CHAPTER 2
PROPOSED ACTION, FACILITY DESCRIPTION, ALTERNATIVES, AND COMPARISON OF ENVIRONMENTAL IMPACTS

2.0 PROPOSED ACTION, FACILITY DESCRIPTION, ALTERNATIVES, AND COMPARISON OF ENVIRONMENTAL IMPACTS

> Chapter 2 describes the actions proposed by the U.S. Department of Energy (DOE) and the New York State Energy Research and Development Authority (NYSERDA) for the decommissioning and long-term stewardship of the Western New York Nuclear Service Center (WNYNSC). The chapter includes descriptions of the reasonable decommissioning alternatives, the No Action Alternative, and the alternatives considered and subsequently eliminated from detailed evaluation. It concludes with a summary comparison of environmental impacts, including costs associated with each of the alternatives, identifies the Preferred Alternative, and summarizes uncertainties associated with the analysis. Appendix C includes details on the WNYNSC facilities, the implementation activities associated with each alternative, and the new construction efforts involved.

2.1 Introduction

As required by the National Environmental Policy Act (NEPA) and the New York State Environmental Quality Review Act (SEQR), this environmental impact statement (EIS) presents the environmental impacts associated with the range of reasonable alternatives to meet the DOE and NYSERDA purpose and need for action and a No Action Alternative. The alternatives evaluated include:

- The Sitewide Removal Alternative, which would allow unrestricted release of the entire WNYNSC.
- The Sitewide Close-In-Place Alternative, under which existing facilities and contamination would be managed at their current locations, and areas having higher levels of long-lived contamination would use engineered barriers to control contamination.
- The Phased Decisionmaking Alternative (the Preferred Alternative), under which there would be an initial (Phase 1) 8-year period of removal actions for all facilities except the Waste Tank Farm, U.S. Nuclear Regulatory Commission (NRC)-licensed Disposal Area (NDA), State-licensed Disposal Area (SDA), and Construction and Demolition Debris Landfill. During a period of up to 30 years, DOE and NYSERDA would conduct a variety of activities intended to expand the information available to support later additional decommissioning decisionmaking (Phase 2) for those facilities and areas not addressed in Phase 1.
- The No Action Alternative, which involves the continued management and oversight of WNYNSC under the conditions that would exist at the starting point of this EIS. The No Action Alternative does not meet the purpose and need for agency action. It is included for comparison purposes as required by NEPA and SEQR.

NYSERDA and DOE recognize that, after consideration of the comments to be received during the public review period for this Draft EIS, some combination of the alternatives analyzed in this document may provide the best approach to meeting the goals of the agencies while protecting human health and safety and the environment. If a specific combination alternative is identified as preferred between the Draft and Final EISs, DOE would present the alternative and its potential impacts in the Final EIS. The combination alternative would be based on the results by Waste Management Area (WMA) of two or more alternatives presented in the Draft EIS. If the agencies were to decide to select an action that is a combination of the four alternatives, the reasons for that selection would be presented in the Record of Decision (ROD) and Findings Statement associated with that decision.

Waste Classifications Used in this EIS

High-level Waste or High-Level Radioactive Waste – The high-level radioactive waste which was produced by the reprocessing of spent nuclear fuel at the Western New York Nuclear Service Center. Such term includes both liquid wastes which are produced directly in reprocessing, dry solid material derived from such liquid waste, and such other material as the U.S. Nuclear Regulatory Commission designates as high-level radioactive waste for the purposes of protecting the public health and safety (West Valley Demonstration Project Act, Public Law 96-368, 94 Stat. 1347). Also see the definition of high-level radioactive waste in the Nuclear Waste Policy Act of 1982, as amended (Public Law 97-425, 96 Stat. 2201), and as promulgated in 10 CFR 63.2.

Transuranic Waste – DOE radioactive waste not classified as high-level radioactive waste and containing more than 100 nanocuries per gram of alpha-emitting transuranic isotopes with half lives greater than 20 years (40 *Code of Federal Regulations* [CFR] Part 191).

Hazardous Waste – A category of waste regulated under the Resource Conservation and Recovery Act (RCRA). To be considered hazardous, a waste must be a solid waste under RCRA and must exhibit at least one of four characteristics described in 40 CFR 261.20-24; 6 New York Code of Rules and Regulations (NYCRR) Part 371.1(d)(1), 371.3 (ignitability, corrosivity, reactivity, or toxicity) or be specifically listed by the U.S. Environmental Protection Agency (EPA) in 40 CFR 261.3-33, or by the State of New York in 6 NYCRR 371.4. Toxicity is determined by the Toxicity Characteristic Leaching Procedure method as given in 40 CFR 261.24; 6 NYCRR 371.3(e).

Low-level Radioactive Waste – Waste that contains radioactivity and is not classified as high-level radioactive waste, transuranic waste, or spent nuclear fuel, or the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material (DOE Manual 435.1-1, 10 CFR 20.1003). In accordance with NRC regulations in 10 CFR 61.55, low-level radioactive waste is further classified into Class A waste, Class B waste, and Class C low-level radioactive waste. Low-level radioactive waste may also be categorized as low specific activity waste for the purposes of transportation analyses. Low specific activity wastes have low specific activity, are nonfissile, and meet certain regulatory exceptions and limits. Low specific activity wastes may be transported in large bulk containers.

Mixed Low-level Radioactive Waste – Low-level radioactive waste that also contains hazardous waste regulated under RCRA (42 United States Code [U.S.C.] 6901 et seq.).

Greater-Than-Class C Waste – Low-level radioactive waste that exceeds the concentration limits established for Class C waste in 10 CFR 61.55.

Construction and Demolition Debris – Discarded nonhazardous material including solid, semisolid, or contained gaseous material resulting from construction, demolition, industrial, commercial, mining, and agricultural operations and from community activities. The category does not include source, special nuclear, or byproduct material as defined by the Atomic Energy Act (42 U.S.C. 2011 et seq.).

2.2 Proposed Action

DOE proposes to decontaminate and decommission the tanks and other WNYNSC facilities in which the high-level radioactive waste solidified under the West Valley Demonstration Project (WVDP) was stored, the facilities used in the solidification of the waste, and any material and hardware used in connection with WVDP, in accordance with the requirements of the WVDP Act. DOE would dispose of low-level radioactive waste and defense-related transuranic waste generated from decontamination and decommissioning activities off site and would store the vitrified high-level radioactive waste and non-defense transuranic waste on site until it can be shipped to a Federal repository for disposal. The types of waste that would be generated are presented in the "Waste Classifications" text box. In carrying out this Proposed Action, DOE would comply with the provisions of the NRC Final Policy Statement on the Decommissioning Criteria for the West Valley Demonstration Project at the West Valley Site (67 *Federal Register* [FR] 5003) and all other applicable Federal and State requirements.

A determination needs to be made on how NYSERDA would decommission or manage the SDA and any other wastes or facilities at WNYNSC that are not within the scope of the WVDP Act. In carrying out its Proposed Action, NYSERDA will comply with all applicable Federal and State requirements, and will also comply with the NRC License Termination Rule (10 CFR Part 20, Subpart E) for all NRC-regulated facilities not within the scope of the WVDP Act.

DOE and NYSERDA need to use the NRC License Termination Rule and associated guidance provided in NRC's Final Policy Statement as the framework for decommissioning and/or long-term stewardship of WVDP facilities. The NRC License Termination Rule is the framework for decommissioning and/or long-term stewardship of NYSERDA-controlled facilities and areas within the NRC-regulated portion of WNYNSC. There is no site-specific decommissioning guidance (comparable to the NRC's Policy Statement) for the SDA; however, if the site were to be decommissioned for unrestricted use, the New York State Department of Environmental Conservation's (NYSDEC's) Cleanup Guideline for Soils Contaminated with Radioactive Materials, DSHM-RAD-0501 (formerly TAGM 4003), would apply until NYSDEC adopts regulations compatible with the NRC's License Termination Rule. RCRA and corresponding State of New York implementing regulations (6 NYCRR Part 373), along with the RCRA 3008(h) Consent Order issued by NYSDEC and EPA (NYSDEC 1992), provide the regulatory framework for management of regulated facilities containing hazardous waste or constituents. The RCRA 3008(h) Consent Order is discussed in Chapter 5.

2.3 The Western New York Nuclear Service Center and Facilities

WNYNSC, shown on **Figure 2–1**, is located 48 kilometers (30 miles) south of Buffalo, New York. It occupies 1,352 hectares (3,340 acres) in northern Cattaraugus County, New York, and approximately 5.7 hectares (14 acres) in southern Erie County, New York. WNYNSC is drained by Buttermilk Creek, which joins Cattaraugus Creek at the northern end of the property. Cattaraugus Creek flows northwest into Lake Erie approximately 50 kilometers (30 miles) southwest of Buffalo, New York.

A 3-strand barbed-wire security fence supported by metal posts runs approximately 38,100 meters (125,000 linear feet) along the perimeter of the WNYNSC property line.

The primary facilities at WNYNSC are a former irradiated nuclear fuel reprocessing plant with four associated underground radioactive waste storage tanks and two radioactive waste disposal areas. One of the disposal areas is licensed by the NRC and the other is licensed by the New York State Department of Health (NYSDOH) and permitted by NYSDEC. Information on facilities and areas at WNYNSC provided in this chapter is from a facility description and methodology technical report (WSMS 2008e) unless otherwise referenced.

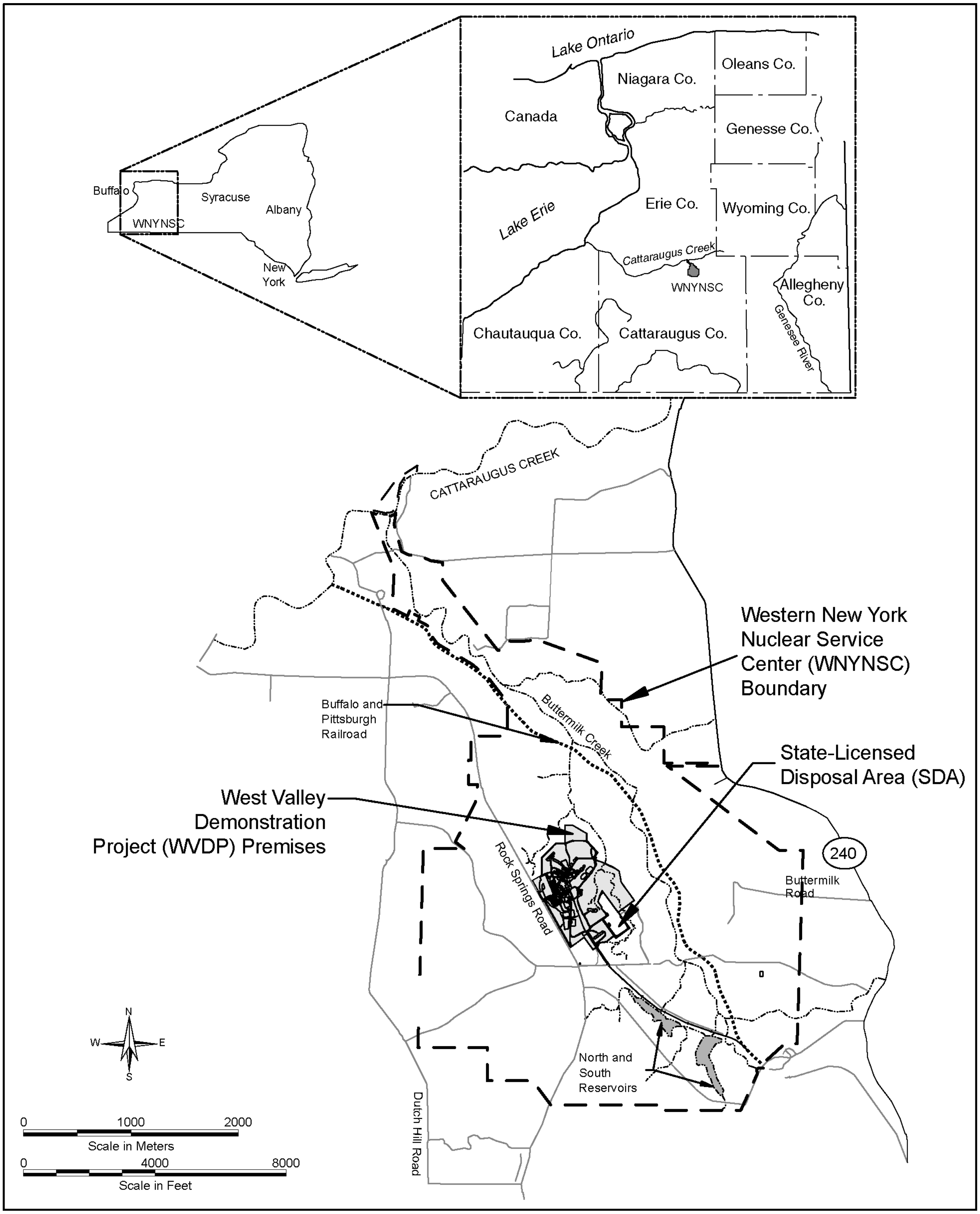

Figure 2–1 The Western New York Nuclear Service Center

WNYNSC has been divided into the 12 WMAs listed below. The locations of WMA 1 through WMA 10 are shown on **Figure 2–2**. The locations of WMA 11 and WMA 12 are shown on **Figure 2–3**.

- WMA 1: Main Plant Process Building and Vitrification Facility Area
- WMA 2: Low-Level Waste Treatment Facility Area
- WMA 3: Waste Tank Farm Area
- WMA 4: Construction and Demolition Debris Landfill
- WMA 5: Waste Storage Area
- WMA 6: Central Project Premises
- WMA 7: NRC-licensed Disposal Area (NDA) and Associated Facilities
- WMA 8: State-licensed Disposal Area (SDA) and Associated Facilities
- WMA 9: Radwaste Treatment System Drum Cell Area
- WMA 10: Support and Services Area
- WMA 11: Bulk Storage Warehouse and Hydrofracture Test Well Area
- WMA 12: Balance of Site

The 66-hectare (164-acre) Project Premises, which are controlled by DOE, are located within WNYNSC, and include WMAs 1 through 10, with the exception of WMA 8 (the SDA), which is managed by NYSERDA and is not included within the Project Premises.

In addition to the 12 WMAs, 2 other areas with unique contamination characteristics that extend through more than 1 WMA are identified in this EIS. The North Plateau Groundwater Plume, a zone of groundwater contamination which extends across portions of WMAs 1 through 6, is shown on **Figure 2–4**; and the Cesium Prong, an area of surface soil contamination extending northwest from the Main Plant Process Building in WMA 1, is shown on **Figure 2–5**. The nature and extent of the North Plateau Groundwater Plume and the Cesium Prong are described in Chapter 3 and in Appendix C.

2.3.1 Environmental Impact Statement Starting Point

The status of WNYNSC at the starting point of this EIS is called the Interim End State, estimated to be achieved by 2011. Prior NEPA reviews have been completed regarding these actions which are needed to place the site in a safe condition (DOE 2003e, 2006c). The primary activities that will be completed to achieve the starting point of this EIS are as follows:

- A number of facilities will be closed, emptied of equipment, decontaminated, and demolished down to their concrete foundations, floor slabs, or gravel pads (DOE 2006c). The disposition of the remaining concrete foundations/slabs/gravel pads is addressed in this EIS. The specific facilities to be removed to achieve the starting point of this EIS are identified in **Table 2–1**, which includes a number of Solid Waste Management Units (SWMUs) identified during the RCRA Facility Assessments that continue to be managed toward RCRA closure. The anticipated status at the EIS starting point with respect to closing these units according to RCRA requirements is listed in Table 2–1 under the column titled "RCRA Status."

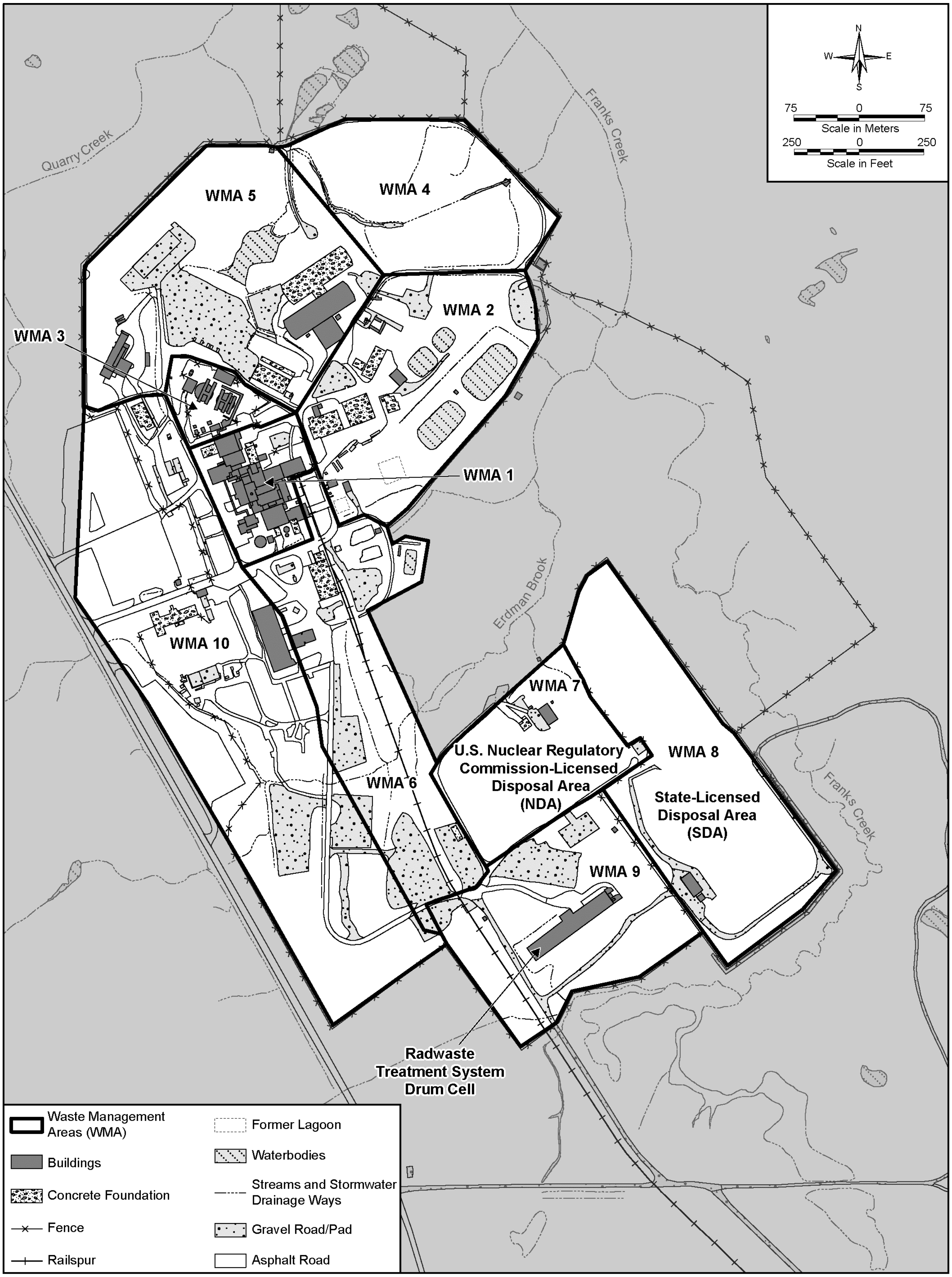

Figure 2–2 Location of Waste Management Areas 1 through 10

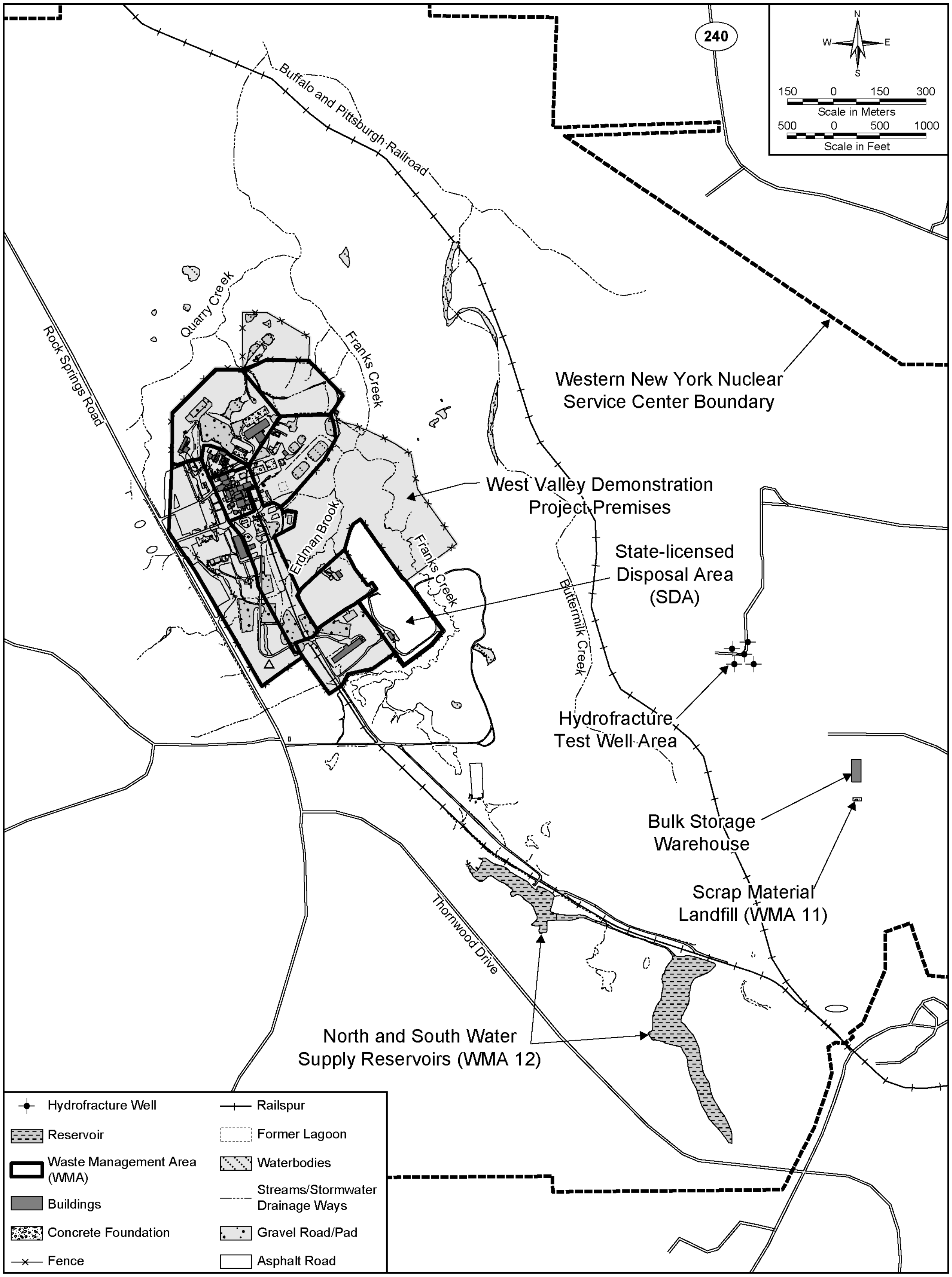

Figure 2–3 Waste Management Areas 11 and 12 – Bulk Storage Warehouse and Hydrofracture Test Area (WMA 11) and Balance of the Western New York Nuclear Service Center (WMA 12)

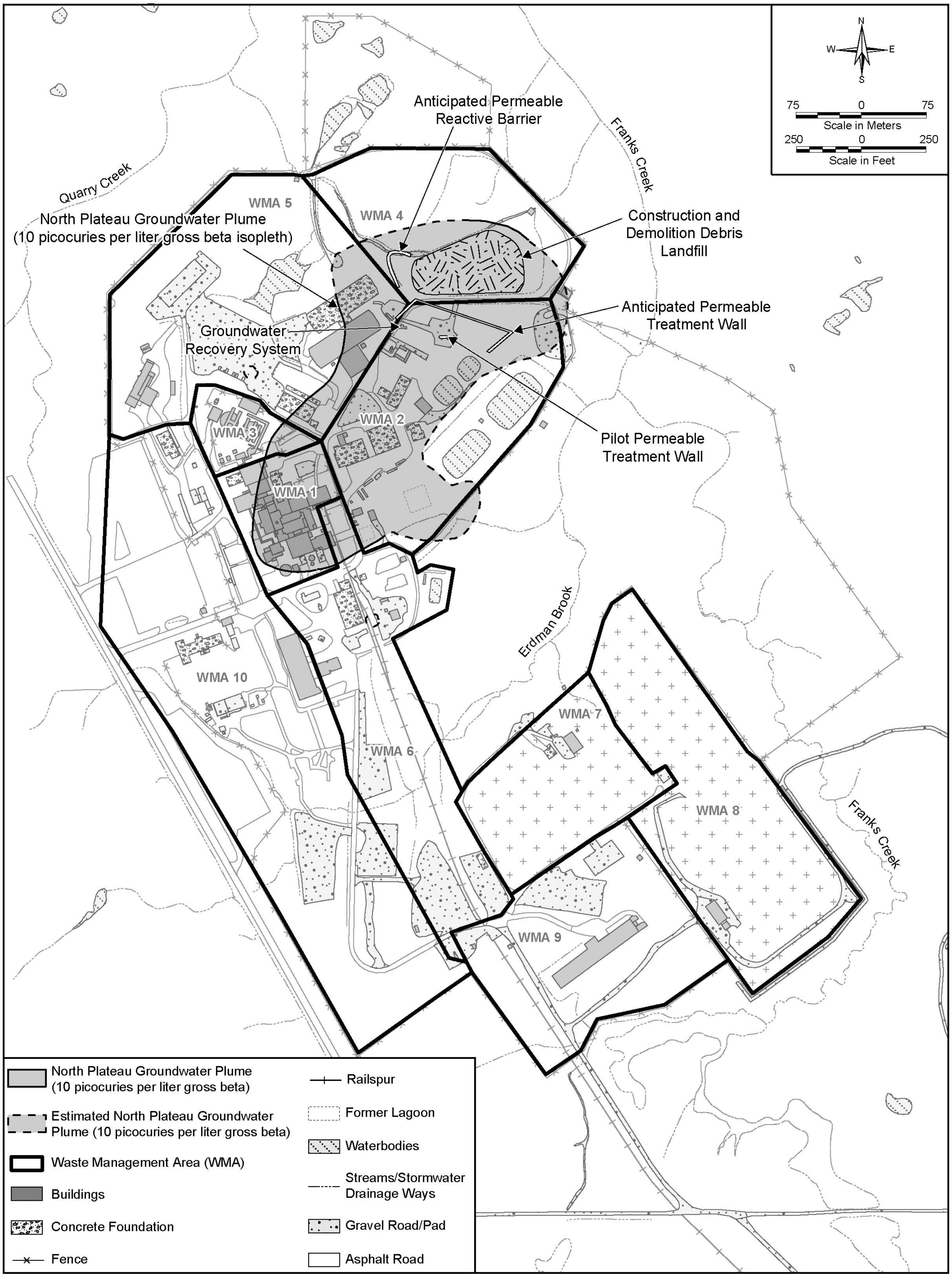

Figure 2–4 The North Plateau Groundwater Plume (a zone of groundwater contamination which extends across Waste Management Areas 1 through 6)

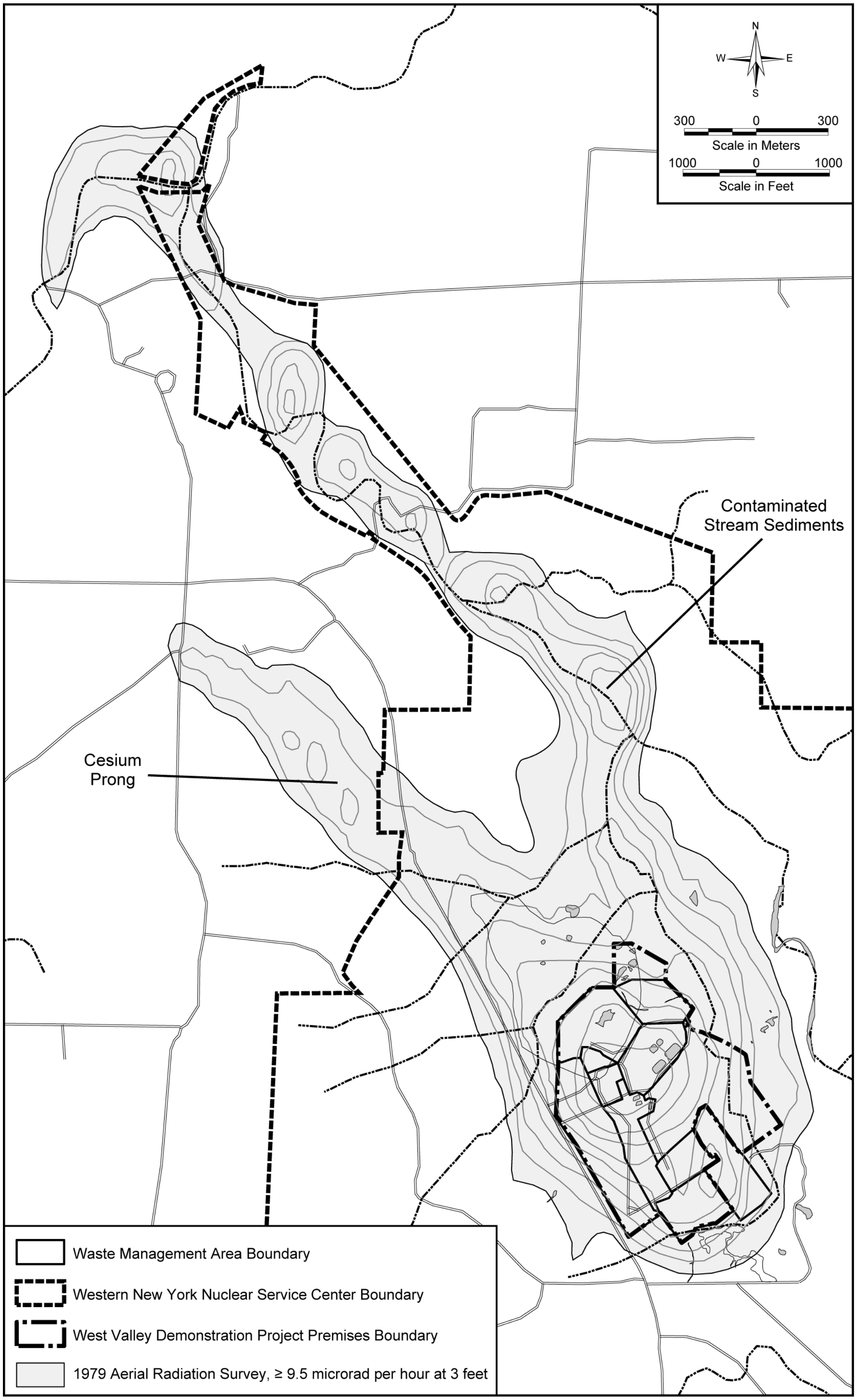

Figure 2–5 1979 Aerial Radiation Survey

Table 2–1 Site Facilities Assumed Removed before Decommissioning; Foundations/Slabs/Pads Remaining at the Starting Point of the Environmental Impact Statement

Facilities Demolished to Grade Foundations/Slabs/Pads Remaining	*RCRA Status at EIS Starting Point*	*Radiological Contamination at EIS Starting Point*
WMA 1		
Fuel Receiving and Storage Ventilation Building	N/A	Assumed to have radiological contamination based on past usage
Fuel Receiving and Storage/High Integrity Container Storage Area	Clean-closed under RCRA Interim Status	Assumed to have radiological contamination based on past usage
Radwaste Process (Hittman) Building	SWMU, NFA	Assumed to have radiological contamination based on past usage
Laundry Room	N/A	Assumed to have radiological contamination based on past usage
Cold Chemical Facility	N/A	No
Emergency Vehicle Shelter	N/A	No
Contact Size-Reduction Facility (including Master Slave Manipulator Repair Shop)	RCRA Interim Status Unit, subject to RCRA Closure	Known to have radiological contamination
WMA 2		
O2 Building	SWMU, CMS being prepared	Assumed to have radiological contamination based on past usage
Test and Storage Building	N/A	No
Vitrification Test Facility	N/A	No
Vitrification Test Facility Waste Storage Area	SWMU, NFA	No
Maintenance Shop	NFA	No
Maintenance Storage Area	N/A	No
Vehicle Maintenance Shop	N/A	No
Industrial Waste Storage Area	SWMU, NFA	No
WMA 3		
None		
WMA 4		
None		
WMA 5		
Lag Storage Building	Clean-closed under RCRA Interim Status	Assumed to have radiological contamination based on past usage
Lag Storage Additions 1,2,3	Clean-closed under RCRA Interim Status	Assumed to have radiological contamination based on past usage
Hazardous Waste Storage Lockers	Clean-closed under RCRA Interim Status	No
Chemical Process Cell Waste Storage Area	Clean-closed under RCRA Interim Status	Assumed to have radiological contamination based on past usage
Cold Hardstand near CDDL	SWMU, NFA	Subsurface contamination
Vitrification Vault and Empty Container Hardstand	SWMU, NFA	No
Old/New Hardstand Area	SWMU, NFA	Assumed to have radiological contamination based on past usage
Waste Packaging Area	Clean-closed under RCRA Interim Status	Known radiological contamination
Lag Hardstand	SWMU, NFA	Assumed to have radiological contamination based on past usage
Container Sorting and Packaging Facility as Part of Lag Storage Addition 4	Clean-closed under RCRA Interim Status	Known radiological contamination
High-Level Waste Tank Pump Storage Vaults	SWMU, NFA	No

Facilities Demolished to Grade Foundations/Slabs/Pads Remaining	***RCRA Status at EIS Starting Point***	***Radiological Contamination at EIS Starting Point***
WMA 6		
Old Warehouse	N/A	No
Cooling Tower	N/A	Assumed to have radiological contamination based on past usage
North Waste Tank Farm Test Tower	N/A	No
Road Salt and Sand Storage Shed	N/A	No
Vitrification Test Facility Waste Storage Area	SWMU, NFA	No
Product Storage Area	NFA	No
WMA 7 [a]		
NDA Hardstand Staging Area	SWMU, NFA	Assumed to have radiological contamination based on past usage
WMA 8		
None		
WMA 9		
Trench Soil Container Area	N/A	Assumed to have radiological contamination based on past usage
WMA 10		
Administration Building	N/A	No
Expanded Environmental Laboratory	N/A	No
Construction Fabrication Shop	N/A	No
Vitrification Diesel Fuel Oil Storage Tank and Building	N/A	No
WMA 11		
None		
WMA 12		
None		

CDDL = Construction and Demolition Debris Landfill; CMS = Corrective Measures Study; EIS = environmental impact statement; MSM = Master Slave Manipulator; NFA = no further action required at this time under RCRA, as determined with concurrence of the NYSDEC as an outcome of the RCRA Facility Investigation; N/A = not applicable, not a RCRA-regulated SWMU; RCRA = Resource Conservation and Recovery Act; SWMU = Solid Waste Management Unit; WMA = Waste Management Area.

[a] The Interim Waste Storage Facility and pad located in WMA 7 and the Old Sewage Treatment Plant in WMA 6 have been RCRA clean-closed and are not listed in the table because there is no remaining foundation to be removed.

- The Main Plant Process Building, with the exception of the area used for storing the vitrified waste canisters and areas and systems supporting high-level radioactive waste canister storage, will be decontaminated to a demolition-ready status. Also, the 01-14 Building and the Vitrification Facility in WMA 1, as well as the Remote-Handled Waste Facility in WMA 5, will be decontaminated to a demolition-ready status.

- An upgradient slurry/barrier wall will be installed and a geomembrane cover will be placed over the NDA as part of the NDA infiltration mitigation measures. The installation of this RCRA Interim Measure is scheduled to begin during the spring and be completed by the fall of 2008. The design will be similar to that installed over the SDA in 1995.

- A Tank and Vault Drying System will be installed at the Waste Tank Farm to dry the liquid contents of Tanks 8D-1 and 8D-2. The liquid in Tank 8D-4 will be processed through absorbent media to remove most of the cesium-137 inventory. The contaminated absorbent media will be disposed of off site. The treated liquid will be added to Tank 8D-2, where it will be evaporated in accordance with appropriate regulatory requirements.

- A permeable treatment wall and a permeable reactive barrier will be installed to mitigate further North Plateau Groundwater Plume migration. The anticipated locations for the permeable treatment wall and the permeable reactive barrier are shown on Figure 2–4. The North Plateau Groundwater Plume and background soils will be sampled for potential RCRA hazardous constituents that may exist in the plume, which is anticipated to be completed by December 2008.

- All waste created by activities that are part of achieving the Interim End State will be shipped off site with the possible exception of the transuranic waste. Currently, there is no disposal pathway for non-defense transuranic waste. Transuranic waste generated by Interim End State activities will be stored on site pending either a "defense" determination[1] or availability of a disposal facility for non-defense transuranic waste.

The following sections provide summary descriptions of the facilities/areas of WNYNSC that will be standing, operational, or inactive at the starting point of this EIS and are addressed in this EIS. **Table 2–2** provides a list of these facilities/areas, along with their RCRA and radiological status as of the starting point of the EIS, and references the specific Appendix C sections where these facilities/areas are discussed in more detail. The additional details in Appendix C provide overall dimensions of key facilities, their operational history, and, for the larger facilities where information is available, radiological and hazardous chemical inventory estimates.

Table 2–2 Site Facilities/Areas at the Western New York Nuclear Service Center Assumed at the Starting Point of the Environmental Impact Statement

Facility	*EIS Starting Point*	*RCRA Status [a] at EIS Starting Point*	*Radiological/Chemical Contamination at EIS Starting Point*	*Description (Appendix C Section)*
WMA 1				
Main Plant Process Building (including HLWISF, LWTS, and A&PC Hot Cells and sealed rooms (demolition ready)	Decontaminated for uncontained demolition except for the HLWISF which contains HLW canisters	RCRA Interim Status Units, subject to RCRA closure	Yes – significant radiological source term remains	C.2.1.1
Vitrification Facility (demolition ready)	Decontaminated for uncontained demolition	RCRA Interim Status Unit, subject to RCRA closure	Yes – significant radiological source term remains	C.2.1.2
01-14 Building (includes the Cement Solidification System and the Vitrification Off-Gas System) (demolition ready)	Gutted and decontaminated for uncontained demolition	RCRA Interim Status Unit, subject to RCRA closure	Decontaminated with only residual activity remaining	C.2.1.3
Load-In/Load-Out Facility	Operational	N/A	No	C.2.1.4
Utility Room and Utility Room Expansion	Operational	N/A	No	C.2.1.5
Fire Pumphouse and Water Storage Tank	Operational	N/A	No	C.2.1.6
Plant Office Building	Operational	N/A	Subsurface soil may be contaminated	C.2.1.7
Electrical Substation	Operational	N/A	No	C.2.1.8
Underground Tanks 35104, 7D-13, 15D-6	Operational	N/A	Yes – radiological contamination remains	C.2.1.9

[1] *DOE is required to make a determination whether a particular transuranic waste stream is related to defense activities. The Waste Isolation Pilot Plant (WIPP) Land Withdrawal Act of 1992 restricts WIPP disposal activities to transuranic waste generated from defense activities. This "defense waste" is defined as "nuclear waste deriving from the manufacture of nuclear weapons and the operation of naval reactors. Associated activities, such as the research carried on in the weapons laboratories, also produce defense waste" (DOE 1997b).*

Facility	*EIS Starting Point*	*RCRA Status [a] at EIS Starting Point*	*Radiological/Chemical Contamination at EIS Starting Point*	*Description (Appendix C Section)*
Off-Gas Trench	Inactive	N/A	Yes – radiological contamination remains	C.2.1.10
WMA 2				
Low-Level Waste Treatment Facility (LLW2)	Operational	SWMU, subject to CWA closure and CA	Yes – radiological contamination remains	C.2.2.1
Lagoon 1	Inactive	SWMU, CMS being prepared	Yes – radiological contamination remains, PAH concentrations exceed TAGM criteria	C.2.2.2
Lagoons 2 through 5	Operational	SWMUs, subject to CWA closure and CA	Yes – radiological contamination remains	C.2.2.3
Neutralization Pit	Operational	SWMU, CMS being prepared	Yes – radiological contamination remains	C.2.2.4
Old Interceptor	Operational	SWMU, CMS being prepared	Yes – radiological contamination remains	C.2.2.4
New Interceptor (North and South)	Operational	SWMU, CMS being prepared	Yes – radiological contamination remains	C.2.2.4
Solvent Dike	Inactive	SWMU, NFA	Yes – radiological contamination remains	C.2.2.5
Maintenance Shop Leach Field	Inactive	SWMU, NFA	Subsurface soil is radiologically contaminated from strontium-90 plume	C.2.2.6
Fire Brigade Training Area	Inactive	SWMU, NFA	Subsurface is radiologically contaminated from strontium-90 plume	C.2.2.7
WMA 3				
Tanks 8D-1, 8D-2, 8D-3, 8D-4	Isolated and emptied	RCRA Interim Status Units, subject to RCRA closure	Yes – contains both radiological and hazardous constituents	C.2.3.1
High-Level Waste Transfer Trench	Transfer lines, trench and pump pits remaining	RCRA Interim Status Unit, subject to RCRA closure	Contamination remains in pump pits and transfer lines	C.2.3.2
Permanent Ventilation System Building	Operational	N/A	Yes – radiological contamination primarily in the HEPA filters	C.2.3.3
Supernatant Treatment System	Isolated, liquid drained	RCRA Interim Status Unit, subject to RCRA closure	Yes – radiological contamination remains	C.2.3.4
Supernatant Treatment System Support Building	Operational	RCRA Interim Status Unit, subject to RCRA closure	Yes – radiological contamination in the valve aisle	C.2.3.4
Equipment Shelter and Condensers	Inactive	SWMU, NFA	Yes – most radiological contamination in ventilation system	C.2.3.5
Con-Ed Building	Inactive	SWMU, NFA	Yes – radiological contamination remains	C.2.3.6
WMA 4				
Construction and Demolition Debris Landfill	Inactive (previously closed)	SWMU, CMS being prepared	Radiologically contaminated from strontium-90 plume	C.2.4

Facility	***EIS Starting Point***	***RCRA Status [a] at EIS Starting Point***	***Radiological/Chemical Contamination at EIS Starting Point***	***Description (Appendix C Section)***
WMA 5				
Remote-Handled Waste Facility	Decontaminated and Deactivated	RCRA Interim Status Unit, subject to RCRA closure	Radiological contamination remains	C.2.5.1
Lag Storage Addition 4, includes Shipping Depot	Operational	RCRA Interim Status Unit, subject to RCRA closure	Small amount of radiological contamination	C.2.5.2
Construction and Demolition Area	Inactive	SWMU, NFA	No	C.2.5.3
WMA 6				
Rail Spur	Operable	N/A	Assumed to have radiological contamination based on past usage	C.2.6.1
Demineralizer Sludge Ponds	Inactive	SWMU, CMS being prepared	Yes – Radiological contamination remains with possible PAH concentrations exceeding TAGM criteria	C.2.6.2
Equalization Basin	Operational	SWMU, subject to CWA closure	No	C.2.6.3
Equalization Tank	Operational	SWMU, subject to CWA closure	No	C.2.6.4
Low-Level Waste Rail Packaging and Staging Area	Operable, waste removed	N/A	No	C.2.6.5
Sewage Treatment Plant	Operational	SWMU, subject to CWA closure	No	C.2.6.6
South Waste Tank Farm Test Tower	Operable	N/A	No	C.2.6.7
WMA 7				
NFS Special Holes	Inactive, Geomembrane Cap and Slurry Wall	SWMU, CMS being prepared	Yes – radiological contamination remains	C.2.7.1
NFS Deep Holes	Inactive, Geomembrane Cap and Slurry Wall	SWMU, CMS being prepared	Yes – radiological contamination remains	C.2.7.1
WVDP Trenches	Inactive, Geomembrane Cap and Slurry Wall	SWMU, CMS being prepared	Yes – radiological contamination remains	C.2.7.1
WVDP Caissons	Inactive, Geomembrane Cap and Slurry Wall	SWMU, CMS being prepared	Yes – radiological contamination remains	C.2.7.1
NDA Interceptor Trench	Operational	SWMU, CMS being prepared	Subsurface is radiologically contaminated. Organic constituents slightly exceed TAGM criteria	C.2.7.2
Liquid Pretreatment System	Operable	SWMU, CMS being prepared	No	C.2.7.2
Leachate Transfer Line	Operational	SWMU, CMS being prepared	Yes – radiologically contaminated and may be chemically contaminated	C.2.7.3
Former NDA Lagoon	Inactive, Geomembrane Cap and Slurry Wall	SWMU, CMS being prepared	Yes – radiologically contaminated soil	C.2.7.4

Facility	***EIS Starting Point***	***RCRA Status [a] at EIS Starting Point***	***Radiological/Chemical Contamination at EIS Starting Point***	***Description (Appendix C Section)***
WMA 8				
Disposal Areas	Inactive, Geomembrane Cap	SWMU, CMS being prepared	Yes – radiological and chemical contamination remains	C.2.8.1
Mixed Waste Storage Facility	Operable	RCRA Interim Status Unit, subject to RCRA closure	Yes – assumed to have radiological and chemical contamination	C.2.8.2
Former Filled Lagoons	Inactive, Geomembrane Cap	SWMU, CMS being prepared	Yes – assumed to have radiological and chemical contamination	C.2.8.3
WMA 9				
Radwaste Treatment System Drum Cell	Operable	SWMU, NFA	Assumed to have radiological contamination	C.2.9
Subcontractor Maintenance Area	In-Place	NFA	No	C.2.9
WMA 10				
New Warehouse	Operational	N/A	No	C.2.10.1
Meteorological Tower	Operational	N/A	No	C.2.10.2
Security Gatehouse and Fences	Operational	N/A	No	C.2.10.3
WMA 11				
Scrap Material Landfill	Inactive	SWMU, NFA	No	C.2.11
WMA 12				
Dams and Reservoirs	Operable	N/A	No	C.2.12.1
Parking Lots and Roadways	Inactive	N/A	No	C.2.12.2
Railroad Spur	Inactive	N/A	No	C.2.12.3
Soils and Stream Sediments	N/A	N/A	Yes – radiological contamination is present	C.2.12.4
North Plateau Groundwater Plume	Inactive	N/A	Yes – radiological contamination is present	C.2.13
Groundwater Recovery System [b]	Operational	N/A	Yes – radiological contamination is present	C.2.13.1
Pilot-Scale Permeable Treatment Wall and Full-Scale Permeable Treatment Wall [b]	Operational	N/A	Yes – radiological contamination is present	C.2.13.2
Permeable Reactive Barrier [c]	Operational	N/A	Yes – radiological contamination is present	C.2.13.3
Cesium Prong	Inactive	N/A	Yes – radiological contamination is present	C.2.14

A&PC = Analytical and Process Chemistry; CA = Corrective Action; CMS = Corrective Measures Study; CWA = Clean Water Act; EIS = environmental impact statement; HLW = high-level radioactive waste; HLWISF = High-Level Waste Interim Storage Facility; LLW2 = Low-Level Waste Treatment Facility; LWTS = Liquid Waste Treatment System; NDA = NRC-licensed Disposal Area; NFA = no further action required at this time under RCRA, as determined with concurrence of the NYSDEC as an outcome of the RCRA Facility Investigation; NFS = Nuclear Fuel Services, Inc.; N/A = not applicable, not a RCRA-regulated SWMU; PAH = polynuclear aromatic hydrocarbon; RCRA = Resource Conservation and Recovery Act; SWMU = Solid Waste Management Unit; TAGM = Technical and Administrative Guidance Memorandum; WMA = Waste Management Area; WVDP = West Valley Demonstration Project.

[a] Interim Status Unit implies that a unit is subject to permitting and closure.
[b] Physically located in WMA 2.
[c] Physically located in WMA 4.

2.3.2 Description of Waste Management Areas

2.3.2.1 Waste Management Area 1: Main Plant Process Building and Vitrification Facility Area

WMA 1 encompasses approximately 1.7 hectares (4 acres). Key facilities standing in WMA 1 at the starting point of this EIS include the Main Plant Process Building, Vitrification Facility, 01-14 Building, Load-In/Load-Out Facility, Utility Room and Utility Room Expansion, Fire Pumphouse and Water Storage Tank, Plant Office Building, and Electrical Substation. Included in WMA 1 are underground tanks, underground pipelines (including those that transferred waste to WMA 3), and the source area of the North Plateau Groundwater Plume. The plume extends through portions of WMAs 1 through 6. WMA 1 is shown on Figure 2–2, and in more detail in Appendix C, Figure C–1.

At the starting point of this EIS, WMA 1 facilities, including the Fuel Receiving and Storage Ventilation Building, Fuel Receiving and Storage High Integrity Container (HIC) Storage Area, Radwaste Process (Hittman) Building, Laundry Room, Cold Chemical Facility, Emergency Vehicle Shelter, and the Contact Size-Reduction Facility including the MSM Repair Shop will have been removed to grade. The remaining concrete foundations and slabs are addressed in this EIS.

The Main Plant Process Building was built between 1963 and 1966, and was used from 1966 to 1971 by Nuclear Fuel Services (NFS) to recover uranium and plutonium from irradiated nuclear fuel. The building is composed of a series of cells, aisles, and rooms that are constructed of reinforced concrete and concrete block. Most of the facility was constructed above grade; however, a few of the cells extend below the ground surface. One of the cells is currently used to store 275 canisters of vitrified high-level radioactive waste from the solidification of the liquid waste originally in the high-level radioactive waste tanks in WMA 3.

At the starting point of this EIS, the Main Plant Process Building will be standing, emptied of most equipment, and decontaminated to the extent that it can be demolished without the use of radiological containment. The major area not decontaminated would be the former Chemical Process Cell (now referred to as the High-Level Waste Interim Storage Facility), where the high-level radioactive waste canisters would still be stored, and those areas that support safe storage of the waste canisters. The Main Plant Process Building areas that would still be operational to support high-level radioactive waste canister storage include the Chemical Process Cell Crane Room, Equipment Decontamination Room, Ventilation Supply Room, the Ventilation Exhaust Cell, and the Head-End Ventilation Building, along with supporting plant utilities. Other equipment remaining in the Main Plant Process Building is located in the Liquid Waste Cell, Acid Recovery Cell, and Ventilation Wash Room. Prior to the starting point of this EIS, a layer of cement grout will be poured on the floors of cells with high radiation and contamination levels, such as the General Purpose Cell and the Process Mechanical Cell, to fix contamination and provide radiation shielding. Details on the Main Plant Process Building and the type and quantity of radiological and chemical contamination present are provided in Appendix C, Section C.2.1.1.

The Vitrification Facility is a structural steel-framed and sheet-metal building that houses the Vitrification Cell, operating aisles, and a control room. High-level radioactive waste transferred from Tank 8D-2 in WMA 3 was mixed with glass formers and vitrified into borosilicate glass within the Vitrification Cell. The Vitrification Facility will be decontaminated for the Interim End State to a point where it would be ready for demolition without containment, but a substantial radiological source term would remain. More detailed information regarding the status of the Vitrification Facility at the starting point of the EIS can be found in Appendix C, Section C.2.1.2.

The 01-14 Building will be in place and sufficiently decontaminated to allow uncontained demolition. The 01-14 Building is a four-story concrete and steel-framed building located next to the southwest corner of the Main Plant Process Building. This building was built in 1971 to house an NFS off-gas system and acid recovery system, which were to be located in the off-gas treatment cell and acid fractionator cell portions of the building. However, the building was never used to support NFS operations. The 01-14 Building currently houses the vitrification off-gas system and the Cement Solidification System. It is radiologically contaminated. The vitrification off-gas system and the Cement Solidification System will be removed and the building decontaminated prior to the starting point of the EIS.

The Load-In/Load-Out Facility is located adjacent to the west wall of the Equipment Decontamination Room of the Main Plant Process Building in WMA 1. The Load-In/Load-Out Facility is a structural steel and steel-sided building. It was used to move empty canisters and equipment into and out of the Vitrification Cell. It has a truck bay and a 14-metric ton (15-ton) overhead crane that is used to move canisters and equipment. It is not radioactively contaminated.

The Utility Room is a concrete block and steel-framed building located on the south end of the Main Plant Process Building. It consists of two adjoining buildings that were built at different times: the original Utility Room and the Utility Room Expansion. The original Utility Room, which was built during the construction of the Main Plant Process Building, makes up the western portion of the Utility Room. The Utility Room contains equipment that supplies steam, compressed air, and various types of water to the Main Plant Process Building. Based on process knowledge and the results of routine radiological surveys, the Utility Room is not expected to have substantial radiological contamination. However, the pipe trench in the original Utility Room is reported to be radioactively contaminated as a result of backup of contaminated water from other sources and may have chemical contamination. A water storage tank and an aboveground No. 2 fuel oil tank are located outside the Utility Room. The aboveground fuel oil tank would require closure under petroleum bulk storage regulations (6 NYCRR Part 613). Asbestos-containing material associated with the fuel oil tank will be managed as asbestos-containing waste in accordance with New York State and Toxic Substances Control Act requirements.

The Utility Room Expansion was built in the early 1990s immediately adjacent and connected to the original Utility Room. Because this building is newer, and because radioactive waste processing operations were not performed in it, the Utility Room Expansion is not expected to be contaminated, and routine radiological surveys have not detected any radiological contamination in this area.

The Fire Pumphouse was constructed when the Main Plant Process Building was built in 1963. The Pumphouse contains two pumps on concrete foundations. One is driven by an electric motor with a diesel engine backup, and the other is driven by a diesel engine. A 1,100-liter (290-gallon), double-wall, carbon-steel, diesel-fuel day tank with No. 2 fuel oil is also located in the Pumphouse. A light metal storage shed rests on a concrete slab. The shed is used to store fire hoses and fire extinguishers. The Water Storage Tank stores water for firefighting purposes. The Fire Pumphouse and the Water Storage Tank are not expected to be radioactively contaminated based on process knowledge and routine radiological surveys.

The Plant Office Building is a three-story concrete block and steel-framed structure located adjacent to the west side of the Main Plant Process Building. The Office Building is designated as an unrestricted occupancy area. Radiological contamination is present beneath the floor in the men's shower room. This contamination originated during spent nuclear fuel reprocessing from releases of radioactive acid from the acid recovery system into the adjacent southwest stairwell and into subsurface soils during NFS operations. This contamination is the primary source of the North Plateau Groundwater Plume, described in Section 2.3.2.13 of this chapter.

The Electrical Substation is located adjacent to the southeast corner of the Main Plant Process Building. A 34.5-kilovolt/480-volt transformer rests on a concrete foundation behind a steel-framed structure. The transformer contains 2,200 liters (586 gallons) of oil containing polychlorinated biphenyls at 292 parts per million, which is managed in accordance with New York State and Toxic Substances Control Act requirements. No radiologically-contaminated areas have been identified at the Electrical Substation.

Tanks 35104, 7D-13, and 15D-6 are located underground in the vicinity of the Main Plant Process Building. They are stainless steel tanks with capacities of 22,300 liters (5,900 gallons), 7,600 liters (2,000 gallons), and 5,700 liters (1,500 gallons) respectively. They served as collection and holding tanks for liquid from drains in contaminated areas and liquid waste from laundry and laboratories. They currently contain radioactive liquids and solids and RCRA constituents. Refer to Section 3.11.5.1 for a description of leaks associated with these tanks.

The Off-Gas Trench is an underground shielded concrete transfer trench located on the west side of the Main Plant Process Building between the Vitrification Facility and the 01-14 Building. It was used to transfer filtered off-gas generated by the vitrification process to the 01-14 Building for further processing before exhausting through the main stack and is radiologically contaminated.

More detailed descriptions of the Main Plant Process Building, Vitrification Facility, 01-14 Building, Load-In/Load-Out Facility, Utility Room and Utility Room Expansion, Fire Pumphouse and Water Storage Tank, Plant Office Building, Electrical Substation, underground tanks, and the Off-Gas Trench are included in Appendix C, Section C.2.1.

2.3.2.2 Waste Management Area 2: Low-Level Waste Treatment Facility Area

WMA 2 encompasses approximately 5.5 hectares (14 acres). It was used by NFS and WVDP to treat low-level radioactive wastewater generated on site. Facilities and areas evaluated in this EIS include the Low-Level Waste Treatment Facility, known as LLW2; inactive filled Lagoon 1; active Lagoons 2, 3, 4, and 5; Neutralization Pit; New and Old Interceptors; Solvent Dike; Maintenance Shop Leach Field; and Fire Brigade Training Area. Included in WMA 2 are underground pipelines, the groundwater recovery wells and the permeable treatment wall that are described in Section 2.3.2.13 of this chapter, and also a portion of the North Plateau Groundwater Plume, which extends under portions of WMAs 1 through 6. The Low-Level Waste Treatment Facility Area is shown on Figure 2–2 and in more detail on Figure C–3 of Appendix C.

At the starting point of this EIS, the O2 Building, Test and Storage Building, Vitrification Test Facility, Vitrification Test Facility Waste Storage Area, Maintenance Shop, Vehicle Maintenance Shop, Maintenance Storage Area, and Industrial Waste Storage Area will have been removed to grade. The remaining concrete foundations and slabs are addressed in this EIS.

The Low-Level Waste Treatment Facility is located southwest of Lagoon 4, and is a pre-engineered, single-story, metal-sided building on a concrete wall foundation. The packaging room, which is typically used for resin handling, includes a 3,400-liter (900-gallon) sump and is high-efficiency particulate air (HEPA) filter ventilated. The Low-Level Waste Treatment Facility is radiologically contaminated.

Lagoon 1 was an unlined pit excavated into the surficial sands and gravels. It was fed directly from the Old and New Interceptors, and had a storage capacity of approximately 1,140,000 liters (300,000 gallons). This lagoon was removed from service in 1984, after a determination was made that it was the source of tritium contamination to nearby groundwater. The liquid and sediment were transferred to Lagoon 2. Lagoon 1 was filled with approximately 1,300 cubic meters (1,700 cubic yards) of radiologically-contaminated debris from the Old Hardstand, including asphalt, trees, stumps, roots, and weeds. It was capped with clay, covered with topsoil, and revegetated.

Lagoon 2 is an unlined pit with a storage capacity of 9.1 million liters (2.4 million gallons). This lagoon was excavated into the Lavery till, and water levels are kept below the sand and gravel unit/Lavery till interface. It is used as a storage basin for wastewater discharged from the New Interceptors before its contents are transferred to the Low-Level Waste Treatment Facility for treatment. Prior to installation of the Low-Level Waste Treatment Facility, wastewater was routed through Lagoons 1, 2, and 3 in series before discharge to Erdman Brook. Radioactive contamination is known to be present in Lagoon 2 sediment.

Lagoon 3 is an unlined pit with a storage capacity of 12.5 million liters (3.3 million gallons). This lagoon was excavated into the Lavery till, and water levels are kept below the sand and gravel unit/Lavery till interface. After installation of the O2 Building, which formerly housed the low-level waste treatment equipment and was subsequently reduced to its floor slab, Lagoon 3 was disconnected from Lagoon 2, emptied, and the sediment was removed. Presently, Lagoon 3 only receives treated water from Lagoons 4 and 5. Treated wastewater in Lagoon 3 is periodically batch discharged to Erdman Brook through a State Pollutant Discharge Elimination System (SPDES)-permitted outfall. Lagoon 3 is radiologically contaminated.

Lagoon 4 was excavated into the sand and gravel unit and was lined with silty till material. Operations relied on the clay liner until 1974, when the lagoon was identified as a source of tritium in the groundwater. A hypalon membrane liner was then added. The membranes lining the lagoon were removed in the late 1990s by WVNSCO and replaced with concrete grout and an XR-5 liner. The lagoon has a capacity of 772,000 liters (204,000 gallons). It receives treated water from the Low-Level Waste Treatment Facility and discharges it to Lagoon 3. It is radiologically contaminated.

Lagoon 5 was also excavated into the sand and gravel unit and lined with silty till material. Operations relied on the clay liner until 1974, when the lagoon was identified as a source of tritium in the groundwater. A hypalon membrane liner was then added. The membranes lining the lagoon were removed in the late 1990s by WVNSCO and replaced with concrete grout and an XR-5 liner. The lagoon has a capacity of 628,000 liters (166,000 gallons). It receives treated water from the Low-Level Waste Treatment Facility and discharges it to Lagoon 3. It is radiologically contaminated.

The Neutralization Pit is a below-grade tank constructed with concrete walls and floor. The tank initially had an acid-resistant coating which failed and was replaced with a stainless steel liner. The pit is radiologically contaminated and may contain chemical constituents, such as mercury derived from the management of low-level radioactive wastewater.

The Old Interceptor is a liquid waste storage tank located below grade that received low-level liquid waste generated at the Main Plant Process Building from the time of initial operation until the New Interceptors were constructed. High levels of radioactive contamination introduced into its Old Interceptor required the addition of an 0.3-meter (1-foot) thick layer of concrete to the floor for shielding. The Old Interceptor is currently used for storing radiologically contaminated liquids that exceed the effluent standard.

The New Interceptors are twin (north and south) stainless steel lined open-top concrete storage tanks located below grade. The New Interceptors replaced the Old Interceptor and are used as liquid sampling points before transfer of the liquid to Lagoon 2.

The Solvent Dike is located about 90 meters (300 feet) east of the Main Plant Process Building. It was an unlined basin, excavated in the surficial sands and gravels. It received rainwater runoff from the Main Plant Process Building Solvent Storage Terrace, which formerly housed an acid storage tank and three storage tanks containing a mixture of used n-dodecane and tributyl phosphate. The sediment has been removed and the area has been backfilled. The Solvent Dike still contains radiologically-contaminated soil.

The Maintenance Shop Leach Field occupies an area of 140 square meters (1,500 square feet) and consists of three septic tanks, a distribution box, a tile drain field, and associated piping. The Leach Field served the Maintenance Shop and the Test and Storage Building before these buildings were connected to the sanitary sewer system in 1988. It may be radiologically contaminated by the North Plateau Groundwater Plume. RCRA hazardous constituents were detected in the sediment of one septic tank, but none of the concentrations exceeded RCRA hazardous waste criteria or action levels prescribed by NYSDEC. All three tanks are out of service and have been filled with sand.

The Fire Brigade Training Area is located north of Lagoons 4 and 5 and was used two to four times a year between 1982 and 1993 for several types of fire training exercises. Piles of wood coated with kerosene or diesel fuel were ignited and then extinguished with water and/or foam. Other exercises involved diesel fuel and water mixtures placed in a shallow metal pan that were ignited and extinguished using a steady stream of water and/or foam. These training exercises were conducted pursuant to the Restricted Burning Permits issued for the training area.

More detailed descriptions of the Low-Level Waste Treatment Facility, Lagoons 1 through 5, Neutralization Pit and Interceptors, Solvent Dike, Maintenance Shop Leach Field, and Fire Brigade Training Area are included in Appendix C, Section C.2.2.

2.3.2.3 Waste Management Area 3: Waste Tank Farm Area

WMA 3 encompasses approximately 0.8 hectares (2 acres). Waste Tank Farm Area facilities evaluated in this EIS include Waste Storage Tanks 8D-1, 8D-2, 8D-3, and 8D-4, their associated vaults, the High-Level Waste Transfer Trench, Permanent Ventilation System Building, Supernatant Treatment System (STS) and STS Support Building, Equipment Shelter and Condensers, and the Con-Ed Building. Also included in WMA 3 is the North Plateau Groundwater Plume, which extends through WMAs 1 through 6, and underground pipelines which transferred waste from WMA 1. At the starting point of this EIS, a Tank and Vault Drying System will have been added to Tanks 8D-1 and 8D-2, which would have dried the residuals left in the tanks as part of achieving the Interim End State. The Waste Tank Farm Area is shown on Figure 2–2 and in more detail on Figure C–4 of Appendix C.

Waste Storage Tanks 8D-1, 8D-2, 8D-3, and 8D-4 were built to store liquid high-level radioactive waste generated during spent nuclear fuel reprocessing operations. Tanks 8D-2 and 8D-4 were used to store PUREX and THOREX wastes respectively from reprocessing operations. Tanks 8D-1 and 8D-3 were used to store condensate from the THOREX waste. These tanks were subsequently modified to support treatment of high-level radioactive waste. Modifications included constructing a fabricated steel truss system over Tanks 8D-1 and 8D-2 to carry the weight of sludge mobilization and transfer pumps, and installation of STS equipment in Tank 8D-1. The tanks will contain residual radiological as well as hazardous chemical constituents, but all the tank contents will be dry. Piping and utilities to the tanks will be isolated to prevent transfers to and from the tanks. Details on the Waste Storage Tanks and associated vaults and the type and quantities of the waste contents at the starting point of this EIS are provided in Appendix C, Section C.2.3.

Tank 8D-1 contains five high-level radioactive waste mobilization pumps, and Tank 8D-2 contains four of these centrifugal pumps. Each pump is approximately 2.4 meters (8 feet) long and is supported by a 25.4-centimeter (10-inch) stainless steel pipe column that is 15.2 meters (50 feet) long. Tanks 8D-1, 8D-2, 8D-3, and 8D-4 also each contain a transfer pump. These centrifugal multi-stage turbine type pumps are each supported by a 35.6-centimeter (14-inch) pipe column, with an overall length of more than 15.2 meters (50 feet) for Tanks 8D-1 and 8D-2 and approximately 6 to 8 meters (20 to 25 feet) in length for Tanks 8D-3 and 8D-4. Like the mobilization pumps, the transfer pumps were driven by 150-horsepower electric motors. The mobilization and transfer pumps are radiologically contaminated. The transfer pumps will likely have more contamination, since high-level radioactive waste passed through the entire length of the pump, rather than impacting only the lower portion as with the mobilization pumps.

The High-Level Waste Transfer Trench is a long concrete vault containing double-walled piping that was designed to convey waste between the Waste Tank Farm and the Vitrification Facility in WMA 1. It is approximately 152 meters (500 feet) long, extending from the Tank 8D-3/8D-4 vault along the north side of Tanks 8D-1 and 8D-2, before turning to the southwest and entering the north side of the Vitrification Facility. The pump pits and piping used to convey high-level radioactive waste are radiologically contaminated.

The Permanent Ventilation System Building is located approximately 15.3 meters (50 feet) north of Tank 8D-2. This steel-framed building contains four rooms: the Permanent Ventilation System Room, Electrical Room, Mechanical Room, and Control Room. It is designed to provide ventilation to the STS Support Building, STS Valve Aisle, STS Pipeway, and Tanks 8D-1, 8D-2, 8D-3, and 8D-4. Most of the residual contamination in this building is in the two HEPA filters, which could contain as much as 7.5 curies of cesium-137 and much smaller activities of other radionuclides. No hazardous contamination is expected. The building contains an aboveground and an underground petroleum storage tank.

The STS was installed in and adjacent to Tank 8D-1. STS equipment installed in Tank 8D-1 (and the only STS equipment coming in contact with high-level radioactive waste) includes the STS prefilter, supernatant feed tank, supernatant cooler, four zeolite columns, STS sand post filter, sluice lift tank, and associated transfer piping.

The STS Support Building is located adjacent to and above Tank 8D-1. It is a two-story structure that contains equipment and auxiliary support systems needed to operate the STS. The upper level of the STS Support Building is a steel-framed structure covered with steel siding. The lower level was constructed with reinforced concrete walls, floor, and ceiling. The building, with the exception of the Valve Aisle, is radiologically clean. The shielded Valve Aisle is located on the first floor of the STS Building, adjacent to Tank 8D-1. The Valve Aisle is radiologically contaminated.

The Equipment Shelter is a one-story concrete-block building located immediately north of the Vitrification Facility. It is radiologically contaminated.

The Waste Tank Farm Condensers are located west of the Equipment Shelter and were originally designed to condense the overheads from Tanks 8D-1 and 8D-2, which were designed to be in a self-boiling condition during operations. The condensed overheads were directed to the Waste Tank Farm Condensate Tank to an ion-exchange unit, and then to the Low-Level Waste Treatment Facility for additional treatment before discharge to Erdman Brook. The condensers are still contaminated with small amounts of radioactivity.

The Con-Ed Building is a concrete-block building located on top of the concrete vault containing Tanks 8D-3 and 8D-4. This building houses the instrumentation and valves used to monitor and control the operation of Tanks 8D-3 and 8D-4. The Con-Ed Building is radiologically contaminated. The majority of the radiological inventory is believed to be contained in the piping and equipment inside the building.

More detailed descriptions of the High-Level Waste Transfer Trench, Permanent Ventilation System Building, STS, STS Support Building, Waste Tank Farm Equipment Shelter and Condensers, and Con-Ed Building are provided in Appendix C, Section C.2.3.

2.3.2.4 Waste Management Area 4: Construction and Demolition Debris Landfill

WMA 4, which includes the Construction and Demolition Debris Landfill (CDDL), is a 4.2-hectare (10-acre) area in the northeast portion on the North Plateau of WVDP. CDDL is the only waste management unit in WMA 4. WMA 4 is shown on Figure 2–2 and in more detail on Figure C–5 of Appendix C.

CDDL covers a 0.6-hectare (1.5-acre) area approximately 305 meters (1,000 feet) northeast of the Main Plant Process Building. CDDL was initially used by Bechtel Engineering from 1963 to 1965 to dispose of nonradioactive waste generated during Bechtel's construction of the Main Plant Process Building. CDDL was used by NFS from 1965 to 1981 to dispose of nonradioactive construction, office, and facility-generated debris, including ash from the NFS incinerator. CDDL was used by DOE from 1982 to 1984 to dispose of nonradioactive waste. Disposal operations were terminated in the CDDL in December 1984, and the landfill closed in accordance with the New York State regulations that were applicable at that time (6 NYCRR Part 360-7.6).

Some volatile organic compounds have been detected in groundwater downgradient of the CDDL. In addition, the CDDL is located in the flow path of the North Plateau Groundwater Plume. The radioactively-contaminated groundwater in the plume is assumed to have come into contact with the waste buried in the CDDL. Therefore, the buried wastes in the CDDL are assumed to require handling as radioactive wastes. A more detailed description of the CDDL is included in Appendix C, Section C.2.4.

2.3.2.5 Waste Management Area 5: Waste Storage Area

WMA 5 encompasses approximately 7.6 hectares (19 acres). Facilities in WMA 5 that will be operational or standing at the starting point of this EIS include the Remote-Handled Waste Facility, Lag Storage Area (LSA) 4 with associated Shipping Depot, and the Construction and Demolition Area. Also included in WMA 5 is the North Plateau Groundwater Plume, which extends through WMAs 1 through 6. WMA 5 is shown on Figure 2–2 and in more detail on Figure C–6 of Appendix C.

At the starting point of this EIS, WMA 5 facilities, including the Lag Storage Building; LSA 1, 2, 3; Hazardous Waste Storage Lockers; the Vitrification Vault Empty Container Hardstand; and Chemical Process Cell Waste Storage Area, will have been removed to grade. The remaining concrete foundations, slabs, and gravel pads are addressed in this EIS. In addition, the Cold Hardstand near the CDDL, Vitrification Vault and Empty Container Hardstand, Old/New Hardstand Area, Waste Packaging Area, Lag Hardstand, High-Level Waste Tank Pump Storage Vaults, and Container Sorting and Packaging Facility will have been completely removed. However, the ground underneath these facilities could be radioactively contaminated, from either, or both operational impacts or the Cesium Prong, and would be subject to decommissioning activities.

At the starting point of this EIS, the Remote-Handled Waste Facility will have been decontaminated to a point where it can be demolished without containment. It is used to remotely section and package high-activity equipment and waste and is permitted as a mixed low-level radioactive waste treatment and storage containment building.

Included in LSA 4 are a Shipping Depot, a Container Sorting and Packaging Facility, and a covered passageway between LSA 3 and LSA 4. The Shipping Depot is connected to LSA 4 and is a metal frame structure. If contamination is encountered in LSA 4, it is expected to be minimal due to packaging requirements and storage practices. LSA 4 and the Container Sorting and Packaging Facility are used for storage, sorting, and repackaging low-level radioactive waste and mixed low-level radioactive waste.

The Construction and Demolition Area, also known as the Concrete Washdown Area, is a shallow ground depression located southwest of the Remote-Handled Waste Facility approximately 91 meters (300 feet) west of the STS Building. From 1990 to June 1994, waste concrete was deposited in this area during the cleanout of concrete mixing trucks that transported concrete from offsite sources to support construction projects such as the Vitrification Facility. The waste concrete generated during truck washing was staged in this area until it hardened, after which it was placed in a dumpster for offsite disposal. Residual concrete is the only waste that was managed in this area.

More detailed descriptions of the Remote-Handled Waste Facility, LSA 4, and Construction and Demolition Area are included in Appendix C, Section C.2.5.

2.3.2.6 Waste Management Area 6: Central Project Premises

WMA 6 encompasses approximately 5.7 hectares (14 acres). Facilities standing, operable, or operational at the starting point of this EIS in WMA 6 include the rail spur, two Demineralizer Sludge Ponds, Equalization Basin, Equalization Tank, Low-Level Radioactive Waste Rail Packaging and Staging Area, Sewage Treatment Plant, and South Waste Tank Farm Test Tower. Also included in a small portion of WMA 6 is the North Plateau Groundwater Plume, which extends through portions of WMA 1 through 6. WMA 6 is shown on Figure 2–2 and in more detail on Figure C–7 of Appendix C.

At the starting point of this EIS, a number of facilities, including the Old Warehouse, Cooling Tower, North Waste Tank Farm Test Tower, Road Salt and Sand Storage Shed, Vitrification Test Facility Waste Storage Area, and the Product Storage Area will have been removed to grade. The remaining concrete foundations, slabs, and gravel pads associated with these facilities are addressed in this EIS. The ground that was underneath the previously removed Old Sewage Treatment Facility may be radioactively contaminated and would be subject to decommissioning.

The rail spur runs about 2,440 meters (8,000 feet) from the south side of the Main Plant Process Building to where it connects to the main line of the railroad. The rails are cast iron and the ties are creosote pressure-treated wood. Low-level radiological soil contamination has been detected in an area along a section of dual track east of the Old Warehouse.

The Demineralizer Sludge Ponds were built between 1964 and 1965 during construction of the Main Plant Process Building on the North Plateau. The sludge ponds are two unlined rectangular basins located southeast of the Process Building. The ponds were designed to receive liquids and sludge from the site utility water treatment system and discharge through a weir box and underground piping to an SPDES-permitted outfall. Both ponds are radiologically contaminated. Characterization activities have also identified the presence of semi-volatile chemicals in sediment that are at concentrations that slightly exceed Technical and Administrative Guidance Memorandum criteria.

The Equalization Basin is a lined basin that is excavated into the sand and gravel layer and underlain with a sand drain. Originally, the basin was called the Effluent Mixing Basin when it received effluents from the Sanitary Sewage Treatment Plant, some Utility Room discharge, and cooling water blowdown. Later it received effluents from the Sludge Ponds. Having been bypassed by installation of the Equalization Tank, the basin currently is used as an excess capacity settling pond for discharges from the Utility Room. No known hazardous or radiological contamination is present in the Equalization Basin.

The Equalization Tank was installed in 1997 to work in parallel with the existing Equalization Basin, not as a replacement. The Equalization Tank is an inground concrete tank that was designed with a total capacity of 75,700 liters (20,000 gallons) and a maximum working capacity of 56,800 liters (15,000 gallons). The Equalization Tank is not expected to be radiologically contaminated.

The Low-Level Radioactive Waste Rail Packaging and Staging Area covers approximately 2,510 square meters (27,000 square feet) east of and adjacent to the railroad tracks at the south end of WMA 6. It was used to package and ship contaminated soil stored in roll-off containers. This area is not expected to be radiologically contaminated.

The Sewage Treatment Plant is a wood-frame structure with metal siding and roofing. The base of the facility is concrete and crushed stone. Eight tanks are associated with the plant: six in-ground concrete tanks, one aboveground polyethylene tank, and one aboveground stainless steel tank. The Sewage Treatment Plant is used to treat sanitary waste. Water treatment chemicals, such as sulfuric acid, sodium hypochlorite, sodium bisulfite, and sodium bicarbonate have been used at the plant. The Sewage Treatment Plant also previously contained a satellite accumulation area that stored mercury-bearing RCRA hazardous waste from the Process Building. No hazardous or radiological contamination is known to exist there. Treated wastewater from the Sewage Treatment Plant is discharged to Erdman Brook through an SPDES-permitted discharge.

The Waste Tank Farm Test Towers, also known as training platforms, consist of two towers. The North Test Tower will have been removed at the starting point of this EIS. The South Test Tower is a pre-engineered structure erected as a stack of six modules including ladders, handrails, and grating.

More detailed descriptions of the rail spur, Demineralizer Sludge Ponds, Equalization Basin, Equalization Tank, Low-Level Radioactive Waste Rail Packaging and Staging Area, Sewage Treatment Plant, and Waste Tank Farm Tower are included in Appendix C, Section C.2.6.

2.3.2.7 Waste Management Area 7: NRC-licensed Disposal Area and Associated Facilities

WMA 7 encompasses approximately 3.3 hectares (8 acres). The NDA includes a radioactive waste disposal area and ancillary structures. The NDA is about 122 meters (400 feet) wide and 183 meters (600 feet) long on the South Plateau. It is divisible into three distinct areas: NFS shallow disposal area (known as special holes) and deep burial holes; WVDP disposal trenches and caissons; and the area occupied by the Interceptor Trench and the associated Liquid Pretreatment System structures. Other ancillary structures in the NDA include the Leachate Transfer Line and a former lagoon. The NDA is shown on Figure 2–2 and in more detail on Figure C–8 of Appendix C.

The NDA Hardstand/Staging Area will have been removed to grade at the starting point of this EIS. The removal of the remaining concrete foundation is addressed in this EIS.

The NDA was operated by NFS, under license from the NRC (formerly U.S. Atomic Energy Commission) for disposal of solid radioactive waste generated from fuel reprocessing operations. Beginning in 1966, solid radioactive waste materials from the nearby Main Plant Process Building exceeding 200 millirad per hour, and other materials not allowable in the SDA, were buried in holes and trenches and backfilled with earth. Between 1966 and 1981, NFS disposed of a variety of wastes in approximately 100 deep holes and 230 special holes in a U-shaped area along the eastern, western, and northern boundaries of the NDA. Between 1982 and 1986, after establishment of the WVDP, waste generated from decontamination and decommissioning activities was disposed of in the NDA in 12 trenches and 4 caissons. Most of these wastes were placed in trenches located in the unused parcel of land located interior to the U-shaped disposal area used by NFS. No waste has been buried at the NDA since 1986. Leachate is known to exist in some NDA disposal holes and trenches. The leachate consists of water contaminated with both radiological and chemical constituents leached from the buried wastes.

The Interceptor Trench and associated Liquid Pretreatment System were installed after groundwater chemical and radioactive contamination was detected in a well downgradient of the NDA. The purpose of the installation was to intercept potentially contaminated groundwater migrating from the NDA. The trench subsurface is radiologically contaminated and several organic constituents have been detected slightly above Technical and Administrative Guidance Memorandum criteria.

The Leachate Transfer Line is a black polyvinyl chloride pipeline that runs along the northeast and northwest sides of the NDA, continues northward across WMA 6, and terminates at Lagoon 2 in WMA 2. The transfer line was originally used to transfer liquids from the SDA lagoons via a pumphouse next to the NDA Hardstand to Lagoon 1. It is radiologically contaminated and may also be chemically contaminated.

The former lagoon was used for collecting surface water runoff. It was located in the northeastern portion of the NDA. Around 1972, it was filled with radiologically-contaminated soil from cleanup after a HEPA filter was dropped at the NDA during disposal operations.

Detailed descriptions of the disposal areas, Interceptor Trench and Liquid Pretreatment System, Leachate Transfer Line, and former Lagoon are included in Appendix C, Section C.2.7.

2.3.2.8 Waste Management Area 8: State-licensed Disposal Area and Associated Facilities

Facilities in WMA 8 which are addressed in this EIS include the North Disposal Area, South Disposal Area, the Mixed Waste Storage Facility, and three former filled lagoons. The SDA is approximately 6.2 hectares (15 acres) in size and is covered with an impermeable geomembrane to prevent infiltration of precipitation. WMA 8 is shown on Figure 2–2 and in more detail on Figure C–9 of Appendix C.

From 1963 to 1975, approximately 68,000 cubic meters (2.4 million cubic feet) of wastes were received at the SDA for burial. The wastes were disposed of in their shipping containers including 19-liter (5-gallon) steel drums, 114-liter (30-gallon) steel drums, 208-liter (55-gallon) steel drums, wooden crates, cardboard boxes, fiber drums, and plastic bags. A subsurface concrete wall was installed during 1987 immediately west of Trench 14. The concrete wall supported NYSERDA's efforts to remove the sand and gravel unit adjacent to Trench 14 and replace it with compacted till. A slurry wall located along the west side of Trench 14 was installed during 1992 to control groundwater infiltration into the SDA. It was made from a mixture of native clay and at least one percent bentonite clay. No radioactive or hazardous chemical contamination of the slurry wall is expected.

Leachate is known to exist in the SDA trenches. It consists of infiltration water contaminated with both radiological and hazardous chemical materials leached from the buried waste. The disposal areas and details on the type and quantities of waste buried in the SDA are discussed in Appendix C, Section C.2.8.

The Mixed Waste Storage Facility consists of two aboveground buildings near the southern end of the SDA. The T-1 Tank Building, which is the smaller of the buildings, is a heated weatherproof building that houses Tank T-1, a 34,800-liter (9,200-gallon) fiber-glass-reinforced plastic leachate collection tank. The lower portion of the building is built of concrete to provide secondary containment for the tank. Tank T-1 contains approximately 28,400 liters (7,500 gallons) of untreated leachate that was pumped from Trench 14 in 1991. The Frac Tank Building, the larger of the two buildings, is a nonheated weatherproof building that houses two stainless steel tanks that have never been used. These tanks provide contingency storage capacity for SDA leachate. Residual radioactive and possibly chemical contamination is expected to be found in the Mixed Waste Storage Facility.

Three lagoons were built in the SDA, and all three have been filled. The Northern Lagoon and Southern Lagoon were associated with the North Disposal Area. The third lagoon, called the Inactive Lagoon, was associated with the South Disposal Area. Based on samples collected and analyzed as part of the RCRA Facility Investigation, these lagoons contain RCRA hazardous constituents and are assumed to contain radiological contamination.

Detailed descriptions of the disposal areas, the Mixed Waste Storage Facility, and the filled lagoons are included in Appendix C, Section C.2.8.

2.3.2.9 Waste Management Area 9: Radwaste Treatment System Drum Cell

WMA 9 includes 5 hectares (12.4 acres) on the South Plateau adjacent to the NDA and SDA. The Radwaste Treatment System Drum Cell (Drum Cell) is the only facility in WMA 9. WMA 9 is shown on Figure 2–2 and in more detail on Figure C–10 of Appendix C.

At the starting point of this EIS, the pad of the Trench Soil Container Area will be in place. Removal of the pad is addressed in this EIS.

The Drum Cell was used to store square 269-liter (71-gallon) drums of cement-solidified supernatant and sludge wash liquids generated from high-level radioactive waste pretreatment and has a capacity of 21,000 drums. These drums have been shipped off site. The Drum Cell is enclosed by a temporary weather structure, which is a pre-engineered metal building. The facility consists of a base pad, shield walls, remote waste handling equipment, container storage areas, and a control room within the weather structure. Data and operational history suggests the Drum Cell is not contaminated, and it is assumed that waste generated from its decommissioning would be nonradioactive construction and demolition debris. A more detailed description of the Radwaste Treatment System Drum Cell is included in Appendix C, Section C.2.9.

The Subcontractor Maintenance Area, located on the South Plateau portion of the WVDP, is approximately 6 meters (20 feet) wide by 9 meters (30 feet) long. The area is flat, covered with compacted stone, and is adjacent to a paved highway. Prior to 1991, a construction contractor had used this area to clean asphalt paving equipment by spraying the equipment with diesel fuel. During the operation, some of the diesel fuel and asphalt material dripped off the equipment and fell onto the ground surface. Since remediation of the area in 1991, it has been used as a staging area for heavy equipment and inert construction materials, including stone and gravel.

2.3.2.10 Waste Management Area 10: Support and Services Area

WMA 10 encompasses approximately 12.3 hectares (30 acres) on the North Plateau and South Plateau. Facilities in WMA 10 addressed in this EIS include the New Warehouse, Meteorological Tower, and Security Gatehouse and fences. WMA 10 is shown on Figure 2–2 and in more detail on Figure C–11 of Appendix C.

At the starting point of this EIS, a number of facilities in WMA 10, including the Administration Building, Expanded Environmental Laboratory, Construction Fabrication Shop, and Vitrification Diesel Fuel Oil Storage Tank and Building will have been removed to grade. The concrete foundations and slabs are addressed in this EIS.

The New Warehouse was built during the 1980s and is located east of the Administration Building. It is a pre-engineered steel building, resting on about 40 concrete piers and a poured-concrete foundation wall.

The Meteorological Tower is located south of the Administration Building. It is constructed from steel supported by a concrete foundation.

The Security Gatehouse is located adjacent to the Administration Building. This gatehouse was constructed when the Main Plant was built in 1963. During the early 1980s, the Main Gatehouse was renovated and a large addition was added. A steel security fence with galvanized steel pipe posts set in concrete footings surrounds the Project Premises, SDA, and miscellaneous other locations. Its total length is approximately 7,620 meters (25,000 feet).

Detailed descriptions of the New Warehouse, Meteorological Tower, and Security Gatehouse and fences are included in Appendix C, Section C.2.10.

2.3.2.11 Waste Management Area 11: Bulk Storage Warehouse and Hydrofracture Test Well Area

WMA 11 is located in the southeast corner of WNYNSC outside the 84 hectares (200 acres) of the Project Premises and SDA. The only facility in the WMA addressed in this EIS is the Scrap Material Landfill. The disposition of the Bulk Storage Warehouse and the Hydrofracture Test Well Area were analyzed in an environmental assessment completed in 2006 (DOE 2006c); therefore, these facilities are not addressed in this EIS. The Hydrofracture Test Wells will be decommissioned per New York State regulations applicable to such wells. While the Bulk Storage Warehouse and Hydrofracture Test Well Area are not addressed in this EIS, they are shown in Figure 2–3 and Appendix C, Figure C–12, for reference.

The Scrap Material Landfill is located approximately 30.5 meters (100 feet) south of the Bulk Storage Warehouse. The surface expression of the Scrap Material Landfill is a noticeable low mound that rises above the surrounding natural grade. During 1982, NYSERDA removed scrap equipment, consisting of an aluminum transfer hood and 326 empty steel and concrete containers, from the Bulk Storage Warehouse and buried them in a trench in the Scrap Material Landfill. This waste material was radiologically surveyed, decontaminated as necessary, and released for unrestricted use before it was buried in the trench. No radioactive or hazardous waste was buried in the Scrap Material Landfill. The trench was backfilled with soil and capped with a soil cover. Two concrete markers identify the ends of the burial trench. The Scrap Material Landfill is also discussed in Appendix C, Section C.2.11.

2.3.2.12 Waste Management Area 12: Balance of Site

WMA 12 facilities addressed in this EIS consists of two earthen dams and reservoirs and parking lots. All are located outside the chain-link fence which surrounds the Project Premises and SDA. WMA 12 also includes a railroad spur, parts of roadways, and Erdman Brook and Franks Creek. The brook and creek contain radiologically-contaminated sediments resulting from regulated releases of treated process wastewater from the Low-Level Waste Treatment Facility by way of Lagoon 3. WMA 12 is shown on Figure 2–3 and on Figure C–12 of Appendix C.

The two water supply reservoirs, the South Reservoir and the North Reservoir, were constructed during 1963 about 2.4 kilometers (1.5 miles) southeast of the Main Plant Process Building. The South Reservoir has an earthen dam 22.9 meters (75 feet) high with piling to prevent seepage. The South Reservoir drains through a short canal to the North Reservoir. The North Reservoir has an earthen dam 15.2 meters (50 feet) high. It also has a control structure and pumphouse to regulate the water level. This reservoir drains into Buttermilk Creek.

Two parking lots are located off Rock Springs Road. They are designated as the Main Parking Lot and the South Parking Lot. The original Main Parking Lot was constructed during the mid-1960s. Two extensions were added during the 1980s. It has a total paved surface area of 16,700 square meters (180,000 square feet). The South Parking Lot is an irregularly-shaped area constructed during 1991. It has approximately 7,430 square meters (80,000 square feet) of parking area, and approximately 595 square meters (6,400 square feet) of driveways, covered with 20 centimeters (8 inches) of asphalt.

A railroad spur runs from the Fuel Receiving and Storage Building to a rail line junction, northeast of Riceville Station.

Roadways are constructed of a stone sub-base covered with asphalt. The total area of pavement is approximately 120,000 square meters (1,300,000 square feet). Although the paved roadways are located in most of the designated WMAs, they are addressed here collectively for convenience.

Contaminated stream sediments in WMA 12 include sediments in Erdman Brook and in Franks Creek between the Lagoon 3 (WMA 2) outfall and the confluence of Franks Creek and Quarry Creek inside the Project

Premises fence. Additional stream sediment contamination can be found along Buttermilk Creek. Stream sediment and water contamination are discussed in Chapter 3, Section 3.6.1.

Descriptions of the Dams and Water Supply Reservoirs, parking lots, roadways, and the railroad spur are included in Appendix C, Section C.2.12.

2.3.2.13 North Plateau Groundwater Plume

For the purpose of analysis in this EIS, the North Plateau Groundwater Plume is divided into two areas: a source area, directly underneath the Main Plant Process Building, and the nonsource area that encompasses the rest of the plume. More detailed information on the North Plateau Groundwater Plume is provided in Appendix C, Section C.2.13.

Groundwater in portions of the sand and gravel unit in the North Plateau of the WVDP is radiologically contaminated as a result of past NFS operations. The most significant area of groundwater contamination is associated with the North Plateau Groundwater Plume, which extends from WMA 1 into WMAs 2, 3, 4, 5, and 6, as shown on Figure 2–4. It discharges from groundwater to surface water in WMA 4. This contaminated surface water then flows from WMA 4 to Franks Creek and then to Cattaraugus Creek, where it leaves the WNYNSC. Section 3.6.2.1 describes the groundwater contamination and associated remediation efforts that have been undertaken.

A pump and treatment system, the Groundwater Recovery System, was established in 1995 in WMA 2, to control the western lobe of the plume. Groundwater is pumped from two wells and treated by ion-exchange in the Low-Level Waste Treatment Facility in WMA 2. The treated groundwater is pumped to Lagoons 4 or 5 and then to Lagoon 3, from which it is eventually discharged through an SPDES-regulated discharge point to Erdman Brook.

During 1999, a pilot-scale permeable treatment wall was installed within the leading edge of the eastern lobe of the plume to evaluate the effectiveness of this type of system in treating groundwater contaminated with strontium-90. The bottom of the pilot-scale permeable treatment wall is keyed into the Lavery till, and the wall extends above the water table level. An evaluation of monitoring data indicates that the permeable treatment wall is effective in removing strontium-90 from groundwater inside the permeable treatment wall through ion exchange although the pilot system is too short in length to mitigate the advance of strontium-90 in the east lobe. Evaluations also indicate some operational and construction improvements can be made to increase the effectiveness of the technology application if applied at full scale. Because the pilot program successfully showed that strontium-90 can be removed in situ using a permeable treatment wall, and also provided information on construction and design issues that can be overcome (Geomatrix 2007), this technology is seen as a potential full-scale remedy for managing strontium-90 affected groundwater at the site and a full-scale system, approximately 120 meters (400 feet) long, is assumed to be implemented before the EIS starting point.

For this EIS, it is assumed that the permeable reactive barrier at the seepage face of the drainage swale is installed before the EIS starting point (Geomatrix 2007). By using a dual approach with this technology, both groundwater and surface water seepage can be addressed and more effectively prevent strontium-90 migration associated with the North Plateau Groundwater Plume.

It should be noted that, in addition to these activities, the State of New York may require RCRA-related actions following future characterization activities. If NEPA or SEQR documentation is necessary for these actions, they would be addressed in a future document.

2.3.2.14 Cesium Prong

The Cesium Prong is the result of uncontrolled releases from the Main Plant Process Building in 1968 that contaminated portions of WNYNSC. Soil contamination resulted from airborne contaminants dispersion, and deposition. The primary contaminant is cesium-137. Based on historical data, the Cesium Prong extends into WMAs 1, 3, 5, 10, and 12, and outside WNYNSC (offsite impacts are addressed as part of the long-term impact analysis in Chapter 4). Studies have shown that contamination concentrations may decrease with depth with the majority of the activity present in the upper 5 centimeters (2 inches) of soil. The extent of the Cesium Prong is shown on Figure 2–5. Additional information is provided in Appendix C, Section C.2.14.

2.4 Alternatives Evaluated in this Environmental Impact Statement

As required by NEPA and SEQR, this EIS presents the environmental impacts associated with the full range of reasonable alternatives to meet the DOE and NYSERDA purpose and need for action, along with a No Action Alternative. The alternatives are based on the recognition that options for management of WNYNSC contaminated facilities and buried waste range from removal and offsite disposal, to in-place management with isolation barriers, to no action.

The description of the alternatives is based on information provided in a series of technical reports (WSMS 2008a, 2008b, 2008c, 2008d) prepared to support the EIS effort unless otherwise referenced. They describe the proposed engineered approaches for implementation of each alternative. The engineered approaches presented in the technical reports are conceptual in nature and provide information for estimating the environmental impacts of the alternatives analyzed in this EIS. The conceptual approaches evaluated in the technical reports provides a spectrum of detailed data useful for understanding and evaluating the impacts of implementing the alternatives including resource commitments, energy/utility usage, labor requirements, durations, waste volumes generated, radiological and nonradiological emissions, and costs. The technical reports also present information on the activities after completion of decommissioning actions, including monitoring and maintenance in support of any remaining facilities.

The following alternatives are analyzed in this EIS:

- ***The Sitewide Removal Alternative*** – Under this alternative, all site facilities (see Table 2–2) would be removed. Environmental media would be decontaminated. All radioactive, hazardous, and mixed low-level radioactive waste would be characterized, packaged as necessary, and shipped off site for disposal. Any orphan waste (i.e., Greater-Than-Class C or non-defense transuranic wastes) would be temporarily stored on site. The Sitewide Removal Alternative includes temporary onsite storage for the vitrified high-level radioactive waste canisters while waiting for a Federal waste repository to open. This alternative would generate waste for which there is currently no offsite disposal location (e.g., non-defense transuranic waste, commercial B/C low-level radioactive waste, Greater-Than-Class C waste). This "orphan" waste would be stored on site until an appropriate offsite facility is available. Since this alternative is estimated to require approximately 64 years to be completed, it is conceivable that the canisters could be shipped off site during this period. The entire WNYNSC would be available for release for unrestricted use. The Sitewide Removal Alternative is one type of bounding alternative that would remove facilities and contamination so that the site could be reused with no restrictions.

Assumptions Used for Analyzing Disposal Locations (by waste type) in this Environmental Impact Statement

High-level Radioactive Waste – In accordance with the Nuclear Waste Policy Act, vitrified high-level radioactive waste must be disposed of in a Federal repository. Transportation and onsite disposal impacts for high-level radioactive waste were analyzed in the *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (Yucca Mountain EIS)* and related documents (DOE 2002b, 2008b, 2008c). Until the high-level radioactive waste canisters can be shipped to a repository, they will be safely stored on site. Annual impacts of onsite storage are presented in this EIS.

Transuranic Waste – Under the Waste Isolation Pilot Plant Land Withdrawal Act, DOE may dispose of only that transuranic waste associated with defense activities in the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. Disposal of WVDP transuranic waste at WIPP would require a defense waste determination or a modification to the Act. For the purposes of transportation impact analysis only, DOE assumed the route characteristics of transporting transuranic waste to WIPP. Onsite impacts of transuranic waste disposal at WIPP were analyzed in the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (DOE 1997b). All transuranic waste would be safely stored until offsite disposal capacity is available.

General Disposal Options for Low-Level Radioactive Waste

Two disposal options are considered:

DOE/Commercial Disposal Option – DOE low-level radioactive waste would be disposed of at DOE disposal facilities, while commercial low-level radioactive waste would be disposed of at commercial disposal facilities. Commercial Class A low-level radioactive waste would be disposed of at a commercial facility such as EnergySolutions in Utah, while commercial Class B and C low-level radioactive waste would be disposed of at a commercial facility, which to accept these wastes for disposal would need the appropriate permits and/or changes in state law. For purposes of analysis, DOE assumed for commercial Class B and C wastes the route characteristics for shipment to the Hanford Site in Washington State and to a disposal facility at Barnwell, South Carolina. DOE low-level radioactive wastes containing radionuclides in equivalent concentrations to Class A, B, or C wastes would be disposed of at the Nevada Test Site, as would low specific activity waste.

Commercial Disposal Option – All low-level radioactive waste would be disposed of at commercial disposal facilities. All commercial Class A low-level radioactive waste would be disposed of at a commercial disposal facility such as EnergySolutions in Utah, as would all DOE low-level radioactive waste containing radionuclides in equivalent concentrations to Class A waste, and all low specific activity waste. All commercial Class B and C low-level radioactive wastes would be disposed of at a commercial disposal facility, as would all DOE wastes having radionuclides in equivalent concentrations to Class B and C wastes. Such a disposal facility would need the appropriate permits and/or changes in state law. For purposes of analysis, DOE assumed the route characteristics for shipment to the Hanford Site in Washington State and to a disposal facility in Barnwell, South Carolina.

The NRC-licensed portion of the site would meet the NRC License Termination Rule (10 CFR 20.1402). The SDA would meet similar State criteria. Residual hazardous contaminants would meet applicable State and Federal standards. A final status survey performed in accordance with Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (NRC 2002) and RCRA guidance would demonstrate that the remediated site meets the standards for unrestricted release, which would be confirmed by independent verification surveys.

- ***The Sitewide Close-In-Place Alternative*** – Under this alternative, most site facilities would be closed in place. The residual radioactivity in facilities having larger inventories of long-lived radionuclides would be isolated by specially-designed closure structures and engineered barriers. The Sitewide Close-In-Place Alternative is another type of bounding alternative where the major facilities and sources of contamination would be managed at their current location.

  This decommissioning approach would allow large portions of WNYNSC to be released for unrestricted use. The license for remaining portions of WNYNSC could remain under long-term license or permit, or the NRC-regulated portion of WNYNSC could have its license terminated under restricted conditions.

- ***The Phased Decisionmaking Alternative*** (the Preferred Alternative) – Under this alternative, the decommissioning would be completed in two phases:

  – Phase 1 would include removal of facilities as identified in Section 2.4.3.1 of this chapter, and any foundations, slabs or pads, the source area of the North Plateau Groundwater Plume, and the lagoons in WMA 2. Except for the permeable treatment wall, all facilities and the lagoons in WMA 2 would be removed. Phase 1 decisions would also include removal of a number of facilities in WMAs 5, 6, 9, and 10. No decommissioning or long-term management activities would be conducted for the Waste Tank Farm and its support facilities, the CDDL, the nonsource area of the North Plateau Groundwater Plume, or NDA. The SDA would continue under active management consistent with its permit requirements. Phase 1 activities would also include additional characterization of site contamination and studies to provide information that would support additional evaluations to determine the technical approach to be used to complete the decommissioning.

  – Phase 2 would complete the decommissioning or long-term management decisionmaking process, following the approach determined through additional evaluations to be the most appropriate.

  Phase 1 involves near-term actions where there is agency consensus and undertakes characterization work and studies that could facilitate future consensus decommissioning decisionmaking for the remaining facilities or areas.

  Phase 1 activities would make use of proven technologies and available waste disposal sites to reduce the near-term health and safety risks from residual radioactivity and hazardous contaminants at the site. Additional studies and evaluations would be conducted to clarify and possibly reduce technical uncertainties related to the decision on final decommissioning and long-term management of the site, particularly the uncertainty associated with long-term performance models, viability and cost of technology for exhuming buried waste, and availability of waste disposal sites. During Phase 1 and prior to implementation of Phase 2, DOE and NYSERDA would seek information about improved technologies for in-place containment and for exhuming the tanks and burial areas that may become available in the intervening years. See Section 2.4.3.1 of this chapter for more information regarding evaluations to determine the Phase 2 approach.

During Phase 1, DOE and NYSERDA would assess the results of site-specific studies as they become available, along with other emerging information such as applicable technology development. In consultation with the joint lead and cooperating agencies on this EIS, DOE will determine whether the new information warrants a new or Supplemental EIS. Council on Environmental Quality and DOE NEPA implementing regulations at 40 CFR 1502.9(c) and 10 CFR 1021.314(a), respectively, require a supplemental EIS if:

– The agency makes substantial changes in the Proposed Action that are relevant to environmental concerns; or

– There are significant new circumstances or information relevant to environmental concerns and bearing on the Proposed Action or its impacts.

If it is unclear whether a Supplemental EIS is needed, DOE would prepare a Supplement Analysis in accordance with 10 CFR 1021.314(c) and make this analysis and resulting determination available to the public. A Supplement Analysis would discuss the circumstances that are pertinent to deciding whether to prepare a Supplemental EIS. Subject to appropriate NEPA review, DOE would determine whether a Phase 2 decision is appropriate. DOE would issue a ROD for Phase 2 no later than 30 years after the Phase 1 ROD has been issued.

In addition to DOE, NYSERDA would assess results of site specific studies and other information during Phase 1 to determine the need for additional SEQR documentation.

- ***The No Action Alternative*** – Under the No Action Alternative, no actions toward decommissioning would be taken. The No Action Alternative would involve the continued management and oversight of the remaining portion of WNYNSC and all facilities located on WNYNSC property as of the starting point of this EIS.

Sections 2.4.1 through 2.4.4 of this chapter discuss the salient features of each alternative that pertain to the environmental impact analysis in this EIS. Because radioactive and hazardous waste would be generated with each alternative, waste management is analyzed as an integral component of each alternative. The text box above describes the disposal assumptions used for each waste type.

2.4.1 Sitewide Removal Alternative

The following sections provide summaries of the implementation activities, new construction required, time sequencing of the implementation activities, and waste generation under the Sitewide Removal Alternative, as well as any long-term monitoring and institutional controls required after its completion. Detailed discussions of implementation activities, waste generation, and new construction, are provided in Appendix C, Sections C.3.1 and C.4.

2.4.1.1 Decommissioning Activities

The following provisions would apply to the decommissioning activities for all WMAs:

- Decommissioning of the NRC-licensed portion of the site would be accomplished in accordance with an NRC-reviewed Decommissioning Plan and RCRA requirements. This plan would provide appropriate derived concentration guideline levels (DCGLs) for environmental media to support unrestricted release of the site. The removal of the SDA would be accomplished in accordance with a NYSDEC-approved plan. A licensing action by NYSDOH would be necessary to allow the property to be made available for release.

- All radioactive, hazardous, and mixed low-level radioactive waste generated during the work would be disposed of off site.
- Characterization surveys would be performed early in the process to quantify the nature and extent of environmental media contamination on WNYNSC. The design of these surveys would take into account available data on environmental contaminants. These surveys would address surface soil, subsurface soil, surface water, groundwater, and stream sediment as applicable on all impacted portions of WNYNSC. Data quality objectives would be such that data collected could also support the final status survey for those areas where no removal actions are taken.
- Before excavated areas are backfilled, final radiological and RCRA status surveys of these areas would be completed, including associated independent verification surveys.
- Areas inside and outside the Project Premises with surface soil and sediment with radioactivity concentrations in excess of DCGLs would be remediated.
- Contaminated soil, rubble, and debris would be disposed of appropriately in accordance with all applicable regulatory criteria.

Implementing this alternative (particularly for the Waste Tank Farm, NDA, and SDA) would generate some waste for which there is no offsite disposal location (e.g., non-defense transuranic waste, commercial Class B/C low-level radioactive waste, Greater-Than-Class C waste), called "orphan" wastes. These wastes would be stored on site until an appropriate offsite facility is available.

The decommissioning activities in each WMA are summarized below.

WMA 1 – The Equipment Decontamination Room and the Load-In/Load-Out Facility would be modified to support removal of the canisters of vitrified high-level radioactive waste. High-level radioactive waste canisters would then be removed from the Main Plant Process Building and stored in a new Interim Storage Facility (Dry Cask Storage Area) constructed on the South Plateau until they could be shipped off site. The Main Plant Process Building areas that had supported high-level radioactive waste canister storage would be decontaminated to the point where the building could be demolished without containment.

All facilities, including underground structures and remaining concrete floor slabs and foundations, would be completely removed, including the Main Plant Process Building, Utility Room, Utility Room Expansion, Plant Office Building, Vitrification Facility, 01-14 Building, Fire Pumphouse and Water Storage Tank, Electrical Substation, underground tanks (35104, 7D-13, and 15D-6), the underground process, wastewater, and utility lines, and the Off-Gas Trench.

The source area of the North Plateau Groundwater Plume located beneath the Main Plant Process Building would be removed, with subsurface soil removed as necessary to meet DCGLs consistent with unrestricted release. Foundation piles exposed during soil removal would be cut at the bottom of the excavation, or deeper if necessary, to support unrestricted release. All other contaminated soil and groundwater within WMA 1 would also be removed to levels supporting unrestricted release.

WMA 2 – All facilities would be completely removed, including all five lagoons, Low-Level Waste Treatment Facility, Neutralization Pit, Old Interceptor, New Interceptors, Solvent Dike, Maintenance Shop Leach Field, underground lines, and all remaining concrete slabs and foundations.

Soil, sediment, and groundwater within WMA 2 would be removed to DCGLs consistent with unrestricted release, including the area impacted by the North Plateau Groundwater Plume.

WMA 3 – All facilities would be removed, including Tanks 8D-1, 8D-2, 8D-3, 8D-4, and their associated vaults, STS and ion exchange media, high-level radioactive waste mobilization and transfer pumps, High-Level Waste Transfer Trench, Permanent Ventilation System Building, STS Support Building, Equipment Shelter and Condensers, Con-Ed Building, underground process, wastewater, and utility lines, and all remaining concrete slabs and foundations. All contaminated soil and groundwater within WMA 3 would be removed to levels supporting unrestricted release.

WMA 4 – The waste in the CDDL would be exhumed and disposed of off site. All contaminated soil, stream sediment, and groundwater would be removed to levels supporting unrestricted release.

WMA 5 – LSA 4 and the associated Shipping Depot and the Remote-Handled Waste Facility would be completely removed, along with the remaining concrete floor slabs and foundations in the area. The underground pipe running from the Remote-Handled Waste Facility to the Waste Tank Farm would also be removed. All contaminated sediment and groundwater in the area would be removed to levels supporting unrestricted release.

WMA 6 – The Sewage Treatment Plant and the South Waste Tank Farm Test Tower would be removed, along with the remaining concrete floor slabs and foundations, asphalt pads, and gravel pads. The rail spur, low-level radioactive waste rail packaging and staging area, Equalization Basin and Tank, and Demineralizer Sludge Ponds would be removed. Any contaminated soil, sediment, and groundwater in the area would be removed to levels supporting unrestricted release.

WMA 7 – The geomembrane cover, the Interceptor Trench, and the Liquid Pretreatment System would be removed, along with the buried leachate transfer line and the remaining concrete slabs and gravel pads associated with the NDA Hardstand Staging Area. The waste in the NDA would be exhumed, repackaged, and transported to suitable offsite disposal facilities. All contaminated soil, sediment, and groundwater in the area would be removed to levels supporting unrestricted release. The NDA Lagoon would be removed after the NDA wastes had been removed.

WMA 8 – A similar approach to that for the NDA would be followed for the SDA. The Mixed Waste Storage Facility would be removed and all of the waste exhumed. All contaminated soil, sediment, and groundwater in the area would be removed to levels consistent with unrestricted release.

WMA 9 – The Drum Cell would be removed, along with its associated instrumentation monitoring shed. The NDA Trench Soil Container Area gravel pad and the Subcontractor Maintenance Area would also be removed. Any contaminated soil, sediment, and groundwater in the area would be removed to levels supporting unrestricted release.

WMA 10 – The Meteorological Tower, New Warehouse, Main Security Gatehouse, and security fence would be removed, along with the remaining concrete floor slabs and foundations. Any contaminated soil, sediment, and groundwater in the area would be removed to levels supporting unrestricted release.

WMA 11 – The waste in the Scrap Material Landfill would be exhumed. Any contaminated soil, sediment and groundwater would be removed to levels supporting unrestricted release.

WMA 12 – The dams and reservoirs would be removed. Contaminated soil across the Project Premises and stream sediments would be removed as necessary to levels supporting unrestricted release.

North Plateau Groundwater Plume – The source area of the North Plateau Groundwater Plume would be removed, with subsurface soil removed as necessary to meet DCGLs consistent with unrestricted release. Soils and water within the nonsource area would be removed to levels allowing unrestricted use. In addition, the

Groundwater Recovery System pilot-scale permeable treatment wall, full-scale permeable treatment wall, and the permeable reactive barrier would be removed.

Cesium Prong – Areas exceeding DCGLs for unrestricted release would be excavated including areas within the Project Premises and the WNYNSC. Areas outside of WNYNSC are assumed to be within DCGLs.

2.4.1.2 New Construction

The following new construction would be required to support decommissioning activities at WNYNSC under the Sitewide Removal Alternative:

- An Interim Storage Facility (Dry Cask Storage Area) located in the southern portion of WMA 6 on the west side of the rail spur to temporarily store the vitrified high-level radioactive waste canisters from WMA 1 until an offsite repository becomes available.
- A Waste Tank Farm Waste Processing Facility to support exhumation of the high-level radioactive waste storage tanks in WMA 3.
- A Soil Drying Facility to process soils contaminated by the North Plateau Groundwater Plume, waste exhumed from the CDDL and contaminated sediment from Erdman Brook and Franks Creek.
- A Leachate Treatment Facility to process contaminated leachate from the NDA and SDA.
- A Container Management Facility to process wastes exhumed from the NDA and SDA. The Container Management Facility would also have a storage area to provide for long-term storage of any orphan waste (waste for which there is no immediate approved disposal location) generated by the alternative.
- A Main Plant Process Building excavation downgradient-barrier-wall in WMA 1 to facilitate removal of underground structures and contaminated soil beneath the Main Plant Process Building.
- Environmental Enclosures to support exhumation of wastes and contaminated soil from the NDA, SDA, Lagoon 1 in WMA 2, and the North Plateau Groundwater Plume Source Area.

These facilities and structures would be constructed, operated, and then demolished when their mission is complete. Descriptions of the proposed new facilities and structures are presented in Appendix C, Section C.4.

2.4.1.3 Time Sequencing of Decommissioning Activities

The time sequencing of the decommissioning activities and the overall time required to complete them under the Sitewide Removal Alternative are shown on **Figure 2–6**. The activities depicted on the figure are described in detail in Appendix C, Sections C.3.1 and C.4. The schedule is based on assumed funding levels and task sequencing that could change in the future. The task sequences are intended to provide an approximation of task durations and when the tasks would be performed relative to one another within the assumed planning constraints. The schedule supports the environmental impact analysis but does not represent a final approach.

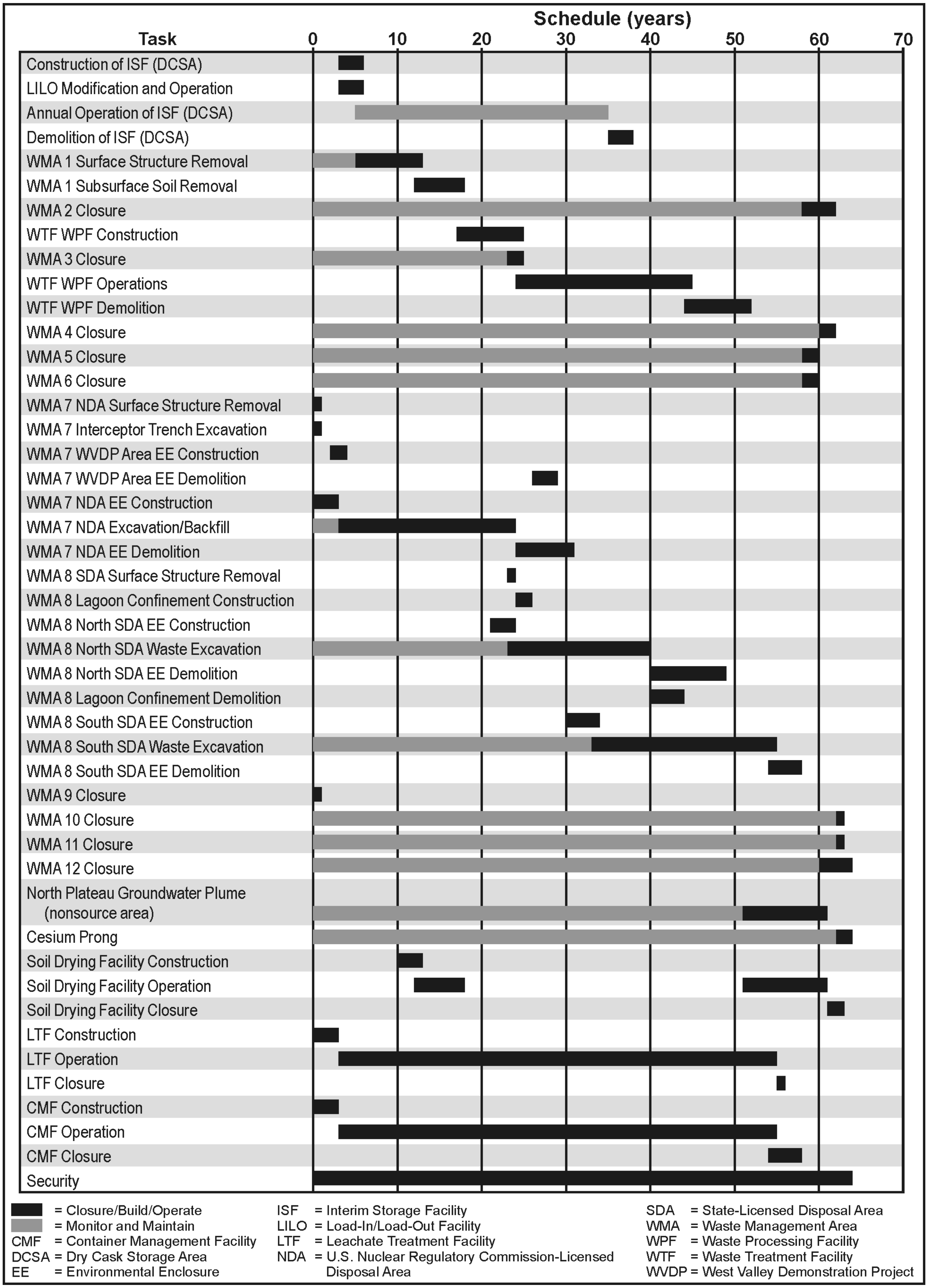

Figure 2–6 Sitewide Removal Alternative – Sequencing of Implementation Activities

2.4.1.4 Waste Generation

The waste volumes expected to be generated under the Sitewide Removal Alternative would be approximately as follows:

- Construction and demolition debris: 120,000 cubic meters (4.2 million cubic feet)
- Hazardous waste: 18 cubic meters (620 cubic feet)
- Low-level radioactive waste: 1.5 million cubic meters (53 million cubic feet)
- Greater-Than-Class C waste: 4,200 cubic meters (150,000 cubic feet)
- Transuranic waste: 1,000 cubic meters (36,000 cubic feet)
- Mixed low-level radioactive waste: 570 cubic meters (20,000 cubic feet)

These estimated waste volumes are based on commercial disposal and are given to two-digit accuracy.

Under the Sitewide Removal Alternative, the EIS analyzes two cases for potential orphan wastes: prompt shipment of such wastes and interim onsite storage of the waste in temporary storage areas until offsite disposal sites become available, with estimates for the annual costs and impacts of the onsite storage. Orphan wastes are those generated during the decommissioning that do not have an immediate approved disposal location. They would be stored in the new Container Management Facility.

Details on waste volumes that would be generated under this alternative are presented in Appendix C, Section C.3.1.

2.4.1.5 Long-term Monitoring and Institutional Controls (Long-term Stewardship)

Because the site would meet all required criteria for unrestricted release, no long-term monitoring or institutional controls would be required.

2.4.2 Sitewide Close-In-Place Alternative

The following sections summarize decommissioning activities, new construction required, the time sequencing of decommissioning activities, and waste generation under the Sitewide Close-In-Place Alternative, as well as any long-term monitoring and institutional controls required after its completion. Detailed discussions of decommissioning activities, waste generation, and new construction, are provided in Appendix C, Sections C.3.2 and C.4.

2.4.2.1 Decommissioning Activities

The following provisions would apply to the activities for all WMAs:

- The decommissioning of the NRC-licensed portion of the site, including the NDA, would be accomplished in accordance with an NRC-reviewed Decommissioning Plan. Long-term management activities for the SDA would be accomplished in accordance with NYSDEC requirements.

- Characterization surveys would be performed to quantify the nature and extent of contamination in soil and streambed sediment. The surveys would focus primarily on the known impacted areas. Much of the data collected would be intended to serve Final Status Survey purposes as well, since remediation of any areas exceeding DCGLs would not be undertaken under this alternative.

- No efforts would be made to remediate impacted surface soil in the Cesium Prong area, other surface or subsurface soil contamination, or contaminated groundwater, including that associated with the North Plateau Groundwater Plume; however, engineered barriers would be maintained to contain the plume while it decays (i.e., new treatment walls to be installed as part of the Interim End State). Radioactivity in these environmental media would be allowed to decay in place.

- In cases where below-grade portions of facilities are to be backfilled with demolition rubble or with soil, characterization or final status surveys would be performed to document the radiological status of the underground area and arrangements made for appropriate independent verification surveys to be performed before backfilling.

- Several facilities such as LSA 4 and the Remote-Handled Waste Facility would be demolished to grade with the resulting wastes shipped off site for disposal.

The decommissioning activities in each WMA are summarized below.

WMA 1 – The Equipment Decontamination Room and the Load-In/Load-Out Facility would be modified to support removal of the canisters of vitrified high-level radioactive waste. The high-level radioactive waste canisters would be removed from the Main Plant Process Building and stored in a new Interim Storage Facility (Dry Cask Storage Area) to be constructed on the South Plateau in WMA 6 until they could be shipped off site. This new facility is discussed in Appendix C, Section C.4.1. The Main Plant Process Building areas that had supported high-level radioactive waste canister storage would be decontaminated to the point where the building could be demolished without containment. All structures within WMA 1 would be demolished to grade level, including the Main Plant Process Building, Utility Room, Utility Room Expansion, Plant Office Building, Vitrification Facility, 01-14 Building, Fire Pumphouse and Water Storage Tank, and Electrical Substation. The demolition rubble from the above-grade portions of these structures would be used as backfill for the below-grade portions of the Main Plant Process Building and Vitrification Facility. The remaining debris would be used to form a rubble pile that would form the foundation of a cap. The underground tanks (35104, 7D-13, and 15D-6) would be filled with grout; and all underground process, wastewater, and utility lines, and the Off-Gas Trench would remain in place.

The backfilled, below-grade portions of the Main Plant Process Building and the Vitrification Facility and the North Plateau Groundwater Plume source area would all be closed in an integrated manner with WMA 3, within a common circumferential hydraulic barrier (such as a slurry wall), an upgradient barrier wall, and beneath a common multi-layer cap. The source area for the North Plateau Groundwater Plume would not be removed. The edge of the cap would be bounded by a wall made of large boulders to provide erosion protection and act as a perimeter intruder barrier.

WMA 2 – Decommissioning activities involve enclosing Lagoon 1 within a vertical hydraulic barrier wall, filling Lagoons 2 and 3 with compacted clean soil, removing the liners and underlying berms from Lagoons 4 and 5, and then covering the area of all five lagoons with a multi-layer cover. Other activities in WMA 2 include backfilling the Neutralization Pit and the Interceptors after breaking up their bottoms, and removing the Low-Level Waste Treatment Facility to grade. No actions would be taken on the North Plateau Groundwater Plume, which would be managed by the control measures installed as part of the Interim End State, or the Solvent Dike, Maintenance Shop Leach Field, or remaining floor slabs and foundations.

WMA 3 – The four underground waste tanks and associated vaults, with the STS equipment still in place, would be backfilled with controlled low-strength material (a self-compacted, cementious material used primarily as a backfill in lieu of compacted material). Strong grout would be placed between the tank tops and the roof vaults and in the tank risers to serve as an intrusion barrier. The underground piping in the area would remain in place and be filled with grout.

The Permanent Ventilation System Building, STS Support Building, Con-Ed Building, and Equipment Shelter and related condensers would be removed. The high-level radioactive waste mobilization and transfer pumps would be removed, along with the pump pits. The High-Level Waste Transfer Trench piping would be grouted and left in place with the transfer trench.

The Waste Tank Farm would be closed in an integrated manner with the area of the Main Plant Process Building, Vitrification Facility, and North Plateau Groundwater Plume Source Area within a common circumferential hydraulic barrier, an upgradient barrier wall, and beneath a common multi-layer cap that incorporates large boulders to provide erosion protection and serve as an intrusion barrier.

WMA 4 – The CDDL would remain in place and continue to be monitored and maintained.

WMA 5 – LSA 4 and the associated Shipping Depot and the Remote-Handled Waste Facility would be removed to grade, with the resulting debris disposed off site as appropriate. The below-grade underground portion of the Remote-Handled Waste Facility would be filled with clean soil. The remaining concrete floor slabs and foundations would remain in place.

WMA 6 – The Sewage Treatment Plant and the South Waste Tank Farm Test Tower would be removed to grade and the demolition debris disposed of off site. The rail spur would remain in place. The Demineralizer Sludge Ponds, the Equalization Basin, and the Equalization Tank would be backfilled with clean soil.

WMA 7 – The Liquid Pretreatment System would be removed and the demolition debris disposed of off site. The Interceptor Trench would be emptied of leachate and filled with material such as cement grout to provide a stable base for a multi-layer cap and to impede potential transport of groundwater contamination. Leachate would also be removed from some of the NFS disposal holes and the WVDP trenches where it accumulates and grout injected in these holes and trenches to stabilize them. The buried leachate transfer line, which has been determined to contain a small amount of residual radioactivity, would remain in place. The existing NDA geomembrane cover would be replaced with a robust multi-layer cap.

WMA 8 – Leachate would be removed from the disposal trenches and stabilizing grout injected in the disposal trenches. The Mixed Waste Storage Facility would be removed to grade with the resulting debris disposed off site as appropriate. The existing SDA geomembrane cover would be replaced with a robust multi-layer cap and a hydraulic barrier wall would be installed.

WMA 9 – The Radwaste Treatment System Drum Cell would be removed, along with its associated instrumentation monitoring shed, and the rubble disposed of off site.

WMA 10 – No decommissioning actions would be taken in WMA 10. The Meteorological Tower, the Main Security Gatehouse, and the security fence would remain in place and operational.

WMA 11 – No decommissioning actions would be implemented.

WMA 12 – The dams and reservoirs would be taken out of service in accordance with applicable State and Federal regulations with only the middle third of the dams being removed. As part of the sitewide erosion controls construction, all of the streams would be regraded and covered with erosion protection rip-rap, an activity which involves significant excavation in the streambeds. All of this excavated material, including the material that has been potentially impacted by site operations, would be utilized on site for grading fill beneath the site caps.

North Plateau Groundwater Plume – The North Plateau Groundwater Plume Source Area would be closed in an integrated manner with the area of the Main Plant Process Building, Vitrification Facility, and the Waste

Tank Farm within a common circumferential hydraulic barrier. The nonsource area of the North Plateau Groundwater Plume would be allowed to decay in place. The permeable treatment wall installed prior to the starting point of this EIS would remain in place and would be replaced approximately every 20 years.

Cesium Prong – The Cesium Prong would be managed by implementing restrictions on use for a nominal period of 100 years until in-place decay results in levels allowing for unrestricted use. Monitoring data would be routinely evaluated and access to the area reassessed as part of performance evaluations (see Section 2.4.2.5 of this chapter).

2.4.2.2 New Construction

The following new construction would be required to support decommissioning activities at WNYNSC under the Sitewide Close-In-Place Alternative.

- An Interim Storage Facility (Dry Cask Storage Area) would be located in the southern portion of WMA 6 on the west side of the rail spur to temporarily store the vitrified high-level radioactive waste canisters from WMA 1 until an offsite repository becomes available.
- A Leachate Treatment Facility would be built to treat leachate from the NDA and SDA before grouting.
- An upgradient chevron and circumferential hydraulic barrier wall would be installed around WMA 1 and WMA 3 to control groundwater.
- An integrated engineered multi-layer cover would be installed over WMA 1 and WMA 3, and erosion control structures would be installed on the North Plateau.
- A hydraulic barrier wall would be installed around Lagoon 1 in WMA 2.
- A multi-layer cover would be installed over the lagoons in WMA 2.
- Engineered multi-layer covers and erosion control structures would be installed for the NDA and SDA.
- Erosion Control Structures on the North and South Plateau would be constructed around closed in-place facilities and creeks.

Descriptions of the proposed facilities and structures are presented in Appendix C, Section C.4.

2.4.2.3 Time Sequencing of Decommissioning Activities

The time sequencing of decommissioning activities and the overall time required to complete these activities under the Sitewide Close-In-Place Alternative are shown on **Figure 2–7**. The decommissioning activities depicted on the figure are described in detail in Appendix C, Sections C.3.2 and C.4. The schedule is based on assumed funding levels and task sequencing that may change in the future. The task sequences are intended to provide an approximation of task durations and when the tasks would be performed relative to one another within the assumed planning constraints. The schedule supports the environmental impact analysis but does not represent a final approach.

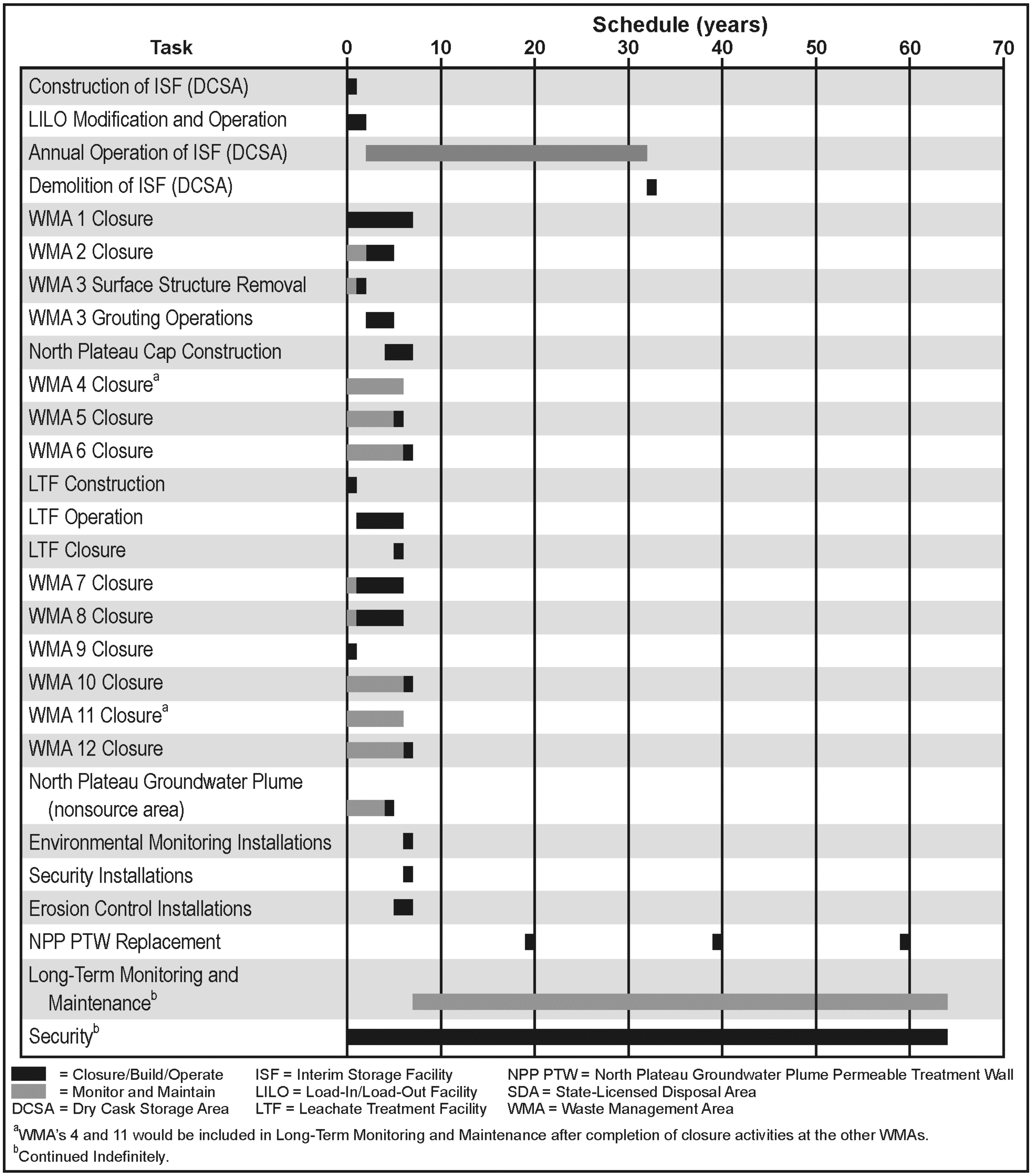

Figure 2–7 Sitewide Close-In-Place Alternative – Sequencing of Implementation Activities

2.4.2.4 Waste Generation

The waste volumes expected to be generated under the Sitewide Close-In-Place Alternative would be as follows:

- Construction and demolition debris: 15,000 cubic meters (550,000 cubic feet)
- Hazardous waste: 3 cubic meters (120 cubic feet)
- Low-level radioactive waste: 10,000 cubic meters (600,000 cubic feet)
- Greater-Than-Class C waste: 0
- Transuranic waste: 39 cubic meters (1,400 cubic feet)
- Mixed low-level radioactive waste: 410 cubic meters (14,000 cubic feet)

These estimated waste volumes are based on commercial disposal and are given to two-digit accuracy. Monitoring and maintenance activities and periodic replacement of the North Plateau Groundwater Plume permeable treatment wall would generate an average of 110 cubic meters (3,900 cubic feet) per year of low-level radioactive waste.

Details on the waste volumes that would be generated and subject to offsite disposal under the alternative are presented in Appendix C, Section C.3. If any orphan waste was to be generated under the Sitewide Close-In-Place Alternative, it would be stored in an existing storage facility.

2.4.2.5 Long-term Monitoring and Institutional Controls (Long-term Stewardship)

Monitoring and maintenance functions would be instituted for the foreseeable future and periodically addressed through performance assessment reviews. A series of monitoring devices would be installed to monitor various environmental and geotechnical parameters for a period following completion of the decommissioning actions. Monitoring devices would include, but would not be limited to: (1) groundwater monitoring wells, (2) inclinometers, and (3) survey monitors. Specific areas to be monitored would include:

- The slurry walls.
- The engineered multi-layer covers over the NDA, SDA, and the combination of WMA 1 and WMA 3.
- Erosion controls installed on Quarry Creek, Erdman Brook, and Franks Creek.

Institutional controls would also be put in place for portions of the site not released from the NRC license or the NYSDEC permit, or for which the NRC license is terminated under restrictions. The details of the institutional controls would be developed with regulatory authorities and are expected to include:

- Access controls which would be facilitated by fences and signage.
- Performance assessment reviews that would, on a specified frequency, evaluate the effectiveness of the in-place closure designs and access controls. The monitoring data identified in this section would be important input for the performance assessment reviews.

2.4.3 Phased Decisionmaking Alternative

The Preferred Alternative is the Phased Decisionmaking Alternative. Section 2.7 of this chapter provides the rationale for identifying this alternative as Preferred. The following sections summarize the decommissioning activities, new construction required, time sequencing of the decommissioning activities, and waste generation under the Phased Decisionmaking Alternative, as well as any long-term monitoring and institutional controls required after its completion. Detailed discussions of decommissioning activities, waste generation, and new construction, are provided in Appendix C, Sections C.3.3 and C.4.

2.4.3.1 Decommissioning Activities

The following provisions apply to Phase 1 decommissioning activities for all WMAs:

- Decommissioning activities would be accomplished in accordance with an NRC-reviewed Decommissioning Plan, which would specify the appropriate DCGLs. The Decommissioning Plan would also provide information on analyses performed to estimate the impacts of residual radioactivity that would remain at WNYNSC after completion of Phase 1 decommissioning activities.
- All radioactive, hazardous, and mixed low-level radioactive waste generated during the work and with an immediate path to disposal would be disposed of off site, with the possible exception of transuranic waste which could require temporary onsite storage pending a “defense” determination.
- Characterization surveys would be performed in Phase 1 to determine the nature and extent of surface soil and sediment contamination.
- Before excavated areas are backfilled, final radiological status surveys of these areas would be completed, including the associated independent verification surveys.
- Any excavation performed to remove slabs and foundations would be limited. If additional contamination were found at a depth greater than approximately 0.5 meter (2 feet), that contamination would be addressed as part of Phase 2.

Phase 1 activities in each WMA are summarized below.

WMA 1 – The canisters of vitrified high-level radioactive waste would be removed from the Main Plant Process Building and placed in a new Interim Storage Facility (Dry Cask Storage Area) constructed early in Phase 1 on the South Plateau. The Main Plant Process Building areas that support high-level radioactive waste canister storage would be decontaminated to the point where the building could be demolished without containment. All facilities in WMA 1 would be completely removed, including the Main Plant Process Building, Utility Room, Utility Room Expansion, Plant Office Building, Vitrification Facility, 01-14 Building, Load-In/Load-Out Facility, Fire Pumphouse, Water Storage Tank, underground tanks (35104, 7D-13, 15D-6), all underground process, wastewater, and utility lines, Off-Gas Trench, and all remaining concrete slabs and foundations.

The source area of the North Plateau Groundwater Plume located beneath the Main Plant Process Building would be removed, with subsurface soil removed as necessary to meet DCGLs consistent with unrestricted release. A hydraulic barrier would be installed around the Main Plant Process Building area to control groundwater during excavation. The downgradient portion of this barrier would remain in place after the excavated area is backfilled.

To remove the plume source area and the below-grade structures of the Main Plant Process Building and the Vitrification Facility, an area larger than the footprints of these two buildings would be excavated. This excavation would extend into the Lavery till where necessary to accommodate removal of extended below-grade structures such as the Cask Unloading Pool. Foundation piles exposed during soil removal would be cut at the bottom of the excavation or deeper if necessary to support unrestricted release. Underground lines within the excavated area would be removed. Pipeline sections remaining at the face of the excavation would be characterized and the portion of the piping within WMA 1 removed as necessary depending on the characterization results.

WMA 2 – All facilities in WMA 2 would be removed. A hydraulic barrier wall would be installed northwest of Lagoons 1, 2, and 3, which would be removed at the end of its operational life with excavations extending 0.6 meter (2 feet) into the Lavery till. The liners and underlying berms for Lagoons 4 and 5 would be removed.

Underground lines within the excavated areas would be removed. Pipeline sections remaining at the face of the excavations would be characterized and the portion of the piping within WMA 2 removed as necessary depending on the characterization results.

WMA 3 – The high-level radioactive waste mobilization and transfer pumps would be removed from the underground Waste Tanks. The Waste Tanks themselves would remain in place, as would the Permanent Ventilation System Building, STS Support Building, and underground piping in the area. The STS vessels and contents in Tank 8D-1 would remain in place. The Equipment Shelter and Condensers and Con-Ed Building would be removed. The Waste Tanks would continue to be monitored and maintained with the Tank and Vault Drying System operating as necessary. The piping used to convey high-level radioactive waste in the High-Level Waste Transfer Trench would be removed and the trench would remain in place. Pipe removal would be conducted with soil removal with cutoffs of the piping occurring somewhere between the excavation and the tanks. The barrier wall would also extend westward across the piping runs.

WMA 4 – The CDDL would remain in place and continue to be monitored and maintained.

WMA 5 – LSA 4 and the associated Shipping Depot and the Remote-Handled Waste Facility would be removed. The remaining concrete floor slabs and foundations in the area would also be removed.

WMA 6 – The Sewage Treatment Plant and the South Waste Tank Farm Test Tower would be removed, along with the remaining concrete floor slabs and foundations, asphalt pads, and gravel pads. The Equalization Basin and Tank, and the Demineralizer Sludge Ponds and the Low-Level Waste Rail Packaging and Staging Area would be removed. The rail spur would remain operational, potentially with a new terminus due to the excavation of the Main Plant Process Building.

WMA 7 – The NDA would continue to be monitored and maintained. The Interceptor Trench and the Liquid Pretreatment System would remain operational. The buried leachate transfer line would remain in place. The remaining concrete slabs and gravel pads associated with the NDA Hardstand would be removed. The NDA is subject to actions requested by NYSDEC during the 30-year ongoing assessment period. However the pad associated with the NDA Hardstand and the Trench Soil Container Area would be removed under the WMA 9 scope of work.

WMA 8 – The SDA would continue to be actively managed, taking any additional actions requested by the regulator, for as long as 30 years. The associated Mixed Waste Storage Facility would remain operational. The SDA is subject to actions requested by NYSDEC during the 30-year ongoing assessment period.

WMA 9 – The Drum Cell and the Subcontractor Maintenance Area would be removed, along with the associated instrumentation monitoring shed. The NDA Trench Container Area pad would also be removed.

WMA 10 – The New Warehouse and the remaining concrete floor slabs and foundations would be removed. The Meteorological Tower, Security Gatehouse, and security fence would remain in place and operational.

WMA 11 – No decommissioning actions would be implemented.

WMA 12 – The dams and reservoirs would continue to be monitored and maintained. Sediment and surface soils would be characterized to evaluate any potential contamination.

North Plateau Groundwater Plume – The source area of the North Plateau Groundwater Plume would be removed as in the Sitewide Removal Alternative.

The nonsource area of the North Plateau Groundwater Plume would be contained by the permeable reactive barrier and permeable treatment wall installed for the Interim End State. The permeable treatment wall would be replaced if necessary. The Groundwater Recovery System would be removed.

Cesium Prong – The Cesium Prong would be managed by continuing restrictions on use and access.

Phase 1 Data Collection, Studies, and Monitoring

The following types of studies would be performed during Phase 1:

- Characterization studies, which would include sampling of surface soil and stream sediments and characterization of selected underground piping that would be exposed during other removal activities;

- Data collection and studies to improve understanding of the removal option or improve its viability, such as monitoring and evaluating technology developments regarding disposal facilities for orphan waste, underground waste tank cleaning and exhumation, and exhuming buried radioactive waste; and

- Data collection and studies to improve understanding of the in-place closure option or improve its viability, such as research related to long-term performance of engineered barriers and work to enhance site erosion and hydrology models.

Evaluations to Determine the Phase 2 Approach

The approach to be followed for Phase 2 decisions for decommissioning and long-term management would be the subject of further evaluations by DOE and NYSERDA, with the participation of WNYNSC regulators, who serve as cooperating agencies for the EIS. Several factors that would be taken into account in these evaluations include:

- The results of analyses to estimate the impacts of residual radioactivity that would remain after completion of the Phase 1 activities;

- The additional information developed in the studies to be carried out in Phase 1; and

- The availability of new technologies that might be applied in Phase 2.

The evaluations would take into account the status of the underground Waste Tanks and the two waste disposal areas, which would be reviewed at approximately 5-year intervals, along with the viability of the various decommissioning or long-term management approaches. The final decision on the Phase 2 decommissioning and long-term management approach would be made within 30 years of the date of issue of the Phase 1 ROD. As new information becomes available during Phase 1, DOE would conduct appropriate NEPA reviews.

2.4.3.2 New Construction

The following new construction would be required to support decommissioning activities at WNYNSC under Phase 1 of the Phased Decisionmaking Alternative.

- An Interim Storage Facility (Dry Cask Storage Area) would be located in the southern portion of WMA 6 on the west side of the rail spur to temporarily store the high-level radioactive waste canisters from WMA 1 until an offsite repository becomes available.

- A Main Plant Process Building excavation downgradient-barrier-wall in WMA 1 to facilitate removal of below-grade structures and contaminated soil associated with the source area of the North Plateau Groundwater Plume.

- A low-permeability subsurface barrier wall would be installed in WMA 2 northwest of Lagoons 1, 2, and 3 to control groundwater.

Descriptions of the proposed facilities and structures are presented in Appendix C, Section C.4.

2.4.3.3 Waste Generation

The waste volumes expected to be generated under Phase 1 of the Phased Decisionmaking Alternative would be as follows:

- Construction and demolition debris: 35,000 cubic meters (1.2 million cubic feet)

- Hazardous waste: 7 cubic meters (260 cubic feet)

- Low-level radioactive waste: 180,000 cubic meters (6.2 million cubic feet)

- Greater-Than-Class C waste: 0

- Transuranic waste: 710 cubic meters (25,000 cubic feet)

- Mixed low-level radioactive waste: 41 cubic meters (1,400 cubic feet)

These estimated waste volumes are based on commercial disposal and are given to two-digit accuracy. Monitoring and maintenance, and periodic replacement of the North Plateau Groundwater Plume permeable treatment wall, if necessary, and the SDA geomembrane would generate an average of 190 cubic meters (6,700 cubic feet) per year of low-level radioactive waste.

Details on the waste volumes that would be generated and would be subject to offsite disposal under the alternative are presented in Appendix C, Section C.3. If any orphan waste was to be generated under Phase 1 of the Phased Decisionmaking Alternative, it would be stored on site in an existing facility.

2.4.3.4 Time Sequencing of Decommissioning Activities

The time sequencing of the decommissioning activities and the overall time required to complete these activities under Phase 1 of the Phased Decisionmaking Alternative are shown on **Figure 2–8**. The decommissioning activities depicted on the figure are discussed in detail in Appendix C, Sections C.3.3 and C.4. The schedule is based on assumed funding levels and task sequencing that may change in the future. The task sequences are intended to provide an approximation of task durations and when the tasks would be performed relative to one another within the assumed planning constraints. The schedule supports the environmental impact analysis but does not represent a final approach. Not shown in the figure are Phase 1 characterization and monitoring studies that are presented in Section 2.4.3.1 of this chapter.

2.4.3.5 Long-term Monitoring and Institutional Controls (Long-term Stewardship)

During Phase 1, existing monitoring and institutional controls would continue in place. Depending on the nature of Phase 2, there could be long-term monitoring and institutional controls that would look like the Sitewide Close-In-Place Alternative, or no monitoring and controls as in the Sitewide Removal Alternative.

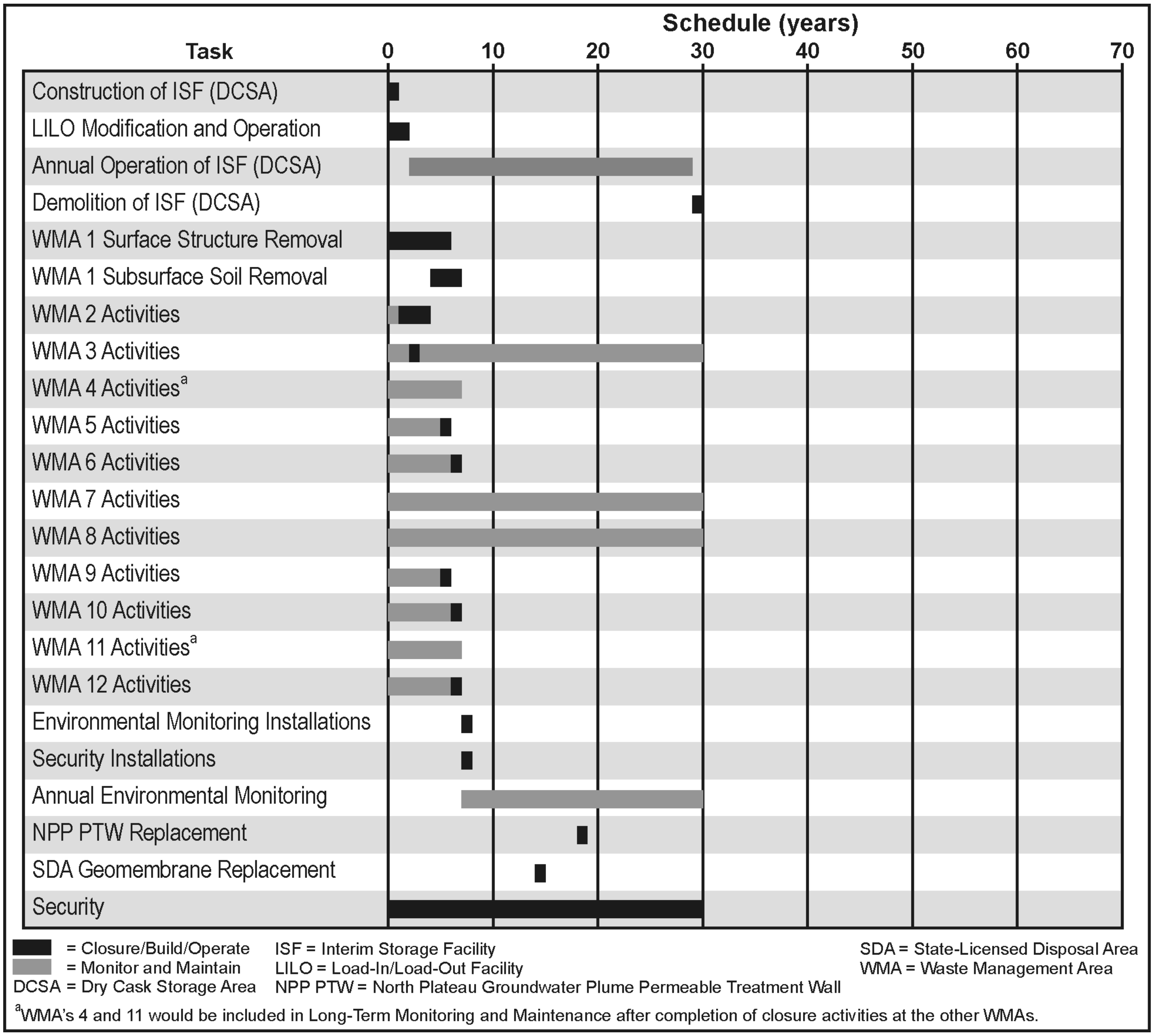

Figure 2–8 Phased Decisionmaking Alternative, Phase 1 – Sequencing of Implementation Activities

2.4.4 No Action Alternative

Under the No Action Alternative, no decommissioning or long-term management actions would take place. Consistent with the Interim End State, the site would continue to be monitored and maintained for the foreseeable future as required by State and Federal regulations to protect the health and safety of workers, the public, and the environment.

2.4.4.1 Maintenance and Replacement Activities

The site maintenance program would be modified as appropriate for facility and system conditions of the Interim End State. These conditions would include continued interim storage of the high-level radioactive waste canisters in the Main Plant Process Building. The Waste Tank Farm and all waste burial grounds would remain under Interim End State conditions.

Facilities would be repaired as necessary to maintain them in a safe condition. Portions of facilities would be replaced periodically to this end, with examples being the roofs of the Main Plant Process Building, the geomembrane covers over the waste disposal areas, and the permeable treatment wall for the North Plateau Groundwater Plume.

Capabilities would remain in place to deal with unexpected failures of structures, systems, and components, as well as with other site emergencies that might occur. Appropriate site management and oversight would remain in place.

2.4.4.2 Waste Generation

The annual waste volumes expected to be generated under the No Action Alternative would be approximately as follows:

- Demolition debris: 32 cubic meters (1,100 cubic feet)
- Hazardous waste: 0.73 cubic meters (26 cubic feet)
- Low-level radioactive waste: 450 cubic meters (16,000 cubic feet)
- Greater-Than-Class C waste: 0 cubic meters (0 cubic feet)
- Transuranic waste: 0 cubic meters (0 cubic feet)
- Mixed low-level radioactive waste: 0.14 cubic meters (5 cubic feet)

These estimated waste volumes are based on commercial disposal and are given to two-digit accuracy.

2.4.4.3 Time Sequencing of Maintenance and Replacement Activities

A typical schedule of the stewardship activities of the No Action Alternative is shown in **Figure 2–9**. The activities necessary to monitor, maintain, and/or operate facilities would be ongoing, while those activities taken to ensure protection of the public and the environment would be performed periodically (e.g., once every 20 to 25 years), and would be completed within 1 year. Maintenance and replacement activities would continue indefinitely.

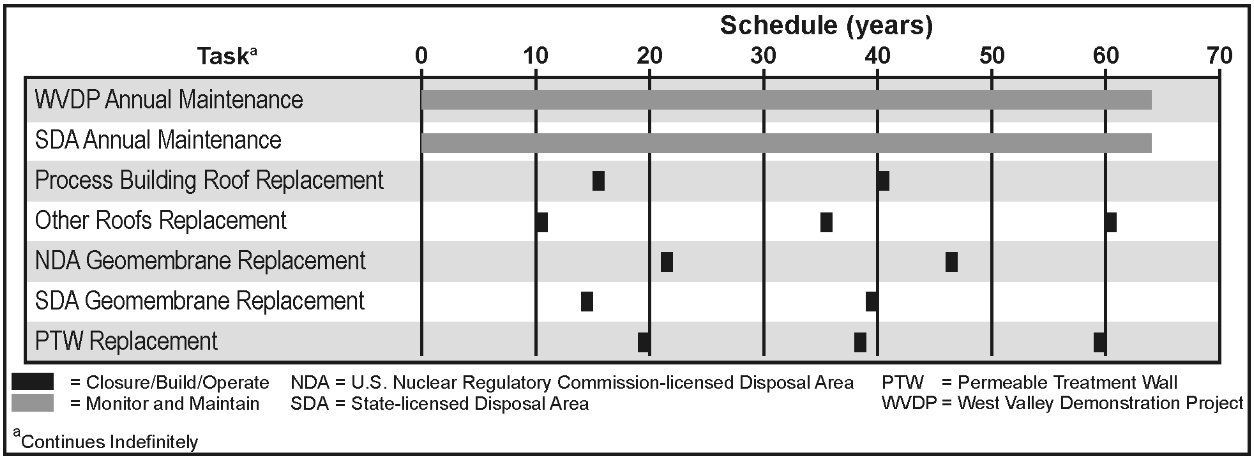

Figure 2–9 No Action Alternative – Sequencing of Implementation Activities

2.4.4.4 Monitoring and Institutional Controls

The existing monitoring and institutional controls would continue in place for the foreseeable future.

2.5 Alternatives Considered but Eliminated from Detailed Analysis

2.5.1 Indefinite Waste Storage of Decommissioning or Long-term Management Waste in Existing or New Aboveground Structures

DOE and NYSERDA do not consider the use of existing structures or construction of new aboveground facilities at WNYNSC for indefinite storage of decommissioning or long-term management waste to be a reasonable alternative for further consideration. The indefinite storage of waste is inconsistent with the NRC License Termination Rule and Final Policy Statement on WVDP Decommissioning. Under the *Waste Management Programmatic Environmental Impact Statement* (DOE 1997a), DOE decided that sites such as the Project Premises would ship their low-level radioactive waste and mixed low-level radioactive waste to other DOE sites that have disposal capabilities for these wastes (65 FR 10061). This decision did not preclude the use of commercial disposal facilities. The construction, subsequent maintenance, and periodic replacement over time of new facilities for indefinite onsite waste storage at West Valley would be impractical from a cost, programmatic, health, and environmental standpoint. Thus, DOE would not consider indefinite onsite waste storage in new or existing facilities to be a viable waste management alternative for its decommissioning actions at the Project Premises. In addition, the WVDP Act calls for DOE to decontaminate and decommission facilities. NYSERDA would use available commercial facilities for disposal of any non-Project low-level radioactive waste and mixed low-level radioactive waste that it may generate, in lieu of incurring the costs of new construction.

2.5.2 Walk Away

The 1996 *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center (Cleanup and Closure Draft EIS*) analyzed an alternative that involved discontinuing all West Valley operations and essentially “walking away” from the WNYNSC, its facilities, and wastes (DOE 1996a). This “Walk Away” Alternative was intended to help DOE and the public understand the inherent risks of site facilities, buried waste, environmental contamination, and site erosion. (This alternative was also identified in the March 13, 2003, Notice of Intent for this revised Draft EIS, but it was called the No Action Alternative).

In the 1996 *Cleanup and Closure Draft EIS* and in the current draft, this option was not considered as a reasonable alternative.

After additional consideration, the lead agencies, in consultation with the cooperating agencies, decided to eliminate the Walk Away Alternative as the No Action Alternative and redefine the No Action Alternative. The Walk Away Alternative, as defined in the 1996 *Cleanup and Closure Draft EIS*, was not a reasonable alternative because it would not satisfy the requirements of the WVDP Act, it would not satisfy DOE and NYSERDA requirements under 6 NYCRR Part 373 and RCRA, and would pose major health and safety issues to the public. Further, neither of the lead agencies would or could select the "Walk Away" Alternative because it would represent a violation of their duties and responsibilities.

2.6 Comparison of Alternatives

This section summarizes the environmental impacts of the alternatives in a concise comparative form, thus sharply defining the issues and providing a clear basis for selection among the alternatives as required by 40 CFR 1502.14. This section also summarizes the environmental consequences for those resource areas with impacts that have meaningful differences among the alternatives.

The environmental consequences section in Chapter 4 of this EIS presents an analysis of the direct and indirect environmental effects of each alternative. It forms the analytical basis for the concise comparison of alternatives in this section. For more information on impacts by resource area for each alternative, including those resource areas not discussed here, see Chapter 4.

The comparison of alternatives is organized into three sections that present impacts for specific resource areas that have meaningful differences in impacts among the alternatives. These include:

- Near-term impacts, which address the impacts resulting from implementing the decommissioning actions (e.g., removal or isolation)
  - land use: land available for release
  - socioeconomics: employment levels
  - human health and safety: population dose and worker dose
  - waste management: waste generation
  - transportation: population dose and worker dose
- Long-term impacts, which address impacts resulting from wastes remaining on site
  - human health and safety: population dose to downgradient water users
- Cost-benefit considerations

Other resource areas presented in Chapter 4 are not discussed in this comparison of alternatives because, although they may have differences among the alternatives, the differences are not considered meaningful enough to influence the selection of a Preferred Alternative.

The Sitewide Removal and Sitewide Close-In-Place Alternatives are complete decommissioning alternatives, where decommissioning actions are taken to achieve an end state. The Phased Decisionmaking Alternative is partial decommissioning with the end state undefined. Phase 1 impacts have been addressed, but the Phase 2 impacts would depend on future decisions on decommissioning and closure actions. However, impacts are expected to be bounded by those analyzed in the Sitewide Removal Alternative and the Close-In-Place Alternative, and a qualitative statement can be made about the range of impacts for the Phased Decisionmaking Alternative. The No Action Alternative is not a decommissioning alternative, because there are no actions to reconfigure the site.

2.6.1 Near-term Impacts

Near-term impacts for five resource areas identified as having meaningful differences among the alternatives are presented in **Table 2–3**. Additionally, the duration of the decommissioning period and monitoring and maintenance period for each of the alternatives is shown in Table 2–3 for comparison.

To construct the analytical basis for evaluation of project impacts, appropriate analytical tools and methods were used to estimate potential environmental impacts. The best available information on waste inventory and characteristics, site characteristics and processes, and engineering approaches was used in the analysis. Uncertainty was addressed by performing multiple analyses (e.g., alternate disposal configuration, alternate transportation modes, continuation as well as loss of institutional controls) and using conservative assumptions. This approach was performed in such a way that did not bias the comparison of alternatives.

2.6.1.1 Land Use

The Sitewide Removal Alternative would result in the greatest land area available for release for unrestricted use, which would be the entire 1,352 hectares (3,340 acres) encompassing WNYNSC. With the exception of land necessary to manage orphan waste that may remain on site until a disposition path is available, the entire site would be cleaned up to the point where it could meet license termination without restriction standards, potentially allowing it to be used for other purposes.

The Sitewide Close-In-Place Alternative would result in about 1,100 hectares (2,700 acres) being available for release for unrestricted use. After completion of decommissioning activities, as well as decay of the Cesium Prong and nonsource areas of the North Plateau Groundwater Plume, much of the site would be available for release for unrestricted use. Land would need to be retained for access control, as a buffer zone on the western side of the NDA and for maintenance and erosion control for the South Plateau burial grounds. The exact amount and timing of land releases would be the result of interaction between NYSERDA, NRC, and DOE.

Following completion of Phase 1 of the Phased Decisionmaking Alternative, an estimated 690 hectares (1,700 acres) of land would be available for release for unrestricted use. A determination of the amount of land available for unrestricted release following implementation of Phase 2 would depend on the selection of Phase 2 actions. If the decision is removal of remaining contamination, the remaining 662 hectares (1,600 acres) would become available, and the total for this alternative would be similar to that under the Sitewide Removal Alternative. If the decision is in-place closure of the remaining structures, an additional 430 hectares (1,100 acres) would be available, similar to the Sitewide Close-In-Place Alternative.

For the No Action Alternative, 690 hectares (1,700 acres) would be available for release for unrestricted use. This land would not be needed for continued management and oversight.

Table 2–3 Comparison of Alternatives by Resource Areas for Near-term Impacts [a]

Resource Area	*Sitewide Removal Alternative*	*Sitewide Close-In-Place Alternative*	*Phased Decisionmaking Alternative (Phase 1 only)* [b]	*No Action Alternative*
Duration of Decommissioning Action	64 years	7 years	8 years	None
Duration of Ongoing Monitoring and Maintenance	Necessary only while any orphan waste is being stored	In perpetuity as part of long-term stewardship	In perpetuity as part of long-term stewardship if Phase 2 involves in-place closure	In perpetuity
Land Use [c] – land estimated to be available for unrestricted release upon completion of alternative	Entire 1,352 hectares (except for any land used for optional orphan waste storage)	1,100 hectares	690 hectares	690 hectares
Socioeconomics [d] – average employment	Decommissioning: 260 employees annually Monitoring and Maintenance: 0 employees (assuming no orphan waste management after decommissioning)	Decommissioning: 300 employees annually Monitoring and Maintenance: About 30 employees annually until Interim Storage Facility removed; then about 18, indefinitely	Decommissioning: 230 employees annually Monitoring and Maintenance: About 50 employees annually, up to 30 years	Monitoring and Maintenance: About 75 employees annually, indefinitely
Human Health and Safety (public) [e] – population dose (and risk) to the public	Decommissioning: 73 person-rem (0.018 LCF) Monitoring and Maintenance: negligible dose, even if orphan and legacy waste are stored on site	Decommissioning: 27 person-rem (0.0093 LCF) Monitoring and Maintenance: 0.00045 person-rem for permeable treatment wall replacement, if necessary	Decommissioning: 42 person-rem (0.0056 LCF) Monitoring and Maintenance: 0.0045 person-rem for permeable treatment wall replacement, if necessary	Monitoring and Maintenance: 0.077 person-rem per year
– peak annual MEI dose	0.26 millirem (8.4×10^{-8} LCF)	0.14 millirem (4.1×10^{-8} LCF)	0.84 millirem (1.1×10^{-7} LCF)	0.61 millirem (2.1×10^{-7} LCF)
Human Health and Safety (site workers) [f] – worker population dose (and risk)	Decommissioning: 1,100 person-rem (0.70 LCF) Monitoring and Maintenance following decommissioning actions: 0.15 person-rem (8.0×10^{-5} LCF) per year if orphan waste is stored on site	Decommissioning: 130 person-rem (0.080 LCF) Monitoring and Maintenance following decommissioning actions: 0.2 person-rem (1.0×10^{-4} LCF) per year	Decommissioning: 140 person-rem (0.080 LCF) Monitoring and Maintenance following decommissioning actions: 2.0 person-rem (0.001 LCF) per year	Monitoring and Maintenance: 2.6 person-rem per year (0.0020 LCF)
– average worker dose from decommissioning actions	66 millirem (4.0×10^{-5} LCF) per year	44 millirem (3.0×10^{-5} LCF) per year	58 millirem (3.0×10^{-5} LCF) per year	0 millirem (0 LCF) per year
Waste Management [g] – packaged decommissioning waste (cubic meters)	120,000 nonhazardous 18 hazardous 1,500,000 LLW [h] 4,200 GTCC [h] 1,000 TRU [h] 570 MLLW 1,600,000 Total	15,000 nonhazardous 3 hazardous 10,000 LLW [h] 0 GTCC 39 TRU [h] 410 MLLW 26,000 Total	35,000 nonhazardous 2 hazardous 170,000 LLW [h] 0 GTCC 710 TRU [h] 41 MLLW 210,000 Total	None

Resource Area	*Sitewide Removal Alternative*	*Sitewide Close-In-Place Alternative*	*Phased Decisionmaking Alternative (Phase 1 only)* [b]	*No Action Alternative*
Waste Management [g] – packaged monitoring and maintenance (M&M) or long-term stewardship (LTS) waste (cubic meters per year)	None [h] (assuming no orphan waste)	0 nonhazardous 0 hazardous 110 LLW 0 GTCC 0 TRU 0 MLLW 110 Total (LTS)	11 nonhazardous <1 hazardous 180 LLW 0 GTCC 0 TRU 0 MLLW 190 Total (M&M)	32 nonhazardous 1 hazardous 450 LLW 0 GTCC 0 TRU <1 MLLW 480 Total (M&M)
Transportation [i, j] – dose and risk to the public along transportation routes during transportation (person-rem [LCFs])	DOE/Commercial Truck: 380 (2.3×10^{-1}) Rail: 96 (5.7×10^{-2}) Commercial Truck: 360 (2.1×10^{-1}) Rail: 96 (5.7×10^{-2})	DOE/Commercial Truck: 12 (6.9×10^{-3}) Rail: 2.9 (1.8×10^{-3}) Commercial Truck: 10 (6.2×10^{-3}) Rail: 2.8 (1.7×10^{-3})	DOE/Commercial Truck: 71 (4.3×10^{-2}) Rail: 16 (9.8×10^{-3}) Commercial Truck: 59 (3.5×10^{-2}) Rail: 16 (9.7×10^{-3})	DOE/Commercial Truck: 15 (8.8×10^{-3}) Rail: 3.2 (1.9×10^{-3}) Commercial Truck: 12 (7.3×10^{-3}) Rail: 3.2 (1.9×10^{-3})
Transportation [i, j] – dose and risk to transportation workers during transportation (person-rem [LCFs]) [k]	DOE/Commercial Truck: 2,100 (1.3) Rail: 65 (3.9×10^{-2}) Commercial Truck: 2,200 (1.3) Rail: 65 (3.9×10^{-2})	DOE/Commercial Truck: 51 (3.0×10^{-2}) Rail: 2.0 (1.2×10^{-3}) Commercial Truck: 48 (2.9×10^{-2}) Rail: 1.5 (9.0×10^{-4})	DOE/Commercial Truck: 270 (1.6×10^{-1}) Rail: 11 (6.3×10^{-3}) Commercial Truck: 400 (2.4×10^{-1}) Rail: 11 (6.6×10^{-3})	DOE/Commercial Truck: 47 (2.8×10^{-2}) Rail: 2.0 (1.2×10^{-3}) Commercial Truck: 39 (2.3×10^{-2}) Rail: 1.7 (1.0×10^{-3})
Transportation [i, j] – nonradiological accident risk (number of traffic fatalities)	DOE/Commercial Truck: 7.5 Rail: 30 Commercial Truck: 7.2 Rail: 29	DOE/Commercial Truck: 0.090 Rail: 0.37 Commercial Truck: 0.080 Rail: 0.33	DOE/Commercial Truck: 1.0 Rail: 4.0 Commercial Truck: 0.90 Rail: 3.4	DOE/Commercial Truck: 0.060 Rail: 0.20 Commercial Truck: 0.050 Rail: 0.20

GTCC = Greater-Than-Class C waste, LCF = latent cancer fatality, LLW = low-level radioactive waste, MEI = maximally exposed individual, MLLW = mixed low-level radioactive waste, TRU = transuranic waste.

[a] Totals may not add due to rounding. All values, except for the area of the whole WNYNSC under the Sitewide Removal Alternative (which has a known acreage), are rounded to two significant figures.

[b] Magnitude of impacts for the Phased Decisionmaking Alternative depends on the Phase 2 activities implemented.

[c] Source: Chapter 4, Table 4–1, of this Draft EIS, Summary of Land and Visual Resources Impacts.

[d] Source: Chapter 4, Table 4–11, of this Draft EIS, Summary of Socioeconomic Impacts.

[e] Source: Chapter 4, Table 4–12, of this Draft EIS, Summary of Health and Safety Impacts. The peak annual dose to the MEI is the highest of the following locations: receptor at nearest site boundary, on Cattaraugus Creek near the site, or the lower reaches of Cattaraugus Creek.

[f] Source: Chapter 4, Table 4–18, of this Draft EIS, Projected Worker Dose and Risk During and After Decommissioning.

[g] Source: Chapter 4, Table 4–45, of this Draft EIS, Summary of Waste Management Impacts. For all decommissioning alternatives, up to approximately 3.2 cubic meters (110 cubic feet) per year of additional low-level radioactive waste would be generated due to management of orphan waste.

[h] Pre-West Valley Demonstration Project Class B and C low-level radioactive waste, Greater-Than-Class C low-level radioactive waste, and non-defense transuranic waste do not have a clear disposal path and may need to be stored on site until a disposal location is identified. DOE plans to select a location for a disposal facility for Greater-Than-Class C waste and potential non-defense transuranic waste following completion of the *Disposal of Greater-Than-Class C Low-Level Radioactive Waste Environmental Impact Statement (GTCC EIS)* (DOE/EIS-0375).

[i] Source: Chapter 4, Table 4–52, of this Draft EIS, Risks of Transporting Radioactive Waste Under Each Alternative.

[j] For the purpose of comparison to other alternatives, transportation impacts for the No Action Alternative are provided for monitoring and maintenance activities over a 25-year period. Under the DOE/Commercial Disposal Option, wastes are assumed to go to the Nevada Test Site or a western U.S. disposal site. Under the Commercial Disposal Option, only commercial facilities would be used. (There would be no disposition for transuranic and Greater-Than-Class C waste).

[k] The dose to transportation workers presented in this table does not reflect administrative controls applied to the workers. In practice, workers who are not trained radiation workers would be limited to a dose of 100 millirem per year, and trained radiation workers would be limited to an Administrative Control Limit of 2 rem per year, which would be a risk of 0.0012 LCF per year for a trained radiation worker. Enforcement of the administrative limit would most likely be necessary under the Sitewide Removal Alternative.

Note: To convert hectares to acres, multiply by 2.471. To convert cubic meters to cubic feet, multiply by 35.314.

2.6.1.2 Socioeconomics

For decommissioning activities, the Sitewide Removal Alternative would create the greatest level of employment because the duration of decommissioning activities is the longest. Both the Sitewide Close-In-Place Alternative and Phase 1 of the Phased Decisionmaking Alternative would create average annual employment levels within a similar range as the Sitewide Removal Alternative, but over a much shorter duration. The near-term socioeconomic impact of all alternatives is positive because local employment is maintained. The negative impact associated with the completion of decommissioning actions would cause limited disruption because the site is not a major employer on a local or regional scale.

There would be no post-decommissioning employment required for monitoring and maintenance activities for the Sitewide Removal Alternative, assuming there is no need for temporary orphan waste storage. The other alternatives, including the No Action Alternative, would require a reduced employment level for an indefinite period of time.

If the decision for Phase 2 of the Phased Decisionmaking Alternative is removal of remaining contamination, the employment level for that alternative would be similar to the Sitewide Removal Alternative for the duration of decommissioning actions, and there would be no post-decommissioning employment required for monitoring and maintenance. If the decision is in-place closure of the remaining structures, the decommissioning employment levels would be similar to those for Sitewide Close-In-Place Alternative, and there would be employment following decommissioning during an indefinite monitoring and maintenance period.

Based on the expected changes in employment levels for each of the alternatives, there would be no discernable impact on the economies of the local and regional areas surrounding the West Valley Site.

2.6.1.3 Human Health and Safety

Decommissioning actions would result in radiological releases to the atmosphere and to local waters. These releases would result in radiation doses and the associated risk of latent cancer fatalities (LCFs)[2] to offsite individuals and populations. The number of LCFs can be used to compare the risks among the various alternatives. The decommissioning actions would also result in occupational exposure to site workers. Radiological doses to the public and to site workers would be highest under the Sitewide Removal Alternative and lowest under the No Action Alternative. Phase 1 of the Phased Decisionmaking Alternative would generate doses to the public and workers that are higher than the Sitewide Close-In-Place Alternative.

Excluding the No Action Alternative, the projected total decommissioning dose to the general population within an 80-kilometer (50-mile) radius of WNYNSC ranges from 27 person-rem (for the Close-In-Place Alternative) to 73 person-rem (for the Sitewide Removal Alternative). The doses would be expected to result in less than 1 (0.0093 to 0.018) additional LCF within the affected population as a result of decommissioning actions under any of the alternatives. Note that the peak annual dose to an MEI located at the site boundary would be highest for Phase 1 of the Phased Decisionmaking Alternative because it has the highest annual radionuclide release rate. The peak annual dose is still less than 1 millirem (the average person in the United States receives an annual background dose of 360 millirem).

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[2] *LCF is a term to indicate the estimated number of cancer fatalities that may result from exposure to ionizing radiation. Dose conversion factors are used to convert radiation dose to LCFs.*

Total estimated worker dose for decommissioning actions would range from 130 person-rem for the Sitewide Close-In-Place Alternative to 1,100 person-rem for the Sitewide Removal Alternative. The higher dose would be expected to result in up to 1 additional LCF among the involved worker population. The average individual worker dose for decommissioning would range from 44 to 66 millirem per year, which is below the site 500 millirem per year administrative limit (WVNSCO 2006). All workers in radiation areas would be monitored to ensure they stayed within annual limits.

2.6.1.4 Waste Management

Depending on the alternative, decommissioning actions would generate different types of waste including nonhazardous, hazardous, low-level radioactive, mixed low-level radioactive, transuranic, and Greater-Than-Class C waste.

The Sitewide Removal Alternative would generate the largest volume of waste from decommissioning, but no waste from long-term stewardship. Nonhazardous waste is common demolition debris that would be expected to have no adverse impact on commercial disposal facilities. Much of the Class A low-level radioactive waste is lightly-contaminated low specific activity waste that would be expected to have no adverse impact on the capacity of DOE or commercial disposal facilities. Until the issues related to disposal of commercial Class B/C low-level radioactive waste, Greater-Than-Class C wastes, and transuranic waste are resolved, these wastes would be stored in the new Container Management Facility as orphan waste. A disposal facility for Greater-Than-Class C waste and potential non-defense transuranic waste would be determined by a Record of Decision for the *Disposal of Greater-Than-Class C Low-Level Radioactive Waste Environmental Impact Statement (GTCC EIS)* (DOE/EIS-0375).

Phase 1 of the Phased Decisionmaking Alternative would generate the second largest volume of waste from decommissioning activities. The nonhazardous waste is common demolition debris that would be expected to have no adverse impact on commercial disposal facilities. Much of Class A low-level radioactive waste is lightly-contaminated low specific activity waste that would be expected to have no adverse impact on the capacity of DOE or commercial disposal facilities. Until the issues related to disposal of transuranic waste are resolved, this small volume of potentially orphan waste would be stored in LSA 4. If the Phase 2 decision is removal of remaining contamination, the total decommissioning wastes for the Phased Decisionmaking Alternative would be expected to be similar to those generated under the Sitewide Removal Alternative. If Phase 2 results in in-place closure of the remaining underground structures and wastes, the decommissioning waste volumes generated for the total Phased Decisionmaking Alternative would be the sum of the Phase 1 waste volume and about 30 percent of the waste volume generated under the Sitewide Close-In Place Alternative.

The Sitewide Close-In-Place Alternative would generate the third largest volume of waste from decommissioning and some low-level radioactive waste from long-term stewardship activities. Until the issues related to disposal of commercial Class B/C low-level radioactive waste and transuranic waste are resolved, these orphan wastes would be stored in LSA 4.

The No Action Alternative would generate no waste from decommissioning activities but the largest volume of waste from monitoring and maintenance.

2.6.1.5 Transportation

Both radiological and nonradiological impacts result from shipment of radioactive materials from WNYNSC to offsite disposal sites. DOE and NYSERDA could choose to use a combination of rail and truck shipments during the implementation of any of the proposed alternatives. The dose to the general population would be expected to range between about 2.8 person-rem, which is associated with all rail shipments to commercial disposal sites under the Sitewide Close-In-Place Alternative, and about 380 person-rem associated with truck shipments to NTS under the Sitewide Removal Alternative. The additional LCFs that would be expected from such exposures to the general population would be less than 1 (0.0017 to 0.23). The impacts are dependent on the distance traveled and the number of people residing along the transportation routes.

The dose and risk information in Table 2–3 for transportation workers assumes that no administrative controls would be placed on the workers; however, it should be noted that DOE limits dose to a worker to 5 rem (10 CFR 835.202), and also sets an administrative goal at 2 rem per year (DOE 1999b). The potential risk for a trained radiation worker to develop an LCF from the maximum annual exposure limit would be less than 1 (0.0012).

For the Sitewide Removal Alternative, the highest level of radiological health impacts to transportation workers would occur under the Commercial Disposal Option using all truck shipments; the greatest impacts to the general population would occur under the DOE/Commercial Disposal Option, also using all truck shipments. For the Sitewide Close-In-Place Alternative, the highest level of health impacts to transportation workers and to the general public would both occur under the DOE/Commercial Disposal Option using all-truck shipments. For Phase 1 of the Phased Decisionmaking Alternative, the highest level of health impacts to transportation workers would be from the truck Commercial Disposal Option; the highest level of health impacts to the general public would be from the truck DOE/Commercial Disposal Option. For Phase 2, if the decision is removal of the remaining wastes, total transportation risks for this alternative (Phase 1 and Phase 2) would be equal to those evaluated under the Sitewide Removal Alternative. If the Phase 2 decision is in-place closure, the transportation risks from the additional activities (Phase 2) would be less than those evaluated under the Sitewide Close-In-Place Alternative due to removal activities already performed under Phase 1 of the Phased Decisionmaking Alternative. However, the total transportation risks for the Phased Decisionmaking Alternative would be greater than those for the Sitewide Close-In-Place Alternative. For the No Action Alternative, the highest level of health impacts to transportation workers and population from all transportation activities would occur under the DOE/Commercial Disposal Option.

The Sitewide Removal Alternative has the highest nonradiological health risk to the public, with the risk ranging from 7.2 to 29 traffic accident fatalities for the various shipping options.[3] The other alternatives would result in less than 1 nonradiological accident fatality, except for the Phased Decisionmaking Alternative, which would have a risk of 3.4 to 4.0 fatalities for the rail shipping options for Phase 1. For Phase 2, if the decision is removal of the remaining wastes, total transportation risks for this alternative (Phase 1 and Phase 2) would be equal to those evaluated under the Sitewide Removal Alternative. If the Phase 2 decision is in-place closure, the transportation risks from the additional activities (Phase 2) would be less than those evaluated under the Sitewide Close-In-Place Alternative due to removal activities already performed under Phase 1 of the Phased Decisionmaking Alternative. However, the total transportation risks for Phased Decisionmaking Alternative would be greater than those for the Sitewide Close-In-Place Alternative. Considering that the transportation activities would occur over a period of time from about 10 to 60 years and that the average number of annual traffic fatalities in the United States is about 40,000 per year, the traffic fatality risks under all alternatives would be very small.

[3] *The rail nonradiological accident fatality estimates are based on the conservative assumption of one rail car per train. The use of trains with higher numbers of waste rail cars would result in lower accident fatality estimates.*

2.6.2 Long-term Impacts

This section summarizes the estimated long-term impacts associated with the alternatives. For analysis purposes, "long-term" is from the end of the decommissioning action implementation period out to at least 10,000 years and perhaps longer if the predicted peak annual dose occurs later. The impacts were estimated using models that accounted for site features and processes that facilitated contaminant transport and natural and engineered barriers that mitigated contaminant transport. The models predicted the dose consequences as a function of time to a spectrum of offsite and onsite receptors engaged in exposure scenarios. Chapter 4, Section 4.1.10, of this EIS, presents peak annual doses for the spectrum of receptors for the two alternatives where the amount and configuration of remaining contamination can be quantitatively estimated: the Sitewide Close-In-Place Alternative and the No Action Alternative.

Table 2–4 provides an overview of the potential impacts for comparison among the alternatives. More information on the impacts to human health and safety are presented in Chapter 4, Section 4.1.10, of this EIS.

Table 2–4 Comparison of Long-term Impacts

<table>
<tr><th>Resource Areas for Comparison of Long-term Impacts</th><th>Sitewide Removal Alternative</th><th>Sitewide Close-In-Place Alternative</th><th>Phased Decisionmaking Alternative</th><th>No Action Alternative</th></tr>
<tr><td>Peak Annual Dose to Offsite Receptors</td><td>Essentially negligible.</td><td>Less than 1 millirem per year if institutional controls remain in place.

On the order of 100 millirem per year if institutional controls fail for many hundreds of years and unmitigated erosion occurs.</td><td rowspan="2">If Phase 2 is removal for the remaining WMAs, long-term impacts would be comparable to Sitewide Removal Alternative.

If Phase 2 is close-in-place for the remaining WMAs, long-term impacts are slightly less than Sitewide Close-In-Place because the Main Plant Process Building and Low-Level Waste Treatment Facility would have been removed.</td><td>Less than 1 millirem per year if institutional controls remain in place.

On the order of 100 millirem per year if institutional controls fail for many hundreds of years and unmitigated erosion occurs.</td></tr>
<tr><td>Peak Annual Dose to Onsite Receptors (assumes loss of institutional controls)</td><td>Less than 25 millirem per year for very conservative scenarios, much less for more realistic scenarios.</td><td>Moderate doses (a few to hundreds of millirem per year) to individuals who have gardens in contaminated soil or wells in contaminated water.</td><td>Very large doses (10 to 1,000 rem per year) to individuals who have gardens in contaminated soil or wells in contaminated water.</td></tr>
</table>

WMA = Waste Management Area.

The Sitewide Removal Alternative would have minimal long-term impacts. The contamination would be removed such that an individual in direct contact with residual contamination would receive an annual dose of less than 25 millirem per year assuming conservative land reuse scenarios that include houses, gardens and wells in the highest areas of residual contamination. Other site reuse scenarios would result in substantially lower doses and the dose to offsite individuals would be many orders of magnitude lower (i.e., negligible).

The Sitewide Close-In-Place Alternative would include additional engineering barriers and also rely on institutional controls to limit offsite and onsite doses. For this alternative, the estimated doses to offsite individuals, if institutional controls are assumed to remain in place, would be less than 1 millirem per year, and would be similar to the No Action Alternative. The estimated dose to offsite individuals in the event of failure of institutional controls would be less than 1 millirem per year if only groundwater release mechanisms are involved (less than the No Action Alternative) and on the order of 100 millirem per year (the same as the No Action Alternative) if there is extended (many hundreds of years) loss of institutional control such that unmitigated erosion occurs. If institutional controls are lost and there are intruders into the industrialized area, there could be moderate annual doses (10 to 100 millirem) to individuals who would have gardens with contaminated soil from large excavation activities or who uses water from contaminated wells. The intruder doses would be less than those for the No Action Alternative because of engineered barriers that reduce the likelihood of direct intrusion or slow the migration of contaminants. The highest doses for the Sitewide Close-In-Place Alternative would be related to the North Plateau Plume, the Main Plant Process Building and the Waste Tank Farm.

The long-term human health impacts for the Phased Decisionmaking Alternative would depend on the Phase 2 decision. If the Phase 2 decision is removal, the long-term impacts at the site and in the region would be the same as those for the Sitewide Removal Alternative. If the Phase 2 decision is close-in-place for the remaining WMAs, the long-term impacts would be slightly less than those for the Sitewide Close-In-Place Alternative because the Main Plant Process Building, the source area of the North Plateau Groundwater Plume, and the Low-Level Waste Treatment Facility lagoons, would have been removed. If one considers the time-integrated (cumulative) population dose the first 1,000 years would be reduced to about 50 percent of that of the Sitewide Close-In-Place Alternative; however, the reduction over 10,000 years is much less (less than 10 percent) because of the dose from the long-lived radionuclides in the burial grounds.

The No Action Alternative would not remove material or add engineering barriers to isolate the waste. It would rely on existing barriers and active and/or passive institutional controls to limit offsite and onsite doses. The estimated doses to offsite individuals, if institutional controls are assumed to remain in place, would be less than 1 millirem per year. The estimated dose to offsite individuals in the event of failure of institutional controls would be on the order of 10 millirem per year if only groundwater release mechanisms are involved and on the order of 100 millirem per year if there is extended (many hundreds of years) loss of institutional control such that unmitigated erosion occurs. If institutional controls are lost and there are intruders into the industrialized area, there could be very large annual doses (10 to 1,000 rem) to individuals who have gardens with contaminated soil from large excavation activities or use water from contaminated wells. The high doses could occur near any of the industrial facilities in the Project Premises and the SDA. This No Action Alternative is considered the baseline when evaluating the long-term performance of the various decommissioning actions.

2.6.3 Cost-benefit Analysis

The incremental cost-effectiveness of the dose reduction for the alternatives is presented in **Table 2–5**. This is based on the dose reduction and the present value estimates identified in Chapter 4, Table 4–56, of this EIS.

The various decommissioning alternatives take different strategies to reducing long-term risk, which is predominantly from radiological releases. Insight into the cost-effectiveness of the alternatives is provided by comparing the ratio of the incremental cost for an alternative (the cost for an alternative less the cost of the No Action Alternative) and the net 1,000-year population dose reduction (the avoided population dose due to removal or increased isolation less the worker and public population dose required to achieve the new end state). This cost effectiveness can be useful when comparing the alternatives and can be useful when evaluating compliance with decommissioning requirements. Additional information on the cost-benefit analysis is presented in Chapter 4, Section 4.2.

Based on the information in Table 2–5, the Sitewide Close-In-Place Alternative would be more cost effective than the Sitewide Removal Alternative. The incremental cost-effectiveness of the Phased Decisionmaking Alternative would be expected to lie between approximately $4,500 and $20,000 discounted cost per avoided person-rem.

Table 2–5 Cost/Benefit Comparative Assessment [a]

Sitewide Removal Alternative	***Sitewide Close-In-Place Alternative***	***Phased Decisionmaking Alternative (Phase 1 only)***	***No Action Alternative***
The Sitewide Removal Alternative would be effective in removing essentially all of the site radionuclide inventory from the accessible environment. The discounted cost per avoided person-rem is estimated to be about $20,000.	The Sitewide Close-In-Place Alternative would be effective in keeping most of the site radionuclide inventory out of the accessible environment. The incremental discounted cost per avoided person-rem (incremental cost-effectiveness) is estimated to be about $2,000.	The cost-effectiveness of this alternative would be driven primarily by the Phase 2 decision. If the Phase 2 decision is timely removal of the remaining WMAs, the incremental cost-effectiveness ($20,000) would be similar to the Sitewide Removal Alternative. If the Phase 2 decision is timely in-place closure for the remaining WMAs, the incremental cost-effectiveness ($4,500) would approach that of the Sitewide Close-In-Place Alternative.	The No Action Alternative serves as a baseline for assessing the cost-effectiveness of the decommissioning alternatives.

WMA = Waste Management Area.

[a] Cost-benefit analysis is not typically included in a DOE EIS but is included in NRC EISs. The cost-benefit analysis presented in this EIS is intended to increase the utility of the document to NRC.

2.6.4 Conclusions from Comparative Analysis of Alternatives

The following conclusions were derived from the comparative analysis of alternatives presented in this section:

- The Sitewide Removal Alternative would result in the most land available for reuse, and would not require long-term institutional controls (except for the possible management of orphan waste), but would incur the greatest radiological dose to the public and workers from onsite and transportation activities.

- The Sitewide Close-In-Place Alternative would require the least amount of time to accomplish and would generate the least amount of waste (other than the No Action Alterative) that would need to be disposed of elsewhere, but would require long-term institutional controls on site. The reasonably foreseeable long-term peak annual dose to Lake Erie water users would be very small (indistinguishable) from the dose associated with background radiation.

- Phase 1 of the Phased Decisionmaking Alternative would not result in any more land available for release than for the No Action Alternative, but would have positive impacts over the No Action Alternative because of decommissioning activities that would remove contaminated facilities and address source terms for groundwater contamination. If Phase 2 is removal, the total impacts for the Phased Decisionmaking Alternative would be similar to the Sitewide Removal Alternative. If Phase 2 were close-in-place, the total impacts of the Phased Decisionmaking Alternative would be less than the sum of Phase 1 plus the Sitewide Close-In-Place Alternative. The total impact would be less than the sum because of the reduced number of facilities that would be closed-in-place.

- The Sitewide Removal Alternative would incur the highest discounted cost per avoided person-rem to total worker and public populations, the Sitewide Close-In-Place the lowest discounted cost per avoided person-rem, and the Phased Decisionmaking Alternative would be in between.

- The No Action Alternative would not involve decommissioning. Waste and contamination would remain in their current locations, and there would be no change in site operations. This alternative and its impacts serve as the baseline when evaluating a decommissioning alternative.

2.7 Preferred Alternative Identification and Rationale

DOE and NYSERDA have selected the Phased Decisionmaking Alternative as their Preferred Alternative. The rationale for selecting the Phased Decisionmaking Alternative is as follows:

- Phase 1 of the Phased Decisionmaking Alternative would remove major facilities (such as the Main Plant Process Building, lagoons) thereby reducing or eliminating potential human health impacts while introducing minimal potential for generation of new orphan waste.

- Phase 1 of the Phased Decisionmaking Alternative would remove the source area for the North Plateau Groundwater Plume, thereby reducing the source of radionuclides that are a potential contributor to human health impacts.

- Phase 1 of the Phased Decisionmaking Alternative allows up to 30 years for collection and analysis of data and information on major facilities or areas (e.g., Waste Tank Farm, NDA, SDA), with the goal of reducing technical risks (e.g., generation of less additional orphan waste, and improved long-term performance of facilities left in place). Examples of analyses that could be performed to address technical risk could include how to address the Cesium Prong, reaching a determination regarding Wastes Incidental to Reprocessing, and further evaluation of long-term impacts.

The additional information gathering conducted in Phase 1 is expected to provide data to support decisionmaking for Phase 2 activities. Phase 2 activities could be sitewide removal of the remaining facilities and contamination (Sitewide Removal Alternative), close-in-place of the remaining facilities and contamination (Sitewide Close-In-Place Alternative), or a combination of activities from these two alternatives. It is also anticipated that during Phase 1, progress would be made in the identification and development of disposal facilities for "orphan" wastes, thereby facilitating removal actions if they are selected as part of the Phase 2 decisionmaking. Establishment of improved close-in-place designs or improved analytical methods for long-term performance assessment would facilitate close-in-place actions if they are selected as part of Phase 2 decisionmaking.

2.8 Uncertainties Associated with Implementation of the Various Alternatives

Implementing any of the project alternatives involves some amount of uncertainty. For example, there is uncertainty related to the availability of waste disposal sites for some classes of waste expected to be generated under the different alternatives. Also, there is some uncertainty involved with the availability of technologies needed to implement the alternatives. These uncertainties are discussed in greater detail in the following sections. Uncertainty associated with analytical methods and the use of new technologies has been accommodated in this EIS by making conservative assumptions in the environmental impact analysis.

2.8.1 Consequence Uncertainties

Chapter 4, Section 4.3, of this EIS presents a discussion of incomplete and unavailable information that introduces uncertainty into the consequence analyses. The areas affected include human health (occupational exposure), transportation, waste management (waste quantities and disposal options), and long-term human health. The uncertainties associated with incomplete and unavailable information related to these areas are presented in this section.

2.8.1.1 Human Health

For occupational exposure, information that is incomplete or unavailable includes (1) more detailed information on the radionuclides in the waste, particularly the gamma emitters, (2) the design details for the facilities that would be used for waste handling and processing, and (3) more detailed information on how workers would be utilized in decommissioning actions. However, the uncertainty related to the lack of this information is addressed through the use of conservative assumptions related to the development of the labor-category-specific exposure rates and the fact that no credit is taken for the decay of the gamma emitters that are expected to control the dose. Active management controls will assure that occupational dose standards are met. Appendix I further addresses uncertainties associated with short-term human health impacts.

2.8.1.2 Transportation

Information that is incomplete or unavailable includes (1) more detailed information on the distribution of radionuclides in the packaged waste, particularly the gamma emitters, (2) the radiation dose from the waste package shipment arrays, (3) the specific transportation route and (4) more precise information on how the waste would be shipped (truck, rail, or some combination of truck and rail). The uncertainty related to the lack of this information is addressed through the use of conservative assumptions related to waste package inventory and surface dose rate, and the fact that no credit is taken for the decay of the gamma emitters that are expected to control the dose. Uncertainty about disposal locations was addressed by considering two different waste disposal options (DOE/commercial and commercial) and different disposal sites for the low-level radioactive waste.

2.8.1.3 Waste Volumes

The waste management analysis has two areas of uncertainty due to incomplete and unavailable information: (1) the volumes and characteristics of waste that would be generated by each alternative, and (2) the availability of disposal sites for all the waste, particularly commercial low-level radioactive waste (Class B and C), Greater-Than-Class C waste, transuranic waste, and high-level radioactive waste. The uncertainty related to the volumes and characteristics of the waste is principally related to the amount of site characterization data available. While some soils characterization data does exist, much of the soil volume assumed to be excavated for the Sitewide Removal and Phased Decisionmaking Alternatives is based on process knowledge and operational history. The actual volumes to be exhumed could be smaller or greater than the assumptions in this EIS. Based on the above and the challenge of estimating exact volumes of water that would require treatment during excavation of soils and buried wastes, there would also be uncertainty associated with the volume and characteristics of wastes resulting from water management/treatment during excavation activities. The Phased Decisionmaking Alternative allows for some uncertainty in that additional actions could be analyzed and implemented as part of Phase 2 activities.

2.8.1.4 Waste Disposal Options

The lack of availability of disposal sites for commercial Class B and C low-level radioactive waste, Greater-Than-Class C waste, transuranic waste, and high-level radioactive waste creates uncertainty in how these wastes would be disposed of. Management options are presented in Chapter 4, Section 4.1.11.2, of this EIS. Until recently, the only commercial facility available and licensed for disposal of WVDP Class B or C waste from West Valley was in Barnwell, South Carolina; however, this facility is now no longer accepting any non-Atlantic Compact waste for disposal. Alternatives that generate commercial Class B or C wastes, therefore, would require an onsite storage facility to store these wastes until a disposal location is available.

Under the Low-Level Radioactive Waste Policy Amendments Act of 1985 (Public Law 99-240), DOE is responsible for ensuring the safe disposal of Greater-Than-Class C waste in a facility licensed by the NRC; however, no such Greater-Than-Class C waste disposal facility exists at this time. A *GTCC EIS* that evaluates alternatives for developing a Greater-Than-Class C waste disposal facility is being prepared (72 FR 40135). Future options for Greater-Than-Class C waste disposal may significantly change the Greater-Than-Class C disposal cost included in the Sitewide Removal Alternative cost estimate. Under the Sitewide Removal Alternative, onsite storage would be needed for these wastes until a disposal location is available.

As discussed in Chapter 4, Section 4.1.11.2, the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (*WIPP SEIS*) analyzed the receipt and disposal of transuranic waste from WNYNSC (DOE 1997b). At this time, the WNYNSC is not approved to ship transuranic waste to WIPP because of unresolved questions regarding whether WNYNSC transuranic waste can be considered defense or commercial in origin. WIPP is currently authorized to accept only DOE defense waste. In addition, disposal of transuranic wastes from West Valley is currently being examined under the *GTCC EIS*. Until a determination is made with regard to transuranic waste originating from West Valley, it would be stored on site.

No high-level radioactive waste would be generated by decommissioning and/or long-term stewardship of WNYNSC unless the Waste Incidental to Reprocessing process determines that the empty high-level radioactive waste tanks and any applicable associated equipment are not incidental to reprocessing. If it is determined that the waste incidental to reprocessing process cannot be applied (i.e., the wastes cannot be managed as low-level radioactive waste and transuranic waste), these wastes would need to be managed as high-level radioactive waste under all of the alternatives. There is currently no waste acceptance criteria established for this type of high-level radioactive waste, and it is not included in the types of high-level radioactive waste expected to be disposed of at a future geologic repository. Therefore, under the Sitewide Removal and Phased Decisionmaking Alternatives, this waste would need to be stored on site until a disposal location is available.

For any alternative, the NRC may require a long-term license for an appropriate portion of the site until an acceptable alternative is found for the disposition of these wastes.

2.8.1.5 Long-term Human Health

The estimates of long-term doses and risk to individuals are the result of a complex series of calculations. The major elements of incomplete or unavailable pieces of information that are used in these calculations include (1) characterization of the nature and extent of the contaminants, (2) the performance of engineered barriers and caps (presented in Section 2.8.2.6 of this EIS), (3) site hydrology and groundwater chemistry, (4) contaminant release rates, (5) long-term erosion-driven releases rates of contaminants, (6) contaminant chemistry at the point of release into surface waters and the resulting adsorption and deposition, (7) bioaccumulation in plants and animals, and (8) knowledge of future human activity. To accommodate the uncertainty associated with this incomplete or unavailable information, conservative assumptions are used in the analysis, as presented in Chapter 4, Section 4.3.5, of this EIS. Appendix H further addresses uncertainties associated with long-term impacts.

2.8.2 Technology Uncertainties

There are several activities involved in the implementation of the alternatives wherein there exists uncertainty related to the technology, productivity, or safety of the workers involved in the work. This uncertainty could impact the cost and schedule of activities to mitigate these factors. The following provides a brief description of the application of technologies that may introduce greater uncertainties as compared to other technologies being implemented.

2.8.2.1 NRC-licensed Disposal Area/State-licensed Disposal Area and Container Management Facility

As presented in Appendix C, Sections C.4.4 and C.4.6.8, of this EIS, the conceptual Container Management Facility and the modular shielded environmental enclosures proposed for the NDA and SDA remediation are considered "first of a kind." There are no full-scale field examples of waste retrieval and processing operations of this magnitude involving the waste classes that would be dealt with under the Sitewide Removal Alternative. The anticipated wastes have been listed based on historic documentation. However, there exists a significant potential to discover wastes and types that are unexpected or unplanned. The cost of construction of the facilities would be fairly reliable (within the contingency specified in the estimates), as the structural and equipment components are readily available and have been used in some capacity in the past. However, project productivity and safety are items of uncertainty and will need to be managed during the conduct of operations.

One component of the waste retrieval process that involves a high level of uncertainty is the retrieval of wastes from the NFS deep holes, using primarily a telescoping boom having various end effectors. Conceptually, this equipment would be able to work vertically at depth, using different end attachments to scan, excavate, cut, and vacuum the waste materials and bring the wastes to the surface; however, this process would need to be demonstrated in a full-scale field application.

2.8.2.2 Leachate Treatment Facility

Similar to the Container Management Facility, the conceptual Leachate Treatment Facility (presented in Appendix C, Section C.4.5) is designed to process leachate generated during NDA and SDA waste removals. Management of the leachate in the excavations is assumed to occur in concert with the removal of wastes. However, difficulties in leachate management and treatment might eventually cause disruption of work progress in the NDA and SDA. Handling and treatment processes are based on currently available technologies that have been tested, but management of the wastes generated during the leachate treatment process may be problematic. Waste types, leachate volumes, and waste products are assumed based on the current leachate characterization data. Significant changes to the leachate quality or quantity might trigger significant reduction in NDA and SDA productivity. Verification tests would be performed to optimize technology performance and reduce uncertainties associated with processing of leachate.

2.8.2.3 Main Plant Process Building Foundation

During removal of the Main Plant Process Building and the North Plateau Groundwater Plume source area soils, nearly 500 foundation piles would be encountered (see Appendix C, Section C.3.1.1.8, of this EIS). Assumptions have been made regarding the pile removal that involve potentially numerous work crews working together productively in a small space (excavation and concrete demolition would be proceeding at the same time as pile removal). This working arrangement might cause reductions in work productivity to occur, increasing cost and decreasing the level of safety against worker injury. The work involved in this task is relatively common; however, coordination among the work crews would need to be managed closely.

2.8.2.4 Waste Tank Farm Mobilization Pump Removal

Several pumps have been removed from High-level Waste Tanks and stored on site, as presented in Appendix C, Section C.3.1.3.2, of this EIS. Under the Sitewide Removal, Sitewide Close-In-Place, and Phased Decisionmaking Alternatives, all of the remaining pumps would be removed and segmented. The methods and controls needed for safe removal of the pumps have been demonstrated with the previous pump removals; however, the segmenting methods and controls have not been demonstrated. The pumps would have to be segmented to fit inside of waste containers for eventual offsite disposal. Trial runs could be performed to demonstrate the effectiveness of segmenting methods and controls.

2.8.2.5 Dry Cask Storage Waste Transfers

For purposes of these evaluations, it is assumed that one canister could be removed from the Load-In/Load-Out Facility, transferred to the Dry Cask Storage Area, and unloaded into a storage unit in an 8-hour shift (Appendix C, Section C.4.1, of this EIS). This estimate is based on experience gained during the removal and placement of high and very high dose rate material (greater than 100 milliRoentgen per hour) contained in lead-shielded containers at Brookhaven National Laboratory and Oak Ridge National Laboratory, and compares favorably with the *Diablo Canyon Independent Spent Fuel Storage Installation Safety Analysis Report* (PG&E 2002) estimate of time required for similar activities (17 hours for transferring a loaded cask to the Independent Spent Fuel Storage Installation). While these events are similar to those proposed for the high-level radioactive waste canister transfer, there are differences in loading configuration and waste disposition that could affect duration and cost estimates, which could be addressed through detailed project planning and trial runs.

2.8.2.6 Performance of Engineered Hydraulic Barriers and Covers

Engineered hydraulic barriers and covers are described in Appendix C, Sections C.2.13 and C.4.7, of this EIS. Performance of the permeable treatment wall would be predicated on the effectiveness of the zeolite material on contaminant removal and its duration. To reduce uncertainties associated with the performance of the permeable treatment wall (and permeable reactive barrier), a study was conducted that evaluated the performance of the pilot-scale permeable treatment wall (Geomatrix 2007). While the study showed where construction and operational improvements could be made in a full-scale system, other factors could influence the performance of the technology. These include both hydraulic factors such as groundwater bypass around the system, and dispersal of "treated" groundwater, and operational factors such as the logistics and practicality of replacing the zeolite approximately every 20 years.

There is uncertainty about the long-term performance of other engineered barriers, including multi-layered covers, waste grout, and slurry walls. Hydraulic factors such as mounding and groundwater bypass, and other aspects such as long-term durability, potentially impact the long-term performance of slurry walls designed to keep subsurface contaminants from migrating off the site. Long-term performance of closure caps can be affected by erosion and differential settlement that increases the permeability of the engineered covers. These hydraulic factors are mitigated in the analysis by use of conservative assumptions. The performance of the hydraulic barriers as incorporated into the sensitivity analysis, is presented in Appendix H.