motor Wheel Corporation (Goodyear subsidiary)	Diamond Magnesium Company
Current	Spectrulite Consortium	B&T Metals	Uretech International	Uniroyal Chemical Company
WASTE INVENTORY				
Site Total Waste Volume (yd^3)	10	1,500	34,500	69,000
Total Curies				
Waste Type	LLRW (uranium, thorium)	LLRW (uranium)	11(e)2 (uranium, radium, beryllium)	11(e)2 (uranium, radium, possibly lead)
NATURE AND EXTENT OF CONTAMINATION				
Primary Contaminants	Uranium-238, Thorium-232	Uranium-238	Uranium-238, radium-226, beryllium	Uranium-238, radium-226
Areas/Locations of Contamination	Dust on overhead beams in Building 6	Main office building		Widespread in soil on Uniroyal property, especially area west of buildings around railroad car spill containment basin. Small area on adjacent Lonza Chemical Company property.
Site Map Reference	Figure 3.7	Figure 3.8	Figure 3.9	Figure 3.10
Contaminated Media	Building 6	Main office building	Soil and sediments	Soil and sediments
Soil and Sediments				
Primary Contaminants and Concentrations	None detected above guidelines	None detected above guidelines	Uranium-238: 2.6-280 pCi/g Radium-226: 2.1-4000 pCi/g Beryllium: 120-6400 µg/g	Uranium-238: 0.8-210 pCi/g Radium-226: 0.5-1500 pCi/g Thorium-232: 0.1-5.1 pCi/g CHECK
Locations of Contamination > Guidelines	Not applicable	Not applicable	Widespread in surface and subsurface soil near dike-enclosed landfill and near waste lagoons on southern side of plant and on northern side extending onto property north of site leased for farming	Widespread in surface and subsurface soil within Uniroyal property boundaries and in smaller area on adjacent Lonza property
Maximum Depth of Contamination	Not applicable	Not applicable	To be determined	To be determined
Buildings and Structures				
Primary Contaminants	Uranium-238 (6.2-310 pCi/g) Thorium-232 (0.5-7.8 pCi/g) (Thorium not related to DOE predecessor activities)	Uranium-238 (3.5-1700 pCi/g)	No radioactive contamination detected in survey of accessible areas of production building	No radioactive contamination detected in survey of accessible areas of Buildings 420, 421, and 422
Locations of Contamination > Guidelines	Overhead beams (and possibly overhead conduits and piping) in south end of Building 6	Main office building (floor, drain system beneath floor, support beams)	Not applicable	Not applicable

Table 3.4 (continued)

State	Illinois	Ohio		
Release Site	**Madison**	**B&T Metals**	**Luckey**	**Painesville**
Groundwater				
Primary Contaminants	Not applicable	Not applicable	To be determined	To be determined
Locations of Contamination > Guidelines	Not applicable	Not applicable	To be determined	To be determined
RISK				
RELATIVE RISK (RDS)	See Section 4.2 (Tables 4.3 and 4.4)	See Section 4.2 (Tables 4.3 and 4.4)	See Section 4.2 (Tables 4.3 and 4.4)	See Section 4.2 (Tables 4.3 and 4.4)
RELATIVE RANKING (EM-40)	High See Section 4.1 (Tables 4.1 and 4.2)	High See Section 4.1 (Tables 4.1 and 4.2)	High See Section 4.1 (Tables 4.1 and 4.2)	High See Section 4.1 (Tables 4.1 and 4.2)
REFERENCES	ORNL 1990a; BNI 1995a	ORNL 1990b; BNI 1995a, 1995b; DOE 1991a, 1991b	Ohio EPA 1984; Ohio Dept. of Health 1988; ORNL 1990c; DOE 1991a, 1991b, 1992d; BNI 1995a; Brush Wellman 1983; Goodyear 1988; Mansdorf 1987a, 1987b; Weston 1989, 1990	ORNL 1990d, 1991; DOE 1992e, 1992f, 1992g; BNI 1995a



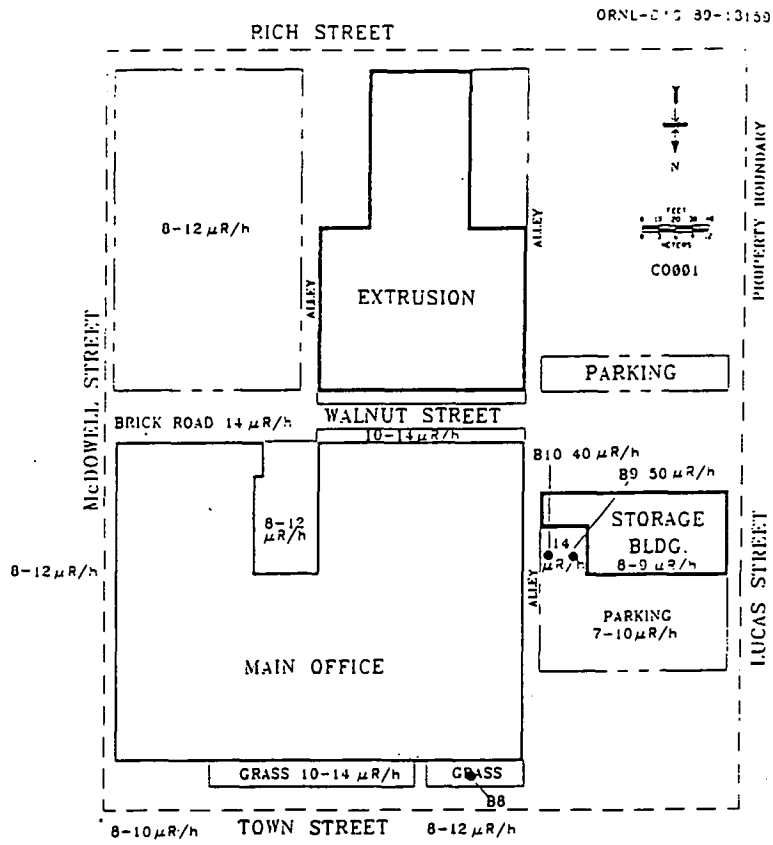
Locations of overhead beam dust contamination (shaded area) in Building 6



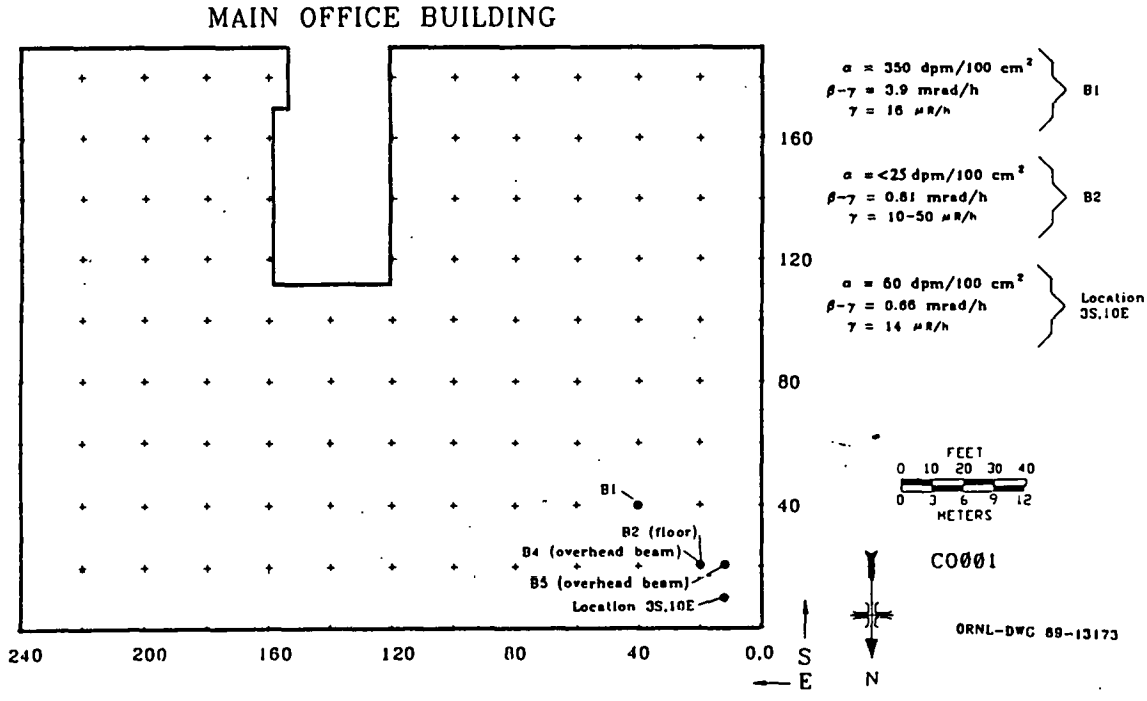
Range of surface gamma exposure rate measurements (μR/h) in Building 6

Source: **Modified from ORNL 1990a**

Figure 3.7 Areas of Radioactive Contamination at Madison

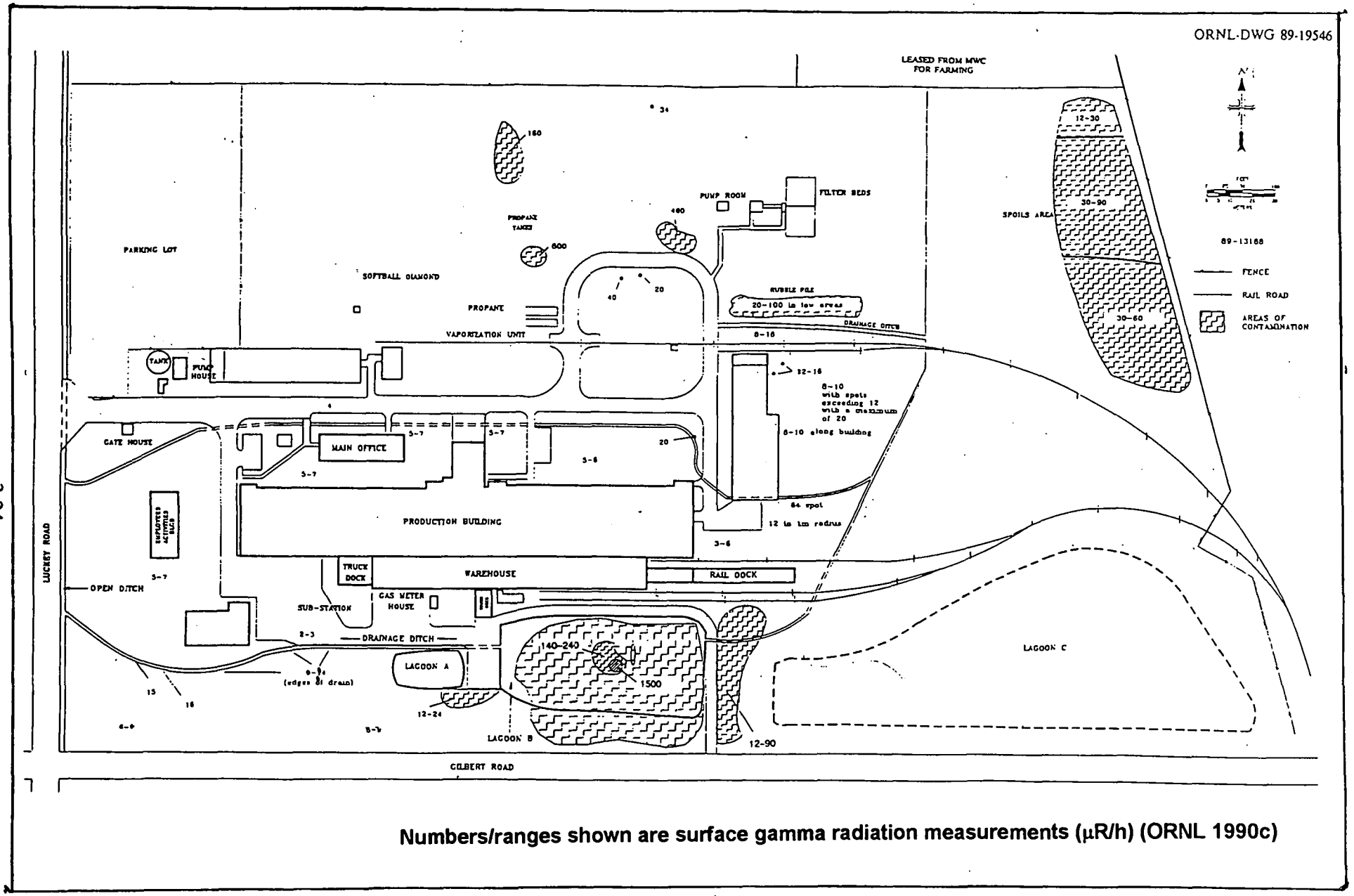


Grid system, sampling locations, and results of direct radiation measurements at the floor surface in the main office building (ORNL 1990b)



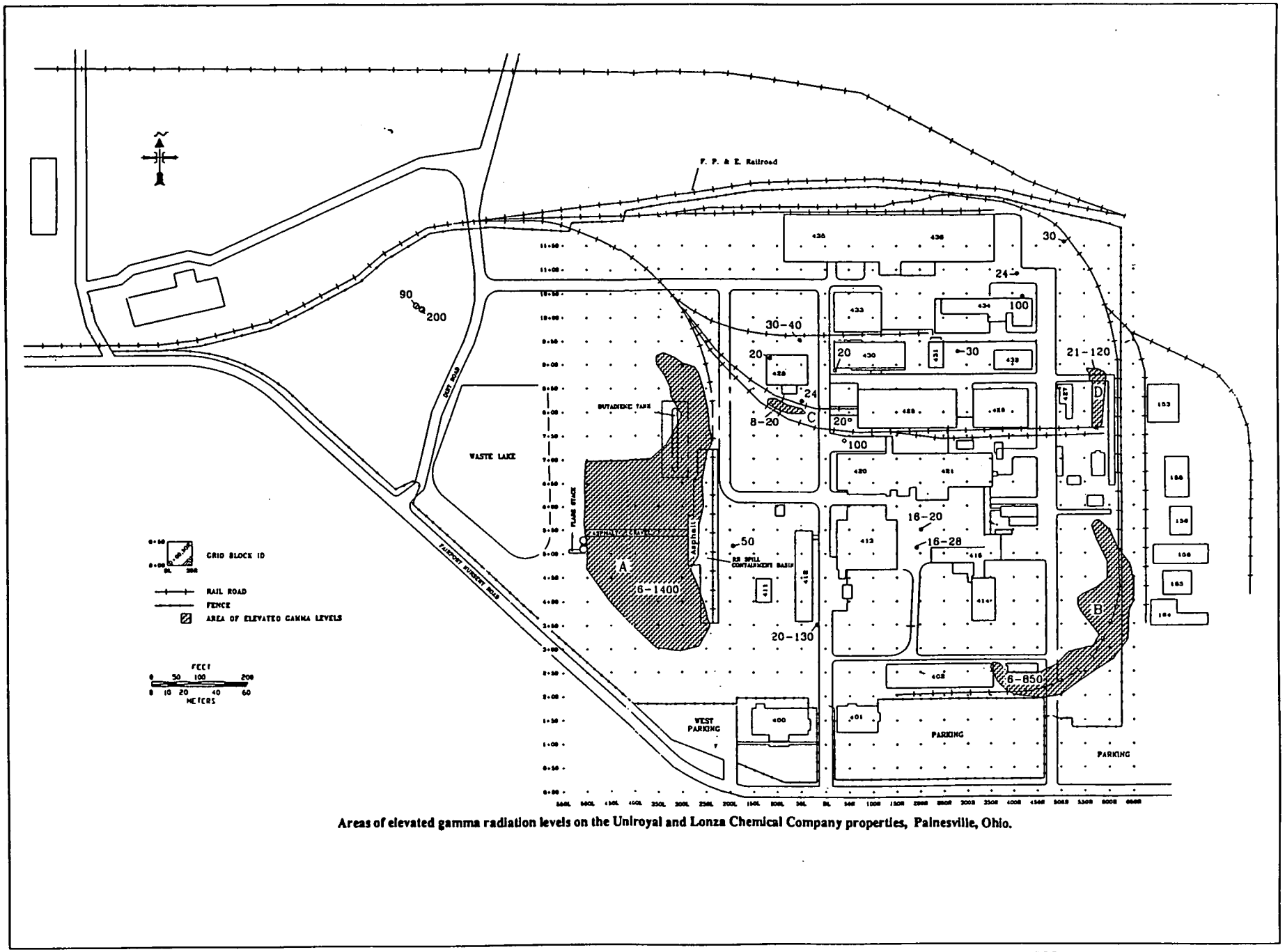
Gamma radiation levels (μR/h) at the surface and soil sampling locations

Figure 3.8 Areas of Radioactive Contamination at B&T Metals



Numbers/ranges shown are surface gamma radiation measurements (μR/h) (ORNL 1990c)

Figure 3.9 Areas of Radioactive Contamination at Luckey



Areas of elevated gamma radiation levels on the Uniroyal and Lonza Chemical Company properties, Painesville, Ohio.

Figure 3.10 Areas of Radioactive Contamination at Painesville

Luckey. Field investigations at Luckey to date have included radiological surveys and sampling by DOE, the Ohio Environmental Protection Agency, and the Ohio Department of Health; onsite contamination was identified in all previous investigations (OEPA 1984; Mansdorf 1987a, 1987b; Ohio Department of Health 1988; Weston 1989, 1990; ORNL 1990c; DOE 1991a, 1991b, 1992d; BNI 1995a). Preliminary radiological investigations in 1988 included a walkover surface gamma scan over a large portion of the property outdoors and sampling and analysis of water and surface and subsurface soil (ORNL 1990c). The results indicated that site soils contain radium-226 and uranium-238 as well as high concentrations of beryllium (Table 3.4). Areas of radioactive contamination are shown in Figure 3.9. Because waste solutions and precipitated sludges from beryllium processing operations were impounded in the lagoons on the southern side of the plant, high concentrations of beryllium in soil near the lagoons were not surprising. Elevated levels of beryllium were also detected in soil on the northern side of the plant and extending onto the leased property north of the site. Site remediation under FUSRAP is in its initial planning stages. The scope of work for FY 1996 includes preliminary characterization based on analysis of historical records, site drawings, and site photographs to determine site topography, drainage patterns, vegetation and other ecological resources, and relationships to adjoining areas. Additional characterization to delineate the boundaries of the contaminated areas will be performed as part of the remedial investigation before remedial action begins (BNI 1995a).

Painesville. Previous field investigations at Painesville included radiological surveys in 1988 and 1990 (ORNL 1990d, 1991). The 1988 survey included a gamma scan of selected portions of the property and sampling of surface and subsurface soil; no indoor survey measurements were performed. Uranium-238 and radium-226 were detected at elevated levels in soil samples from the area west of the buildings around the railroad car spill containment basin (ORNL 1990d). The 1990 investigation identified widespread radioactive contamination outdoors on the Uniroyal property and elevated radionuclide concentrations in a small area on the Lonza property (Table 3.4). Areas of radioactive contamination are shown in Figure 3.10. The contamination on the Uniroyal property was found in two large areas reportedly used for storage of scrap metal and in numerous smaller areas and isolated spots throughout the site. Elevated levels of radium-226 and thorium-230 were found in surface and subsurface soil on both properties. Uranium concentrations in some samples also exceeded current guidelines, and relatively high concentrations of lead were detected in a soil sample that also contained elevated levels of radium-226, an observation typical of residues from pitchblende operations. Detailed characterization to delineate the boundaries of the contaminated areas will be conducted as part of the remedial investigation before remedial action begins (BNI 1995a).

Sites in Connecticut, Maryland, and Massachusetts

CE. Radiological surveys during the 1980s identified elevated levels of thorium and uranium in an onsite "burn and drum" storage area as well as in drainpipes and sewer lines, a waste storage pad area, and a brook on the property. These areas were remediated by CE in 1986, and the area was determined to be within NRC guidelines for thorium and uranium in soil (ORAU 1989). A 1993 survey revealed the presence of highly enriched uranium residues in several areas formerly used for AEC activities (ORISE 1993) and indicated the need for further cleanup (Table 3.5). Areas of radioactive contamination are shown in Figure 3.11. CE is undergoing cleanup activities to close out existing NRC licenses. Although CE is designated for remedial action under FUSRAP, the extent of DOE's responsibility for site cleanup is limited to highly enriched uranium (uranium-235 enrichments of 20% or greater). DOE's authority at CE is restricted to Building 3, other facilities (such as sewer lines and drain pipes) associated exclusively with Building 3, and contamination that is exclusively highly enriched uranium (DOE 1994a, 1994b, 1994c; BNI 1995a). The extent of FUSRAP involvement in remediation has yet to be fully determined. Additional radiological characterization will define the levels of uranium enrichment in various portions of the facility and will help to determine the scope of remedial action and identify effective cleanup strategies. DOE will work with CE in assessing the nature and extent of contamination to reach consensus regarding cleanup.

Table 3.5 Site Activity Summary: FUSRAP Sites in Connecticut, Maryland, and Massachusetts

State	Connecticut	Maryland	Massachusetts	
Release Site	**CE**	**W.R. Grace & Company**	**Shpack Landfill**	**Ventron**
ADS No.	OR-1300-AA	OR-1300-AA	OR-1300-AA	OR-1300-AA
WBS No.	1.4.11.1.4 (136)	1.4.11.1.4 (110)	1.4.11.1.4 (125)	1.4.11.1.4 (127)
Remedial Action Status	Planning/Preliminary characterization	Planning/Preliminary characterization	Partial characterization Partial RA	Partial characterization Partial RA
Total Site Area	1,100 acres	90 acres	8 acres	3 acres
Vicinity Properties	None	None	None	None
Vicinity Properties Remediated	Not applicable	Not applicable	Not applicable	Not applicable
Cleanup Actions Completed	None	None	Removal of uranium-235 contamination and installation of boundary fence in 1980.	Radiological support to Morton during renovation and harbor remediation (1986, 1993, 1995). Extensive planning and coordination with Morton for remedial action (to include soil excavation and building decontamination/dismantlement). (See Table 3.1)
Cleanup Actions Remaining	Cleanup of HEU-contaminated soil, sediments, and Building 3	Cleanup of Building 23 and contaminated soil in 4-acre radioactive waste disposal area and surrounding 40-acre waste management area	Other PRPs: RI/FS Cleanup of contaminated soil in landfill DOE: Support final report preparation	Removal of contaminated soil and sediments Building decon/demolition (5 buildings to be demolished, including 2 to be decontaminated before dismantlement)
REGULATORY STATUS				
EPA Region	I	III	I	I
NPL Site	No	No	Yes	No
Federal Facilities Agreement (FFA)	No	No	Yes (EPA and other PRPs)	No
DOE-Owned/Leased Site	No	No	No	No
Designation Authority/Date	DOE-designated (1994)	DOE-designated (1980)	DOE-designated (1980)	DOE-designated (1986)
Lead Agency for Remedial Action	DOE	DOE	EPA/other PRPs (?)	DOE
Key Regulators	NRC, Connecticut Department of Environmental Protection, Connecticut Department of Health Services	EPA Region III, State Department of the Environment, local health department	EPA Region I, Massachusetts Department of Environmental Protection, local health department	EPA Region I, Massachusetts Department of Environmental Protection, local health department
Regulatory Drivers	CERCLA, NEPA, NRC guidelines, state and local laws and regulations	CERCLA, NEPA, state and local laws and regulations	CERCLA, NEPA, state and local laws and regulations	CERCLA, NEPA, state and local laws and regulations
Level of CERCLA Documentation	Characterization Report EE/CA with Action Memorandum	Characterization Report EE/CA with Action Memorandum	RI/FS-EIS with ROD (other PRPs)	Characterization Report EE/CA with Action Memorandum
Compliance Milestones	1998: Action Memorandum based on EE/CA 2004: Complete remedial action	2007: Action Memorandum based on EE/CA 2008: Complete remedial action	1999: ROD based on RI/FS 1999: Complete remedial action	1996: Action Memorandum based on EE/CA 1997: Complete remedial action

Table 3.5 (continued)

State	Connecticut	Maryland	Massachusetts	
Release Site	**CE**	**W.R. Grace & Company**	**Shpack Landfill**	**Ventron**
OPERATIONAL HISTORY				
Historic Origin of Contamination	Highly enriched uranium (HEU) machining/ fabrication for AEC (1940s-60s) Supplied non-nuclear components for AEC nuclear projects 1940s-50s HEU fuel fabrication work 1955-67	Processing/recovery of thorium and rare earth elements from AEC-owned monazite ore (1955-58)	Radioactive materials disposal in private landfill (early 1960s). Landfill closed 1965.	Conversion of uranium oxide to uranium metal powder; uranium recovery from fuel fabrication plant scrap/turnings by Metal Hydrides Corporation under contract to MED/AEC (1942-48)
Owner/Landlord				
Historic	CE (Combustion Engineering)	Rare Earths, Inc./W.R. Grace & Company	Mrs. Isadore Shpack (sold to Town of Norton 1981)	Metal Hydrides Corporation (became Ventron Corporation 1965; sold to Morton Thiokol 1976)
Current	CE	W.R. Grace & Company (Davison Chemical Division)	Town of Norton, Massachusetts	Morton International (formerly Morton Thiokol)
WASTE INVENTORY				
Site Total Waste Volume (yd^3)	10,000	36,000	9,370	2,000
Total Curies				
Waste Type	LLRW (highly enriched uranium)	11(e)2 (thorium)	LLRW (uranium, radium)	LLRW (uranium, thorium) (Thorium contamination attributable to Morton's commercial activities unrelated to MED/AEC work)
NATURE AND EXTENT OF CONTAMINATION				
Primary Contaminants	Highly enriched uranium	Thorium-232	Radium-226, uranium-238, uranium-235 (principal sources of uranium-235 removed during 1980 survey)	Uranium-238, thorium-230
Areas/Locations of Contamination	Soil/sediments (waste storage pads, drum burial pit, grounds north of Building 3, site brook bank, sanitary sewer and industrial drain lines at manhole access locations, site brook) Building 3 (including associated sewer lines & drain pipes), Building 6 (basement)	Soil (especially in 4-acre radioactive waste disposal area), Building 23	Soil (landfill) over much of property, especially near swamp	Soil; Building A; fill material beneath Buildings B1, B2, C1; sediment in storm sewer manholes
Site Map Reference	Figure 3.11	Figure 3.12	Figure 3.13	Figure 3.14
Contaminated Media	Buildings 3 & 6, soil, sediments	Soil, Building 23	Soil	Soil, sediments, buildings
Soil and Sediments				
Primary Contaminants and Concentrations	Highly enriched uranium (>20% enrichment in uranium-235) Uranium 235: Waste storage pad area: <0.1-2169 pCi/g Drum burial pit: <0.1-620.1 pCi/g Grounds north of Bldg 3: <0.1-148 pCi/g Site brook bank: 12.1-77.2 pCi/g Manhole sediments: <0.1-3868 pCi/g	Thorium-232: 97 pCi/g (max)	Uranium-238: 253.9 pCi/g (av) 3092 pCi/g (hotspot av.) 16,460 pCi/g (max) Radium-226: 70.3 pCi/g (av) 873.4 pCi/g (hotspot av) 1571 pCi/g (max)	Uranium-238: 1.9-62,000 pCi/g Thorium-230: 0.4-53 pCi/g Radium-226: 0.4-3.9 pCi/g

Table 3.5 (continued)

State	Connecticut	Maryland	Massachusetts	
Release Site	**CE**	**W.R. Grace & Company**	**Shpack Landfill**	**Ventron**
Locations of Contamination > Guidelines	Soil at 5 onsite locations contaminated with uranium shavings Sediment in site brook and manholes	4-acre radioactive waste disposal area Several locations within surrounding 40-acre waste management area	Surface and subsurface soil over much of landfill property	Surface and subsurface soil to maximum depth of 11.5 ft; sediment in storm sewer manholes
Maximum Depth of Contamination	To be determined	15 ft	10 ft	11.5 ft
Buildings and Structures				
Primary Contaminants	Uranium-238 (Building 3): 2.1-780 pCi/g Uranium-235 (Building 3): 0.4-98 pCi/g	Thorium-232	No buildings	Uranium-238
Locations of Contamination > Guidelines	Building 3 (drains, east wall, pipe insulation in drop tube furnace testing area, north wall and vault room)	Floors and walls on all 5 levels of Building 23	Not applicable	Building A (floors, walls, overhead surfaces, crawl spaces, roof) Fill material beneath Buildings B1, B2, C1
Groundwater				
Primary Contaminants	To be determined		Radium-226, uranium-238	
Locations of Contamination > Guidelines	To be determined		Levels > background in some onsite wells. No offsite migration detected. Other PRPs are responsible for groundwater monitoring using wells installed by DOE in 1982.	
RISK				
RELATIVE RISK (RDS)	See Section 4.2 (Tables 4.3 and 4.4)	See Section 4.2 (Tables 4.3 and 4.4)	See Section 4.2 (Tables 4.3 and 4.4)	See Section 4.2 (Tables 4.3 and 4.4)
RELATIVE RANKING (EM-40)	High See Section 4.1 (Tables 4.1 and 4.2)	High See Section 4.1 (Tables 4.1 and 4.2)	Medium See Section 4.1 (Tables 4.1 and 4.2)	High See Section 4.1 (Tables 4.1 and 4.2)
REFERENCES	BNI 1995a; DOE 1994a, 1994b, 1994c; ORAU 1989; ORISE 1993, 1994; Borawski 1968	BNI 1985a, 1986a, 1988a, 1989a, 1990a, 1990b, 1995a; Aerospace Corp. 1984a, 1984b; RMC 1978; EG&G 1979; ORNL 1984a, 1984b,, 1989; NUS 1984; DOE 1985; W.R. Grace 1978, 1985, 1990; Geraghty & Miller 1980	BNI 1984a, 1990c, 1995a; ORNL 1981a; EPA 1982a	BNI 1986b, 1986c, 1987a, 1989b, 1995a; ORNL 1985, 1986, 1988a

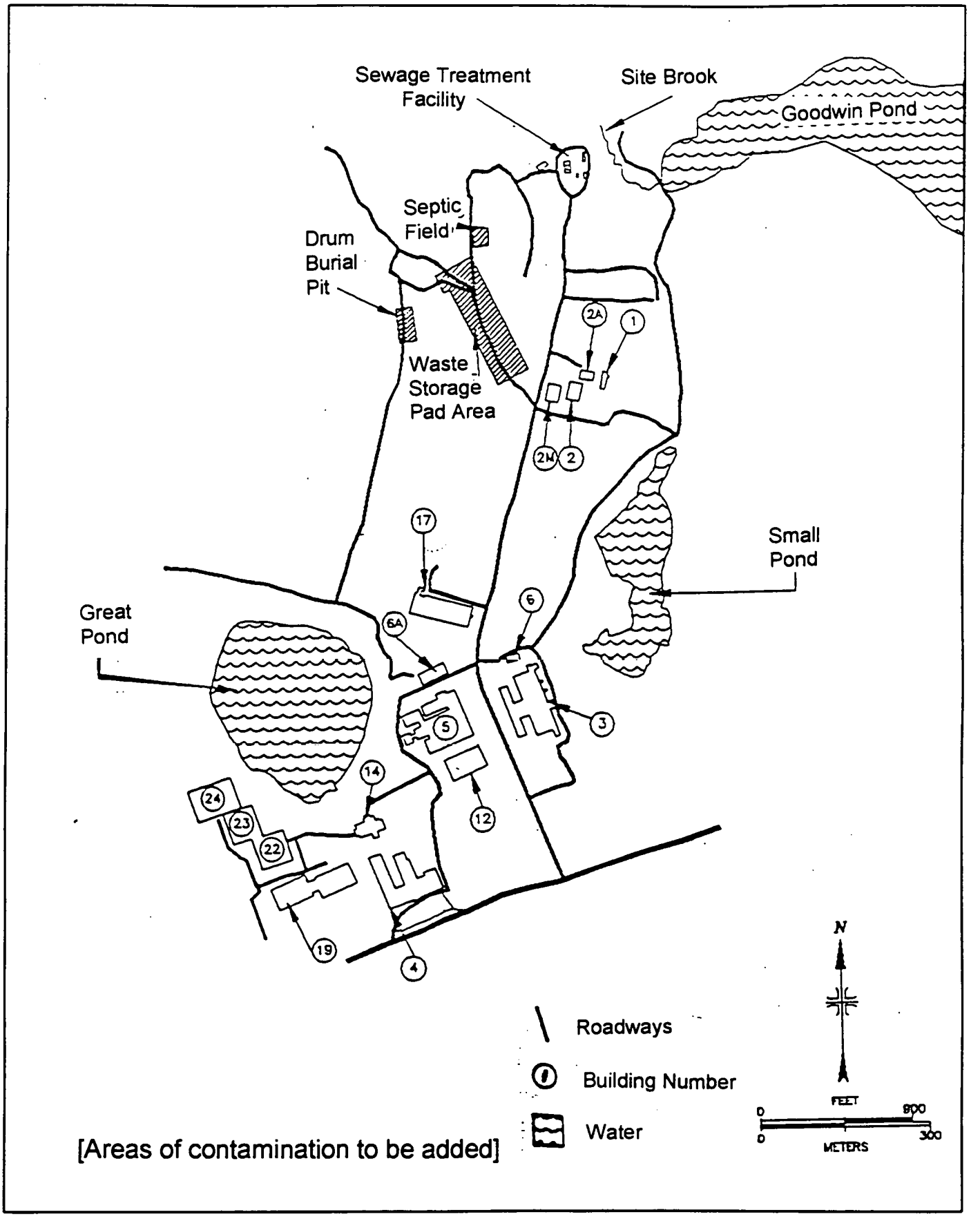
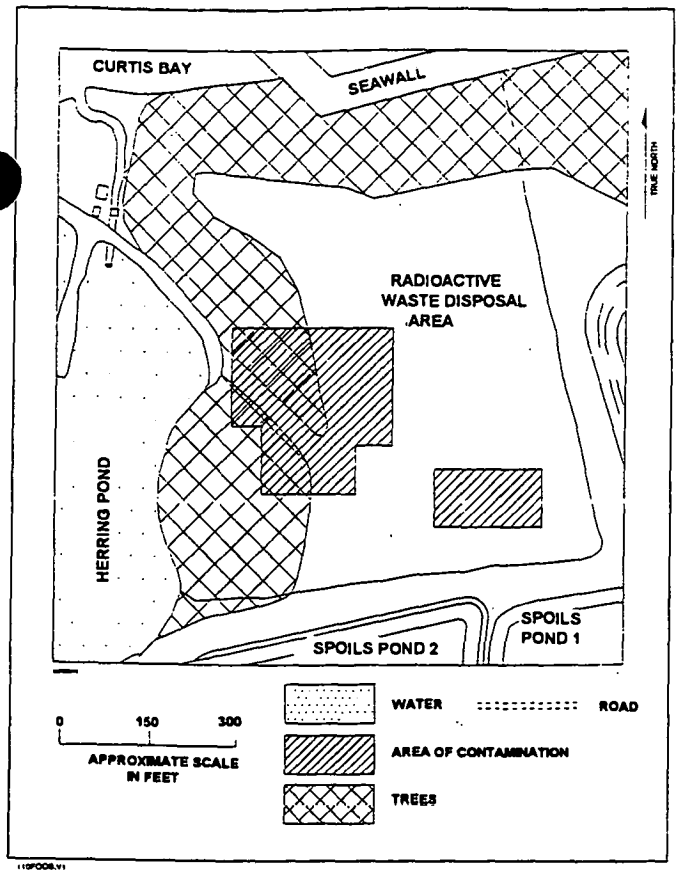
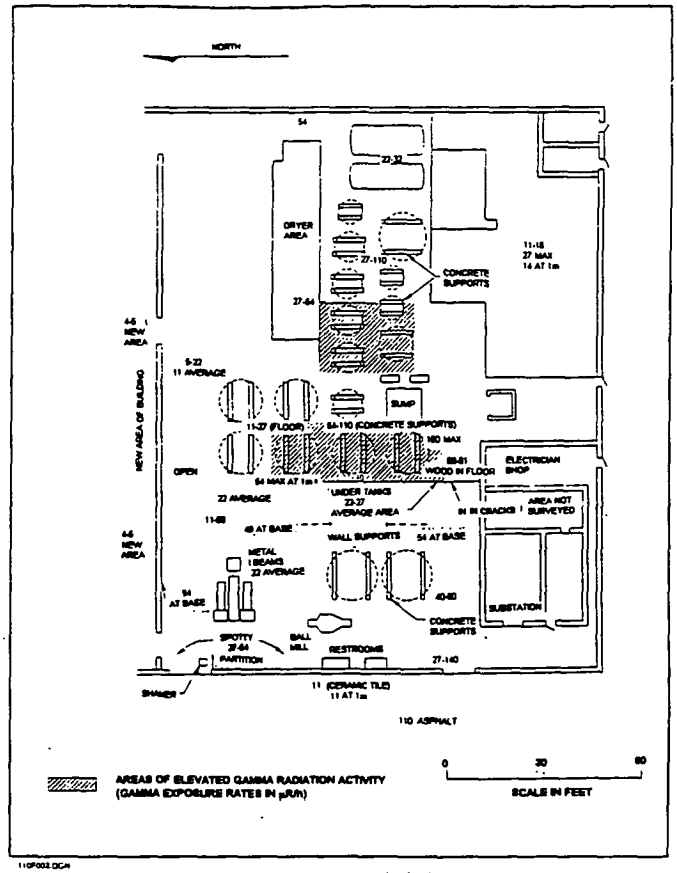


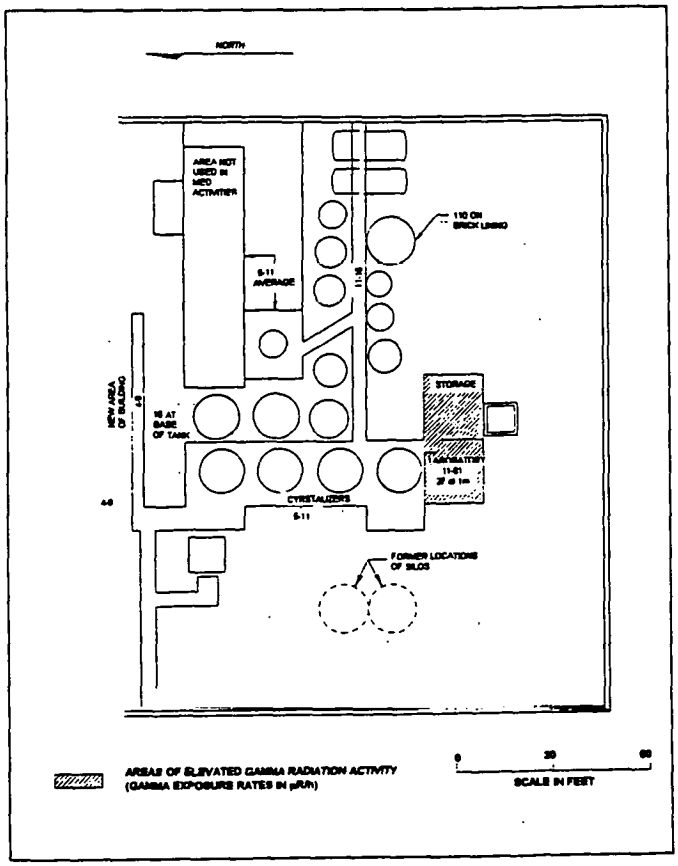
Figure 3.11 Areas of Radioactive Contamination at CE



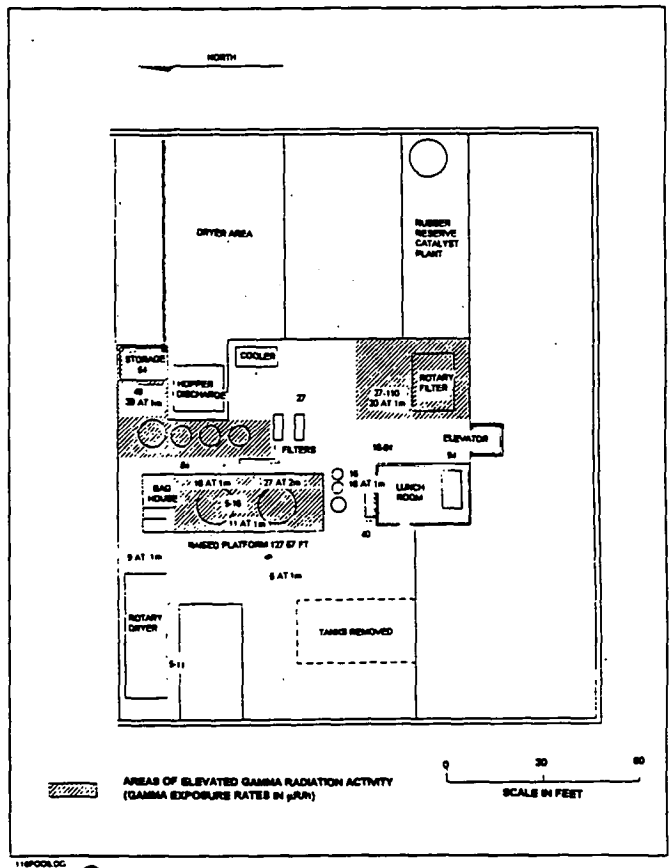
Areas of contamination identified in initial radiological survey (RMC 1978)



Gamma exposure rates (μR/h) on ground level of Building 23 (ORNL 1989: BNI 1991b)

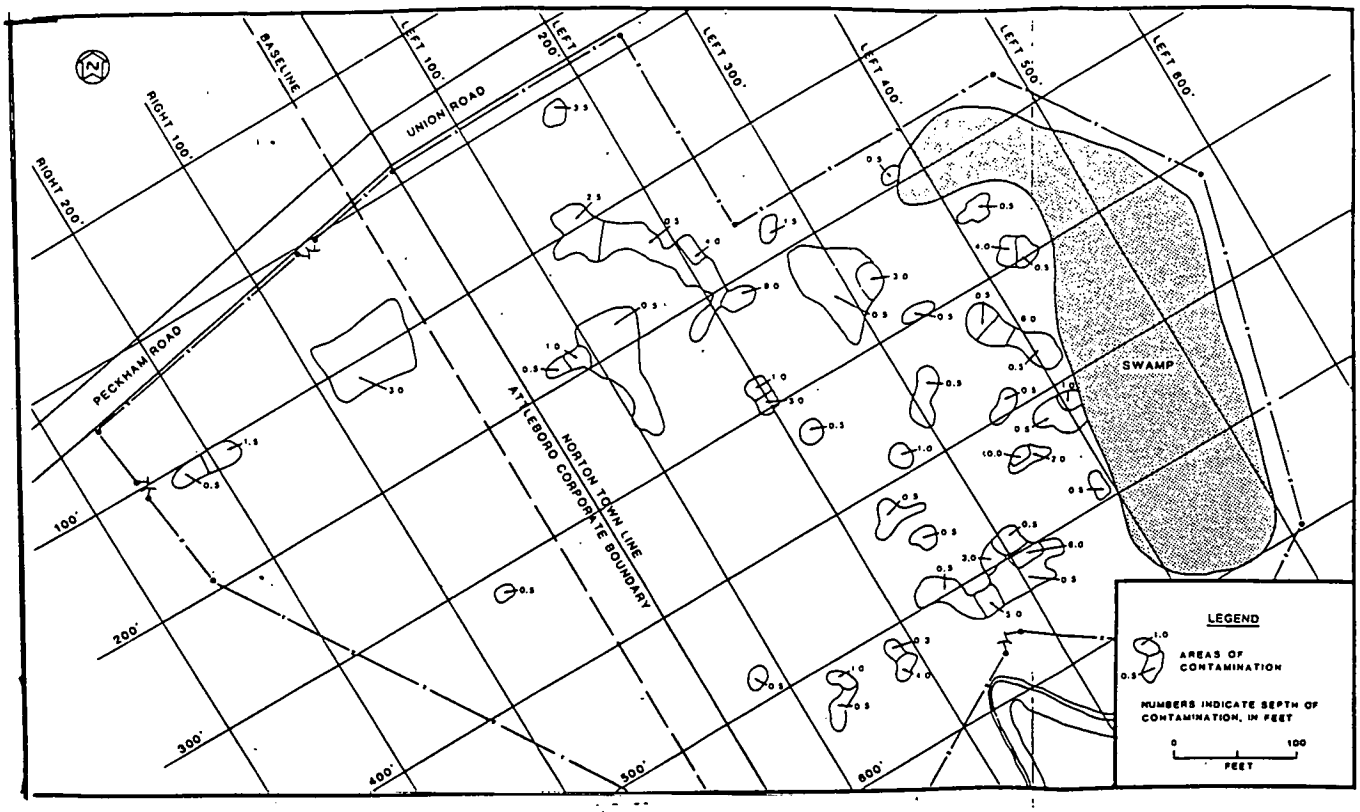


Gamma exposure rates (μR/h), second story of Building 23 (ORNL 1989; BNI 1991b)

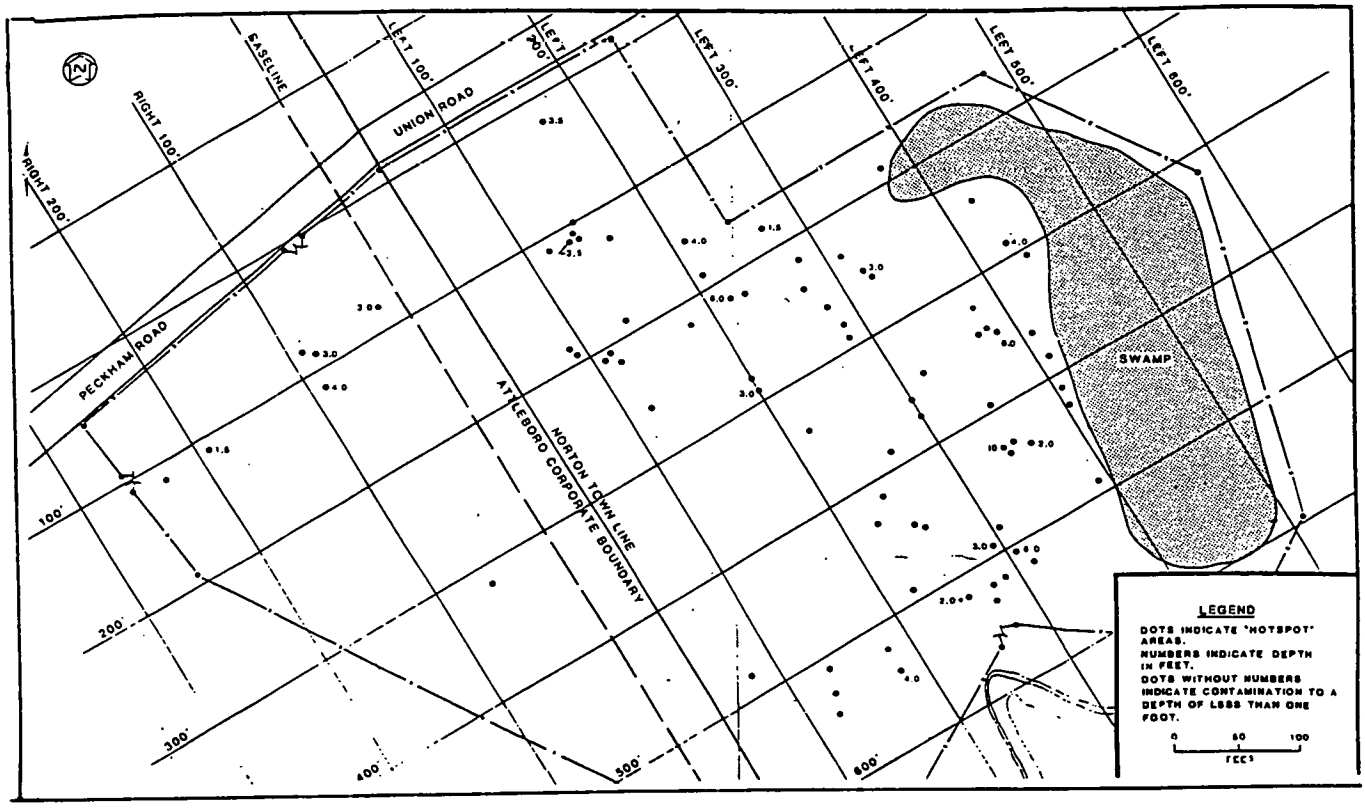


Gamma exposure rates (μR/h), third story of Building 23 (ORNL 1989; BNI 1991b)

Figure 3.12 Areas of Radioactive Contamination at W.R. Grace & Company



Areas of contamination (BNI 1984a)



"Hot spot" areas (BNI 1984a)

Figure 3.13 Areas of Radioactive Contamination at Shpack Landfill

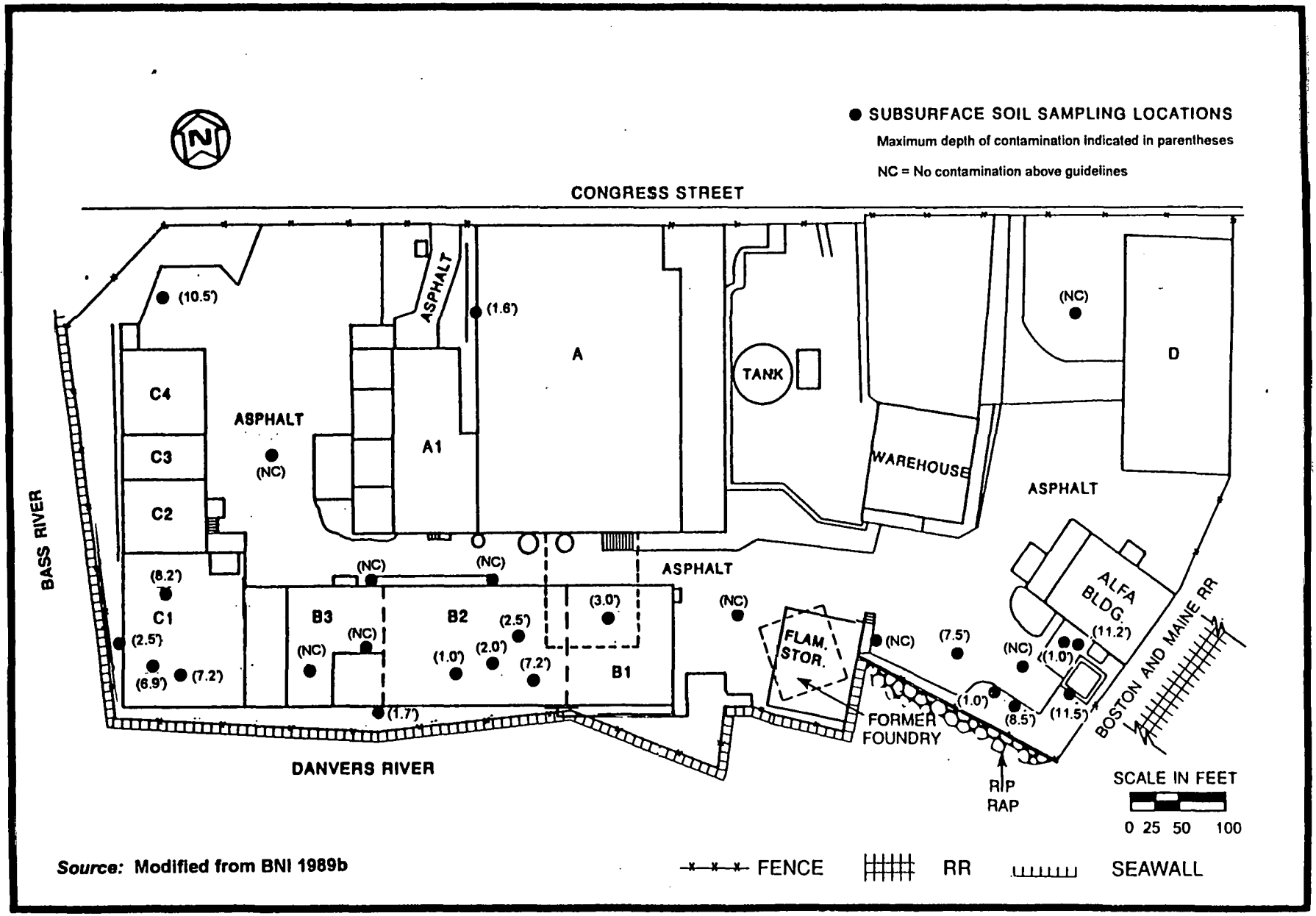


Figure 3.14 Areas of Radioactive Contamination at Ventron

W.R. Grace & Company. Results of earlier radiological surveys in the landfill area at W.R. Grace & Company indicated elevated levels of radioactivity to a maximum depth of 15 ft (RMC 1978; EG&G 1979; ORNL 1984a, 1984b). Gamma activity above guidelines was found in the 4-acre waste disposal area, and elevated levels of radioactivity were detected at several locations within the 40-acre waste management area surrounding the 4-acre residue disposal site (Table 3.5). Radiation levels on surfaces in Building 23 also exceeded guidelines, especially around vats and hoppers, and surface contamination exceeded guidelines on all five levels of the building (ORNL 1989; BNI 1995a). Areas of radioactive contamination are shown in Figure 3.12. Additional radiological and chemical characterization will be required before remedial action begins. An EE/CA will be developed to summarize existing radiological conditions and to describe and compare remedial action alternatives and their costs.

Shpack Landfill. An NRC survey of the landfill in 1978 identified radioactivity in excess of natural background levels for the area. The primary contaminants were radium-226, uranium-238, and uranium-235. The NRC findings were confirmed by further radiological characterization in 1980 (ORNL 1981a), which defined the general areas of contamination and provided the basis for inclusion of the site in FUSRAP (Table 3.5). During this investigation, the principal sources of uranium-235 surface contamination were removed. The 1980 survey included measurement of beta-gamma dose rates and gamma exposure rates as well as sampling and analysis for radionuclides and metals in surface and subsurface soil and surface water runoff from the site. Analytical results confirmed that radium and uranium are the primary contaminants, and elevated levels of metals were detected in several samples contaminated with uranium of varying enrichments. The boundaries of contamination were further delineated in a 1982 survey by FUSRAP (BNI 1984a). The distribution of onsite contamination was irregularly spaced and uneven, both vertically and horizontally. Areas of radioactive contamination are shown in Figure 3.13.

Nonradioactive hazardous materials unrelated to work sponsored by DOE predecessor agencies were also detected, and DOE is not the lead agency for cleanup at this site. In 1990, EPA issued an Administrative Order by Consent for the other potentially responsible parties (PRPs) to conduct an RI/FS. DOE will not prepare separate documents but will support the efforts of the other PRPs by submitting information as needed about radiological aspects of site remediation. The PRPs are responsible for sampling and analysis of groundwater using monitoring wells installed by DOE during the 1982 radiological survey. FUSRAP has provided input for the RI/FS documents prepared by the other PRPs' contractor and support in resolution of EPA comments on these documents.

Ventron. Based on results of radiological surveys of the site grounds, buildings, and other structures in 1977, 1980, and 1982 (ORNL 1985, 1988a), the site was designated for remedial action under FUSRAP (DOE 1986b). Residual radioactive contamination (largely uranium, with lesser amounts of thorium and radium) was identified in soil and in fill material beneath four buildings (Table 3.5). Surface contamination exceeding current guidelines was also found in two buildings on roofs, floors, walls, and overhead surfaces and in crawl spaces. Radiological analysis of sediment from storm sewer manholes indicated concentrations of thorium-232 exceeding naturally occurring background levels; however, the elevated thorium levels can be attributed to Morton's commercial activities involving radioactive materials and are unrelated to MED/AEC contract work. Areas of radioactive contamination at Ventron are shown in Figure 3.14. FUSRAP provided radiological support to Morton during renovation activities at Ventron in 1986. Support included removal of an underground storage tank and general maintenance activities (BNI 1989b). Additional radiological support was provided in 1993 during Morton's investigations of mercury contamination of sediments in the harbor adjacent to the site. During radiological characterization in 1992, the Streamlined Approach for Environmental Restoration (SAFER) was employed as a pilot project. Implementation of this method based on earlier characterization by Oak Ridge National Laboratory allowed DOE to realize substantial cost savings (BNI 1995a). Site characterization data will be used to support an EE/CA for planned removal actions, which are scheduled to be completed during FY 1997.

3.2 REGULATORY AGREEMENTS, PERMITS, AND OTHER DRIVERS

Site regulatory history and status (including key regulators and regulatory drivers; compliance milestones; and regulatory documentation requirements) are summarized in Tables 3.2 through 3.5 and discussed briefly below.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is the principal statutory authority for response actions at sites on EPA's National Priorities List (NPL) and most other FUSRAP sites. NEPA categorical exclusions are also used to document removal actions where there is limited contamination. DOE plans and activities are coordinated with EPA and appropriate state agencies. Through the FUSRAP community relations program (and through the EMAB process at large sites), DOE also provides for participation of federal and state legislators, local and county officials, and the general public in making decisions on options for remedial action, waste disposal, and future site use after remediation is complete.

DOE is the lead agency for remedial action at the sites covered by this MAP document, with the exception of the Shpack Landfill, where other PRPs are responsible for cleanup. Based on available data, FUSRAP may have the authority to address remediation of ~ 9,370 yd^3 of radioactively contaminated material at the Shpack Landfill; however, the presence of various hazardous chemicals for which EPA is responsible may affect the remedial action effort. The work plan for remedial action at Shpack has been deferred pending coordination with EPA and PRPs. The Shpack Landfill is the only NPL site covered by this MAP document.

FUSRAP activities under CERCLA are conducted in accordance with the values of the National Environmental Policy Act (NEPA). Other regulatory drivers at some FUSRAP sites include provisions of the Clean Air Act [e.g., portions of the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) requirements], the Clean Water Act [e.g., Safe Drinking Water Act criteria, National Pollutant Discharge Elimination System(NPDES) regulations], and the Resource Conservation and Recovery Act (RCRA), as well as state and local environmental laws and regulations. The Solid Waste Disposal Act, as amended by RCRA, addresses management of chemically hazardous material. Chemically contaminated material that results from implementing the remedial action and meets the RCRA definition of hazardous waste must be handled in accordance with the substantive requirements of RCRA. Mixed waste is managed in compliance with DOE Order 5400.3.

- NESHAPs requirements (Subparts H and M) have been applicable to Colonie. Compliance with Subpart H (nonradon radionuclide standards) is verified by applying the EPA-approved CAP-88 model (EPA 1992b; BNI 1995h). Subpart M contains the national emission standard for asbestos, which was present in the main plant building at Colonie but was removed in compliance with NESHAPs and New York state asbestos regulations. Asbestos waste from renovation of the main plant building was shipped offsite for disposal in 1995, and the building has been dismantled during 1995-1996.

- NESHAPs Subparts H, Q, and M are potentially applicable to the Niagara Falls Storage Site (NFSS). Because the soils containing radioactive material have been incorporated in the engineered onsite WCS, which is designed to prevent fugitive releases, Subpart H is currently not applicable (BNI 1995d). However, if future operations changed the configuration of the WCS sufficiently to create the potential for release of radionuclides, the notification and modeling requirements of Subpart H would apply to NFSS. Radon flux monitoring is conducted at NFSS in compliance with Subpart Q. Asbestos is present in Building 401 and in an onsite burial area at NFSS. Subpart M would apply to the buried asbestos if excavation occurred; however, long-term storage is planned, and excavation is not anticipated.

- In compliance with the Clean Water Act, DOE has obtained general stormwater discharge permits from NYSDEC for Colonie and NFSS. Safe Drinking Water Act maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) also have been adopted by NYSDEC and identified as applicable or relevant and appropriate requirements (ARARs) for Colonie and NFSS.

- Wastes regulated under RCRA were formerly present at Colonie. A RCRA Part A interim status permit for container storage of these wastes onsite was on file with NYSDEC but is now closed. An official notice of site closure under RCRA was submitted to NYSDEC on September 24, 1991. A site closure plan including provisions for removal of all wastes regulated under RCRA was submitted for review and comment in November 1991, and NYSDEC approved the plan on January 5, 1993. Final closure was achieved when secondary wastes from treatment activities and mixed waste oils containing polychlorinated biphenyls (PCBs) were removed and shipped for offsite disposal in July 1995. The closure plan was submitted in September 1995.

3.3 WASTE MANAGEMENT AND DISPOSITION ACTIVITIES IMPACTING SITE REMEDIATION

Predominantly low-level residual radioactive contamination remains at FUSRAP sites. Radioactive materials include soil; building materials; solidified material and other solids; liquids and other liquid-containing waste; personal protective equipment; site sampling, remediation, and maintenance equipment; and solid waste not directly associated with remedial action activities. Remediation generally involves excavation of soil and decontamination and/or removal of building material, equipment, and hazardous substances. An inventory identifying waste type, estimated volume, and location of radioactively contaminated media at the FUSRAP sites covered by this MAP document is included in Tables 3.2 through 3.5.

FUSRAP has in place programs for waste management, waste minimization, and pollution prevention awareness (BNI 1991a, 1993a). The FUSRAP waste management strategy addresses pollution control; waste treatment, storage, disposal, and transportation; interface requirements; and implementation of new technology. The overall objective of the FUSRAP waste management program is to manage radioactive and/or hazardous materials in a manner that minimizes the amount of waste requiring disposal and protects the environment and the health and safety of the public and DOE and contractor personnel.

3.4 PROJECT SUPPORT ACTIVITIES

3.4.1 Public Participation Program/Stakeholder Involvement

DOE is committed to a program of public participation and stakeholder involvement in the remedial action process for FUSRAP sites. In evaluating options for cleanup and disposal of FUSRAP waste, DOE is actively working with stakeholder groups at large FUSRAP sites through the EMAB process. EMAB, which includes representatives of other federal agencies, state and local governments, environmental and citizen activist groups, labor organizations, and members of the scientific and academic community, is the framework within which DOE works with stakeholders in remedy selection and decision making. National Stakeholder Summits provide a forum for public input to EMAB. At smaller sites, DOE works directly with property owners, local officials, and regulators to reach consensus on the selected remedies and disposal options.

During the past 2 years, communities near large FUSRAP sites have been invited to participate in the National Summit process and EMAB as a means for providing input to issues involving the remedy selection and implementation process. EMAB operates as an advisory board to the Assistant Secretary for Environmental Management and provides advice and recommendations on a wide range of issues confronting the program. EMAB established 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.

On May 2-3, 1995, more than 60 stakeholders from communities with large FUSRAP sites throughout the United States convened in Washington, D.C., to attend the first annual FUSRAP National Stakeholder Summit. Summit participants identified and prioritized issues and values and developed action plans. The five key general issues identified at the conference were

- Funding
- Cleanup criteria
- Risk management
- Remedy selection
- Community acceptance

The EMAB FUSRAP Committee used the issues and information from the May 1995 National Stakeholder Summit to begin its deliberations on guiding principles. When draft principles have been developed, they will be reviewed in a similar national forum, and ample opportunity will be provided for the public to influence final recommendations to DOE.

DOE also continues to interact with the public and other stakeholders through the FUSRAP community relations program as part of the CERCLA/NEPA process (BNI 1995c). 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 to provide an opportunity for residents of communities surrounding the sites to participate in and comment on the remedy selection and decision-making process. Unresolved issues and community concerns expressed during such meetings and in community interviews are incorporated in the implementation plans guiding subsequent phases of the remedial action process. Specific stakeholder issues and community concerns identified through CERCLA community relations activities and the EMAB/Stakeholder Summit process are summarized in Section 7 (see Table 7.2).

3.4.2 Technology Initiatives

Various treatment technologies are used to reduce the toxicity, mobility, or volume of generated or existing wastes at FUSRAP sites. For example, the VORCE soil-washing machine currently being tested at FUSRAP sites in New Jersey appears viable for some site soils. This soil-washing technique reduces waste volume by separating clean soils from soils contaminated above guidelines. New waste treatment technologies and other technology initiatives currently being tested and/or used at FUSRAP sites include:

- Use of a mobile rock-crushing machine that reduces building rubble and debris to soil-like material (which has a much lower unit cost for disposal), saving >$500,000 in Ohio and Missouri
- Use of field gamma spectroscopy to reduce analytical costs, saving $150,000 in Ohio and Missouri
- Design/construction/use of mobile wet chemistry lab
- Development of GIS modeling for data interpretation and visual communication
- Testing of chemical extraction soil-washing treatment methodology in progress (including bench-scale demonstration in Missouri)
- Development and testing of Long-Range Alpha Dctection (LRAD) system for use in site characterization and cleanup activities
- Bench-scale demonstration and field testing of segmented gate system (SGS) soil treatment at NBS, achieving 70% volume reduction for uranium and comparable results for radium
- Use of rock crusher and supercompaction to reduce waste volume from building demolition at Colonie

4. RELATIVE RANKING

A number of separate evaluations have been or are expected to be performed for the sites covered by this MAP document:

- DOE EM-40 Relative Ranking evaluation has been performed for all sites.

- DOE Risk Data Sheet (RDS) evaluation has been performed for the six sites expected to be funded in FY 1998
  - Middlesex Sampling Plant
  - Colonie
  - Niagara Falls Storage Site
  - Luckey
  - Painesville
  - CE

- Risk assessments driven by regulatory requirements of CERCLA and NEPA have been performed for those sites that have undergone or shortly will undergo cleanup. These assessments are included in the applicable NEPA categorical exclusion, EE/CA, or baseline risk assessment for the site.

4.1 DOE EM-40 RELATIVE RANKING

The EM-40 relative ranking process ranks each release site in one of three categories (high, medium, or low) describing 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:

- Source Hazard Factor (SHF): the significance and concentration of the source
- Pathway Factor (PF): the existence or potential for a contaminant migration/exposure pathway
- Receptor Factor (RF): the potential for receptors to have access to the contaminated media

The EM-40 relative ranking for each of the release sites discussed in this MAP document is summarized in Table 4.1. The basis for each ranking category is provided in Table 4.2, which describes the SHF, PF, and RF.

4.2 RISK DATA SHEET EVALUATION

The Risk Data Sheet (RDS) evaluation process provides information to the Environmental Management (EM) program that assists in budget development decisions. The process provides data that allow the assessment of possible effects of various budget levels on the ability of a given site or program to manage risk in comparison with other activities in the EM program.

Each site is evaluated in seven categories:

- Public Safety and Health (PS&H)
- Site Personnel Safety and Health (SPS&H)
- Environmental Impact (EI)
- Compliance with laws, regulations, and agreements (C)
- Mission Impact to stated DOE goals and mission (MI)
- Mortgage Reduction (i.e., reducing long-term DOE financial liabilities) (MR)
- Social/Cultural/Economic impacts in the affected community/state (S/C/E)

Table 4.1 EM-40 Relative Ranking

Site	EM-40 Relative Ranking				
	Groundwater	Surface Water/ Sediment	Soil	Facility	Overall Ranking
Sites in New Jersey					
DuPont & Company	Not evaluated	Not evaluated	High	High	HIGH
Middlesex Sampling Plant	Medium	High	High	High	HIGH
New Brunswick Site	Low	Low	Medium	High	HIGH
Sites in New York					
Bliss and Laughlin Steel	Not evaluated	Not evaluated	Not evaluated	Medium	MEDIUM
Colonie	High	Low	High	Low	HIGH
Niagara Falls Storage Site	Low	Low	Low	Low	LOW
Sites in Illinois and Ohio					
Madison	Not evaluated	Not evaluated	Not evaluated	High	HIGH
B&T Metals	Not evaluated	Not evaluated	High	High	HIGH
Luckey	Low	High	High	Not evaluated	HIGH
Painesville	Not evaluated	Not evaluated	High	High	HIGH
Sites in Connecticut, Maryland, and Massachusetts					
CE	Not evaluated	High	High	Not evaluated	HIGH
W.R. Grace & Company	Not evaluated	Not evaluated	High	High	HIGH
Shpack Landfill	Not evaluated	Not evaluated	Medium	Not evaluated	MEDIUM
Ventron	Not evaluated	Not evaluated	High	High	HIGH

Table 4.2 Basis for EM-40 Relative Ranking Categories

Site	Media	Factor	Description
			SITES IN NEW JERSEY
DuPont & Company	Groundwater		Not evaluated
	Surface Water/Sediment		Not evaluated
	Soil	SHF	Radium, thorium, and uranium are present in surface and subsurface soil
		PF	Contaminated soil is accessible to personnel performing facility improvements/maintenance
		RF	Potential exists for site worker contact with contaminated soils
	Facility		Not evaluated
Middlesex Sampling Plant	Groundwater	SHF	Concentrations of contaminants are low and represent a low source hazard
		PF	Potential exists for contaminant migration from the source
		RF	Potential exists for groundwater use in the vicinity of the site
	Surface Water/Sediment	SHF	Radium and lead have been detected in sediment onsite
		PF	Potential exists for migration of radionuclides in sediment
		RF	Potential exists for access of members of the public and onsite workers to sediments containing radionuclides
	Soil	SHF	Radium, thorium, and uranium are present in surface and subsurface soil
		PF	Potential exists for access of onsite workers to contaminated soil
		RF	Potential exists for contact of site workers with contaminated soil
	Facility	SHF	Gamma exposure rates and building radon levels represent a moderate hazard
		PF	Presence of site workers in areas of exposure is evident
		RF	Site worker exposure has been identified

Table 4.2 (continued)

Site	Media	Factor	Description
New Brunswick Site	Groundwater	SHF	Concentrations of contaminants are low and represent a minimal source hazard
		PF	Potential exists for contaminant movement from the source
		RF	Potential exists for public access to groundwater
	Surface Water/Sediment	SHF	Concentrations of contaminants represent a minimal source hazard
		PF	Potential exists for contaminant migration from the source
		RF	Potential exists for access of members of the public and onsite workers to sediment and surface water
	Soil	SHF	Radium and uranium are present in surface and subsurface soil in a localized area onsite
		PF	Potential exists for access of site workers and members of the public to contaminated soil
		RF	Potential exists for contact of site workers and members of the public with contaminated soil
	Facility	SHF	Gamma exposure rates at the fenceline are above guidelines in some locations
		PF	Potential exists for presence of site workers and members of the public in areas of exposure
		RF	Potential exists for site worker and public exposure but is minimized by access controls
			SITES IN NEW YORK
Bliss and Laughlin Steel	Groundwater		Not evaluated
	Surface Water/Sediment		Not evaluated
	Soil		Not evaluated
	Facility	SHF	Radioactive contamination is present at several locations within building
		PF	Potential exists for presence of non-DOE site workers in areas of exposure
		RF	Potential exists for non-DOE site worker exposure

Table 4.2 (continued)

Site	Media	Factor	Description
Colonie	Groundwater	SHF	Radioactive contaminants have been detected in groundwater
		PF	Potential exists for contaminant movement
		RF	Industrial wells in the area represent potential for public access to the groundwater
	Surface Water/Sediment	SHF	Concentrations of radionuclides are low and represent a minimal source hazard
		PF	Potential exists for movement of surface water and sediments
		RF	Potential exists for access of the public and onsite workers to surface water and sediment
	Soil	SHF	Radium, thorium, and uranium have been detected in surface and subsurface soil
		PF	Potential exists for contaminated soil in publicly accessible areas
		RF	Potential exists for contact of site workers and members of the public with contaminated soil
	Facility	SHF	Gamma exposure rates at the facility fenceline are minimal
		PF	Potential exists for presence of site workers and members of the public in areas of exposure
		RF	Potential exists for exposure of site workers and members of the public
Niagara Falls Storage Site	Groundwater	SHF	Concentrations of radionuclides are low and represent a minimal source hazard
		PF	Radionuclide movement appears confined based on hydrogeologic analysis
		RF	There is limited potential for public or site worker access to the groundwater
	Surface Water/Sediment	SHF	Concentrations of radium in surface water and sediment are below DOE guidelines and represent no source hazard
		PF	No movement of surface water and sediments at the site is evident
		RF	No access of the public and onsite workers to surface water and sediment is identifiable
	Soil	SHF	High concentrations of contaminants representing a significant source hazard are located within the engineered waste containment structure (WCS)
		PF	Contaminated soil and process residues are confined within the WCS
		RF	No contact of site workers or members of the public with contaminated materials is currently identifiable

Table 4.2 (continued)

Site	Media	Factor	Description
	Facility	SHF	Gamma exposure rates at the facility fenceline are very low and represent a minimal source hazard; asbestos contamination is a minimal hazard
		PF	Potential exists for presence of site workers and members of the public in areas of exposure
		RF	Potential exists for site worker and public exposure
			SITES IN ILLINOIS AND OHIO
Madison	Groundwater		Not evaluated
	Surface Water/Sediment		Not evaluated
	Soil		Not evaluated
	Facility	SHF	Radioactive contamination is present on surfaces at some locations within building
		PF	Potential exists for access of non-DOE site workers to contaminated surfaces
		RF	Potential exists for non-DOE site worker exposure
B&T Metals	Groundwater		No contaminated groundwater has been identified
	Surface Water/Sediment	SHF	Uranium has been detected in sewer line sediment
		PF	Potential exists for access of site workers and members of the public to contaminated sediment in sewer
		RF	Potential exists for exposure of site workers and members of the public to contaminated sediment
	Soil		No contaminated soil has been identified
	Facility	SHF	Radioactive contamination has been detected on surfaces at several locations within building
		PF	Potential exists for access of non-DOE site workers to contaminated surfaces
		RF	Potential exists for non-DOE site worker exposure

Table 4.2 (continued)

Site	Media	Factor	Description
Luckey	Groundwater	SHF	Concentrations of contaminants are low and represent a minimal source hazard
		PF	Potential exists for contaminant migration from the source
		RF	There is limited potential for access of members of the public or site workers to groundwater
	Surface Water/Sediment	SHF	Concentrations of radium and uranium in surface water represent a moderate source hazard
		PF	Potential exists for migration of contaminants in surface water
		RF	Potential exists for access of members of the public and onsite workers to surface water
	Soil	SHF	Radium, uranium, and beryllium have been detected in surface and subsurface soil
		PF	Contaminated soil is accessible to personnel performing facility improvements/maintenance
		RF	Potential exists for contact of site workers and members of the public with contaminated soil
	Facility		Not evaluated
Painesville	Groundwater		Not evaluated
	Surface Water/Sediment		Not evaluated
	Soil	SHF	Radium and uranium have been detected in surface and subsurface soil
		PF	Contaminated soil is accessible to personnel performing facility improvement/maintenance
		RF	Potential exists for non-DOE site worker contact with contaminated soil
	Facility	SHF	Gamma exposure rates are above guidelines in areas of contamination at the facility
		PF	Potential exists for presence of site workers and members of the public in areas of exposure
		RF	Potential exists for exposure of site workers and members of the public

Table 4.2 (continued)

Site	Media	Factor	Description
			SITES IN CONNECTICUT, MARYLAND, AND MASSACHUSETTS
CE	Groundwater		Not evaluated
	Surface Water/Sediment	SHF	Uranium has been detected in drain sediment onsite
		PF	Potential exists for access of onsite workers to drain system sediments containing radionuclides
		RF	Potential exists for site worker exposure
	Soil	SHF	Uranium is present in surface and subsurface soil onsite
		PF	Potential exists for access of non-DOE site workers to contaminated soil during facility improvements/maintenance
		RF	Potential exists for site worker contact with contaminated soil
	Facility		Not evaluated
W.R. Grace & Company	Groundwater		Not evaluated
	Surface Water/Sediment		Not evaluated
	Soil	SHF	Thorium is present in surface and subsurface soil onsite
		PF	Potential exists for site worker access to contaminated soil during facility maintenance/management
		RF	Potential exists for non-DOE site worker contact with contaminated soil
	Facility	SHF	Gamma exposure levels and contamination levels are above guidelines at some locations
		PF	Potential exists for access of non-DOE site workers to contaminated surfaces
		RF	Potential exists for non-DOE site worker exposure

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Table 4.2 (continued)

Site	Media	Factor	Description
Shpack Landfill	Groundwater		Not evaluated
	Surface Water/Sediment		Not evaluated
	Soil	SHF	Radium and uranium are present in surface and subsurface soil at the landfill
		PF	Potential for access to contaminated soil at the landfill is limited
		RF	Potential contact with contaminated soils is limited
	Facility		Not evaluated (no onsite buildings)
Ventron	Groundwater		Not evaluated
	Surface Water/Sediment		No significant contamination found
	Soil	SHF	Radium, thorium, and uranium have been detected in surface and subsurface soil
		PF	Potential exists for site worker access to contaminated soil in accessible areas
		RF	Potential exists for site worker contact with contaminated soil
	Facility	SHF	Surface contamination has been detected at some locations within buildings
		PF	Potential exists for presence of site workers in areas of exposure
		RF	Potential exists for site worker exposure to contamination

SHF = Source Hazard Factor; PF = Pathway Factor; RF = Receptor Factor

Within each category, the site is evaluated in terms of

- "Before" risk (the risk associated with the site/activity before the fiscal year's budget expenditures for the budgeted activity)
- "During" risk (the risk associated with undertaking the budgeted activity)
- "After" risk (the residual risk remaining after completing the budgeted activity)

The RDS ratings for the six sites expected to be funded in FY 1998 are provided in Table 4.3. The RDS ratings indicate that five of the six sites currently rank high and one site ranks medium, based on the management criteria used to assign funding priority. In all cases, the residual risk after completing the funded activities is low, indicating a significant net benefit associated with funding the activity. Detailed explanations of the basis for each rating are included in the EM Risk Data Sheet database. A general summary of the rating rationale is provided in Table 4.4.

Table 4.3 Risk Data Sheet (RDS) Ratings

Site	Category	Risk		
		Before Budgeted Activity	During Budgeted Activity	After Budgeted Activity
SITES IN NEW JERSEY				
Middlesex Sampling Plant	Public Safety and Health (PS&H)	High	Medium	Low
	Site Personnel Safety and Health (SPS&H)	Medium	Medium	Low
	Environmental Impact (EI)	High	Medium	Low
	Compliance (C)	High	*	Low
	Mission Impact (MI)	High	*	Low
	Mortgage Reduction (MR)	High	*	Low
	Social/Cultural/Economic Impacts (S/C/E)	High	High	Low
SITES IN NEW YORK				
Colonie	PS&H	High	Medium	Low
	SPS&H	Medium	Medium	Low
	EI	High	Medium	Low
	C	High	*	Low
	MI	High	*	Low
	MR	High	*	Low
	S/C/E	High	High	Low

Table 4.3 (continued)

Site	Category	Risk		
		Before Budgeted Activity	During Budgeted Activity	After Budgeted Activity
Niagara Falls Storage Site	PS&H	High	Low	Low
	SPS&H	Medium	Medium	Low
	EI	High	Medium	Low
	C	High	*	Low
	MI	High	*	Low
	MR	High	*	Low
	S/C/E	High	High	Low
SITES IN ILLINOIS AND OHIO				
Luckey	PS&H	High	Medium	Low
	SPS&H	High	Medium	Low
	EI	High	Medium	Low
	C	High	*	Low
	MI	High	*	Low
	MR	High	*	Low
	S/C/E	High	High	Low
Painesville	PS&H	High	Medium	Low
	SPS&H	Medium	Medium	Low
	EI	High	Medium	Low
	C	High	*	Low

Table 4.3 (continued)

Site	Category	Risk		
		Before Budgeted Activity	During Budgeted Activity	After Budgeted Activity
Painesville (continued)	MI	High	*	Low
	MR	High	*	Low
	S/C/E	High	High	Low
SITES IN CONNECTICUT, MARYLAND, AND MASSACHUSETTS				
CE	PS&H	High	Medium	Low
	SPS&H	Medium	Medium	Low
	EI	High	Medium	Low
	C	High	*	Low
	MI	High	*	Low
	MR	High	*	Low
	S/C/E	High	High	Low

* Compliance, Mission Impact, and Mortgage Reduction are not evaluated for risk "During" the budgeted activity.

Table 4.4 Summary of RDS Rating Rationale

Evaluation Category	Period Relative to Budgeted Activity	RDS Rating Rationale
Public Safety and Health (PS&H)	Before	All sites have the potential for public exposures greater than 15-100 mR/year if funding for cleanup/maintenance/monitoring is eliminated.
	During	There is a small possibility of below-guideline public exposure during cleanup activities.
	After	There is very little risk of public exposure or injury following cleanup from either residual contamination or a potential onsite disposal cell.
Site Personnel Safety and Health (SPS&H)	Before	Site workers could receive radiation exposures in excess of 15-100 mR/year, particularly if site cleanup/maintenance/monitoring were discontinued.
	During	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	Following remedial action, onsite risk of injury or radiation exposure at all sites is low.
Environmental Impact (EI)	Before	There is a significant possibility of the redistribution of contaminated soils/debris in accessible areas if site cleanup/maintenance/monitoring activities are discontinued.
	During	There is a small possibility of localized *onsite* releases resulting from stormwater redistribution of contamination, small fuel spills, etc.
	After	Following remedial action, the possibility of environmental releases from residual contamination has either been eliminated or is very small (e.g., radon release from a capped disposal cell within EPA-regulated limits, etc.).
Compliance (C)	Before	Work on these sites is to be performed in accordance with requirements in DOE Orders to take actions to remove public hazards and achieve cleanup guidelines.
	After	Completing budgeted work would allow compliance with applicable requirements.
Mission Impact (MI)	Before	Not undertaking the funded work would directly affect the fundamental DOE missions such as protection of environmental safety and health (ES&H) and environmental restoration (ER).
	After	Undertaking the planned, budgeted work would allow DOE to meet its ER and ES&H missions.
Mortgage Reduction (MR)	Before	Not undertaking the planned work would result in an increase in the total cleanup cost for the 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 the increase in total estimated cost for these sites that would result from added program support costs for the year(s) that the project is unfunded.
Social/Cultural/ Economic Impact (S/C/E)	Before	Not undertaking the work as budgeted and planned could result in organized public outcry or unfavorable media attention.
	During	During the execution of the cleanup work, criticism or unfavorable media attention is possible.
	After	Following cleanup, further social, cultural, or economic impact would be very low.

5. ENVIRONMENTAL RESTORATION STRATEGY

Key components of the FUSRAP program-wide ER strategy include

- Relative risk prioritization (assigning higher priority to remediating high-relative-risk sites, based on the relative risk from exposure to site contaminants)
- Expediting the remediation of non-DOE-owned sites and vicinity properties (relative to DOE-owned sites where public access is precluded or minimized by institutional controls)
- Interim removal actions at NPL sites and other large sites to progressively reduce risk while remedy selection is still in progress
- Reduction of long-term program management costs by using expedited protocols to compress the remediation schedule and complete sites ahead of schedule whenever possible
- Identifying and applying new technologies for waste volume reduction
- Promoting stakeholder involvement in remedy selection and decision-making through the EMAB/ Stakeholder Summit process

Emphasis on these strategic elements, which are based on strategic goals and program priorities outlined in the ER Strategic Plan (DOE 1995a), 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

The remediation strategy for the sites covered by this MAP document is based on technical, cost/schedule, and other assumptions identified in Table 5.1.

5.2 REMEDY SELECTION STRATEGY

The risk-based FUSRAP remedial action strategy focuses on risk reduction and assigns higher priority to remediating high-relative-risk sites than to cleanup of low-relative-risk sites. Risk prioritization depends on adequate characterization to identify sources, nature, and extent of contamination and provide other information needed for accurate determination of relative risk, scope, cost, and schedule of remedial action at each site.

5.2.1 Stakeholder Based Participation in Remedy Selection and Decision Making

In evaluating options for cleanup and disposal of FUSRAP waste at large FUSRAP sites, DOE is actively working with stakeholder groups, integrating guidance offered by the Environmental Management Advisory Board (EMAB). EMAB serves as a framework within which DOE works with stakeholders at large sites in remedy selection and decision making. National Stakeholder Summits and local stakeholder meetings provide a forum for public input to EMAB. At smaller sites, DOE works directly with property owners, local officials, and regulators to reach consensus on the selected remedies and disposal options.

During the past 2 years, FUSRAP communities near large sites have been invited to participate in the EMAB process as a means for providing input to issues involving the remedy selection and implementation process. In January 1992, DOE established the Environmental Restoration and Waste Management Advisory Committee in accordance with the Federal Advisory Committee Act. This

Table 5.1 Key Assumptions for Site Remediation Strategy

Category/Activity	Assumptions
General	• Principal radioactive contaminants are uranium-238, radium-226, thorium-230, thorium-232 • Soil and/or buildings are primary contaminated media • Public access to all sites is restricted under current conditions
DOE Remediation Authority	DOE remediation authority covers • all wastes (radioactive & chemical) resulting from or associated with MED/AEC operations • nonradioactive wastes that are commingled with radioactive wastes associated with MED/AEC operations
Waste Volumes/Contaminated Media (BNI 1995a)	Sites in New Jersey: • DuPont & Company: 8,270 yd^3 (soil, sediments, Building 845) • Middlesex Sampling Plant: 89,000 yd^3 [soil (including 2 storage piles), sediments, 4 buildings (process building, boiler house, garage, admin building)] • New Brunswick Site: 4,500 yd^3 (soil) Sites in New York: • Bliss and Laughlin Steel: 20 yd^3 [site building (primarily special finishing area)] • Colonie: 53,900 yd^3 (soil, buildings; decon/dismantlement of main plant building essentially complete) • Niagara Falls Storage Site: 255,000 yd^3 (onsite engineered WCS containing soil and residues from onsite and VP cleanups) Sites in Illinois and Ohio: • Madison: 10 yd^3 [Building 6 (overhead beam dust)] • B&T Metals: 1,500 yd^3 (main office building) • Luckey: 34,500 yd^3 (soil) • Painesville: 69,000 yd^3 (soil) Sites in Connecticut, Maryland, and Massachusetts: • CE: 10,000 yd^3 (soil, sediment in site brook, Building 3) • W.R. Grace & Company: 36,000 yd^3 (soil in 4-acre radwaste burial area, sediment, Building 23) • Shpack Landfill: 9,370 yd^3 (soil) • Ventron: 2,000 yd^3 (soil, sediment, Building A, fill material beneath Buildings B-1, B-2, C-1)
Relative Ranking (EM-40) (See Table 4.1)	• High: DuPont & Company, Middlesex Sampling Plant, New Brunswick Site, Colonie, Madison, B&T Metals, Luckey, Painesville, CE, W.R. Grace & Company, Ventron • Medium: Bliss and Laughlin Steel, Shpack Landfill • Low: Niagara Falls Storage Site

Table 5.1 (continued)

Category/Activity	Assumptions
Future Site Use Scenario Used for 1996 BEMR Cost Estimate (BNI 1995a)	Future site use depends on the options selected for site cleanup and waste disposal. The final decision regarding land use depends on the record of decision/action memorandum that will document the remedy selected for implementation. Remedy selection will involve input from EPA, state and local agencies, and stakeholders. Future use assumptions for the 1996 BEMR cost estimate were as follows: • Permanent onsite disposal of wastes by consolidation and capping at DuPont & Company, Middlesex Sampling Plant, Luckey, Painesville, and W.R. Grace & Company • Disposal of wastes from New Brunswick Site, Bliss and Laughlin Steel, Colonie, Madison, B&T Metals, CE, and Ventron at an existing out-of-state commercial disposal facility • Management of wastes from Shpack Landfill to be arranged by other PRPs • Future land use after remediation assumed to remain industrial at DuPont & Company, Bliss and Laughlin Steel, B&T Metals, CE, Madison, W.R. Grace & Company, and Ventron. • Operations at existing industrial facilities assumed to continue
Schedule (BNI 1995a)	
Complete Characterization (Record of Decision or Action Memorandum)	• 1996: New Brunswick Site, Bliss and Laughlin Steel, Ventron, B&T Metals • 1998: Middlesex Sampling Plant, CE • 1999: Luckey, Painesville, Shpack Landfill • 2001: Madison • 2003: DuPont & Company • 2007: W.R. Grace & Company
Complete Remedial Action	• 1996: New Brunswick Site, B&T Metals Complete interim cleanup at Niagara Falls Storage Site • 1997: Bliss and Laughlin Steel, Ventron • 1999: Shpack Landfill • 2000: Colonie • 2001: Middlesex Sampling Plant • 2002: Madison, Luckey • 2004: Painesville, CE • 2005: DuPont & Company • 2007: Niagara Falls Storage Site (complete final closure) • 2008: W.R. Grace & Company

Table 5.1 (continued)

Category/Activity	Assumptions
Remedial Action Scenario for BEMR Cost Estimate (BNI 1995a)	The hypothetical scenarios used for the 1996 BEMR cost estimate were based on the following assumptions: • Excavation of contaminated soils at DuPont & Company, Middlesex Sampling Plant, New Brunswick Site, Colonie, B&T Metals, Luckey, Painesville CE, W.R. Grace & Company, Shpack Landfill (by other PRPs), and Ventron • Excavation of contaminated sediments at DuPont, Middlesex, CE, W.R. Grace & Company, and Ventron • Building decontamination at DuPont & Company (Building 845), Middlesex Sampling Plant (garage, admin building), Bliss and Laughlin Steel (site building), B&T Metals (main office building), CE (Building 3), Madison (Building 6), and W.R. Grace & Company (Building 23), and E&T Metals (main office building) • Demolition of 2 buildings at Middlesex Sampling Plant (process building , boiler house) and 5 buildings at Ventron (including 2 buildings to be decontaminated before dismantlement) • Consolidation of wastes and disposal by onsite capping at DuPont & Company, Middlesex Sampling Plant, Luckey, Painesville, and W.R. Grace & Company • Continuation of DOE onsite surveillance and maintenance at DuPont & Company, W.R. Grace & Company, Luckey, and Painesville for 2 years after remedial action is complete • Transfer of responsibility for long-term surveillance and maintenance at Luckey and Painesville to Grand Junction Projects Office • Responsibility for long-term surveillance and maintenance at DuPont & Company and W.R. Grace & Company to be assumed by the property owner
Cost to Implement Final Remedy (1996$)	• DuPont: $8.1M • Middlesex Sampling Plant: $17M-$140M • New Brunswick Site: $2.8M-$5.4M • Bliss and Laughlin Steel: $1.6M • Colonie: $22M-$172M • Niagara Falls Storage Site: $40.2M • Madison: $2.5M • B&T Metals: $3.2M • Luckey: $64.2M • Painesville: $90M • CE: $22.9M • W.R. Grace & Company: $22.1M • Shpack Landfill: $2.1M • Ventron: $16.2M
Regulatory Compliance	Site remediation activities will comply with ARARs and TBCs
Stakeholder Acceptance	• DOE will continue its commitment to stakeholder involvement and public participation in the remedy selection process. • The final remedy documented in the record of decision or action memorandum will incorporate recommendations and other input from stakeholders as appropriate. • DOE will continue to coordinate with stakeholders through the EMAB process

Table 5.1 (continued)

Category/Activity	Assumptions
Other Assumptions (see Community Commitment Register, October 10, 1995)	• DOE will not initiate interim cleanup activities without the prior agreement of the affected communities (1991). • DOE will give written notification to NJDEP and Borough of Middlesex before initiating remedial action (Memorandum of Understanding, DOE, NJDEP, Mayor of Middlesex, November 1979). • DOE will give priority for added funds to initiate work at New Jersey, Missouri, and New York Sites (applicable to Colonie) • (Energy & Water Appropriation Act, 1983). • DOE will not bring new wastes to Niagara Falls Storage Site (Final Environmental Impact Statement, April 1986). • DOE will terminate any further study of Niagara Falls Storage Site as a regional disposal site (1982). • DOE will not consider options that include use of Niagara Falls Storage Site for disposal of radioactive materials from other locations within or outside the state of New York (1983).
Sources: BNI 1995a; DOE 1995a	

committee was charged with providing recommendations to the Assistant Secretary for Environmental Management on the Programmatic Environmental Impact Statement (PEIS) and related issues. The committee was rechartered in January 1994 as EMAB. The PEIS for the Environmental Management (EM) Program will evaluate alternatives for implementing an integrated program-wide approach to NEPA issues.

EMAB operates as an advisory board to the Assistant Secretary and provides advice and recommendations on a wide range of issues confronting the EM 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 established 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.

On May 2-3, 1995, more than 60 FUSRAP stakeholders from communities near large sites throughout the United States convened in Washington, D.C., to attend the first annual FUSRAP National Stakeholder Summit. Summit participants identified and prioritized issues and values and developed action plans. The five major issues identified at the conference were

- Funding
- Cleanup criteria
- Risk management
- Remedy selection
- Community acceptance

The EMAB FUSRAP Committee used the issues and information from the National Stakeholder Summit to begin its deliberations on guiding principles. When draft principles have been developed, they will be reviewed in a similar national forum, and ample opportunity will be provided for the public to influence final recommendations to DOE.

5.2.2 Interim Removal Actions

During the remedy selection process, interim removal actions have been and will continue to be conducted to expedite site remediation and progressively reduce risk. Major interim removal actions at the sites covered by this MAP document have included cleanup of vicinity properties at Colonie, Middlesex Sampling Plant, and Niagara Falls Storage Site. Interim onsite storage also has been and will continue to be employed as appropriate to manage wastes from site maintenance activities and interim removal actions before the decision is reached on a final remedy. Interim storage locations include the vicinity property and landfill piles at Middlesex Sampling Plant and the main plant building at Colonie, where containerized wastes from vicinity property cleanups were stored until the building was decontaminated and dismantled during 1995-1996. Wastes from cleanup of Niagara Falls Storage Site vicinity properties are entombed within the onsite engineered WCS.

The CERCLA remedial action process at Luckey and Painesville in Ohio and Shpack Landfill in Massachusetts will include an RI/FS-EIS to define the nature and extent of contamination at the sites, evaluate options for remedial action, assess environmental impacts, and select the appropriate remedy for site cleanup. The RI/FS-EISs at Luckey and Painesville will be conducted by FUSRAP; the RI/FS-EIS for the Shpack Landfill is being conducted by other PRPs, with DOE providing information as needed about the radiological aspects of site remediation. At the remaining sites covered by this MAP document, results of characterization are being or will be used as the basis for evaluation of cleanup options in one or more EE/CAs.

5.3 FUSRAP RELEASE SITE MANAGEMENT STRATEGY

Management of characterization and remediation activity at FUSRAP sites is at the release site level. FUSRAP strategy in management and remediation of release sites is driven by eight ER program priorities (DOE 1995a), which are used to determine budget priorities and to plan and sequence work activities:

- **Reduce offsite contamination** (e.g., at vicinity properties) that may pose risk to the public and the environment.

- **Prevent contaminant migration** through timely identification, reporting, assessment, application of best technologies, and safe storage.

- **Remediate non-DOE-owned sites and facilities** formerly used by DOE and its contractors.

- **Reduce onsite contamination** that could pose risk to the public and the environment during future use of the site. DOE works collaboratively with stakeholders and regulators to determine the projected future site use and select remedies to prevent exposure and minimize potential risk.

- **Cost-effectively maintain the essential infrastructure** by responsibly investing in site safety, security, utilities, and maintenance, thereby making funds available for other restoration activities.

- **Make prudent business decisions:**

    ⇒ Invest in capital projects that upgrade efficiency of operations
    ⇒ Complete sites ahead of schedule to reduce longer-term costs
    ⇒ Train employees for safety and enhanced job performance
    ⇒ Implement technically effective and cost-effective remedial action approaches

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

- **Reduce uncertainty through characterization** to more accurately determine relative risk, scope, cost, and schedule for site remediation activities. Establish data needs and objectives before characterization to increase cost-effectiveness and efficiency.

In accordance with these program priorities, FUSRAP program-wide ER strategic goals (DOE 1995a) are to:

- Address immediate risk concerns and prevent further increases in relative risk at all FUSRAP sites
- Complete 50% of current FUSRAP sites (23 of 46) by the end of FY 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 is to remediate all FUSRAP sites in a safe, cost-effective, and timely manner that optimizes opportunities for land and facility reuse.

5.4 NON-ENVIRONMENTAL RESTORATION REGULATORY STRATEGY

CERCLA remedial and removal actions conducted by DOE at the sites covered by this MAP document are being coordinated with EPA Regions I (Connecticut and Massachusetts), II (New York and New Jersey), III (Maryland), and V (Illinois and Ohio). Under authority delegated by Executive Order 12580, DOE is

the lead agency for remedial action at all but one of the FUSRAP sites covered by this MAP document, with oversight by EPA and coordination with state regulatory agencies. (The exception is the Shpack Landfill, where DOE is not the lead agency for site cleanup.) DOE holds routine meetings with EPA and state regulators to discuss plans and information relevant to the sites.

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. A key element of the integrated CERCLA/NEPA process is to determine the level of environmental analysis appropriate under NEPA based on factors such as the complexity of the proposed action, the probability of significant environmental impacts, and the potential for considerable public interest. At Colonie, an environmental assessment was prepared in conjunction with the EE/CAs for the building and site grounds. At NFSS and the Middlesex Sampling Plant, environmental impact statements were prepared. DOE has determined that an environmental impact statement is the appropriate level of NEPA review for the Luckey and Painesville sites and will prepare an RI/FS-EIS for these sites to determine the nature and extent of existing contamination and to evaluate alternatives for response actions. DOE also conducts expedited removal actions at small sites. Expedited removal actions allow cleanup of limited contamination at small sites to be managed in a cost-effective and environmentally responsible manner that is in compliance with NEPA and CERCLA.

FUSRAP non-ER regulatory strategy for the sites covered by this MAP document includes compliance with applicable or relevant and appropriate legal requirements other than those under CERCLA/NEPA. The evaluation of cleanup/disposal options for the Colonie building EE/CA included consideration of compliance with ARARs and to-be-considered (TBC) requirements under each option (SAIC 1995). Tables listing potential ARARs for removal actions at Colonie, Middlesex Sampling Plant, and the New Brunswick Site are provided in Appendix F. Non-ER regulatory requirements at sites covered by this MAP document include:

- Clean Air Act [applicable provisions of NESHAPs: 40 CFR 61, Subparts H (radon flux), Q (radionuclides other than radon), and M (remedial activities involving asbestos)] at NFSS and Subparts H and M at Colonie (Table 3.3). See Tables 3.2, 3.4, and 3.5 for applicability to other sites.

- Clean Water Act (applicable provisions of NPDES regulations, 40 CFR 121-125, imposing engineered controls and limits on stormwater and pollutant discharges through federal permit programs under Clean Water Act Section 402). In compliance with the Clean Water Act, DOE has obtained general stormwater discharge permits from NYSDEC for Colonie and NFSS. Safe Drinking Water Act MCLs and MCLGs have also been adopted by NYSDEC and identified as ARARs for Colonie and NFSS (Table 3.3). See Tables 3.2, 3.4, and 3.5 for applicability of NPDES stormwater discharge regulations to other sites.

- Wastes regulated under RCRA were formerly present at Colonie. A RCRA Part A interim status permit for container storage of these wastes onsite was on file with NYSDEC but is now closed. An official notice of site closure under RCRA and a RCRA closure plan were submitted to NYSDEC in 1991 and approved in 1993. Final closure was achieved when secondary wastes from treatment activities and mixed waste oils containing PCBs were shipped for offsite disposal in July 1995; the final closure plan was submitted in September 1995.

- OSHA regulations (29 CFR 1910 and 1926 ensuring site worker safety and health, setting standards to prevent injuries, regulating exposures, and requiring that employees be informed about job dangers at FUSRAP sites.

- DOE Orders (including guidelines for residual radioactive materials in soil and requirements for public and worker radiation protection, radioactive waste management and disposal, labeling and packaging waste for transportation, decommissioning, and radiation dosimetry programs).

- Executive Orders (including requirements involving impacts on floodplains and wetlands).

- State laws and regulations regarding water quality and effluent limitations.

5.5 PROJECT SUPPORT ACTIVITY STRATEGY

DOE is committed to a program of public participation and stakeholder involvement in the remedial action process for FUSRAP sites. As described in Section 5.2, DOE is actively working with stakeholders at large sites through the EMAB process in evaluating options for cleanup and disposal of FUSRAP waste at these sites. As part of the CERCLA/NEPA process, DOE also continues to interact with stakeholders through the FUSRAP community relations program by gathering information from the community, informing the public of ongoing and planned activities, and facilitating public input to the decision-making process. The community relations program provides interaction with the public through news releases and fact sheets, public meetings to discuss remedial action plans with the community and provide opportunities for public comment, discussions with local interest groups, response to public comments, and maintenance of a public repository for site-related information.

Arrangements with waste transporters and commercial disposal vendors could affect project performance by affecting disposal of waste from interim removal actions. No problems are currently anticipated in continuing commercial disposal of waste from interim actions. Plans are to continue pursuing cost-effective contracting strategies with waste transporters and disposal vendors. FUSRAP progress in transportation and disposal arrangements during 1995 included the following:

- Sponsored comprehensive transportation and disposal planning meeting with waste transporters and Envirocare for FY 1995 shipping campaign
- Reached agreement with Envirocare on method for determining densities for bulk shipments of FUSRAP waste
- Coordinated FUSRAP waste shipping and disposal campaigns through teleconferences with Envirocare, transportation contractors, and field and home office personnel
- Awarded 11(e)2 waste disposal subcontract to dispose of 100,000 yd^3 of FUSRAP waste
- Awarded mixed waste treatment subcontract to Envirocare
- Executed Low-Level Waste Disposal Subcontract Amendment lowering unit disposal cost rates
- Issued waste moisture control design basis document

Other support activities with the potential to affect cleanup progress include:

- Access agreements needed to conduct work at privately owned properties (all sites covered by this document except Middlesex Sampling Plant, New Brunswick Site, Colonie, and Niagara Falls Storage Site). All necessary agreements have been or will be negotiated and signed far enough in advance to prevent any schedule disruptions.

- Program management support programs (including verification support). No problems anticipated.

- Interface with DOE waste management and technology development programs. No problems anticipated.

- Surveillance and maintenance. No problems anticipated.

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

- is reasonable, tailored to the work to be performed, and defensible

The S/RID meets an objective set forth 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 of the initiatives identified was the "use of commercial standards for non-nuclear facilities, which will save millions throughout the DOE complex."

In developing the S/RID, those DOE directives that were deemed "non-applicable" and those that were deemed "applicable yet duplicative" of other federal requirements were not selected for inclusion. The substantive value of "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. Use of common codes and standards for work under FUSRAP parallels other agency processes for similar work.

The selection process for S/RID development recognized the important variations in the hazards, work, and other circumstances for FUSRAP; therefore, it provided a systematic and disciplined application of the graded approach. The S/RID contains those requirements that are necessary to conduct an effective FUSRAP program, are sufficient for protection of human health and the environment, and represent efficient use of financial resources. No impediments to site remediation progress are anticipated as a result of implementing the S/RID. In fact, S/RID implementation is expected to facilitate remediation progress.

5.6 PERFORMANCE MEASURES

DOE will use performance measures derived from the strategic measures outlined in the EM-40 ER Strategic Plan (DOE 1995a) to track overall accomplishment of the mission and vision of the ER program at FUSRAP sites. 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. FUSRAP 1996 performance measures are summarized in Table 5.2.

5.6.1 Relative Risk Reduction

FUSRAP will track all FUSRAP sites by relative risk to public health, the environment, and worker safety. Relative risk categories will include high, medium, and low as determined by EM-40 relative ranking. As program priorities are implemented and program goals are attained, it is expected that high relative risk sites and properties will move to a lower risk classification or to the "Completed Site" category. Similarly, the general trending of medium- and low-relative-risk sites and properties should be toward the Completed Site category. Progressive risk reduction through interim response actions is an important component of this strategy.

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) with regard to remediation of site soils and decontamination of buildings so that they are ready to be transferred for appropriate future 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 is a steady decline in funding requirements for core activities and assessment, with a corresponding increase in funds allocated to remedial action.

Table 5.2 FUSRAP FY 1996 Performance Measures

WBS No.	Release Site	Subproject or Interim Action Name	Planned Completion Date	Number Committed to Headquarters
Assessments				3
1.4.11.1.03	New Brunswick Site	New Brunswick Site	June 1996	
1.4.11.1.04	Ventron	Ventron	May 1996	
1.4.11.1.04	B&T Metals	B&T Metals	June 1996	
Interim Actions				5
1.4.11.1.03	Wayne	• Pile Removal -- Phase A	September 1996	
1.4.11.1.03	Maywood	• Pile Removal -- Phase C	September 1996	
1.4.11.1.02	Linde	• Decon Building 31 • Decon Building 14 • Demolish Building 38	January 1996 September 1996 September 1996	
Remedial Actions				2
1.4.11.1.03	New Brunswick Site	New Brunswick Site	August 1996	
1.4.11.1.04	B&T Metals	B&T Metals	September 1996	
1.4.11.1.04	Baker Brothers	Baker Brothers	December 1995	Completed
Decommissioning				0
None				
Vicinity Properties				15
1.4.11.1.01	Latty Avenue Properties	• Rykoff-Sexton (Property 6L) • Quaker State (Property 3L)	December 1995 December 1995	Completed Completed
1.4.11.1.01	St. Louis Airport Site (SLAPS) Vicinity Properties	• 21 Frost Avenue • 22 Frost Avenue • 23 Frost Avenue • 24 Frost Avenue • 26 Frost Avenue • 27 Frost Avenue • 30 Frost Avenue • 47 Hazelwood Avenue • 48 Hazelwood Avenue	August 1996 August 1996 August 1996 July 1996 August 1996 July 1996 July 1996 September 1996 September 1996	
1.4.11.1.01	St. Louis Downtown Site (SLDS)	• Site Owners D&D	September 1996	
1.4.11.1.03	Maywood	• 90 Avenue C • 79 Avenue B • 113 Avenue E • 112 Avenue E • 108 Avenue E • 16 Long Valley • 18 Long Valley • 20 Long Valley • 22 Long Valley • 24 Long Valley • 26 Long Valley	December 1995 December 1995 July 1996 July 1996 July 1996 August 1996 August 1996 September 1996 September 1996 September 1996 September 1996	Completed Completed Completed Completed Completed
1.4.11.1.03	Middlesex Sampling Plant	• Remediate Ditch	September 1996	

6. MASTER SCHEDULE

6.1 MASTER SCHEDULE FOR ENVIRONMENTAL RESTORATION

The master schedule for environmental restoration activities planned for the sites covered by this MAP document is provided in Figure 6.1. The schedule was developed in accordance with FUSRAP budget planning as of fiscal year 1996. The record of decision for Niagara Falls Storage Site was signed in 1986, and the action memorandum for the Colonie building was issued in 1995. Records of decision for Shpack, Luckey, and Painesville are expected in FY 1999. Action memoranda for Bliss and Laughlin Steel, B&T Metals, Ventron, the New Brunswick Site, and the site grounds EE/CA at Colonie are expected in FY 1996; those for CE and Middlesex Sampling Plant in 1998; and those for Madison, DuPont & Company, and W.R. Grace & Company in FY 2001, FY 2003, and FY 2007, respectively. Remedial design and remedial action will be initiated after signing of the decision documents. The schedule shows the relationships between activities and their projected durations. Specific dates beyond 1996 should not be considered as firmly established, however, because funding is allocated on a yearly basis by congressional action.

6.2 COMPLIANCE MILESTONES

Compliance milestones for remediation of the FUSRAP sites covered by this MAP document are shown in Table 6.1.

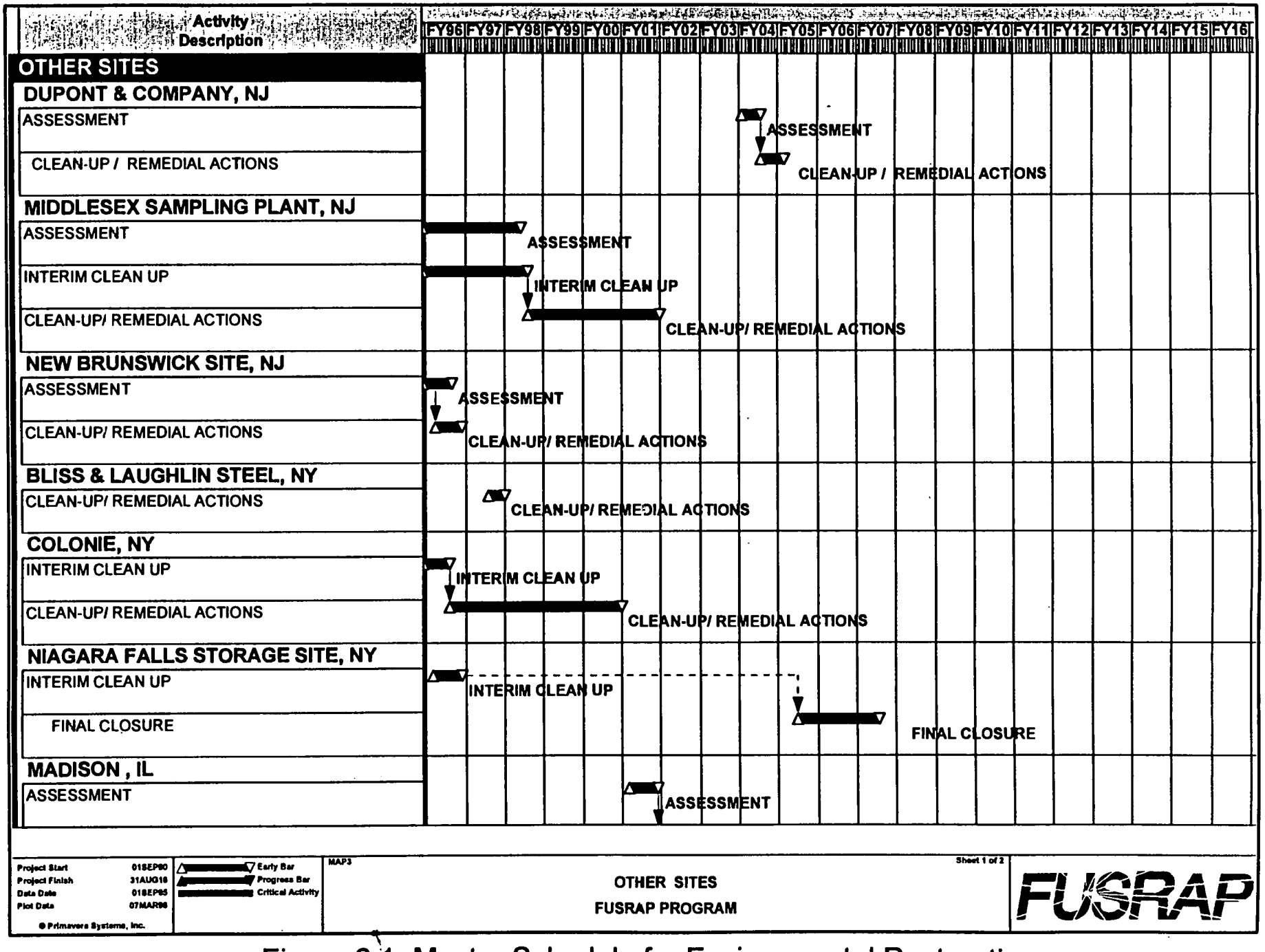

Figure 6.1 Master Schedule for Environmental Restoration

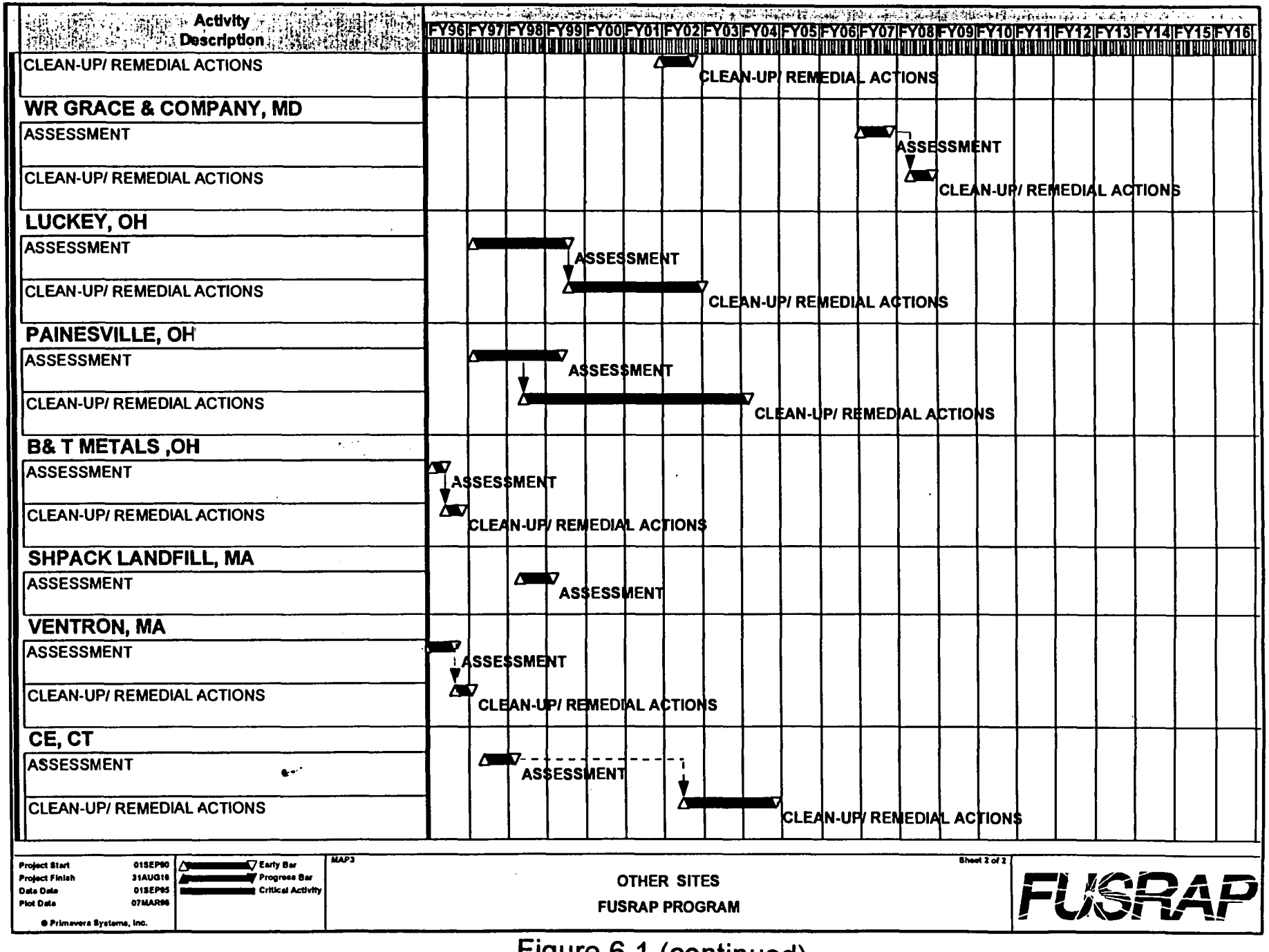

Figure 6.1 (continued)

Table 6.1 Major Activity Milestones

Site	Activity	Completion Date (Fiscal Year)
SITES IN NEW JERSEY		
DuPont & Company	• Complete Characterization/Sign Action Memorandum based on EE/CA	2003
	• Complete Remedial Action	2005
Middlesex Sampling Plant	• Complete Characterization/Sign Action Memorandum based on EE/CA	1998
	• Complete Remedial Action	2001
New Brunswick Site	• Complete Characterization/Sign Action Memorandum based on EE/CA	1996
	• Complete Remedial Action	1996
SITES IN NEW YORK		
Bliss and Laughlin Steel	• Complete Characterization	1996
	• Complete Remedial Action	1997
Colonie	• Complete Characterization/Sign Action Memorandum based on building EE/CA	1995
	• Issue Action Memorandum based on site grounds EE/CA	1996
	• Complete Remedial Action	2000
Niagara Falls Storage Site	• Complete interim cleanup	1996
	• Complete Final Closure	2007

Table 6.1 (continued)

Site	Activity	Completion Date (Fiscal Year)
SITES IN ILLINOIS AND OHIO		
Madison	• Complete Characterization/Sign Action Memorandum based on EE/CA	2001
	• Complete Remedial Action	2002
B&T Metals	• Complete Characterization/Sign Action Memorandum based on EE/CA	1996
	• Complete Remedial Action	1996
Luckey	• Complete Characterization/Record of Decision Signed by EPA	1999
	• Complete Remedial Action	2002
Painesville	• Complete Characterization/Record of Decision Signed by EPA	1999
	• Complete Remedial Action	2004
SITES IN CONNECTICUT, MARYLAND, AND MASSACHUSETTS		
CE	• Complete Characterization/Sign Action Memorandum based on EE/CA	1998
	• Complete Remedial Action	2004
W.R. Grace & Company	• Complete Characterization/Sign Action Memorandum based on EE/CA	2007
	• Complete Remedial Action	2008
Shpack Landfill	• Complete Characterization/Record of Decision Signed by EPA and PRPs	1999
	• Complete Remedial Action	1999
Ventron	• Complete Characterization/Sign Action Memorandum based on EE/CA	1996
	• Complete Remedial Action	1997

7. ISSUES AND INITIATIVES

7.1 ISSUES AFFECTING PROJECT PERFORMANCE

Several issues related to remediation of FUSRAP sites have the potential to impede progress of the environmental restoration process and drive costs upward. FUSRAP must focus attention on these challenges to quickly, safely, and cost-effectively complete its mission at these sites. Key technical, cost/schedule, and regulatory strategic issues potentially affecting project performance in remediation of the sites covered by this MAP document are listed in Table 7.1.

Stakeholder-related issues that may impact site remediation and risk management strategies include effects on land use, perceived health risks, effects on property values, and other impacts noted as concerns in community interviews, public comment and scoping meetings, and Stakeholder Summits. Public officials and citizens' groups have expressed a variety of concerns about the radioactive materials at FUSRAP sites and about potential disposal alternatives. General stakeholder concerns include

- Schedule, pace, and cost of cleanup
- Safety and health concerns
- Interim cleanup priorities
- Storage and disposal site selection
- Economic impacts
- Land use considerations
- Data quality and sufficiency

Specific issues and concerns identified by stakeholders are summarized in Table 7.2.

7.2 INITIATIVES IMPLEMENTED TO IMPROVE PROJECT PERFORMANCE

Productivity and Cost Savings Initiatives

- Achieved $1.2 million in cost savings through Productivity Improvement Program and Cost Savings Initiatives
- Developed FUSRAP protocol for expedited response actions at FUSRAP sites where contamination is minimal and generally limited to indoor areas
- Achieved substantial cost savings during characterization at Ventron by employing as a pilot project the Streamlined Approach for Environmental Restoration (SAFER)
- Prepared and issued 27 Project Instructions and revisions in 1995

Technology Initiatives

- Use of rock crusher to reduce volume of contaminated material for disposal, generating cost savings of >$500,000 in Missouri and Ohio
- Use of field gamma spectroscopy to reduce analytical costs, saving $150,000 in Missouri and Ohio
- Design/construction of mobile wet chemistry lab (in use at FUSRAP sites in Missouri)
- Developed GIS modeling for data interpretation and visual communication
- Bench-scale demonstration and field testing of Segmented Gate System (SGS) soil treatment at NBS, achieving 70% volume reduction for uranium and radium
- Completed initial development and testing of Long Range Alpha Detection (LRAD) system for use in FUSRAP site cleanup activities
- Use of rock crusher and supercompaction to reduce waste volume from building demolition at Colonie
- Ferrous sulfate stabilization of salt bath brick material from Colonie building demolition, converting 300 drums of material classified as mixed waste to radiological waste

Table 7.1 Key Issues Affecting Project Performance

Issue	Program Impacts	Major Parties Involved in Resolution	Action Planned for Resolution
SITES IN NEW JERSEY			
DuPont & Company			
• Consensus with community and property owner on proposed onsite disposal	Disposal option selected as part of final remedy impacts cost of cleanup	DOE, E.I. du Pont de Nemours & Co., community of Deepwater	DOE will work with property owner and other stakeholders to reach consensus on final remedy, including disposal options
• Effects of DuPont's RCRA corrective measures on remedial action by DOE			
Middlesex Sampling Plant			
• Final remedy selection and interim action priorities	May impact cleanup schedule	DOE, stakeholders	All options open for final remedy. Interim removal actions (including drainage ditch and process building) planned for FY 1996-1998
• Role of treatment in final remedy	Volume reduction through treatment can significantly reduce disposal costs		Evaluation of soil treatment technologies to reduce disposal volume (including chemical fixation for landfill pile). Laboratory treatability studies in progress; pilot demonstration planned for FY 1997
• Classification of waste in landfill pile	May impact disposal costs	DOE, EPA	
• Cleanup criteria/reaching consensus with NJDEP		DOE, NJDEP	
• Timing for issuing EE/CA-Action Memorandum	May impact cleanup schedule		Action memorandum scheduled to be issued FY 1998. Interim actions scheduled for FY 1996-1998.
New Brunswick Site			
• Timing of EE/CA-Action Memorandum for expedited removal action	May impact cleanup schedule		EE/CA scheduled to be issued early 1996. Current plans are for expedited removal using streamlined approach (including surveys/sampling and verification sampling concurrently with removal action).

Table 7.1 (continued)

Issue	Program Impacts	Major Parties Involved in Resolution	Action Planned for Resolution
SITES IN NEW YORK			
Bliss and Laughlin Steel • Property owner does not wish to interrupt commercial operations at present to allow DOE access for cleanup	May impact cleanup schedule	DOE, Niagara Cold Drawn Steel Corp.	Characterization completed 1995. Cleanup postponed until at least FY 1997 at owner's request.
Colonie • Community and state acceptance of proposed remedy	May impact cleanup schedule		Meetings with state and local officials planned for FY 1996
Niagara Falls Storage Site • Permanent disposition of K-65 residues in WCS	May impact schedule for installation of permanent cap		National Academy of Sciences Review of K-65 residues (1996)
SITES IN ILLINOIS AND OHIO			
Madison • Property owner currently does not wish to interrupt commercial operations to allow DOE access for cleanup	May impact cleanup schedule	DOE, Spectrulite Consortium	Continuing discussions with property owner to identify optimal opportunity to perform cleanup
B&T Metals • None			
Luckey • None			
Painesville • Other historical, Non-DOE contamination at this site may result in NPL status and other PRP involvement	May increase complexity of cleanup program interfaces and requirements	DOE, EPA, Ohio EPA, property owners, PRPs	Continuing discussion with regulators and property owners to identify optimal remediation framework

Table 7.1 (continued)

Issue	Program Impacts	Major Parties Involved in Resolution	Action Planned for Resolution
SITES IN CONNECTICUT, MARYLAND, AND MASSACHUSETTS			
CE • Extent of DOE involvement in HEU cleanup	May impact cleanup cost/schedule	DOE, CE, NRC	DOE will coordinate with NRC and CE in assessing levels of uranium enrichment in various portions of the facility so that consensus can be reached on scope of cleanup
W.R. Grace & Company • None			
Shpack Landfill • Extent of DOE involvement in remedial action	May impact total FUSRAP costs/schedule	DOE, EPA, other PRPs	DOE will coordinate with EPA and other PRPs to provide support in final documentation
Ventron • State regulator acceptance of remedial action proposal for Buildings A and A-1	May impact cleanup and disposal costs	DOE, Morton International, Massachusetts Department of Environmental Protection	Dose calculation accompanying proposal will allow Morton International to dismantle both buildings and will allow waste to be sent to commercial smelter and landfill at substantial cost savings
GENERAL COST/SCHEDULE ISSUES			
• Availability of Funding Necessary to Complete Selected Remedies Within a Reasonable Time	Impacts progress toward remedy selection and implementation and ability to meet compliance milestones	DOE/Congress	DOE will incorporate technically sound, cost-effective and protective remedies and cost-saving scheduling and contracting strategies in preparing proposed budgets to be submitted for funding approval
GENERAL STAKEHOLDER-RELATED ISSUES			
• Acceptance of FUSRAP Guiding Principles	Impacts effort to reach consensus with stakeholders on final remedy	DOE/Stakeholders	DOE will continue to work with stakeholders through the EMAB process in remedy selection and decision-making

Table 7.2 Stakeholder Issues and Community Concerns

General Issues Identified at First Annual FUSRAP National Stakeholder Summit (May 1995)
• Funding • Cleanup criteria • Risk management • Remedy selection • Community acceptance
Stakeholder Issues and Concerns Identified through CERCLA Community Relations Activities
• Reduction of property values in areas where a disposal site is developed as part of the final remedy • Loss of use of recreational areas if a disposal site is developed in the vicinity of such areas • Possible accidents during transportation of contaminated soil for offsite/out-of-state disposal • Possible use of a local disposal cell for materials outside the area • Possible contamination of local waterways via offsite migration of contaminants from existing sources (or from a disposal cell if onsite disposal is part of the final remedy) • Adverse effects on future economic development of properties near sites where onsite disposal is proposed • Ability of an onsite disposal cell to withstand flooding or other natural disasters • Safety of interim and long-term storage technologies • Public involvement in the remedy selection and decision-making process • Potential for increasing contaminant transport pathways by installing groundwater wells • Potential spread of contamination during cleanup and/or movement of radioactive waste

Transportation and Disposal

- Sponsored comprehensive transportation and disposal planning meeting with waste transporters and Envirocare for FY 1995 shipping campaign
- Reached agreement with Envirocare on method for determining densities for bulk shipments of FUSRAP waste
- Coordinated FUSRAP waste shipping and disposal campaigns through teleconferences with Envirocare, transportation contractors, and field and home office personnel
- Awarded 11(e)2 waste disposal subcontract to dispose of 100,000 yd^3 of FUSRAP waste
- Awarded mixed waste treatment subcontract to Envirocare
- Executed Low-Level Waste Disposal Subcontract Amendment lowering unit disposal cost rates
- Issued waste moisture control design basis document

Stakeholder Involvement/Community Relations

- Increased visibility of program; increased level of site work and number of site completions in 1995
- First use of Innovator (a computer-assisted decision-making tool) by a FUSRAP citizens' group to prioritize remedial alternative evaluation criteria
- Interviewed former workers at Luckey to support community-assisted site characterization
- Presented workshop on FUSRAP's innovative community relations strategic planning process at international conference
- Conducted conflict resolution training for program, site, and project managers
- Worked toward developing consensus with stakeholders on cost/risk management
- Establishment of Environmental Management Advisory Board (EMAB) to provide framework for stakeholder participation in remedy selection and decision making
- National Stakeholder Summits and local/regional EMAB meetings
- Site newsletters, fact sheets supporting activity at Middlesex Sampling Plant, periodic meetings with local officials, and site tours on request. DOE plans to bring local stakeholders onsite during future treatment vendor demonstrations.
- Meetings with local officials to move cleanup forward at NBS
- Site tours and workshops at Colonie
- Consultation with National Academy of Sciences regarding remediation strategy at NFSS

Safety and Health

- 500,000 hours worked with zero lost-time accidents
- Conducted emergency response exercises at six FUSRAP sites during 1995
- Completed and issued annual Emergency Readiness Assurance Plan

APPENDIX A

FISCAL YEAR FUNDING REQUIREMENTS

APPENDIX A: FISCAL YEAR FUNDING REQUIREMENTS/COSTS

The cost baseline for the FUSRAP sites covered by this MAP document is provided in Table A.1.

Table A.1 Site Cost Baseline

Site	Phase	FY 1989-95 (000$)	FY 1996 (000$)	FY 1997 (000$)	FY 1998 (000$)	FY 1999 (000$)	FY 2000 - Completion (000$)
High Relative Ranking							
DuPont & Company	Assessment		0	2	0		
	Remediation		0	0	0		
Middlesex Sampling Plant	Assessment		700	55	671		
	Remediation		2,719	2,732	630		
New Brunswick Site	Assessment		196	13	0		
	Remediation		5,298	502	0		
Colonie	Assessment		848	8	0		
	Remediation		8,615	19,749	19,296		
Madison	Assessment		143	13	0		
	Remediation		0	0	0		
B&T Metals	Assessment		476	0	0		
	Remediation		2,415	130	0		
Luckey	Assessment		677	3,120	2,365		
	Remediation		0	765	3,614		
Painesville	Assessment		231	4,635	5,982		
	Remediation		0	143	1,819		
CE	Assessment		454	694	1,678		
	Remediation		0	0	22		
W.R. Grace & Company	Assessment		0	0	0		
	Remediation		0	0	0		
Ventron	Assessment		396	7	0		
	Remediation		4,580	206	0		
Subtotal High	Assessment		4,121	3,557	10,696	3,838	5,666
	Remediation		23,627	24,227	25,381	35,545	215,847

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Table A.1 (continued)

Site	Phase	FY 1989-95 (000$)	FY 1996 (000$)	FY 1997 (000$)	FY 1998 (000$)	FY 1999 (000$)	FY 2000 - Completion (000$)
Medium Relative Ranking							
Bliss and Laughlin Steel	Assessment		0	67	0		
	Remediation		0	421	0		
Shpack Landfill	Assessment		39	35	0		
	Remediation		0	0	0		
Subtotal Medium	Assessment		39	102	0	143	0
	Remediation		0	421	0	108	132
Low Relative Ranking							
Niagara Falls Storage Site	Assessment		292	0	0		
	Remediation		1,449	956	901		
Subtotal Low	Assessment		292	0	0	0	0
	Remediation		1,449	956	901	1,063	37,634
Program Management	Included Above		--	--	--	--	--
Other	None		--	--	--	--	--
Total		121,399	29,528	34,263	36,978	40,697	259,279

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APPENDIX B

ENVIRONMENTAL RESTORATION DELIVERABLES

APPENDIX B: ENVIRONMENTAL RESTORATION DELIVERABLES

A listing of major ER documents developed and issued for the FUSRAP sites covered by this map document between 1989 and 1995 is provided in Table B.1.

Table B.1 Environmental Restoration Deliverables

Title	Date	Document No.	Phase	Point of Contact
Deliverables 1989-1995				
Health and Safety Plan for the Formerly Utilized Sites Remedial Action Program, Rev. 1	1989	DOE/OR/20722-213	Assessment	BNI
Site Plan for Ventron Division of Morton Thiokol, Inc., Beverly, Massachusetts	1989	DOE/OR/20722-117	Assessment	BNI
Site Plan for W.R. Grace & Company Curtis Bay Facility, Baltimore, Maryland	1989	DOE/OR/20722-125	Assessment	BNI
Follow-up Confirmatory Radiological Survey of Other Drum Storage Area, Combustion Engineering Property, Windsor, Connecticut	1989	ORAU 89/E-93	Assessment	ORAU
Conceptual Design for a Permanent Disposal Site for FUSRAP Wastes	1989	DOE/OR/20722-212	Design	BNI
Results of the Indoor Radiological Survey at the W.R. Grace & Co. Curtis Bay Site, Baltimore, Maryland	1989	ORNL/TM-10439	Assessment	ORNL
Background Review of the Brush Beryllium and Diamond Magnesium Plants in Luckey, Ohio	1989	Unnumbered	Assessment	R.F. Weston, Inc.
Colonie Interim Storage Site Annual Site Environmental Report – Calendar Year 1988	1989	DOE/OR/20722-217	Assessment	BNI
Post-Remedial Action Report for the Colonie Interim Storage Site Vicinity Properties – 1988	1989	DOE/OR/20722-225	Remedial Action	BNI
Hazard Assessment for Radioactive Contamination on the Roof of the Commercial Building at 1104 Central Avenue in Colonie, New York	1989	Unnumbered	Assessment	BNI
Hazard Assessment for Radioactive Contamination on the Roof of the Commercial Building at 50 Yardboro Avenue in Colonie, New York	1989	Unnumbered	Assessment	BNI
Hazard Assessment for Radioactive Contamination on the Carport Roof at 1101 Central Avenue in Colonie, New York	1989	Unnumbered	Assessment	BNI
Certification Docket for the Remedial Action Performed at the Colonie Interim Storage Site Vicinity Properties in Colonie and Albany, New York in 1984 and 1985	1989	Unnumbered	Certification	BNI
Performance Monitoring Report for the Niagara Falls Storage Site Waste Containment Structure, Lewiston, New York, Calendar Year 1987 and January - June, 1988	1989	DOE/OR/20722-208	Assessment	BNI
Niagara Falls Storage Site Annual Site Environmental Report – Calendar Year 1988	1989	DOE/OR/20722-219	Assessment	BNI
Post-Remedial Action Report for the Niagara Falls Storage Site Vicinity Properties – 1985 and 1986	1989	DOE/OR/20722-133	Remedial Action	BNI
Middlesex Sampling Plant Annual Site Environmental Report – Calendar Year 1988	1989	DOE/OR/20722-214	Assessment	BNI
Site Inspection Report for Middlesex Sampling Plant, Middlesex, New Jersey	1989	Unnumbered	Assessment	BNI
Certification Docket for the Remedial Action Performed at the Middlesex Municipal Landfill in Middlesex, New Jersey, in 1984 and 1986	1989	Unnumbered	Certification	BNI
Hazard Ranking System Scoring for Middlesex Sampling Plant	1989	Unnumbered	Assessment	BNI

Table B.1 (continued)

Title	Date	Document No.	Phase	Point of Contact
Additional Characterization Prior to Phase III Decontamination and Decommissioning of the New Brunswick Laboratory - New Jersey Site	1989	ANL-OHS/HP-84-110	Assessment	ANL
Trip Report, W.R. Grace & Company	1990	CCN 69493	Assessment	BNI
Results of the Preliminary Radiological Survey at B&T Metals, 425 West Town Street, Columbus, Ohio (C0001)	1990	ORNL/RASA-89/1	Assessment	ORNL
Preliminary Results of the Radiological Survey at the Former Dow Chemical Company Site, Madison, Illinois	1990	ORNL/TM-11552	Assessment	ORNL
Results of the Preliminary Radiological Survey at the Former Diamond Magnesium Company Site, Luckey, Ohio (DML001)	1990	ORNL/TM-11182	Assessment	ORNL
Preliminary Site Survey Report for the Uniroyal Chemical Company, 720 Fairport-Nursery Road, Painesville, Ohio (DMP001, DMP002)	1990	ORNL/TM-11119	Assessment	ORNL
Environmental Compliance Assessment for the Shpack Landfill Site, Norton, Massachusetts	1990	Unnumbered	Assessment	BNI
Environmental Compliance Assessment for the W.R. Grace & Company Curtis Bay Facility, Baltimore, Maryland	1990	Unnumbered	Assessment	BNI
Work Plan for the Remedial Investigation/Feasibility Study-Environmental Assessment for the Colonie Site, Colonie, New York	1990	DOE/OR/20722-210.1	Planning	BNI
Field Sampling Plan for the Remedial Investigation/Feasibility Study-Environmental Assessment for the Colonie Site, Colonie, New York	1990	DOE/OR/20722-210.3	Planning	BNI
Quality Assurance Project Plan for the Remedial Investigation/Feasibility Study-Environmental Assessment for the Colonie Site, Colonie, New York	1990	DOE/OR/20722-210.4	Planning	BNI
Health and Safety Plan for the Remedial Investigation/Feasibility Study-Environmental Assessment for the Colonie Site, Colonie, New York	1990	DOE/OR/20722-210.5	Planning	BNI
Certification Docket for the Remedial Action Performed at the Colonie Interim Storage Site Vicinity Properties in Colonie and Albany, New York -- 1988	1990	Unnumbered	Certification	BNI
Niagara Falls Storage Site Annual Site Environmental Report -- Calendar Year 1989	1990	DOE/OR/20722-264	Assessment	BNI
Performance Monitoring Report for the Niagara Falls Storage Site Waste Containment Structure, Lewiston, New York, July - December 1988 and Calendar Year 1989	1990	DOE/OR/20722-270	Assessment	BNI
Preliminary Assessment for the Niagara Falls Storage Site	1990	Unnumbered	Assessment	BNI
Middlesex Sampling Plant Annual Site Environmental Report -- Calendar Year 1989	1990	DOE/OR/20722-265	Assessment	BNI
Quality Assurance Project Plan for Field Sampling at the Middlesex Sampling Plant	1990	DOE/OR/20722-273	Planning	BNI
Field Sampling Plan for the Middlesex Sampling Plant	1990	DOE/OR/20722-274	Planning	BNI
ERDA New Brunswick Laboratory, Expanded Site Inspection, New Brunswick, New Jersey (Draft)	1990	Unnumbered	Assessment	ANL
Designation Summary for the Former Beryllium Production Facility in Luckey, Ohio	1991	CCN 096626	Designation	DOE
Authority Determination--Former Beryllium Production Facility in Luckey, Ohio	1991	CCN 096626	Designation	DOE

Table B.1 (continued)

Title	Date	Document No.	Phase	Point of Contact
Radiological Characterization of the Former Diamond Magnesium Company Site, 720 Fairport-Nursery Road, Painesville, Ohio (DMP001, DMP002)	1991	ORNL/TM-11817	Assessment	ORNL
Waste Minimization and Pollution Prevention Awareness Plan	1991	Unnumbered	Planning	BNI
Environmental Responsibilities on the Job Site	1991	Unnumbered		BNI
Pile Cover Study for FUSRAP	1991	Unnumbered	Design	BNI
Remedial Action Cost Study for Contaminated Building Surfaces and Underlying Soil at the St. Louis Downtown Site	1991	Unnumbered	Assessment	BNI
Environmental Monitoring Plan for the Colonie Interim Storage Site	1991	DOE/OR/21949-306	Planning	BNI
Niagara Falls Storage Site Annual Site Environmental Report – Calendar Year 1990	1991	DOE/OR/20722-289	Assessment	BNI
Well A-42 Investigation Report for the Niagara Falls Storage Site	1991	Unnumbered	Assessment	BNI
Chemical Characterization Report for the Niagara Falls Storage Site	1991	DOE/OR/21949-309	Assessment	BNI
Health and Safety Plan for the Waste Consolidation Work at the Niagara Falls Storage Site	1991	DOE/OR/20722-291	Planning	BNI
Field Sampling Plan for the DuPont Site	1991	DOE/OR/20722-295	Planning	BNI
Environmental Compliance Assessment for the E.I. du Pont de Nemours Chambers Works Site	1991	Unnumbered	Assessment	BNI
Field Sampling Plan for Middlesex Sampling Plant, Rev. 1	1991	DOE/OR/20722-274	Planning	BNI
Environmental Compliance Assessment for the Middlesex Municipal Landfill Site	1991	Unnumbered	Assessment	BNI
Site Inspection Report for the New Brunswick Laboratory Site, New Brunswick, New Jersey	1991	Unnumbered	Assessment	BNI
Environmental Monitoring Plan for the New Brunswick Laboratory Site, New Brunswick, New Jersey	1991	DOE/OR/21949-308	Planning	BNI
Environmental Monitoring Plan for the Niagara Falls Storage Site, Lewiston, New York	1991	DOE/OR/21949-309	Planning	BNI
Environmental Monitoring Plan for Middlesex Sampling Plant, Middlesex, New Jersey	1991	DOE/OR/21949-307	Planning	BNI
Characterization Report for the Interim Storage Piles at the Middlesex Sampling Plant, Middlesex, New Jersey, Vols. I and II	1991	DOE/OR/21949-297	Assessment	BNI
FUSRAP Roadmap	1992	Unnumbered	Planning	BNI
ALARA Plan for the Formerly Utilized Sites Remedial Action Program	1992	Unnumbered	Planning	BNI
Site Security Plan for DOE-Owned or -Leased Sites Under FUSRAP	1992	DOE/OR/21949-299	Planning	BNI
Final Report on Test Cell Monitoring	1992	Unnumbered	Assessment	BNI
Designation Summary for Diamond Magnesium Company, Painesville, Ohio	1992	CCN 095794	Designation	DOE
Authorization for Remedial Action at Diamond Magnesium Site in Painesville, Ohio	1992	CCN 095794	Designation	DOE
Quality Assurance Program Plan for U.S. DOE FUSRAP, Rev. 2	1992	Unnumbered	Planning	BNI
Designation for Remedial Action at the Former Beryllium Production Facility in Luckey, Ohio	1992	CCN 095796	Designation	DOE
U.S. Department of Energy Project Plan, Formerly Utilized Sites Remedial Action Program, Rev. 3	1992	Unnumbered	Planning	DOE

Table B.1 (continued)

Title	Date	Document No.	Phase	Point of Contact
Site-Specific Plan for the Formerly Utilized Sites Remedial Action Program	1992	MSA-142	Planning	DOE
FUSRAP Management Requirements and Policy Manual, Rev. 3	1992	Unnumbered	Management	DOE
Designation Summary for Bliss & Laughlin Steel Company, Buffalo, New York	1992	CCN 995786	Designation	DOE
Authorization for Remedial Action at Bliss & Laughlin Steel Company Site, Buffalo, New York	1992	CCN 995786	Designation	DOE
Radiological Survey of the Former Bliss & Laughlin Steel Company Facility, Buffalo, New York	1992	ORISE 92/G-6	Assessment	ORISE
Closure Plan for the RCRA Wastes at the Colonie Interim Storage Site, Colonie, New York	1992	Unnumbered	Planning	BNI
Characterization Report for the Colonie Site	1992	DOE/OR/21949-260	Assessment	BNI
Colonie Interim Storage Site Annual Site Environmental Report -- Calendar Year 1991	1992	DOE/OR/21949-284	Assessment	BNI
Niagara Falls Storage Site Annual Site Environmental Report -- Calendar Year 1991	1992	DOE/OR/20722-289	Assessment	BNI
Performance Monitoring Report for the Niagara Falls Storage Site Waste Containment Structure, Lewiston, New York, Calendar Year 1990	1992	DOE/OR/20722-303	Assessment	BNI
Performance Monitoring Report for the Niagara Falls Storage Site Waste Containment Structure, Lewiston, New York, Calendar Year 1991	1992	DOE/OR/20722-348	Assessment	BNI
Certification Docket for Remedial Action Performed at the Niagara Falls Storage Site in Lewiston, New York from 1983 through 1986	1992	Unnumbered	Certification	BNI
Middlesex Sampling Plant Annual Site Environmental Report -- Calendar Year 1991	1992	DOE/OR/20722-342	Assessment	BNI
New Brunswick Site Annual Site Environmental Report -- Calendar Year 1991	1992	DOE/OR/21949-346	Assessment	BNI
Engineering Evaluation and Cost Analysis (EE/CA) for the Colonie Interim Storage Site (CISS) Building	1993	DOE/OR/21950-888	Assessment	SAIC
Work Plan-Implementation Plan for the Remedial Investigation/Feasibility Study-Environmental Impact Statement for the St. Louis Sites	1993	DOE/OR/21949-271.1	Planning	BNI
Waste Management Program Plan for FUSRAP	1993	191-WMPP-Rev. 0	Planning	BNI
Environmental Protection Program Implementation Plan for November 9, 1991 through November 9, 1993	1993	Unnumbered	Planning	BNI
Quality Assurance Document for Site Environmental Reports	1993	DOE/OR/21949-362	Planning	BNI
Groundwater Protection Management Plan	1993	191-GPMP-Rev. 0	Planning	BNI
Letter Report on the Risks Associated with Contaminated Sediment During Remediation Activities at Coldwater Creek	1993	CCN 099899	Assessment	SAIC
Letter Report on a Direct Exposure Assessment for the St. Louis Site Beneficial Reuse Disposal Option	1993	CCN 098856	Assessment	SAIC
Evaluation of Contaminated Sediment Transport in Coldwater Creek, St. Louis, Missouri	1993	CCN 105790	Assessment	SAIC
Evaluation of Disposal Options for Wastes Generated During Remediation of Formerly Utilized Sites Remedial Action Program Sites	1993	Unnumbered	Assessment	SAIC

Table B.1 (continued)

Title	Date	Document No.	Phase	Point of Contact
Letter Report on the Risks Associated with Contaminated Sediments Present in Coldwater Creek	1993	CCN 106332	Assessment	SAIC
Niagara Falls Storage Site Environmental Report -- Calendar Year 1992	1993	DOE/OR/21949-367	Assessment	BNI
Health and Safety Plan for the DuPont and Company Site, Deepwater, New Jersey	1993	108-HSP-Rev. 0	Planning	BNI
Middlesex Sampling Plant Site Environmental Report -- Calendar Year 1992	1993	DOE/OR/21949-366	Assessment	BNI
New Brunswick Site Environmental Report -- Calendar Year 1992	1993	DOE/OR/21949-363	Assessment	BNI
Health and Safety Plan for the New Brunswick Site, New Brunswick, New Jersey	1993	144-HSP-01-Rev. 0		
Designation Survey, Combustion Engineering Site, Windsor, Connecticut	1994	ORISE 94/D-63	Assessment	ORISE
Designation Summary for Combustion Engineering Site, Windsor, Connecticut	1994	CCN 118132	Designation	DOE
Authorization for Remedial Action at the Combustion Engineering Site, Windsor, Connecticut	1994	CCN 118132	Designation	DOE
Authority Determination, Combustion Engineering Site, Windsor, Connecticut	1994	CCN 118132	Designation	DOE
Feasibility Study/Environmental Impact Statement for the St. Louis Sites, St. Louis, Missouri	1994	DOE/OR/21950-130	Assessment	SAIC
Remedial Investigation Report for the St. Louis Sites	1994	DOE/OR/21949-280	Assessment	BNI
Emergency Readiness Assurance Plan for the Formerly Utilized Sites Remedial Action Program, Rev. 2	1994	Unnumbered	Planning	BNI
Health and Safety Plan for the Colonie Interim Storage Site, Colonie, New York	1994	DOE/OR/21949-338 (139-HSP)	Planning	BNI
Niagara Falls Storage Site Environmental Surveillance Report -- Calendar Year 1993	1994	DOE/OR/21949-379	Assessment	BNI
Environmental Monitoring Plan for the Niagara Falls Storage Site (2 vols.)	1994	158-HSP-Rev. 0	Planning	BNI
Failure Analysis Report for the Niagara Falls Storage Site, Lewiston, New York	1994	Unnumbered	Assessment	BNI
Middlesex Sampling Plant Environmental Surveillance Report -- Calendar Year 1993	1994	DOE/OR/21949-377	Assessment	BNI
New Brunswick Site Environmental Surveillance Report -- Calendar Year 1993	1994	DOE/OR/21949-376	Assessment	BNI
FUSRAP Cultural Resource Management Plan, Rev. 0	1995	191-CRMP	Planning	BNI
1996 Baseline Environmental Management Report for U.S. Department of Energy Formerly Utilized Sites Remedial Action Program (FUSRAP) (Draft)	1995	DOE/OR/21949-394	Assessment	BNI
Environmental Restoration Strategic Plan: Remediating the Nuclear Weapons Complex	1995	DOE/EM-0257	Planning	DOE
FUSRAP FY-1995 Year End Review	1995	Unnumbered	Management Review	DOE
FY 1997 ADS Submission for the Formerly Utilized Sites Remedial Action Program	1995	MSA-142	Cost/Schedule Review & Planning	DOE
FUSRAP Management Appraisal -- 1995	1995	Unnumbered	Management Review	DOE
Environmental Surveillance Results for 1994 for the Middlesex Sampling Plant	1995	Technical Memorandum 118-95-008		

Table B.1 (continued)

Title	Date	Document No.	Phase	Point of Contact
Bliss and Laughlin Steel Characterization Results	1995	Technical Memorandum 128-95-012	Assessment	BNI
Environmental Surveillance Results for 1994 for the Colonie Interim Storage Site	1995	Technical Memorandum 139-95-006	Assessment	BNI
FUSRAP Environmental Monitoring Plan (Draft)	1995	Unnumbered	Planning	BNI
Community Relations Plan for the Remedial Investigation/Feasibility Study-Environmental Assessment for the Colonie Site, Colonie, New York	1995	DOE/OR/20722-210.2	Planning	BNI
Responsiveness Summary for the Colonie Site Building EE/CA, Colonie, New York	1995	Unnumbered	Assessment	SAIC
Post-Remedial Action Report for the Niagara Falls Storage Site, Lewiston, New York	1995	DOE/OR/21949-395	Remedial Action	BNI
Hot Spot Criteria Calculations for Niagara Falls Storage Site	1995	Calc. No. 158-CV-21-Rev.1	Assessment	BNI
Final Report -- Radiological Survey of Buildings 401, 403, and the Hitman Building, Niagara Falls Storage Site, Lewiston, New York	1995	ORISE 95/_____	Verification	ORISE
Proposed Site Treatment Plan for the Middlesex Sampling Plant, Middlesex, New Jersey	1995	Unnumbered	Planning	BNI
Remedial Action Plan for the New Brunswick Site, New Brunswick, New Jersey	1995	DOE/OR/21949-380	Planning	BNI
Expected Deliverables 1996				

APPENDIX C

DECISION DOCUMENT/ROD SUMMARIES

APPENDIX C: DECISION DOCUMENT/ROD SUMMARIES

A record of decision (ROD) for NFSS was issued in 1986. An action memorandum based on the EE/CA for the building at Colonie was signed in 1995; the action memorandum for the Colonie site grounds EE/CA (including the three remaining unremediated vicinity properties) is expected in 1996. Summaries of these decision documents will be included in the next revision of this appendix.

Decision documents for other sites covered by this MAP document will include RODs for the sites where an RI/FS-EIS is being conducted [Shpack Landfill, Luckey, and Painesville (ROD expected FY 1999)] and action memoranda based on EE/CAs for other sites. Summaries of decision documents for these sites will be incorporated in future revisions of this appendix as the decision documents are issued.

APPENDIX D

CONCEPTUAL MODEL DATA SUMMARIES

APPENDIX D: CONCEPTUAL SITE MODEL DATA SUMMARIES

The conceptual site model for Colonie shown in Figure D.1 summarizes information on primary contaminants, sources of contamination, potential contaminant release mechanisms and transport pathways, and potential exposure scenarios. Summaries of exposure pathway analysis for each of the four DOE-owned sites covered by this document are provided in Figures D.2 (Middlesex Sampling Plant), D.3 (New Brunswick Site), D.4 (Colonie), and D.5 (Niagara Falls Storage Site). Environmental monitoring/surveillance programs in place at these sites are designed to monitor potential contaminant migration pathways and current contaminant levels and to detect releases or trends that could lead to a developing problem. As additional information becomes available from characterization and CERCLA-based risk assessments at other sites, and as conceptual models are developed for high-risk sites recently added to FUSRAP, the information will be incorporated in future revisions of this appendix.

Middlesex Sampling Plant (see Figure D.2).

Sources:

- Surface and subsurface soils
- Storage piles
- Interior building surfaces
- Sediments in drainage ditch

Credible Transport Pathways:

- Migration of surface/subsurface soil contaminants to groundwater via infiltration of surface water and subsequent leaching of contaminants from soil to groundwater. Groundwater could then migrate offsite and be used by the public, leading to potential exposure via ingestion or dermal contact.

- Transport of contaminants offsite in surface soils through overland surface runoff onto adjacent properties or into the MSP stormwater drainage system. Surface water and sediments move offsite primarily into Main Stream, then into Ambrose Brook, which is accessible to the public. Exposure could result via ingestion or dermal contact.

Credible Exposure Pathways:

- Inhalation of particulates
- Dermal contact with contaminated sediment
- Dermal contact with contaminated groundwater by workers collecting samples
- Direct exposure to gamma radiation for individuals near site
- Direct contact with contaminated surface soils (credible only onsite or on immediately adjacent properties)

New Brunswick Site (see Figure D.3)

Sources:

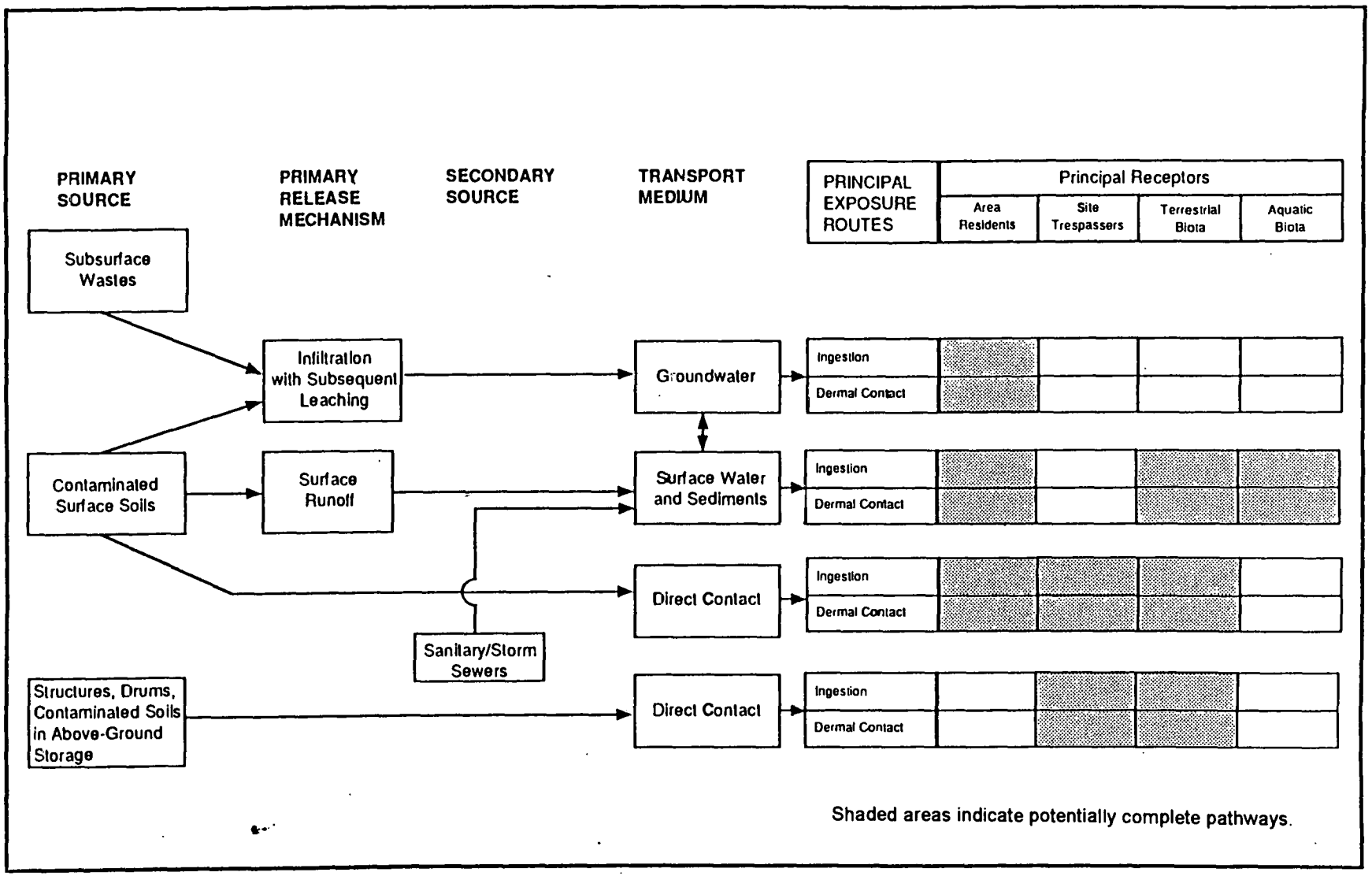
- Surface and subsurface soils

Credible Transport Pathways:

- Migration of surface/subsurface soil contaminants to groundwater via infiltration of surface water and subsequent leaching of contaminants from soil to groundwater. Groundwater could then migrate offsite and be used by the public, leading to potential exposure via ingestion or dermal contact.

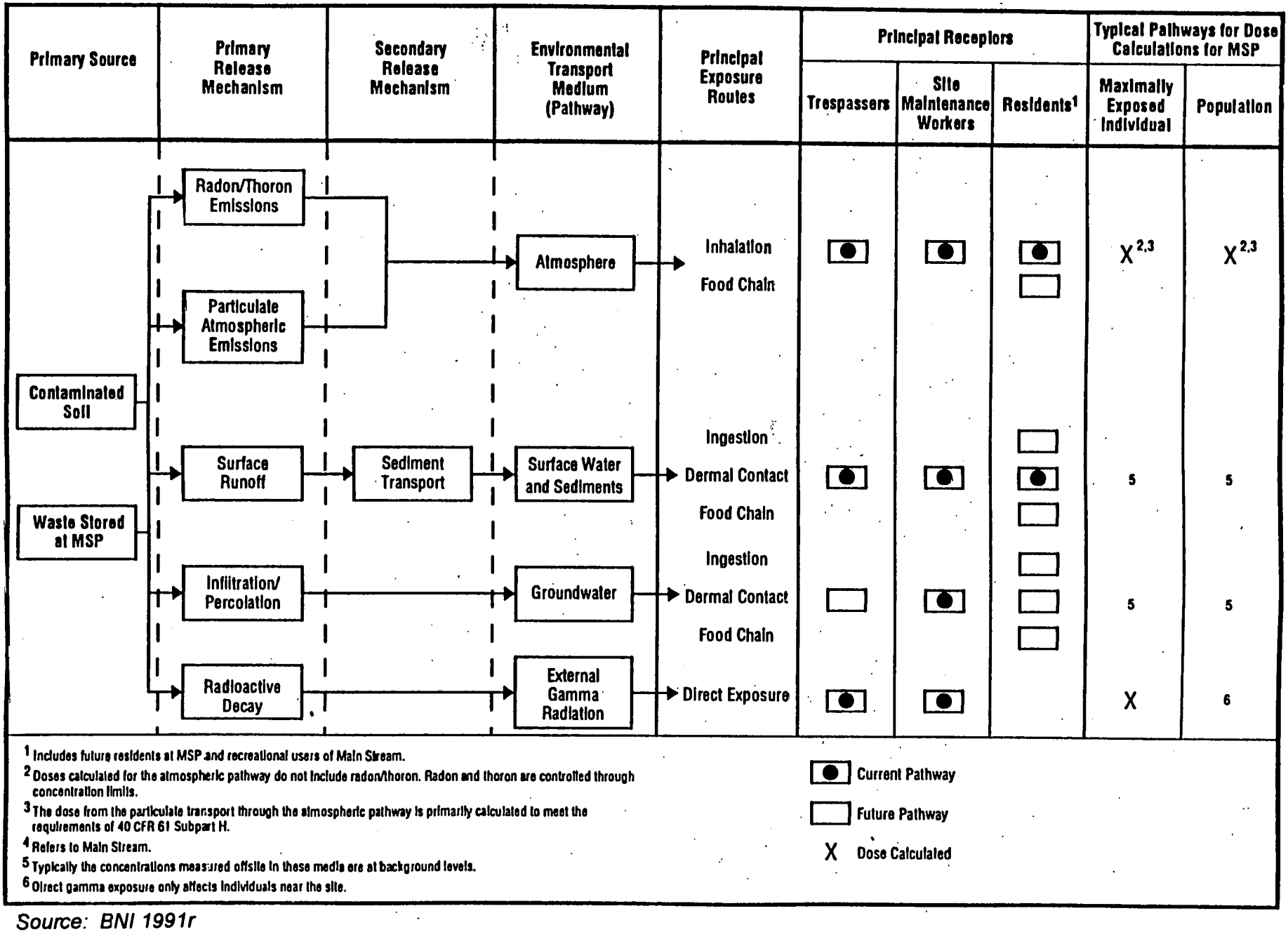
Credible Exposure Pathways:

- Inhalation of radon
- Dermal contact with contaminated sediment onsite
- Dermal contact with contaminated groundwater by workers collecting samples
- Direct exposure to gamma radiation for individuals near site
- Direct contact with contaminated surface soils (credible only onsite or on immediately adjacent properties)



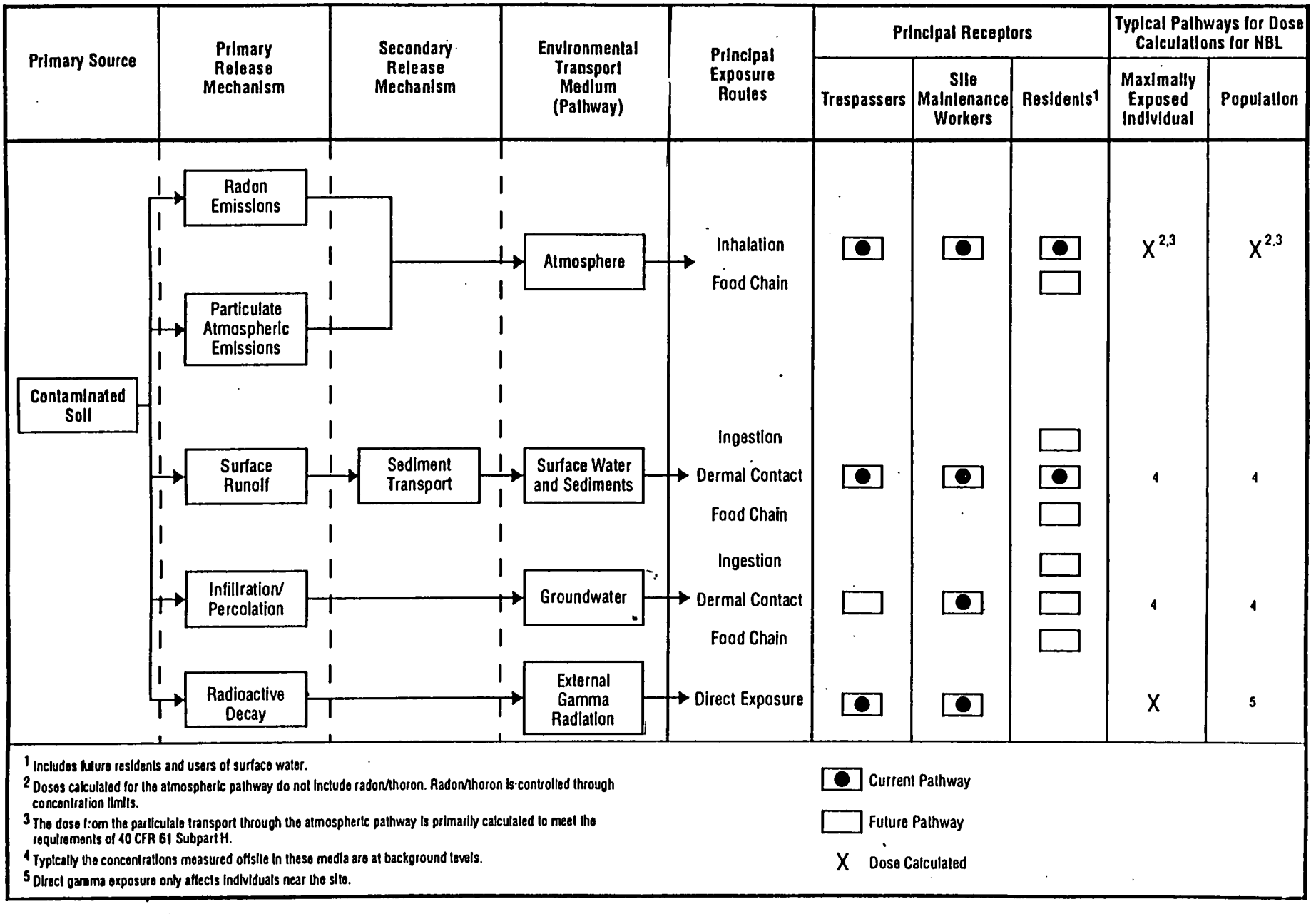
Source: BNI 1990d

Figure D.1 Conceptual Site Model for Colonie



Source: BNI 1991r

Figure D.2 Exposure Pathway Analysis for Middlesex Sampling Plant



Source: BNI 1991o

Figure D.3 Exposure Pathway Analysis for New Brunswick Site

Colonie (see Figure D.4)

Sources:

- Surface and subsurface soils
- Main plant building and containerized waste in sealed drums within building (not applicable; main plant building dismantled 1995-96)
- Sediments in drain inlets, conduits, drainage ditches, and small unnamed tributary of Patroon Creek

Credible Transport Pathways:

- Migration of surface/subsurface soil contaminants to groundwater via infiltration of surface water and subsequent leaching of contaminants from soil to groundwater . Groundwater could then migrate offsite and be used by the public, leading to potential exposure via ingestion or dermal contact.

- Transport of contaminants offsite in surface soils through overland surface runoff onto adjacent properties or into the site stormwater drainage system. Offsite migration of surface water and sediments is primarily to Patroon Creek.

Credible Exposure Pathways:

- Inhalation of particulates
- Dermal contact with contaminated sediment
- Dermal contact with contaminated groundwater by workers collecting samples
- Direct exposure to gamma radiation for individuals near site
- Direct contact with contaminated surface soils (credible only onsite or on the three adjacent unremediated vicinity properties, none of which are residential)

Niagara Falls Storage Site (see Figure D.5)

Sources:

- Contaminated soils and residues entombed within engineered waste containment structure (WCS)

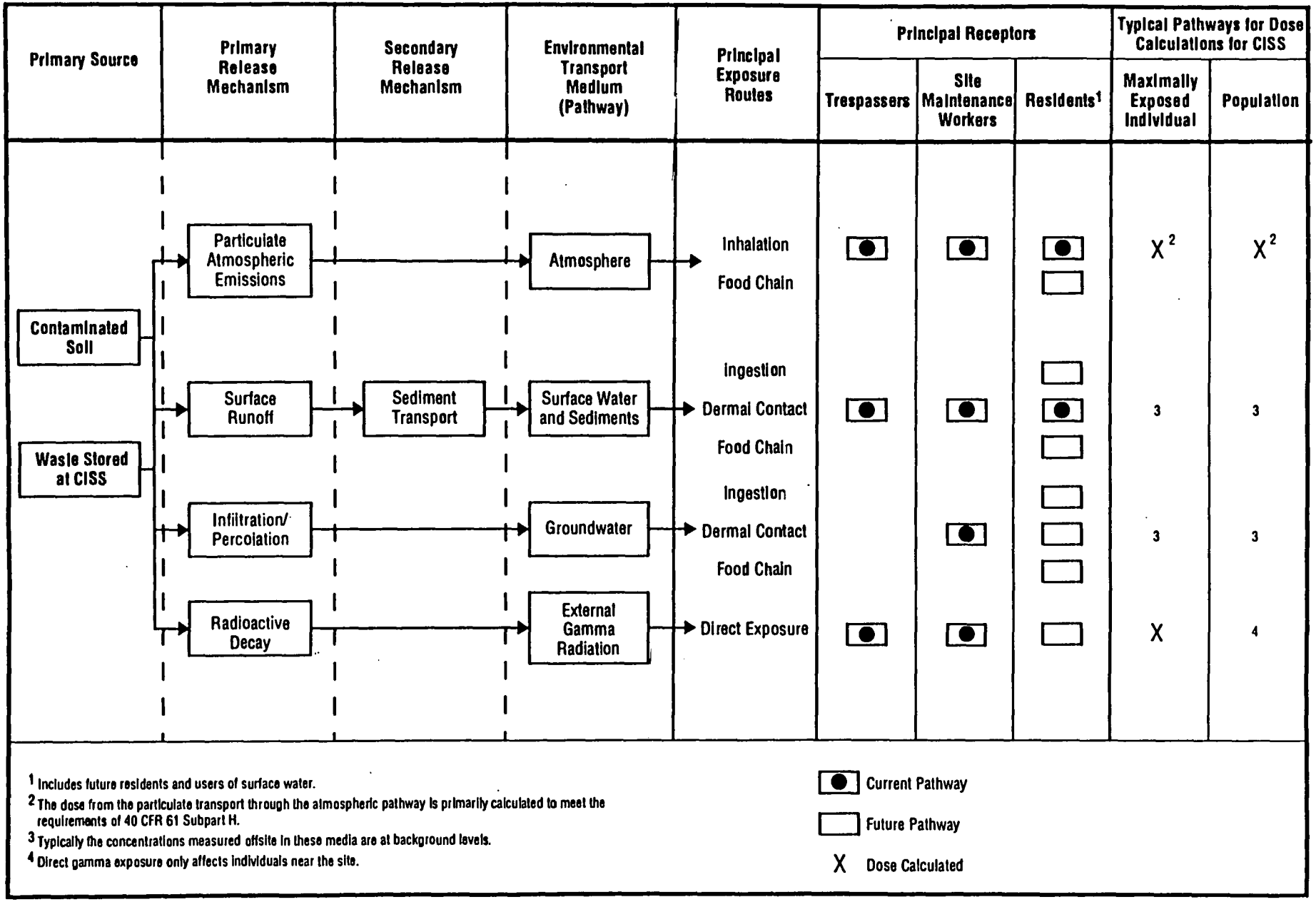
Credible Transport Pathways:

- Migration of contaminants within WCS to groundwater via infiltration of surface water and subsequent leaching of contaminants from waste stored in the WCS to groundwater . Groundwater could then migrate offsite and be used by the public, leading to potential exposure via ingestion or dermal contact.

- Design of WCS cap minimizes erosion from surface runoff. However, contaminants could migrate to surface water through recharge from groundwater or through surface water infiltration of the WCS and subsequent seepage. Contaminated surface water could then be transported offsite via overland surface runoff onto adjacent properties or into the NFSS stormwater drainage system. Offsite migration of surface water and sediments is primarily via the Central Drainage Ditch, which is accessible to the public and could be a route for exposure via ingestion or dermal contact.

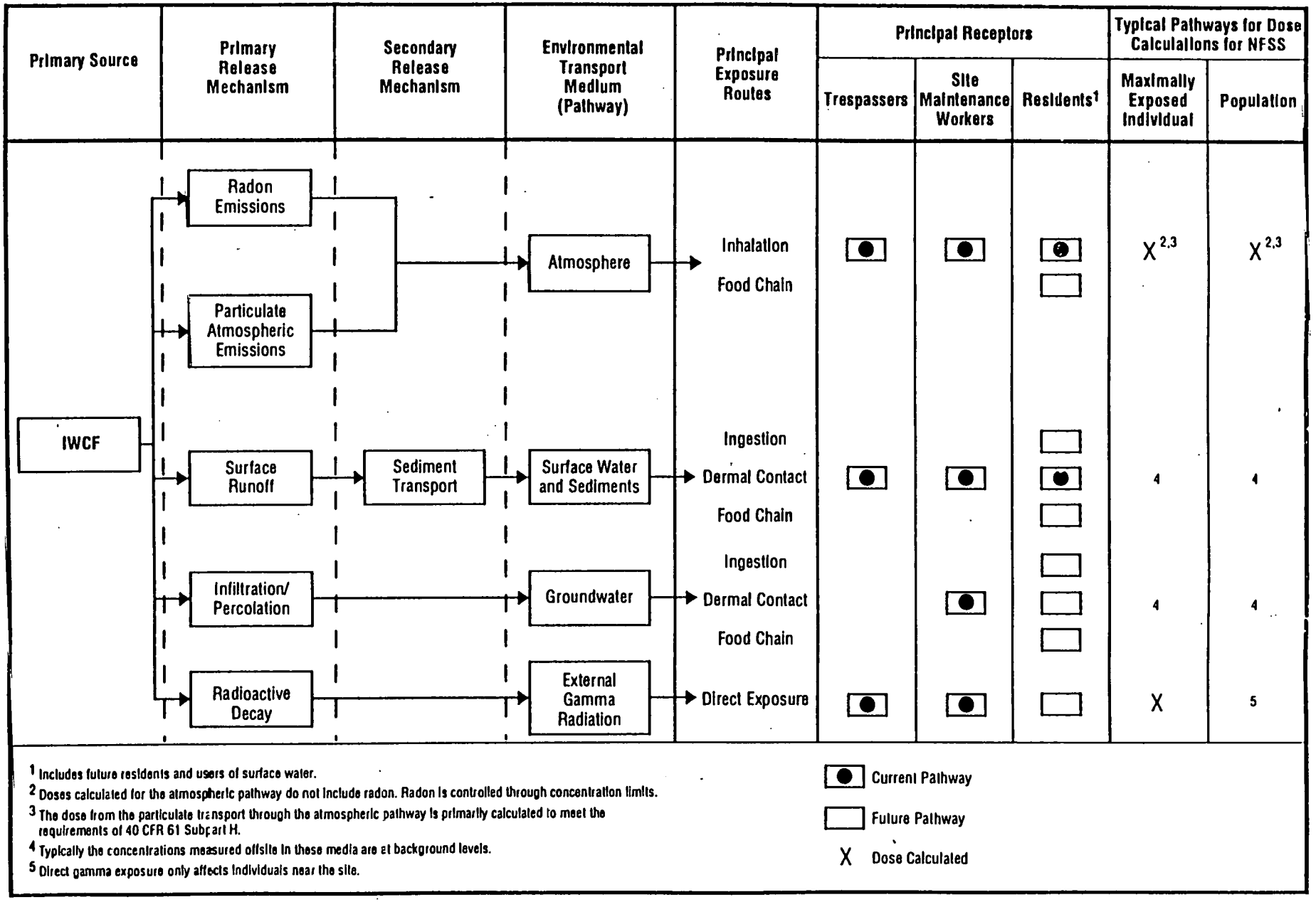
Credible Exposure Pathways:

- Inhalation of radon
- Inhalation of particulates (not credible as current pathway; all contamination is within WCS. Credible future pathway only assuming loss of institutional control of site)
- Dermal contact with contaminated sediment
- Dermal contact with contaminated groundwater by workers collecting samples
- Direct exposure to gamma radiation emitted from contamination within WCS (credible only for individuals at NFSS or adjacent properties)



Source: BNI 1991d

Figure D.4 Exposure Pathway Analysis for Colonie



Source: BNI 1991q

Figure D.5 Exposure Pathway Analysis for Niagara Falls Storage Site

APPENDIX E

PROJECT CONTROLS

APPENDIX E: PROJECT CONTROLS

FUSRAP project controls provide detailed planning for cost, schedule, and technical performance to maximize efforts toward achievement of project goals. Implementation is program-wide 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 given site is coded with a unique WBS number that associates the document with the 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/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 characterization/remedial action process for each 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

REGULATORY DRIVERS/ARARS

Table F.1

POTENTIAL ARARS FOR REMOVAL ACTIONS AT MIDDLESEX SAMPLING PLANT

Table F.1 Requirements Potentially Applicable to the Middlesex Sampling Plant Removal Actions

Potential Requirement	Description	Does Requirement Apply to Cleanup?	Comments
FEDERAL REQUIREMENTS - DOE-SPECIFIC			
Atomic Energy Act of 1954 (AEA), as amended (42 USC 2011-2297G-4)	Establishes authority for licensing and regulating radioactive materials.	Yes	Establishes DOE's authority and responsibilities for managing radioactive materials.
Radiation Protection for Occupational Workers (10 CFR Part 835)	Specifies occupational radiation protection standards and program requirements for DOE and DOE contractor operations; includes basic dose limits of 5000 mrem/year for radiation workers and 100 mrem/year for the public, and derived air concentration limits for radionuclides in air; requires all radiation exposure to be reduced ALARA.	Yes	The proposed action would comply with these requirements.
DOE NEPA Regulations (10 CFR Part 1021)	Establishes DOE procedures for the assessment of the environmental impacts of proposed activities.	Yes	NEPA concerns are incorporated in this EE/CA.
DOE Floodplain/Wetlands Environmental Review (10 CFR Part 1022)	Requires DOE to evaluate the impact of proposed activities in a floodplain or wetlands.	Yes	A Floodplains and Wetlands Assessment has been performed by DOE. A Floodplain Statement of Findings was published in the Federal Register in November 1995.
Radiation Protection of the Public and the Environment (DOE Order 5400.5)	Establishes requirements for DOE facilities and operations for control of radiation exposure to the public.	Yes (TBC - Not ARAR)	Although not promulgated standards, the DOE Order requirements were developed for protection of the public and the environment, and are mandatory requirements for DOE activities; these requirements are proposed for codification in a formal rule at 10 CFR 834 (proposed 3/23/93, 58 FR 16268), which would be applicable upon final promulgation. The proposed action would comply with these requirements.
Radioactive Waste Management (DOE Order 5820.2A)	Specifies requirements for managing DOE radioactive waste.	Yes (TBC - Not ARAR)	Although not promulgated standards, these requirements constitute requirements for protection of the public with which the proposed action would comply.
Environmental Protection, Safety, and Health Protection Standards (DOE Order 5480.4)	Establishes requirements for the application of mandatory environmental protection, safety, and health (ES&H) standards applicable to all DOE and DOE contractor operations.	Yes (TBC - Not ARAR)	Although not promulgated standards, these requirements constitute requirements for protection of the public with which the proposed action would comply.
FEDERAL REQUIREMENTS - GENERAL			
National Emissions Standards for Hazardous Air Pollutants (42 USC 7401-7671, 40 CFR 61, Subparts H & M)	Emissions of radionuclides from any DOE facility to the ambient air shall not exceed levels that would result in an effective dose equivalent of 10 mrem/year. In addition, Subpart M establishes work practice and disposal requirements for asbestos-containing material.	Yes	These requirements are considered pertinent for the protection of the public during implementation of the proposed action. Asbestos requirements may be applicable to roofing and insulation materials.
Occupational Safety and Health Act, General Industry Standards (29 USC 651-678, 29 CFR 1910) and Safety and Health Standards (29 CFR 1926)	Specifies health and safety standards for hazardous waste operations, including limits for exposure to noise, ionizing radiation and certain hazardous materials, including radionuclides. Establishes requirements for worker training, development of emergency response and safety and health plans, and the type of safety equipment and procedures to be followed for hazardous waste site operations.	Yes (but not ARAR)	Since these requirements are part of an employee protection law rather than an environmental protection law, they are not subject to the ARAR process under CERCLA. However, they constitute requirements for worker protection with which the proposed action would comply.

Table F.1 (continued)

Potential Requirement	Description	Does Requirement Apply to Cleanup?	Comments
Federal Facilities Compliance Act of 1992 (PL 102-386)	Requires federal facilities that generate or store mixed wastes subject to land disposal restrictions to obtain regulator approval of treatment plans.	Yes	Mixed waste, e.g. radiologically contaminated lead paint scrapings, may be generated from building decontamination. DOE would comply with all appropriate FFCA requirements for mixed waste treatment activities as stated in correspondence to the EPA and NJDEP (CCN 12036).
Toxic Substances Control Act (15 USC 2601 et seq., 40 CFR 761)	Regulates management and disposal of polychlorinated biphenyls (PCBs) and other toxic wastes.	Yes	Regulated PCB wastes may be generated from mechanical equipment remaining in the process building. Any TSCA-regulated waste that may be generated would be managed and disposed of in accordance with federal TSCA and state hazardous waste regulations.
Hazardous Materials Transportation Act, as amended by the Hazardous Materials Transportation Uniform Safety Act (49 USC 1801-1819, 49 CFR 171-174, 177)	Establishes the requirements for transportation of hazardous (including radioactive) materials, including classification, packaging, labeling, marking, shipping and placarding requirements.	Yes	Potentially applicable to transportation of radioactive materials off-site if shipments of material exceed a CERCLA reportable quantity or if radioactivity concentrations exceed 2000 pCi/g; wastes generated by the proposed action are not expected to exceed these thresholds. Also applicable to off-site transport of any other hazardous material regulated by the DOT.
National Historic Preservation Act, as amended [16 USC 470, 40 CFR 6.301(b), 36 CFR 800]	The effect of any federally assisted undertaking must be taken into account for and district, site, building, structure, or object that is included or eligible for inclusion in the National Register of Historic Places.	Yes	DOE evaluation of the process building has concluded that this property is potentially eligible for inclusion on the Register of Historic Places. DOE has transmitted a Memorandum of Agreement to the state SHPO regarding historic preservation requirements.
Endangered Species Act [16 USC 1531-1544, 50 CFR 17.402, 40 CFR 6.302(h)]	Federal agencies must ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify any critical habitat.	Yes	No critical habitat exists in the affected area, and no adverse impacts on threatened or endangered species would result from the proposed action.
Floodplain Management [Executive Order 11988, 40 CFR 6.302(b)]	Federal agencies must avoid, to the maximum extent possible, any adverse impacts associated with direct and indirect development in a floodplain.	Yes	Portions of proposed sediment removal activities would take place within the stream encroachment boundaries of a waterway adjacent to the man-made drainage ditch. State environmental and engineering standards for work in proximity to waterways have been incorporated in work controlling documents.
Protection of Wetlands [Executive Order 11990, 40 CFR 6.302(a)]	Federal agencies must avoid, to the maximum extent possible, any adverse impacts associated with the destruction or loss of wetlands and the support of new construction in wetlands if a practicable alternative exists.	Yes	Proposed sediment removal activities would occur in freshwater wetlands determined by DOE to be classified as wetlands of ordinary value under state freshwater wetlands regulations. Substantive regulatory requirements have been incorporated into work controlling documents. Impacts would be short-term and readily mitigated.

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