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 and the New York State Energy Research and Development Authority for the decommissioning and long-term stewardship of the Western New York Nuclear Service Center (WNYNSC). This 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 evaluated to meet the U.S. Department of Energy (DOE) and the New York State Energy Research and Development Authority (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 Western New York Nuclear Service Center (WNYNSC).
- The Sitewide Close-In-Place Alternative, under which existing facilities and contamination would be managed at their current locations. Engineered barriers would be used to control contamination in areas with higher levels of long-lived contamination.
- The Phased Decisionmaking Alternative (the Preferred Alternative), under which activities would be implemented in two phases.

  Phase 1, the initial phase, would involve both decommissioning and ongoing assessment actions. During the first approximately 8 to 10 years of Phase 1 (roughly assumed to begin in mid-2011), decommissioning actions would be undertaken 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 the entirety of Phase 1, DOE and NYSERDA would conduct additional scientific studies to possibly reduce uncertainties related to the Phase 2 decisionmaking for those facilities and areas not addressed in Phase 1. DOE and NYSERDA would assess the results of site-specific studies as they become available, along with other relevant information (such as the development of new technologies). The agencies will inform the public on at least a quarterly basis regarding the progress of any such studies. As conditions or new information warrant during that 10-year period, DOE and NYSERDA would determine when a Phase 2 decision is appropriate and involve the public in this process. Additionally, in accordance with their regulatory authority, the regulators would require and conduct regular reviews and renewal of associated permits and licenses.

  As soon as practicable during Phase 1, DOE and NYSERDA would make decisions for the remaining facilities for implementation in Phase 2. It is anticipated that implementation of a Phase 2 decision would begin directly after completion of Phase 1 decommissioning activities in an effort to maintain cleanup momentum and a mobilized work force. Current projections at the site indicate that the transition from Phase 1 into Phase 2 would occur approximately 8 to 10 years after the Phase 1 decision, such that there would be minimal to no work interruptions. However, certain factors such as availability of funding and lack of disposal options for various waste streams may affect Phase 1 completion.

For the West Valley Demonstration Project (WVDP), Phase 2 would complete the decommissioning or long-term management decisionmaking process, implementing the approach determined through review of the currently existing information and any additional studies to be the most appropriate. Decommissioning decisions in Phase 2 would range between full exhumation and in-place closure of remaining facilities. For the SDA, alternatives that will be considered for Phase 2 decisions will range from complete exhumation to close-in-place to continued active management consistent with SDA permit and license requirements. For the balance of WNYNSC, Phase 2 decisions will range from license termination with unrestricted use to continued management under NRC license.

- 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.

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 WVDP was stored, the facilities used in the solidification of the waste, and any material or 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 disposition decisions are made and implemented. The types of waste that would be generated are presented in the "Waste Classifications" text box in this section. In carrying out this Proposed Action, DOE would comply with the provisions of NRC's *Decommissioning Criteria for the West Valley Demonstration Project (M-32) at the West Valley Site; Final Policy Statement* (67 *Federal Register* [FR] 5003) and other applicable Federal and state requirements.

A determination needs to be made on how NYSERDA would decommission or manage 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 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 the U.S. Environmental Protection Agency (NYSDEC 1992), provide the regulatory framework for management of hazardous wastes and implementation of remedial actions/cleanup necessary for the sites with respect to any hazardous waste constituents. The RCRA 3008(h) Consent Order is discussed in Chapter 5.

Waste Classifications Used in this EIS

High-level Waste or High-level Radioactive Waste **–** The high-level radioactive waste that was produced by the reprocessing of spent nuclear fuel at the Western New York Nuclear Service Center. This waste includes liquid wastes, which are produced directly in reprocessing; dry solid material derived from such liquid wastes; and such other material as the U.S. Nuclear Regulatory Commission (NRC) 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 *Code of Federal Regulations* (CFR) 63.2.

Transuranic Waste **–** 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 (DOE Order 435.1). Transuranic waste may be considered defense or non-defense waste depending on its origin.

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 and 6 New York Code of Rules and Regulations (NYCRR) 371.1(d)(1) and 371.3—ignitability, corrosivity and reactivity, or toxicity—or be specifically listed by the U.S. Environmental Protection Agency 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 and 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 at 10 CFR 61.55, low-level radioactive waste that is disposed in facilities licensed by NRC or an NRC Agreement State is further classified into Class A, Class B, or 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 low-level radioactive waste in 10 CFR 61.55. [Note: Greater-Than-Class C waste is generated by activities (e.g., by commercial entities) licensed by the NRC or Agreement States. This waste classification does not apply to low-level radioactive waste generated or owned by DOE that is disposed of at a DOE disposal facility.]

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. This category does not include source, special nuclear, or byproduct material as defined by the Atomic Energy Act (42 U.S.C. 2011 *et seq.*).

2.3 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 1,351 hectares (3,338 acres) most of which is in northern Cattaraugus County, New York, and less than 1 percent of this area in 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 in this chapter on WNYNSC facilities and areas is from a facility description and methodology technical report (WSMS 2009e), unless otherwise referenced.

WNYNSC has been divided into the 12 Waste Management Areas (WMAs) listed below. The locations of WMAs 1 through 10 are shown on **Figure 2–2**. The locations of WMAs 11 and 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: CDDL
- WMA 5: Waste Storage Area
- WMA 6: Central Project Premises
- WMA 7: NDA and Associated Facilities
- WMA 8: 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 68-hectare (167-acre) Project Premises, which is controlled by DOE, is located within WNYNSC and includes WMAs 1 through 10, with the exception of WMA 8 (SDA). WMA 8 is managed by NYSERDA and is not included in the Project Premises.

In addition to the 12 WMAs, two 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**; 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.

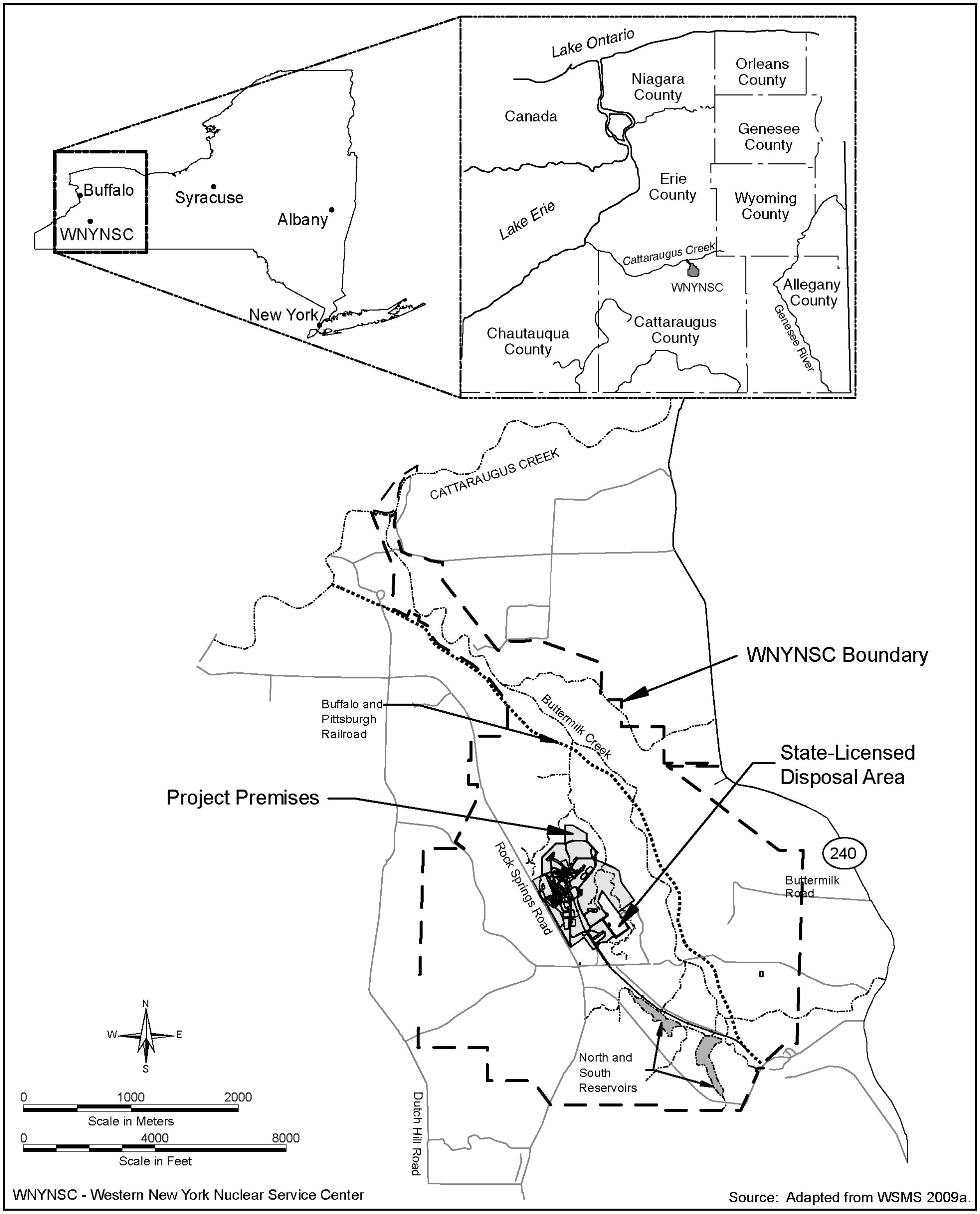


Figure 2–1 The Western New York Nuclear Service Center

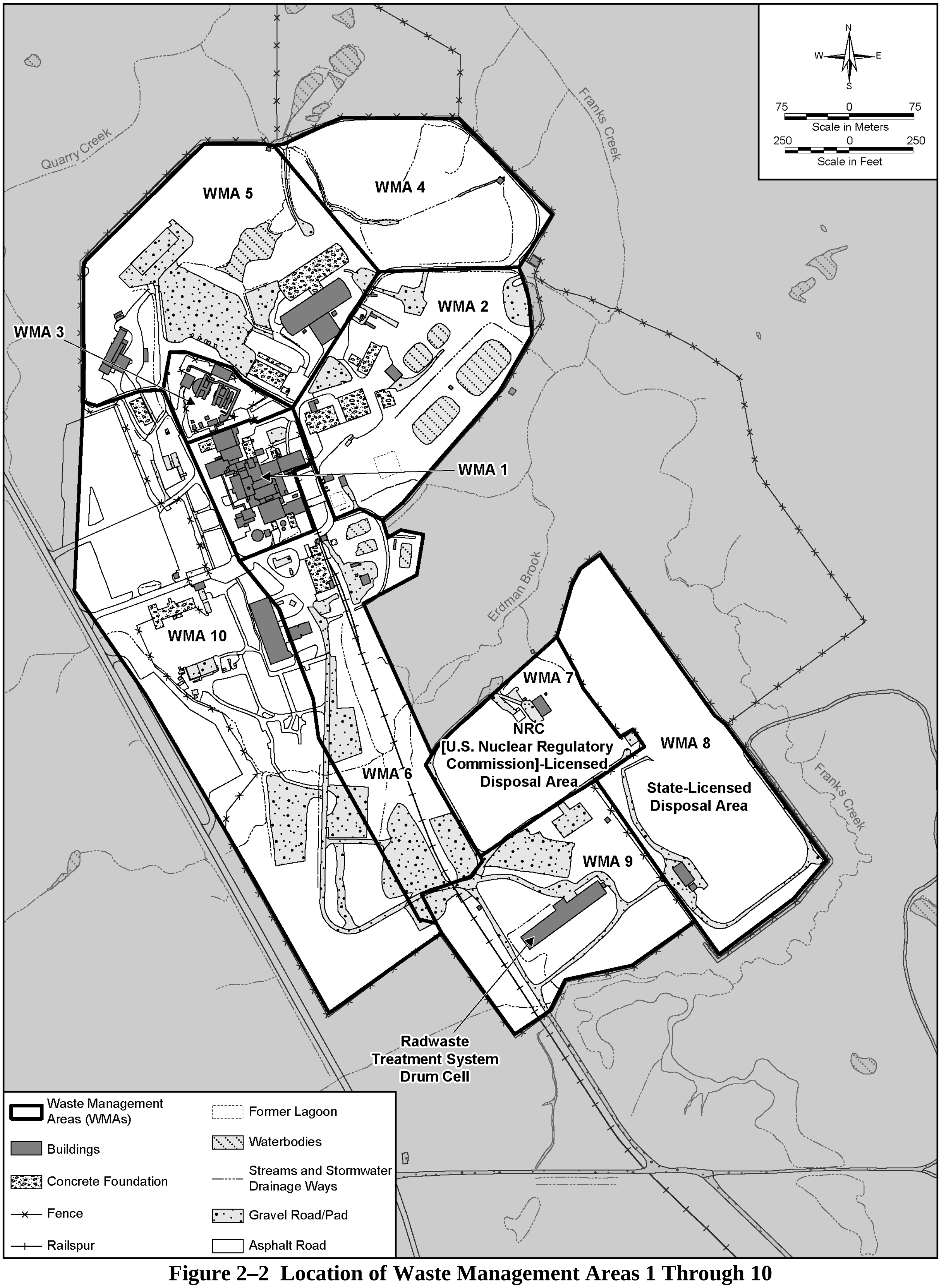


Figure 2–2 Location of Waste Management Areas 1 Through 10

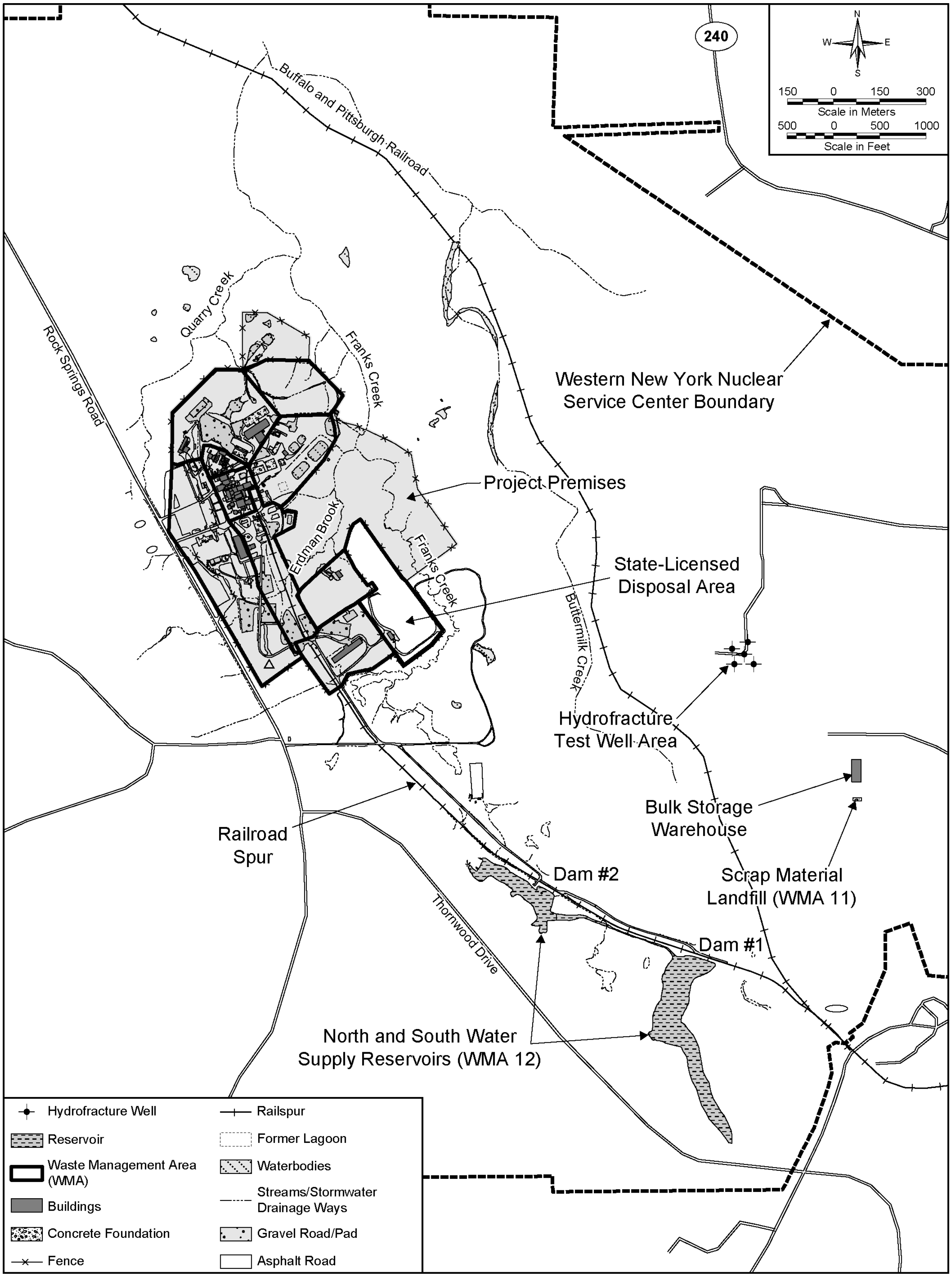


Figure 2–3 Waste Management Areas 11 and 12 – Bulk Storage Warehouse and Hydrofracture Test Area (WMA 11) and Balance of the Western New York Nuclear Service Center (WMA 12)

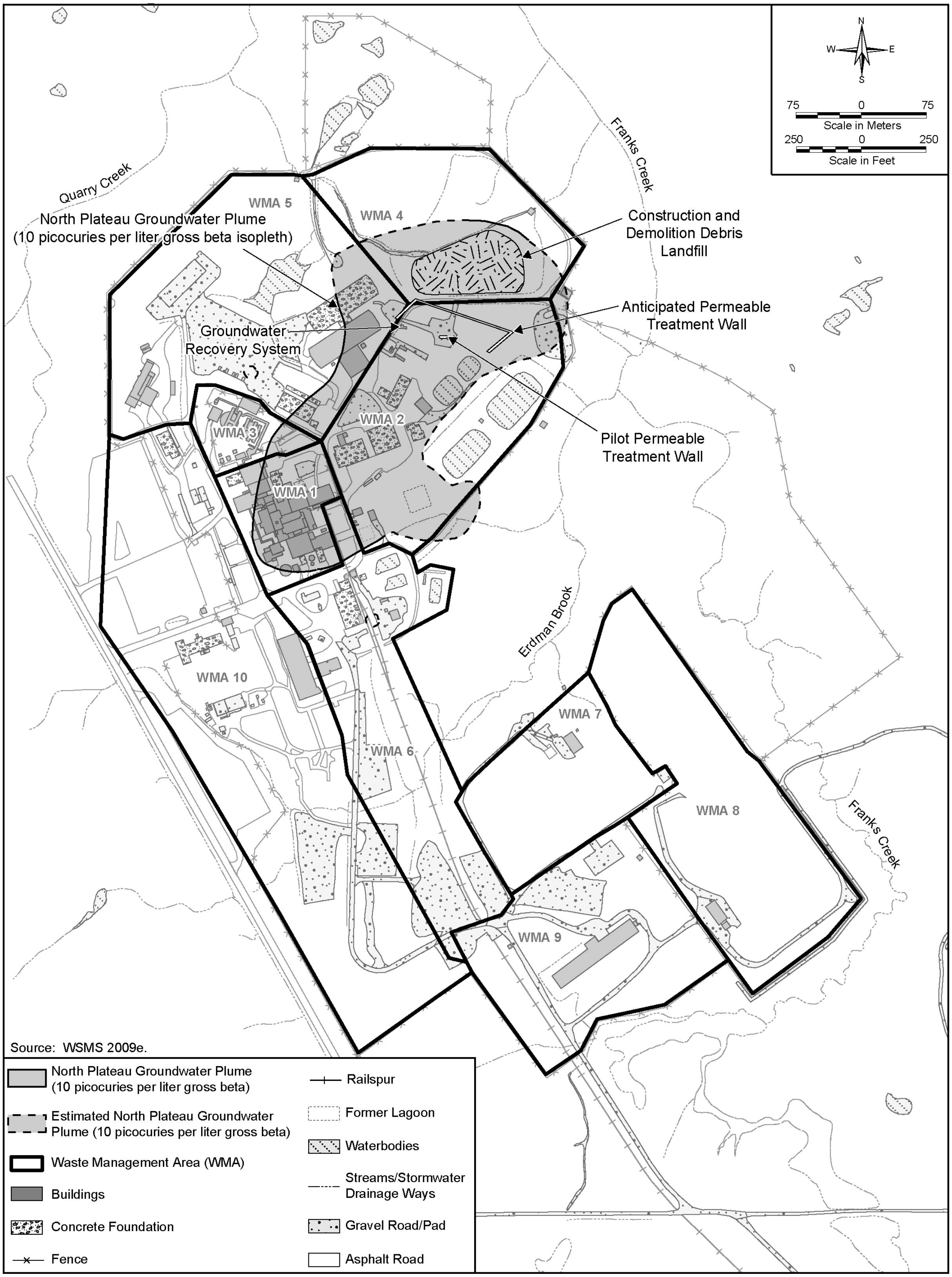


Figure 2–4 The North Plateau Groundwater Plume (a zone of groundwater contamination that extends across Waste Management Areas 1 Through 6)

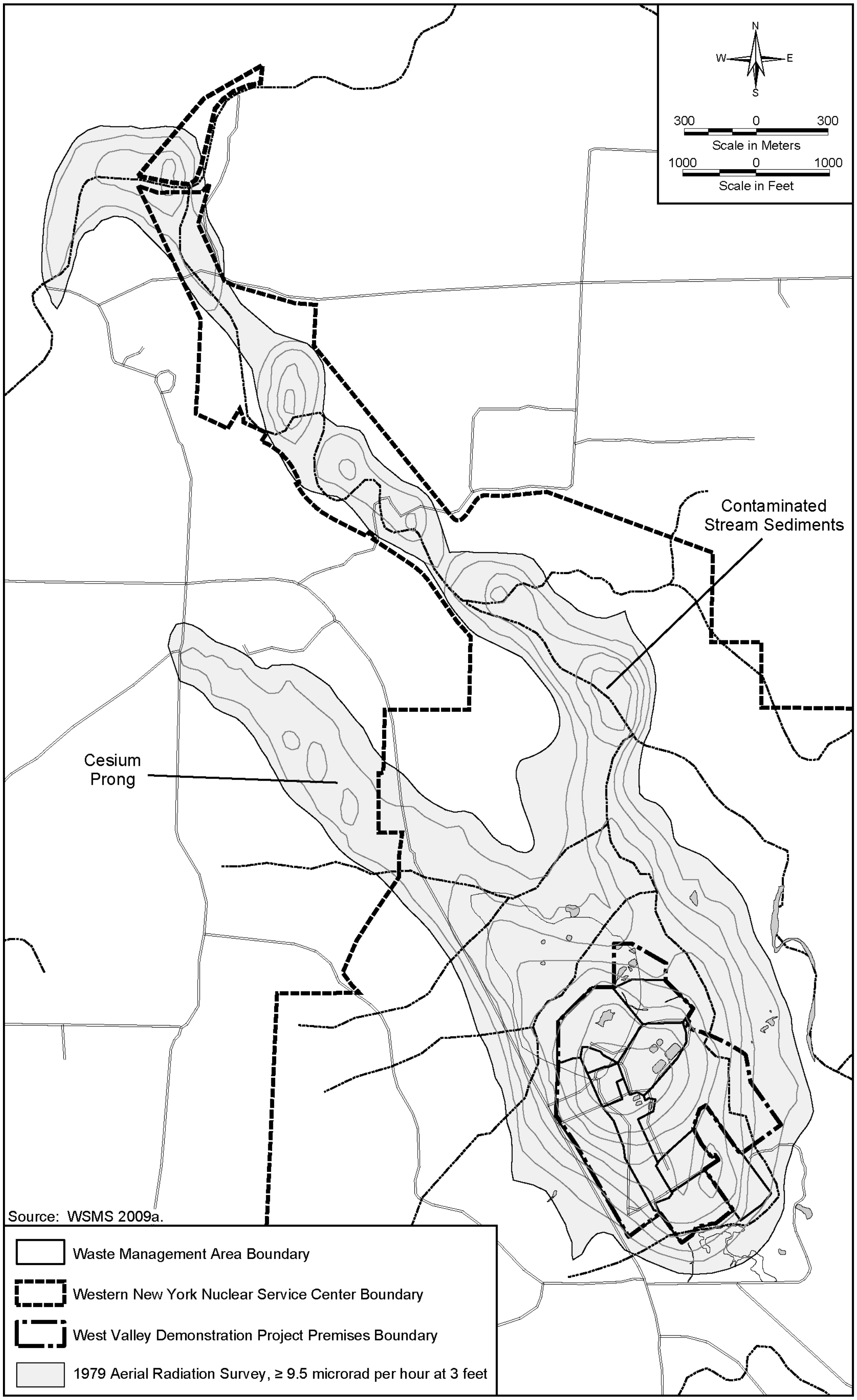


Figure 2–5 1979 Aerial Radiation Survey

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 for most facilities or areas except as described in this section. Achievement of the Interim End State is defined by the physical status of each facility or area identified in **Tables 2–1** and **2–2**. These various closure, decontamination, removal, disposal, and other activities have been evaluated in prior NEPA reviews (DOE 2003e, 2006c). Table 2–1 provides a list of site facilities assumed to be removed before decommissioning; foundations, slabs, and pads remaining at the starting point of this EIS; the RCRA status of these facilities; and whether there is radiological contamination. Table 2–2 provides a list of facilities/areas assumed to be present at the starting point of this EIS, and their RCRA and radiological status. The table also indicates 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 histories, and, for the larger facilities where information is available, radiological and hazardous chemical inventory estimates. Note that a WMA may contain more than one Solid Waste Management Unit (SWMU). 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 SWMUs identified during the RCRA facility assessments and RCRA interim status units that continue to be managed toward RCRA closure. The anticipated status at the EIS starting point with respect to addressing these units according to RCRA requirements is listed in Table 2–1 under the column titled “RCRA Status.”

- 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 barrier wall was installed and a geomembrane cover placed over NDA as part of NDA infiltration mitigation measures in 2008. The design is similar to that installed over SDA in 1995.

- A Tank and Vault Drying System will be installed at the Waste Tank Farm to dry the remaining liquid heels in the tanks. The liquid in Tank 8D-4 will be processed through adsorbent media to remove most of the cesium-137 inventory. The contaminated adsorbent media will be disposed of off site. The treated liquid will be solidified and shipped off site for disposal. This activity is not expected to be completed until approximately 2015, at which time the Interim End State for the tanks will be achieved.

- A permeable treatment wall will be installed to contain further North Plateau Groundwater Plume migration. The anticipated location for the permeable treatment wall is shown on Figure 2–4. The North Plateau Groundwater Plume and background soils were sampled in 2008 and 2009 for potential RCRA hazardous constituents. The samples were also analyzed for radionuclide content (WVES 2009). These specific activities will be completed by the Interim End State.

- 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.

Table 2–1 Site Facilities Assumed to be 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* [a]	*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		
02 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	N/A	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 Areas 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

[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).

Facilities Demolished to Grade Foundations/Slabs/Pads Remaining	***RCRA Status at EIS Starting Point*** [a]	***Radiological Contamination at EIS Starting Point***
Vitrification Vault and Empty Container Hardstand	SWMU, NFA	No
Old/New Hardstand Area	SWMU	Assumed to have radiological contamination based on past usage
High-Level Waste Tank Pump Storage Vaults	SWMU, NFA	No
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	SWMU, NFA	No
WMA 7 [b]		
NRC [U.S. Nuclear Regulatory Commission]-Licensed Disposal Area (NDA) Hardstand Staging Area	SWMU, NFA	Assumed to have radiological contamination based on past usage
WMA 8		
None		
WMA 9		
Trench Soil Container Area	SWMU, NFA	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; NFA = no further action required at this time under RCRA, as determined with concurrence of NYSDEC as an outcome of the RCRA facility investigation; N/A = not applicable, not an RCRA-regulated SWMU; RCRA = Resource Conservation and Recovery Act; SWMU = Solid Waste Management Unit; WMA = Waste Management Area.

[a] Interim Status Unit implies that a unit is subject to permitting and closure. SWMU implies that a unit is subject to corrective action. Each Waste Management Unit could contain multiple SWMUs.

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

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

Facility	*EIS Starting Point*	*RCRA Status at EIS Starting Point* [a]	*Radiological/Chemical Contamination at EIS Starting Point* [b]	*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
Off-Gas Trench	Inactive	N/A	Yes – radiological contamination remains in the duct	C.2.1.10
WMA 2				
Low-Level Waste Treatment Facility	Operational	SWMU, subject to CWA closure and corrective action	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 corrective action	Yes – radiological contamination remains, Lagoon 2 may contain hazardous chemical constituents	C.2.2.3
Neutralization Pit	Operational	SWMU, CMS being prepared	Yes – radiological contamination remains. May contain hazardous chemical constituents	C.2.2.4
Old Interceptor	Operational	SWMU, CMS being prepared	Yes – radiological contamination remains. May contain hazardous chemical constituents	C.2.2.4

Facility	***EIS Starting Point***	***RCRA Status at EIS Starting Point*** [a]	***Radiological/Chemical Contamination at EIS Starting Point*** [b]	***Description (Appendix C Section)***
New Interceptors (North and South)	Operational	SWMU, CMS being prepared	Yes – radiological contamination remains. May contain hazardous chemical constituents	C.2.2.4
Solvent Dike	Inactive	SWMU, NFA	Yes – radiological contamination remains	C.2.2.5
Maintenance Shop Leach Field	Inactive	SWMU, NFA	Yes – subsurface soil is radiologically contaminated from strontium-90 plume	C.2.2.6
Fire Brigade Training Area	Inactive	SWMU, NFA	Yes – subsurface is radiologically contaminated from strontium-90 plume	C.2.2.7
WMA 3				
Tanks 8D-1, 8D-2, 8D-3, 8D-4	Isolated with remaining contamination in a dry form	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	Yes – 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	Yes – radiologically contaminated from strontium-90 plume. May contain hazardous chemical constituents.	C.2.4
WMA 5				
Remote-Handled Waste Facility	Decontaminated and Deactivated	RCRA interim status unit, subject to RCRA closure	Yes – radiological contamination remains	C.2.5.1
Lag Storage Area 4, includes Shipping Depot	Operational	RCRA interim status unit, subject to RCRA closure	Yes – small amount of radiological contamination	C.2.5.2
Construction and Demolition Area	Inactive	SWMU, NFA	No	C.2.5.3

Facility	***EIS Starting Point***	***RCRA Status at EIS Starting Point*** [a]	***Radiological/Chemical Contamination at EIS Starting Point*** [b]	***Description (Appendix C Section)***
WMA 6				
Rail Spur	Operable	N/A	Yes – 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 Barrier Wall	SWMU, CMS being prepared	Yes – radiological contamination remains, may contain hazardous chemical constituents	C.2.7.1
NFS Deep Holes	Inactive, Geomembrane Cap and Barrier Wall	SWMU, CMS being prepared	Yes – radiological contamination remains, may contain hazardous chemical constituents	C.2.7.1
WVDP Trenches	Inactive, Geomembrane Cap and Barrier Wall	SWMU, CMS being prepared	Yes – radiological contamination remains, may contain hazardous chemical constituents	C.2.7.1
WVDP Caissons	Inactive, Geomembrane Cap and Barrier Wall	SWMU, CMS being prepared	Yes – radiological contamination remains, may contain hazardous chemical constituents	C.2.7.1
NDA Interceptor Trench	Operational	SWMU, CMS being prepared	Yes – subsurface is radiologically contaminated	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 Barrier Wall	SWMU, CMS being prepared	Yes – radiologically contaminated soil	C.2.7.4
WMA 8				
Disposal Areas	Inactive, Geomembrane Cap	SWMU, CMS being prepared	Yes – radiological and chemical contamination remain	C.2.8.1
Mixed Waste Storage Facility	Operable	RCRA interim status unit, subject to RCRA closure [c]	Yes – assumed to have radiological and chemical contamination	C.2.8.2

Facility	*EIS Starting Point*	*RCRA Status at EIS Starting Point* [a]	*Radiological/Chemical Contamination at EIS Starting Point* [b]	*Description (Appendix C Section)*
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	Yes – assumed to have radiological contamination	C.2.9
Subcontractor Maintenance Area	In Place	SWMU, 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	Operable	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 [c]	Operational	N/A	Yes – radiological contamination is present	C.2.13.1
Pilot-Scale Permeable Treatment Wall and Full-Scale Permeable Treatment Wall [d]	Operational	N/A	Yes – radiological contamination is present	C.2.13.2
Cesium Prong	Inactive	N/A	Yes – radiological contamination is present	C.2.14

A&PC = Analytical and Process Chemistry; CMS = Corrective Measures Study; CWA = Clean Water Act; HEPA = high-efficiency particulate air; HLW = high-level radioactive waste; HLWISF = High-Level Waste Interim Storage Facility; LWTS = Liquid Waste Treatment System; NDA = NRC [U.S. Nuclear Regulatory Commission]-Licensed Disposal Area; NFA = no further action required at this time under RCRA, as determined with concurrence of NYSDEC as an outcome of the RCRA facility investigation; NFS = Nuclear Fuel Services, Inc.; N/A = not applicable, not an 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. SWMU implies that a unit is subject to corrective action.

[b] When chemical contamination is known to exist through sample results or process knowledge, it is reported in the table.

[c] Under the Mixed Waste Conditional Exemption regulation (6 NYCRR 374-1.9), the Mixed Waste Storage Facility is no longer subject to interim status closure. Nevertheless, this unit will be closed under the RCRA interim status requirements.

[d] Physically located in WMA 2.

2.3.2 Description of Waste Management Areas

This section provides more information to support Tables 2–1 and 2–2. This section includes summary descriptions of the facilities and areas that will be standing, operational, or inactive at the starting point of this EIS and that are addressed in this EIS. Any radiological or hazardous chemical contamination that is known or assumed to be present is noted in each description of a WMA. The radiological and hazardous chemical inventories that are used in the impact analyses for this EIS are provided in Appendix C, Section C.2, by WMA. More-detailed descriptions of radiological and hazardous chemical contamination of soils, surface water, and groundwater are provided in Chapter 3, Sections 3.3, 3.6.1, and 3.6.2, respectively.

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, Electrical Substation, and Off-Gas Trench. 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 Storage Area; Radwaste Process (Hittman) Building; Laundry Room; Cold Chemical Facility; Emergency Vehicle Shelter; and Contact Size-Reduction Facility, including the Master Slave Manipulator 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, Inc. (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 and will have been 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 will be the former Chemical Process Cell (now referred to as the "High-Level Waste Interim Storage Facility"), where the high-level radioactive waste canisters will still be stored, and those areas that support safe storage of the waste canisters. These areas include the Chemical Process Cell Crane Room, Equipment Decontamination Room, Ventilation Supply Room, Ventilation Exhaust Cell, and Head-End Ventilation Building, along with supporting plant utilities. Other equipment that will be remaining in the Main Plant Process Building is located in the Liquid Waste Cell, Off-Gas Cell, Uranium Product Cell, Ventilation Wash Room, and Off-Gas Blower 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 in place 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, 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 have been decontaminated for the Interim End State to a point where it will be ready for demolition without containment, but a substantial radiological source term will 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 will have been 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 have been 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 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 13.7-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; 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. It 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 1,098-liter (290-gallon) double-wall, carbon steel diesel fuel day tank with No. 2 fuel oil is also located in the Fire 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 Plant 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 2,220 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 the Laundry Room and laboratories. They currently contain radioactive liquids and solids and RCRA constituents. See Chapter 3, Section 3.11.5.1, for a description of a leak associated with Tank 7D-13.

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. The duct is radiologically contaminated, but the trench is not.

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 described in Section 2.3.2.13 of this chapter; and 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 02 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; is a pre-engineered, single-story, metal-sided building on a concrete foundation. The Packaging Room, which is typically used for resin handling, includes a 3,400-liter (900-gallon) sump and is ventilated through high-efficiency particulate air (HEPA) filters. 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 (a former pad in WMA 5 that was used to store radioactively contaminated equipment), 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 02 Building, which formerly housed the low-level waste treatment equipment, Lagoon 3 was disconnected from Lagoon 2 and emptied, and its sediment removed. Currently, Lagoon 3 only receives treated water from Lagoons 4 and 5. Treated wastewater in Lagoon 3 is periodically discharged to Erdman Brook in batches 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 a clay liner as the sole barrier until 1974, when the lagoon was identified as a source of tritium in the groundwater. An ethylene membrane liner was then added. The membranes lining the lagoon were removed in the late 1990s by West Valley Nuclear Services Company, Inc. (WVNSCO) and replaced with concrete grout and geomembrane 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 a clay liner as the sole barrier until 1974, when the lagoon was identified as a source of tritium in the groundwater. A propylene diamine membrane liner was then added. The membranes lining the lagoon were removed in the late 1990s by WVNSCO and replaced with concrete grout and geomembrane 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 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 the Old Interceptor required the addition of a 0.3-meter-thick (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 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 firefighting 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 hectare (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, High-Level Waste Transfer Trench, Permanent Ventilation System Building, Supernatant Treatment System (STS) and STS Support Building, Equipment Shelter and Condensers, and 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 plutonium-uranium extraction (PUREX) and thorium extraction (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 during implementation of WVDP. 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 installing 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 meters (50 feet) long. Tanks 8D-1, 8D-2, 8D-3, and 8D-4 also each contain a transfer pump. These centrifugal multistage 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 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 amounts of other radionuclides. No hazardous contamination is expected. The building contains an aboveground and an underground petroleum storage tank, both of which would require closure under 6 NYCRR Part 613 regulations.

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 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 CDDL, is a 4-hectare (10-acre) area in the northeast portion on the North Plateau of WNYNSC. 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 at CDDL were terminated in December 1984, and the landfill closed in accordance with the New York State regulations that were applicable at that time (6 NYCRR 360-7.6).

Some volatile organic compounds have been detected in groundwater downgradient of CDDL. In addition, 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 CDDL; therefore, the buried wastes in CDDL are assumed to require handling as radioactive wastes. A more-detailed description of 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, LSA 4 (Lag Storage Area 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; LSAs 1, 2, and 3; Hazardous Waste Storage Lockers; 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 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 operations or the Cesium Prong, or both, 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 could be demolished without containment. It is used to remotely section and package high-activity equipment and waste under the operational requirements specified in 6 NYCRR Subpart 373-3.30.

Included in LSA 4 are a Shipping Depot, a Container Sorting and Packaging Facility, and a covered passageway between LSA 3 and 4. The Shipping Depot, a metal-framed structure, is connected to LSA 4. 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 that will be standing, operable, or operational at the starting point of this EIS in WMA 6 include two Demineralizer Sludge Ponds and the Rail Spur, 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 WMAs 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 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 hot-rolled steel 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 Main Plant Process Building. The ponds were designed to receive liquids and sludge from the site utility water treatment system and discharge this waste 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 semivolatile 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; it received effluents from the Sanitary Sewage Treatment Plant, some discharge from the Utility Room, and cooling water blowdown. Later it received effluents from the Demineralizer Sludge Ponds. 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 or chemically 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-framed structure with metal siding and roofing. The base of the facility is concrete and crushed stone. Eight tanks are associated with the plant: six inground 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 Main Plant 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 outfall.

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). NDA includes a radioactive waste disposal area and ancillary structures. NDA is about 120 meters (400 feet) wide and 180 meters (600 feet) long within WMA 7. 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 associated Liquid Pretreatment System structures. Other ancillary structures in NDA include the Leachate Transfer Line and a former lagoon, and NDA Hardstand Staging Area. 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.

NDA was operated by NFS, under license from NRC (formerly the 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 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 NDA. Between 1982 and 1986, after establishment of WVDP, waste generated from decontamination and decommissioning activities was disposed of in NDA in 12 trenches and 4 caissons. Most of these wastes were placed in trenches located in the unused parcel of land interior to the U-shaped disposal area used by NFS. No waste has been buried at NDA since 1986. Leachate is known to exist in some NDA disposal holes and trenches, with estimates in the range of approximately 3.8 million liters (1 million gallons). The leachate consists of water contaminated with 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 NDA. The purpose of the installation was to intercept potentially contaminated groundwater migrating from NDA. The trench subsurface is radiologically contaminated and several organic constituents have been detected slightly above Technical and Administrative Guidance Memorandum criteria.

In late 2008, infiltration mitigation measures consisting of an upgradient barrier wall and a geomembrane cover over NDA were installed, as an interim measure under the RCRA 3008(h) Consent Order.

The Leachate Transfer Line is a black polyvinyl chloride pipeline that runs along the northeast and northwest sides of 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 be chemically contaminated.

The former lagoon was used for collecting surface-water runoff. It was located in the northeastern portion of NDA. Around 1972, it was filled with radiologically contaminated soil from cleanup after a HEPA filter was dropped at 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 that are addressed in this EIS include the North Disposal Area, South Disposal Area, Mixed Waste Storage Facility, and three filled lagoons. SDA is approximately 6.1 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 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 in 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 barrier wall located along the west side of Trench 14 was installed in 1992 to control groundwater infiltration into SDA. It was made from a mixture of native clay and at least 1 percent bentonite clay. No radioactive or hazardous chemical contamination of the barrier wall is expected.

Leachate is known to exist in the SDA trenches. The leachate consists of infiltration water contaminated with radiological and hazardous chemical materials leached from the buried waste. Geomembrane covers were installed in the 1990s to reduce the amount of water infiltrating into the trenches as part of a series of interim measures under the RCRA 3008(h) Consent Order. The disposal areas and details on the types and quantities of waste buried in 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 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) leachate collection tank made of fiberglass-reinforced plastic. 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 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 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, which is expected to be slightly contaminated, will be in place. Removal of the pad is addressed in this EIS.

The Drum Cell was used to store square 270-liter (71-gallon) drums of cement-solidified supernatant and sludge wash liquids generated from high-level radioactive waste pretreatment; it 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 suggest the Drum Cell is not contaminated or can be easily decontaminated. It is assumed that waste generated from its decommissioning would be nonradioactive construction and demolition debris. A more-detailed description of the Drum Cell is included in Appendix C, Section C.2.9.

The Subcontractor Maintenance Area, located on the South Plateau portion of WNYNSC, 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 remaining 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 and is supported by a concrete foundation.

The Security Gatehouse is located adjacent to the Administration Building. This gatehouse was constructed when the Main Plant Process Building 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 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 on Figure 2–3 and Figure C–12 of Appendix C for reference.

The Scrap Material Landfill is located approximately 30 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, parking lots, and miscellaneous (roped-off) areas of surface contamination. 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 permitted 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 that is 23 meters (75 feet) high with pilings to prevent seepage. The South Reservoir drains through a short canal to the North Reservoir. The North Reservoir has an earthen dam that is 15 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; both are 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, Railroad Spur, and miscellaneous contaminated areas 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, which is directly underneath the Main Plant Process Building, and the nonsource area, which 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 WNYNSC 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. The plume 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 WNYNSC. Chapter 3, Section 3.6.2.1, describes the groundwater contamination and associated remediation efforts that have been undertaken.

A pump and treat 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 not long enough 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 groundwater affected by strontium-90 at the site; a full-scale system, approximately 150 meters (500 feet) long, is assumed to be implemented before the EIS starting point.

In addition to these activities, note that 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 land inside and outside of WNYNSC. Soil contamination resulted from airborne contaminant 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 evaluated to meet the Proposed Action of DOE and NYSERDA, along with a No Action Alternative. The alternatives are based on the recognition that options for management of contaminated facilities and buried waste at WNYNSC range from removal and offsite disposal, to in-place management with isolation barriers, to no action.

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, 2008a, 2008b).

As indicated in the Administration's fiscal year 2010 budget request, the Administration intends to terminate the Yucca Mountain program while developing nuclear waste disposal alternatives. Notwithstanding this decision to terminate the Yucca Mountain program, DOE remains committed to meeting its obligations to manage and ultimately dispose of high-level radioactive waste and spent nuclear fuel. The Administration intends to convene a blue ribbon commission to evaluate alternative approaches for meeting these obligations. The commission will provide the opportunity for a meaningful dialogue on how best to address this challenging issue and will provide recommendations that will form the basis for working with the Congress to revise the statutory framework for managing and disposing of high-level radioactive waste and spent nuclear fuel.

Until disposition decisions are made and implemented, the high-level radioactive waste canisters will be safely stored on site. Impacts of onsite storage for approximately 30 years 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 West Valley Demonstration Project 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 would need the appropriate permits and/or changes in state law to accept these wastes for disposal. For purposes of analysis, DOE assumed that commercial Class B and C wastes would be shipped to the Hanford Site in Washington State or to a disposal facility in 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 which may include 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 or to a disposal facility in Barnwell, South Carolina.

There is currently no location for the disposal of Greater-Than-Class C low-level radioactive waste, and the Federal Government is responsible for such disposal under the Low-Level Radioactive Waste Policy Amendments Act (Public Law 99-240). DOE is currently evaluating disposal options for Greater-Than-Class C low-level radioactive waste through the preparation of an EIS (DOE/EIS-0375) that considers seven DOE site locations, including the Nevada Test Site, along with generic commercial locations. For the purposes of evaluating transportation impacts in this Final EIS, DOE assumed the route characteristics of transporting Greater-Than-Class C low-level radioactive waste from the Western New York Nuclear Service Center to the Nevada Test Site.

Unless otherwise referenced, the description of the alternatives is based on information provided in a series of technical reports (WSMS 2009a, 2009b, 2009c, 2009d) prepared to support the EIS effort. 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 provide 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 activities that would be necessary 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. Contaminated soil, sediment, and water would be removed. All radioactive, hazardous, and mixed low-level radioactive waste would be characterized; packaged, as necessary; and shipped off site for disposal. This alternative includes temporary onsite storage for the vitrified high-level radioactive waste canisters in the Interim Storage Facility until disposition decisions are made and implemented. Under this alternative, waste for which there is currently no offsite disposal facility (e.g., non-defense transuranic waste, commercial B/C low-level radioactive waste, Greater-Than-Class C waste) would be generated. This "orphan" waste would be stored on site until appropriate offsite facilities are available. Because the estimated duration of this alternative is approximately 60 years, it is conceivable that the waste and canisters could be shipped off site during this period. The entire WNYNSC would be available for release for unrestricted use. Under the Sitewide Removal Alternative, facilities and contamination would be removed so that the site could be reused with no restrictions. This alternative represents one end of the spectrum among the range of alternatives evaluated.

  The NRC-Licensed portion of WNYNSC would meet the criteria of the NRC License Termination Rule (10 CFR 20.1402). The SDA would meet applicable state criteria. Residual hazardous contaminants would meet applicable Federal and state standards. A final status survey performed in accordance with the 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. Closure structures would be designed to meet RCRA requirements and NRC criteria to protect cover systems from damage due to long-term erosion. Engineered barriers in general would be designed to resist degradation due to erosive and geochemical processes; limit infiltration of precipitation; withstand intrusion by plants, animals and humans; and exhibit slope stability under static, seismic, and seepage conditions. Long-term monitoring and maintenance activities would be performed to maintain the closure structures. Under this alternative, the major facilities and sources of contamination would be managed at their current locations; this alternative represents the other end of the spectrum among the range of alternatives evaluated. This alternative includes temporary onsite storage for the vitrified high-level radioactive waste canisters in the Interim Storage Facility until disposition decisions are made and implemented.

This decommissioning approach would allow large portions of WNYNSC to be released for unrestricted use. The 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, decommissioning would be completed in two phases:

  – Phase 1 would include decommissioning of facilities 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 would also include decommissioning of a number of facilities in WMAs 5, 6, 9, and 10. The Waste Tank Farm and its support facilities, the CDDL, the nonsource area of the North Plateau Groundwater Plume, NDA and SDA would continue under active management (i.e., no decommissioning or long-term management activities would be conducted). Phase 1 activities would also include additional characterization of site contamination or studies that may reduce uncertainties to facilitate Phase 2 decisionmaking.

  – Phase 2 would complete the decommissioning or long-term management decisionmaking process, implementing the approach determined through review of the currently existing information and any additional studies to be the most appropriate. NYSERDA has clarified that for the SDA, alternatives that will be considered for Phase 2 actions will include at least: complete exhumation, close-in-place, or continued active management consistent with SDA permit and license requirements.

Phase 1 activities would make use of proven technologies and available waste disposal sites to reduce potential short-term health and safety risks from residual radioactivity and hazardous contaminants at the site. In order to facilitate interagency consensus, additional studies would be conducted to 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 exhuming buried waste and tanks, and availability of waste disposal sites. During Phase 1, DOE and NYSERDA would seek and evaluate information about improved technologies for in-place containment and for exhuming the tanks and burial areas as may become available for use in decisionmaking for Phase 2. See Section 2.4.3.1 of this chapter for more information regarding the process and types of studies that could be used to facilitate consensus on 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 NYSERDA and cooperating and involved agencies on this EIS, DOE would determine whether new information would warrant preparation of a 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 at that time. DOE would issue a Record of Decision (ROD) for Phase 2 no later than 10 years after the initial ROD that documents selection of the Phased Decisionmaking Alternative.

In addition to DOE, NYSERDA would assess results of site-specific studies and other information during Phase 1. NYSERDA expects to prepare an EIS, or to supplement the existing EIS, to evaluate Phase 2 decisions for the SDA and balance of WNYNSC. NYSERDA would issue a Findings Statement for Phase 2 no later than 10 years after the Phase 1 Findings Statement, if the Phased Decisionmaking Alternative is selected.

- ***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 previous text box in this section 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 implementation activities, and waste generation under the Sitewide Removal Alternative, as well as any long-term monitoring and institutional controls required after its completion. Information in this section is from the Sitewide Removal Alternative Technical Report (WSMS 2009a). 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:[2]

- Decommissioning of the NRC-licensed portion of WNYNSC would be accomplished in accordance with the NRC-reviewed *Phase 1 Decommissioning Plan for the West Valley Demonstration Project (Decommissioning Plan)* and applicable RCRA requirements. Removal of 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 contamination at 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.

[2] *Decommissioning actions would be performed in accordance with applicable Part 373/RCRA requirements.*

- Before excavated areas are backfilled, final radiological status surveys and RCRA confirmatory sampling of these areas would be completed, including associated independent verification surveys.
- Areas inside and outside the Project Premises having surface soil and sediment with radioactivity concentrations in excess of DCGLs would be removed for offsite disposal.
- 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 wastes for which offsite disposal capability is currently lacking (e.g., non-defense transuranic waste, commercial Class B/C low-level radioactive waste, Greater-Than-Class C waste). These wastes are referred to as orphan wastes, and would be stored on site until appropriate offsite facilities are available.

The decommissioning activities in each WMA are summarized as follows:

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); underground process, wastewater, and utility lines; and Off-Gas Trench; and Load In/Load Out Facility.

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 be removed until DCGLs supporting unrestricted release have been met.

WMA 2 – All facilities would be completely removed, including all five lagoons, Low-Level Waste Treatment Facility, Fire Brigade Training Area, 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, and 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 until DCGLs supporting unrestricted release have been met.

WMA 4 – The waste in CDDL would be exhumed and disposed of off site. All contaminated soil, stream sediment, and groundwater would be removed until DCGLs supporting unrestricted release have been met.

WMA 5 – LSA 4 and the associated Shipping Depot, the Remote-Handled Waste Facility, and Construction and Demolition Area would be completely removed, along with 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 soil, sediment, and groundwater in the area would be removed until DCGLs supporting unrestricted release have been met.

WMA 6 – The Sewage Treatment Plant and the South Waste Tank Farm Test Tower would be removed, along with 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 until DCGLs supporting unrestricted release have been met.

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 NDA would be exhumed, repackaged, and transported to suitable offsite disposal facilities. All contaminated soil, sediment, and groundwater in the area would be removed until DCGLs supporting unrestricted release have been met. The NDA Lagoon would be removed after the NDA wastes have been removed.

WMA 8 – A similar approach to that for NDA (WMA 7) would be followed for SDA. In addition, the Mixed Waste Storage Facility and geomembrane cover would be removed and all of the waste exhumed. All contaminated soil, sediment, and groundwater in the area would be removed until DCGLs consistent with unrestricted release have been met.

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 until DCGLs supporting unrestricted release have been met.

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 until DCGLs supporting unrestricted release have been met.

WMA 11 – The waste in the Scrap Material Landfill would be exhumed. Any contaminated soil, sediment, and groundwater would be removed until DCGLs supporting unrestricted release have been met.

WMA 12 – The dams and reservoirs, parking lots, roadways, and rail spurs would be removed. Contaminated soil across the Project Premises and stream sediments would be removed, as necessary, until DCGLs supporting unrestricted release have been met.

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 until DCGLs allowing unrestricted use have been met. In addition, the Groundwater Recovery System, pilot-scale permeable treatment wall and full-scale permeable treatment wall would be removed.

Cesium Prong – Areas exceeding DCGLs for unrestricted release would be excavated, including areas within the Project Premises and WNYNSC. Areas outside of WNYNSC are assumed to be within DCGLs based on existing data (Dames and Moore 1995) and would be confirmed through final status surveys.

2.4.1.2 Monitoring and Maintenance

During decommissioning activities, environmental monitoring is expected to continue as currently conducted and described in Chapter 3, Sections 3.6.1, 3.6.1.1, 3.6.2.3, 3.7.2, and 3.11.1. Monitoring locations, contaminants measured, sampling schedules, and reporting requirements would be periodically evaluated and adjusted as decommissioning activities progress to account for elimination of environmental release pathways. Such changes would be made through consultation with the appropriate regulatory agencies.

2.4.1.3 New Construction

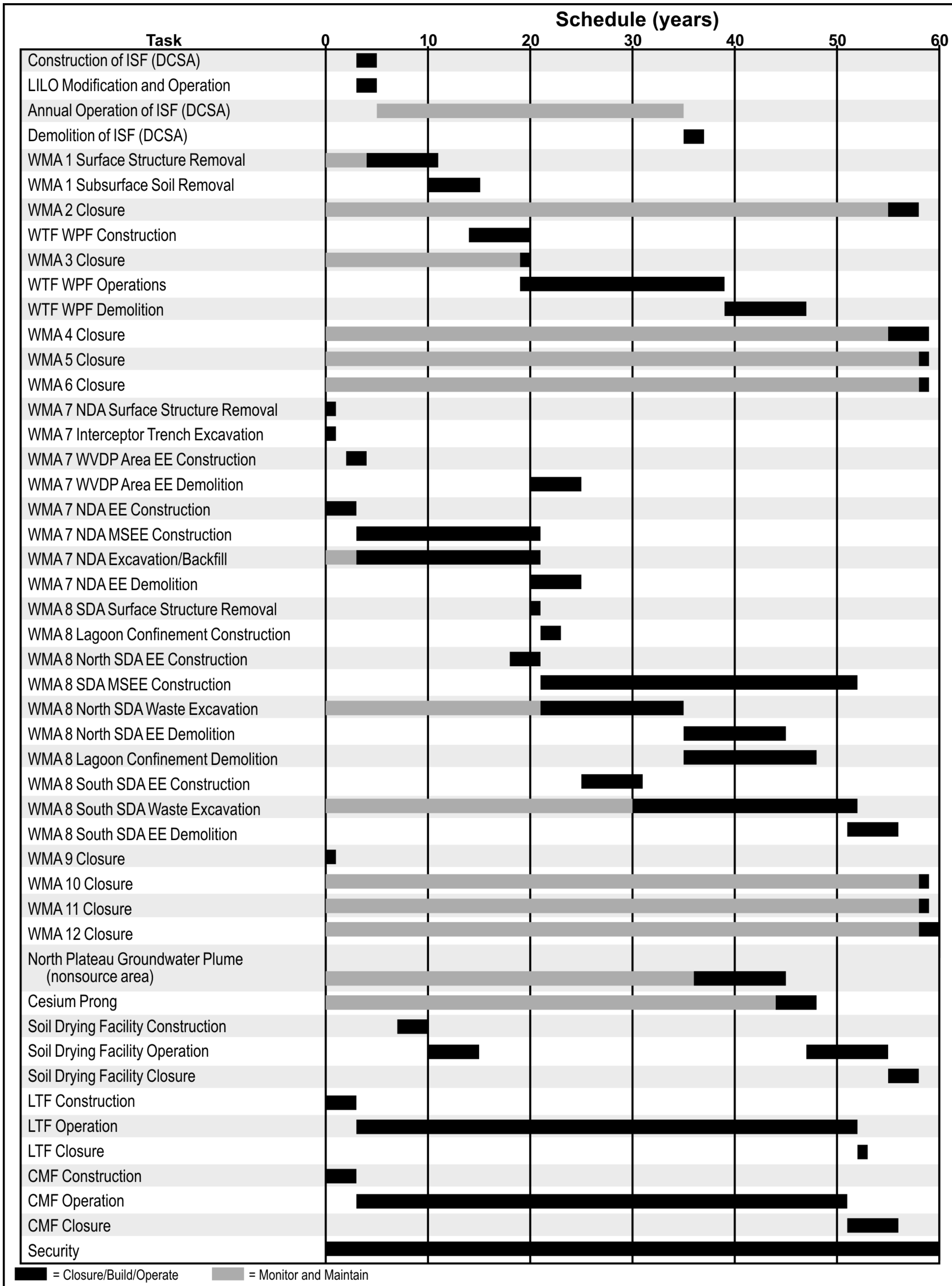
The following new construction would be required to support decommissioning activities at WNYNSC under the Sitewide Removal Alternative:

- 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 disposition decisions are made and implemented.
- 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 CDDL, and contaminated sediment from Erdman Brook and Franks Creek.
- A Leachate Treatment Facility to process contaminated leachate from NDA and SDA.
- A Container Management Facility to process wastes exhumed from 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 barrier wall (whose upgradient and crossgradient portions would consist of sheet pile and downgradient portion would consist of a soil-cement-bentonite backfill mixture) 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 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.

2.4.1.4 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 how long each task would take and when each task would be performed relative to one



Key: CMF = Container Management Facility; DCSA = Dry Cask Storage Area; EE = Environmental Enclosure; ISF = Interim Storage Facility; LILO = Load-In/Load-Out Facility; LTF = Leachate Treatment Facility; MSEE = Modular Shielded Environmental Enclosure; NDA = NRC [U.S. Nuclear Regulatory Commission]-Licensed Disposal Area; SDA = State-Licensed Disposal Area; WMA = Waste Management Area; WPF = Waste Processing Facility; WTF = Waste Treatment Facility; WVDP = West Valley Demonstration Project.

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

another within the assumed planning constraints. Chapter 4 of this EIS presents estimates of impacts from storage of vitrified high-level radioactive waste in the Interim Storage Facility for 31 years, followed by waste removal for shipment to offsite disposal facilities and then demolition. Chapter 2, Section 2.6.1 includes a discussion of the annual major incremental impacts of storing the high-level radioactive waste canisters on site for a longer period of time. If the storage period is extended, the impacts of Interim Storage Facility demolition would also be delayed. The schedule supports the environmental impact analysis but does not represent a final approach. While not reflected in the schedule, annual environmental monitoring would take place for the duration of the alternative.

2.4.1.5 Waste Generation

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

- Construction and demolition debris: 140,000 cubic meters (4.9 million cubic feet)
- Hazardous waste: 15 cubic meters (530 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)

Slight variations in packaged waste volumes reflect differences in packaging requirements between the disposal options. These estimated waste volumes reflect the Commercial Disposal Option discussed in the text box at the beginning of Section 2.4.

Under the Sitewide Removal Alternative, two cases were analyzed in this EIS for managing potential orphan wastes: (1) prompt offsite shipment of such wastes and (2) interim onsite storage of the waste in temporary storage areas until offsite disposal capacity becomes available, with estimates for the annual costs and impacts of the onsite storage, including monitoring and maintenance. Orphan wastes are those generated during the decommissioning that do not have immediate approved disposal capacity. They would be stored in the new Container Management Facility. Management of orphan waste is projected to result in annual generation of up to 3.2 cubic meters (110 cubic feet) of low-level radioactive waste.

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

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

Because WNYNSC 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, time sequencing of decommissioning activities, and waste generation under the Sitewide Close-In-Place Alternative, as well as the long-term stewardship program that would be required after its completion. Information in this section is from the Sitewide Close-In-Place Alternative Technical Report (WSMS 2009b). Detailed discussions of decommissioning activities; waste generation; and new construction, including any closure caps; 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:[3]

- Decommissioning of the NRC-licensed portion of WNYNSC, including NDA, would also be accomplished in accordance with NRC requirements. Long-term management activities for 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, because 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 (i.e., new treatment walls to be installed as part of the Interim End State) would be maintained to contain the plume while it decays. Radioactivity would be allowed to decay in place.

- In cases in which below-grade portions of facilities are to be backfilled with demolition rubble or with soil, characterization or final status surveys including RCRA confirmatory sampling, would be performed to document the radiological and hazardous chemical 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; the resulting wastes would be shipped off site for disposal. LSA 4 may be retained temporarily if needed for storage of orphan waste.

Decommissioning activities in each WMA are summarized as follows:

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, Load In/Load Out Facility, 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.

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[3] *Decommissioning actions would be performed in accordance with applicable Part 373/RCRA requirements.*

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 barrier wall) and 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 top and the sides of the cap would be covered with riprap and the edge would be bordered by a wall of large boulders to provide erosion protection and act as an 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, regrading and 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; the Solvent Dike; the Maintenance Shop Leach Field; Fire Brigade Training Area; or the 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 and 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 – 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; the resulting debris would be disposed of off site as appropriate. The below-grade 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 and Low-level Waste Rail Packaging and Staging Area 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 would be 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 and the resulting debris disposed of 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, Main 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 be taken out of service in accordance with applicable Federal and state regulations; only the middle third of the dams would be 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 engineered caps.

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

During decommissioning activities, environmental monitoring is expected to continue as currently conducted and described in Chapter 3, Sections 3.6.1, 3.6.1.1, 3.6.2.3, 3.7.2, and 3.11.1. Monitoring locations, contaminants measured, sampling schedules, and reporting requirements would be periodically evaluated and adjusted as decommissioning activities progress. Such changes would be made through consultation with the appropriate regulatory agencies.

2.4.2.3 New Construction

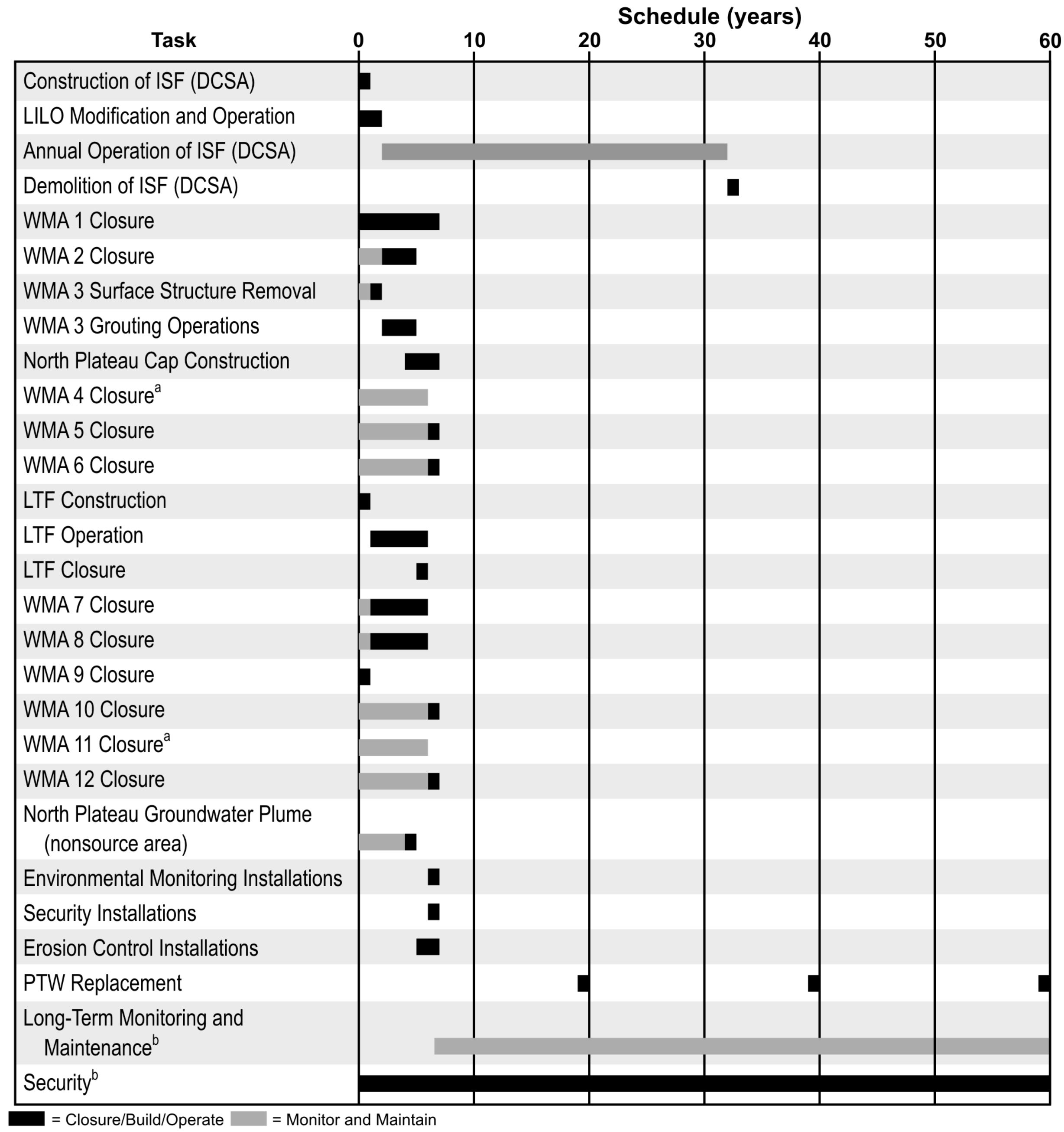
The following new construction would be required to support decommissioning activities at WNYNSC under the Sitewide Close-In-Place Alternative.

- 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 disposition decisions are made and implemented.
- A Leachate Treatment Facility would be built to treat leachate from NDA and SDA before grouting.
- An upgradient chevron-shaped and a circumferential hydraulic barrier wall would be installed around WMAs 1 and 3 to control groundwater.
- An integrated engineered multi-layer cover would be installed over WMAs 1 and 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 NDA and SDA.
- Erosion control structures on the North and South Plateaus would be constructed around closed-in-place facilities and along creeks.

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

2.4.2.4 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 how long each task would take and when each task would be performed relative to one another within the assumed planning constraints. Chapter 4 of this EIS presents estimates of impacts from storage of vitrified high-level radioactive waste in the Interim Storage Facility for 32 years, followed by waste removal for shipment to offsite disposal facilities and then demolition. Chapter 2, Section 2.6.1 includes a discussion of the annual major incremental impacts of storing the high-level radioactive waste canisters on site for a longer period of time. If the storage period is extended, the impacts of Interim Storage Facility demolition would also be delayed. The schedule supports the environmental impact analysis but does not represent a final approach. While not reflected in the schedule, annual environmental monitoring would take place for the duration of the alternative.



Key: DCSA = Dry Cask Storage Area; ISF = Interim Storage Facility; LILO = Load-In/Load-Out Facility; LTF = Leachate Treatment Facility; PTW = Permeable Treatment Wall; WMA = Waste Management Area.

[a] WMAs 4 and 11 would be included in Long-Term Monitoring and Maintenance after completion of closure activities at the other WMAs.
[b] Continued Indefinitely.

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

2.4.2.5 Waste Generation

The decommissioning waste volumes expected to be generated under the Sitewide Close-In-Place Alternative would be approximately 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: 9,900 cubic meters (350,000 cubic feet)
- Greater-Than-Class C waste: 0
- Transuranic waste: 35 cubic meters (1,200 cubic feet)
- Mixed low-level radioactive waste: 410 cubic meters (14,000 cubic feet)

Slight variations in packaged waste volumes reflect differences in packaging requirements between the disposal options. These estimated waste volumes reflect the Commercial Disposal Option discussed in the text box at the beginning of Section 2.4. 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 were to be generated under the Sitewide Close-In-Place Alternative, it would be stored in an existing storage facility. Management of orphan waste is projected to result in annual generation of some low-level radioactive waste, but less than that estimated for the Sitewide Removal Alternative.

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

Once close-in-place activities are completed, the environmental monitoring program would be revised to effectively monitor the performance of structures that have been closed-in-place. The long-term monitoring program would include:

- Surface-water monitoring devices on Franks Creek, Erdman Brook, and Quarry Creek that would be routinely sampled. Other sampling locations would be located upstream and downstream of WNYNSC along Buttermilk Creek and Cattaraugus Creek near the perimeter of WNYNSC.

- Groundwater wells to monitor groundwater elevations and groundwater quality in the North and South Plateaus and offsite residential water supply wells to monitor offsite groundwater. Monitoring tasks would include measurement of water levels, well purging, sampling for appropriate site radiological and chemical parameters, and inspection of each well; any maintenance or repairs required to maintain proper working conditions would be performed as needed.

- Piezometers along the upgradient and downgradient sides of subsurface hydraulic barrier walls installed on the North and South Plateaus to evaluate the performance of these features.

- Inspections and an instrumentation network to monitor the effectiveness and integrity of the multi-layered cover systems. The monitoring and inspection process would be followed by routine maintenance and repair, as necessary, to maintain the integrity of the engineered cover systems.

- Erosion control structures, including diversion berms, diversion ditches, water control structures, and streambed armoring. These structures would be regularly inspected to ensure that they are functioning as designed and to identify signs of blockage and/or physical damage. Corrective maintenance would be performed in response to the inspections and would include clearing debris, repairing erosion control structures, and regrading surfaces, where necessary.

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

- An 8-foot-high chain-link fence around the closed facilities in the North Plateau and South Plateau that would have one or more access points with locked gates and motion sensors and video cameras wired to activate alarms at local law enforcement facilities.

- Signs around the perimeter, as well as near the main WNYNSC access point, providing appropriate information identifying the nature of the site and the presence of residual radioactive inventories in the North Plateau and of buried radioactive wastes in WMAs 7 and 8 and contact information. These signs would be maintained for the duration of the postclosure stewardship.

The performance of the monitoring program, institutional controls, and in-place closure designs would be reviewed and evaluated on a regular basis, and changes to specific aspects would be made, as appropriate.

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 decommissioning activities, new construction required, time sequencing of 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. Information in this section is from the Phased Decisionmaking Alternative Technical Report (WSMS 2009c).

2.4.3.1 Decommissioning Activities

The following provisions apply to Phase 1 decommissioning activities for all WMAs:[4]

- Decommissioning activities would be accomplished in accordance with the NRC-reviewed *Phase 1 Decommissioning Plan for the West Valley Demonstration Project (Decommissioning Plan)*, which specifies the appropriate DCGLs. The *Decommissioning Plan* also provides 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 wastes generated during the work that have 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 or availability of a disposal facility for non-defense transuranic waste.

- Characterization surveys and analyses would be performed during Phase 1 to determine the nature and extent of surface soil and sediment contamination.

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[4] *Decommissioning actions would be performed in accordance with applicable Part 373/RCRA requirements.*

- Before excavated areas are backfilled, final radiological status surveys and RCRA confirmatory sampling of these areas would be completed, including 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 meters (2 feet), that contamination would be addressed as part of Phase 2.

Phase 1 activities in each WMA are summarized as follows:

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; Electrical Substation; 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 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. 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 Tanks 8D-1 and 8D-2 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, and the Tank and Vault Drying System would operate 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 in conjunction with soil removal; cutoffs of the piping would occur somewhere between the excavation and the tanks. The barrier wall would also extend westward across the piping runs.

WMA 4 – 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. LSA 4 may be retained temporarily if needed for storage of orphan waste.

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, Demineralizer Sludge Ponds, and 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 – 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. NDA is subject to RCRA corrective actions requested by EPA and/or NYSDEC. 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 – SDA would continue to be actively managed, and any additional actions requested by the regulator would be taken. The associated Mixed Waste Storage Facility would remain operational. SDA is subject to actions requested by NYSDEC.

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. Parking lots and roadways would remain in place. 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 under the Sitewide Removal Alternative.

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

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

2.4.3.2 Monitoring and Maintenance

During Phase 1, environmental monitoring is expected to continue as currently conducted and described in Chapter 3, Sections 3.6.1, 3.6.1.1, 3.6.2.3, 3.7.2, and 3.11.1. Monitoring and associated sampling activities would be initially conducted on a semiannual basis, with subsequent plans to revert to an annual basis, depending on monitoring results and progress towards implementation of Phase 2. Several specific aspects of environmental monitoring activities during Phase 1 are expected to include the following:

- Monitoring of surface waters draining the North and South Plateaus at locations on Franks Creek, Erdman Brook, and Quarry Creek. Other sampling locations would be located upstream and downstream of WNYNSC along Buttermilk Creek and Cattaraugus Creek near the perimeter of WNYNSC. Additionally, groundwater seeps would be included in the groundwater monitoring program.

- Groundwater wells to monitor groundwater elevations and groundwater quality in the North and South Plateaus. Monitoring tasks would consist of measurement of water levels, well purging, sampling for appropriate site radiological and chemical parameters, and inspection of each well; any maintenance or repairs required to maintain proper working conditions would be performed as needed.

- Piezometers to monitor the performance of the NDA and SDA subsurface barrier walls.

- An air emission discharge point at the stack discharge from the Permanent Ventilation System Building in the Waste Tank Farm in WMA 3. Air discharges from this location would be analyzed for radiological indicator parameters (gross alpha, gross beta, and tritium) and specific radionuclides (cesium-137, strontium-90, iodine-129, americium-241, and uranium and plutonium isotopes). DOE is working with EPA to gain approval to use an alternate method of demonstrating compliance with 40 CFR Part 61 during Phase 1 activities by measuring environmental concentrations of airborne radionuclides at critical receptor locations rather than by using the current "measure and model" approach.

The geomembrane caps installed at NDA and SDA would be routinely inspected for signs of deterioration or damage resulting from subsidence, erosion, or the growth of deep-rooted vegetation. Routine repairs to the covers would be performed as needed. Additional maintenance activities would consist of periodic mowing of the vegetated portions of the site, trimming of vegetation, and removal of vegetation with root depths in excess of one foot to prevent deep root growth into the ballast material on the covers.

During Phase 1, regular inspections would be conducted for signs of erosion in WNYNSC. Maintenance would be performed in response to the inspections and could include clearing debris, repairing or upgrading erosion control structures, and regrading surfaces, where necessary.

Annual environmental monitoring and inspection reports and multiyear review reports would be prepared as part of the environmental monitoring program. The reports would provide data summaries and trends, highlight data points above regulatory or site-specific action levels, and include conclusions and recommendations for interim action, if appropriate. Annual reporting would be conducted up to each scheduled multiyear review cycle (anticipated at 5-year intervals). The multiyear review would contain summarized data and evaluations from the annual reports, as well as additional analysis and recommendations for modification to the monitoring program or further remedial action, if necessary. The annual reports and multiyear review reports would be publicly available.

2.4.3.3 Phase 1 Data Collection and Studies

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, cleaning and exhumation of underground waste tanks, and exhumation of buried radioactive waste
- 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
- Updated long-term performance assessment modeling that may enhance, for example, (probabilistic) risk assessment methods or parameterization

2.4.3.4 Process for Studies to Facilitate Decisionmaking on the Phase 2 Approach

DOE and NYSERDA have both identified the Phased Decisionmaking Alternative as their Preferred Alternative. The agencies agree that under Phase 1 of this alternative, important work would be conducted that the agencies believe is critical to keep WVDP moving toward completion.

In addition, DOE and NYSERDA, with the participation of WNYNSC regulators, who serve as cooperating agencies for the EIS, would on a regular basis review relevant data and information, whether developed by the site, or by industry in the general areas of nuclear decommissioning and environmental remediation.

Phase 2 decisions could be made at any time, or in conjunction with periodic regulatory reviews. Factors that would be taken into account in these reviews could include:

- Site characterization and project implementation information learned during performance of Phase 1 decommissioning activities (e.g., sample data obtained during excavation of the Main Plant Process Building, exhumation technology innovations and best management practices, performance of excavation containment structures and their effect on groundwater mechanics);
- Any information developed in the additional studies to be carried out in Phase 1 (e.g., site-specific erosion and groundwater measurements, radionuclide fate data, and bioaccumulation and dose factors; improved inventory estimates; or tests of exhumation technologies and engineered barriers);
- The availability of new technologies (for use in exhumation or in-place closure) or appropriate disposal options that might be applied in Phase 2;
- Significant advancements of long-term performance modeling capabilities beyond the current state-of-the art.

During Phase 1, DOE and NYSERDA would annually review and evaluate progress and performance of ongoing decommissioning activities, for example the effectiveness of the techniques used and any lessons learned in the process, as well as additional site characterization data collected that may be useful in Phase 2 decisions. Evaluations would take into account the status of the underground waste tanks and the two waste disposal areas, along with the various decommissioning or long-term management approaches (as defined in the NRC Policy Statement on West Valley and any other applicable regulations), changes to regulatory requirements, and the availability of disposal sites for any wastes that would be generated by Phase 2 actions.

Public involvement would continue until final decisions are made and implemented. DOE and NYSERDA would inform the public on at least a quarterly basis regarding the progress of any additional studies. The agencies would schedule additional meetings as necessary to assure timely communication with the public. It is anticipated that the West Valley Citizen Task Force[5] would remain in place during this time. As discussed in Section 2.4, DOE and NYSERDA would conduct appropriate reviews under NEPA and SEQR.

2.4.3.5 New Construction

The following new construction would be required to support decommissioning activities at WNYNSC during 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 disposition decisions are made and implemented.

- A Main Plant Process Building barrier wall (whose upgradient and crossgradient portions would consist of sheet pile and downgradient portion would consist of a soil-cement-bentonite backfill mixture) 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.

2.4.3.6 Waste Generation

The decommissioning waste volumes expected to be generated during Phase 1 would be approximately as follows:

- Construction and demolition debris: 33,000 cubic meters (1.2 million cubic feet)
- Hazardous waste: 2 cubic meters (83 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)

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[5] *Sponsored by DOE and NYSERDA since 1997, the West Valley Citizen Task Force is an 18-member advisory group that initially reviewed and advised on policies, priorities, and guidelines for the clean up, closure, or long-term management of WNYNSC. The Citizen Task Force has met regularly since 1998 to discuss issues regarding facility closure; regulatory issues; and long-term management, including future site use, long term stewardship, and regulatory issues. Most of the Citizen Task Force meetings are open to the general public.*

Slight variations in packaged waste volumes reflect differences in packaging requirements between the disposal options. These estimated waste volumes reflect the Commercial Disposal Option discussed in the text box at the beginning of Section 2.4. 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 (4,900 cubic feet) per year of low-level radioactive waste, 6 cubic meters (210 cubic feet) of nonhazardous waste, and less than 1 cubic meter (35 cubic feet) of hazardous waste.

Details on the waste volumes that would be generated and would be subject to offsite disposal under the Phased Decisionmaking Alternative are presented in Appendix C, Section C.3. If any orphan waste were to be generated, it would be stored on site in an existing facility. The amount of waste stored and annual waste volumes generated as part of storage operations would depend on decisions to be made for both phases of the alternative. Annual waste generation rates for orphan waste storage are expected to be no more than those for the Sitewide Removal Alternative (3.2 cubic meters (110 cubic feet) of low-level radioactive waste per year).

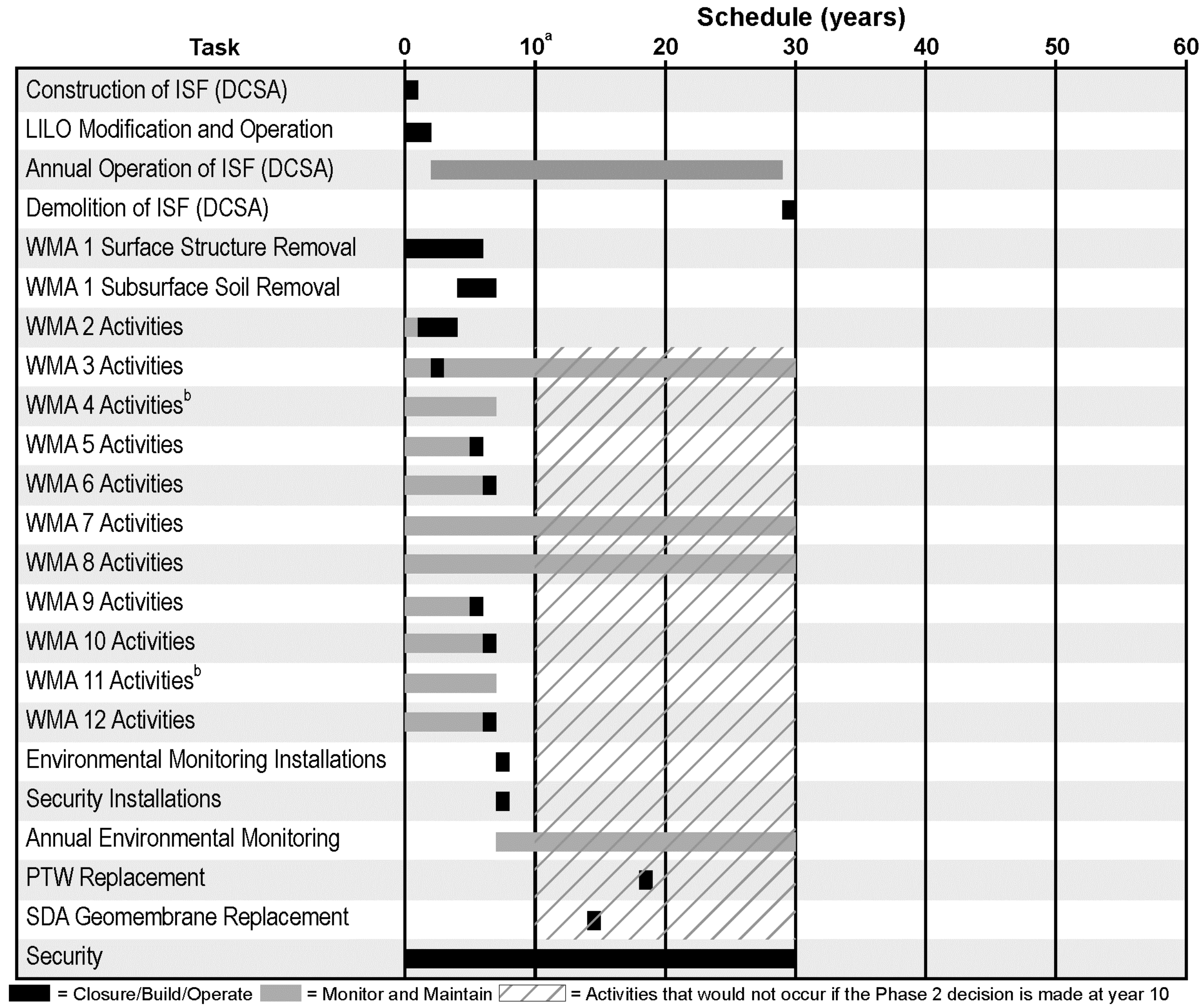
2.4.3.7 Time Sequencing of Decommissioning Activities

The time sequencing of decommissioning activities and the overall time required to complete the activities of 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 figure shows a hatched area with monitoring, maintenance, and replacement activities that are proposed for years 10 through 30 after the initial DOE ROD and NYSERDA Findings Statement, if the Phased Decisionmaking Alternative is selected. If the Phase 2 decision is made as late as 30 years after the ROD and Findings Statement, these activities would occur as part of Phase 1. If the Phase 2 decision is made 10 years after the initial ROD and Findings Statement, these activities would not occur. 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 how long each task would take and when each task would be performed relative to one another within the assumed planning constraints.

The impact analysis presented in Chapter 4 of this EIS assumes that Phase 2 actions are initiated 30 years after the initial DOE ROD and NYSERDA Findings Statement, and is considered to be a bounding Phase 1 impact analysis. The impacts associated with initiation of Phase 2 actions both at both 10 and 30 years after issuance of the initial ROD and Findings Statement are discussed in Section 2.6. Chapter 4 presents estimates of impacts from storage of vitrified high-level radioactive waste in the Interim Storage Facility for 29 years, followed by waste removal for shipment to offsite disposal facilities and then demolition. Chapter 2, Section 2.6.1 includes a discussion of the annual major incremental impacts of storing the high-level radioactive waste canisters on site for a longer period of time. If the storage period is extended, the impacts of Interim Storage Facility demolition would also be delayed. The schedule supports the environmental impact analysis but does not represent a final approach. Not shown on the figure are Phase 1 characterization and monitoring studies, discussed in Section 2.4.3.2 of this chapter, or annual environmental monitoring, which would be conducted during decommissioning activities.

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

Long-term monitoring and institutional controls would be dependent on Phase 2 activities. Depending on the nature of Phase 2, long-term monitoring and institutional controls (stewardship) could resemble those of the Sitewide Close-In-Place Alternative, or no monitoring or institutional controls would be required as under the Sitewide Removal Alternative.



Key: DCSA = Dry Cask Storage Area; ISF = Interim Storage Facility; LILO = Load-In/Load-Out Facility; PTW = Permeable Treatment Wall; SDA = State-Licensed Disposal Area; WMA = Waste Management Area.

[a] Phase 2 decision point 10 years after initial ROD and NYSERDA Findings Statement.
[b] WMAs 4 and 11 would be included in Long-Term Monitoring and Maintenance after completion of closure activities at the other WMAs.

Figure 2–8 Phased Decisionmaking Alternative – Sequencing of Implementation Activities

NYSERDA owns the WNYNSC property and would remain owner following Phase 1 activities. As stipulated in the Cooperative Agreement with NYSERDA, DOE would remain in exclusive use and possession of the Project Premises and related project facilities throughout the remainder of the project term, which includes Phase 1 and Phase 2 (DOE and NYSERDA 1981). DOE would therefore continue to be in control of the Project Premises during implementation of Phase 1. In this capacity, DOE would carry the full authority of the Federal Government in enforcing institutional controls over the Project Premises and other areas under DOE control.

DOE would be responsible for operating and maintaining facilities within the Project Premises such as the Waste Tank Farm, NDA, and nonsource area of the North Plateau Groundwater Plume in a safe manner. DOE would continue to implement the environmental radiation protection program for the Project Premises as required by DOE Order 450.1A, *Environmental Protection Program*. NRC would also be involved in a regulatory oversight capacity over the Project Premises and balance of WNYNSC, which would remain under NRC license.

Existing institutional controls would remain in place during Phase 1. Additional institutional controls would be provided for the new Interim Storage Facility on the South Plateau, such as security fencing around the area and appropriate security lighting. Changes to the environmental monitoring program and institutional controls for Phase 2 would be dependent on future decisions related to the scope of Phase 2, but would be similar to those described in Section 2.4.1.6 if sitewide removal is selected or similar to those described in Section 2.4.2.6 if remaining facilities are closed-in-place.

2.4.4 No Action Alternative

Under the No Action Alternative, no decommissioning or long-term stewardship 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 Federal and state regulations, to protect the health and safety of workers, the public, and the environment. Information in this section is from the No Action Alternative Technical Report (WSMS 2009d).

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 safe conditions. Portions of facilities would be replaced periodically to this end, e.g., the roof 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 contingencies 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:

- Construction and 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)

Slight variations in packaged waste volumes reflect differences in packaging requirements between the disposal options. These estimated waste volumes are based on the Commercial Disposal Option discussed in the text box in Section 2.4.

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 on **Figure 2–9**. The activities necessary to monitor, maintain, and/or operate facilities would be ongoing, while those activities necessary to ensure protection of the public and the environment would be performed periodically (e.g., about once every 20 to 25 years) and would be completed within 1 year. Maintenance and replacement activities would continue indefinitely.

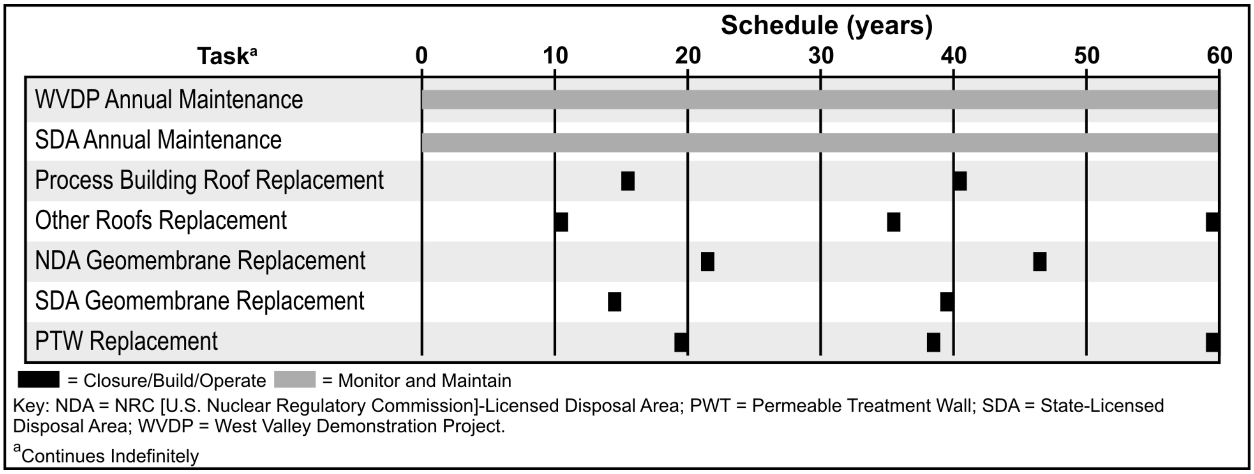


Figure 2–9 No Action Alternative – Sequencing of Implementation Activities

2.4.4.4 Monitoring and Institutional Controls

Environmental monitoring is expected to continue as currently conducted and described in Chapter 3, Sections 3.6.1, 3.6.1.1, 3.6.2.3, 3.7.2, and 3.11.1. There are two general components of the WVDP environmental monitoring program: effluent monitoring and environmental surveillance. In addition, there is a separate monitoring program for SDA.

Institutional controls currently in place would remain. These controls would include maintaining a security workforce; security hardware, such as fencing and monitoring devices; and operating procedures designed to ensure a safe and secure site.

2.5 Alternatives Considered but Eliminated from Detailed Analysis

2.5.1 Indefinite 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 in this manner is inconsistent with the NRC License Termination Rule and Final Policy Statement on WVDP Decommissioning. In the ROD for the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE 1997a), DOE announced its decision 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 WNYNSC 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-WVDP 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)* included analysis of an alternative that involved discontinuing all operations and essentially "walking away" from WNYNSC, its facilities, and its 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 EIS, but it was called the No Action Alternative). In the 1996 *Cleanup and Closure Draft EIS* and in this EIS, this option was not considered a reasonable alternative.

After additional consideration, the lead agencies, in consultation with the cooperating agencies, decided to eliminate the Walk Away 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 requirements for DOE and NYSERDA under 6 NYCRR Part 373 and RCRA, and it would pose major public health and safety issues. Further, neither of the lead agencies would or could select this alternative because it would represent a violation of their duties and statutory 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 impacts for those resource areas with impacts that have meaningful differences among the alternatives.

Chapter 4 of this EIS presents an analysis of the environmental impacts, by resource area, of implementing each alternative. These analyses form the analytical basis for the concise comparison of alternatives in this section. See Chapter 4 for more information on impacts by resource area for each alternative, including the impacts of those resource areas not presented in this section. The analyses for the Phased Decisionmaking Alternative presented in Chapter 4 are based on making a Phase 2 decision 30 years after the initial DOE ROD and NYSERDA Findings Statement, if the Phased Decisionmaking Alternative is selected. This is consistent with the longest timeframe allowed for making a Phase 2 decision for the Phased Decisionmaking Alternative evaluated in the Revised Draft EIS. The Phased Decisionmaking Alternative, the Preferred Alternative for this EIS, now specifies that the Phase 2 decision would be made no later than 10 years after issuance of the initial DOE ROD and NYSERDA Findings Statement, if the Phased Decisionmaking Alternative is selected. The potential effect of making the Phase 2 decision in 10 years rather than 30 years is addressed qualitatively in this section.

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:

- Short-term impacts, the potential impacts that could result from implementing the decommissioning actions (e.g., removal or in-place closure)
  - 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, the potential impacts that could result from wastes and contamination remaining on site
  - Human health and safety: population dose to downgradient water users and potential intruders
- Cost-benefit considerations

Other resource areas that are addressed in Chapter 4 are not discussed in this comparison of alternatives because, although there may be differences in impacts among the alternatives, the differences are not considered meaningful enough to discriminate among the alternatives. The potential effect on these resource areas from this change in the timing of the Phase 2 decision for the Phased Decisionmaking Alternative has also been qualitatively addressed. This assessment indicates that the duration of Phase 1 (10 years or 30 years) does not change the overall impact for any of these resource areas because there are no actions that would result in environmental consequences on these resource areas between the completion of Phase 1 decommissioning actions and the initiation of Phase 2 actions.

The Sitewide Removal and Sitewide Close-In-Place Alternatives are decommissioning alternatives, with defined end states. Decommissioning actions for Phase 1 of the Phased Decisionmaking Alternative have been defined and the impacts have been analyzed. Phase 2 impacts are expected to be generally bounded by those identified for the Sitewide Removal and Sitewide Close-In-Place Alternatives. If the Phase 2 decision for the SDA is continued active management, Phase 2 impacts for some resource areas are expected to be bounded by those for the No Action Alternative. Therefore, 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 no actions would be taken to reconfigure the site.

2.6.1 Short-term Impacts

Short-term impacts for the five resource areas identified as having meaningful differences among the alternatives are presented in **Table 2–3**. Additionally, the duration of the decommissioning and monitoring and maintenance periods 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 has been addressed by performing multiple analyses (e.g., alternate disposal configurations, alternate transportation modes, institutional control continuance and loss) and using conservative assumptions that were consistently applied to all alternatives. This approach was performed in a manner intended to avoid bias in the comparison of alternatives.

The impacts evaluated for each of the decommissioning alternatives include those from approximately 30 years of storage of vitrified high-level radioactive waste in the Interim Storage Facility followed by waste removal for shipment to offsite disposal facilities and then demolition of the Interim Storage Facility. If the waste is stored on site for a longer period of time, the major annual incremental impacts are additional site employment (about 3 additional workers per year) and additional occupational exposure (0.2 person-rem per year). If the storage period is extended, the impacts of Interim Storage Facility demolition would be delayed.

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

Resource Area	*Sitewide Removal Alternative*	*Sitewide Close-In-Place Alternative*	*Phased Decisionmaking Alternative (Phase 1 only)* [b,c]	*No Action Alternative*
Duration of Decommissioning Action	60 years	7 years	8 years	None
Duration of Post-Decommissioning Monitoring and Maintenance or Stewardship	Necessary only while any orphan waste is being stored.	In perpetuity	In perpetuity if Phase 2 involves in-place closure.	No decommissioning. Monitoring and Maintenance in perpetuity.
Land Use [d] – land estimated to be available for unrestricted release upon completion of alternative	Entire 1,351 hectares (except for any land used for orphan waste storage)	1,118 hectares	693 hectares	693 hectares
Socioeconomics [e] – average employment	Decommissioning: 250 employees annually Monitoring and Maintenance: 20 employees (assuming orphan waste storage)	Decommissioning: 320 employees annually Monitoring and Maintenance: About 31 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) [f] – population dose (and risk) to the public	Decommissioning: 120 person-rem (0.027 LCF) Monitoring and Maintenance: negligible dose, even if orphan and legacy waste are stored on site	Decommissioning: 40 person-rem (0.012 LCF) Monitoring and Maintenance: 0.0015 person-rem for periodic permeable treatment wall replacement, if necessary; and one-time Interim Storage Facility removal.	Decommissioning: 42 person-rem (0.0056 LCF) Monitoring and Maintenance: 0.038 person-rem for one-time permeable treatment wall replacement, if necessary; one-time Interim Storage Facility removal; and ongoing WMA 3 operations	Monitoring and Maintenance: 0.083 person-rem per year
– peak annual MEI dose	1.3 millirem (2.0×10^{-7} LCF)	0.16 millirem (4.2×10^{-8} LCF)	2.2 millirem (3.5×10^{-7} LCF)	0.61 millirem (2.1×10^{-7} LCF)
Human Health and Safety (site workers) [g] – worker population dose (and risk)	Decommissioning: 990 person-rem (0.60 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: 120 person-rem (0.0070 LCF) Monitoring and Maintenance following decommissioning actions: 0.80 person-rem (5.0×10^{-4} LCF) per year	Decommissioning: 160 person-rem (0.090 LCF) Monitoring and Maintenance following decommissioning actions: 1.7 person-rem (1.0×10^{-3} LCF) per year	Monitoring and Maintenance: 2.0 person-rem per year (0.0010 LCF)
– average worker dose from decommissioning actions	66 millirem (4.0×10^{-5} LCF) per year	54 millirem (3.0×10^{-5} LCF) per year	83 millirem (5.0×10^{-5} LCF) per year	No decommissioning occurs
Waste Management [h] – packaged decommissioning waste (cubic meters)	140,000 nonhazardous 15 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 9,900 LLW [h] 0 GTCC 35 TRU [h] 410 MLLW 26,000 Total	33,000 nonhazardous 2 hazardous 180,000 LLW [h] 0 GTCC 710 TRU [h] 41 MLLW 210,000 Total	None
Waste Management [h] – packaged monitoring and maintenance (M&M) or long-term stewardship (LTS) waste (cubic meters per year)	3.2 LLW [i] (assuming orphan waste storage)	0 nonhazardous, 0 hazardous 110 LLW 0 GTCC 0 TRU 0 MLLW 110 Total (LTS)	6 nonhazardous, <1 hazardous 140 LLW 0 GTCC 0 TRU 0 MLLW 150 Total (M&M)	32 nonhazardous, 1 hazardous 450 LLW 0 GTCC 0 TRU <1 MLLW 480 Total (M&M)

Resource Area	*Sitewide Removal Alternative*	*Sitewide Close-In-Place Alternative*	*Phased Decisionmaking Alternative (Phase 1 only)* [b,c]	*No Action Alternative*
Transportation [j, k] – dose and risk to the public along transportation routes during transportation (person-rem [LCFs])	DOE/Commercial Truck: 370 (0.22) Rail: 94 (0.057) Commercial Truck: 350 (0.21) Rail: 94 (0.057)	DOE/Commercial Truck: 11 (6.6×10^{-3}) Rail: 2.8 (1.7×10^{-3}) Commercial Truck: 9.9 (6.0×10^{-3}) Rail: 2.6 (1.6×10^{-3})	DOE/Commercial Truck: 72 (0.043) Rail: 16 (9.8×10^{-3}) Commercial Truck: 58 (0.035) Rail: 16 (9.7×10^{-3})	DOE/Commercial Truck: 12 (7.1×10^{-3}) Rail: 2.6 (1.6×10^{-3}) Commercial Truck: 9.8 (5.9×10^{-3}) Rail: 2.6 (1.6×10^{-3})
Transportation [j, k] – dose and risk to transportation workers during transportation (person-rem [LCFs]) [l]	DOE/Commercial Truck: 2,100 (1.2) Rail: 65 (0.039) Commercial Truck: 2,200 (1.3) Rail: 65 (0.039)	DOE/Commercial Truck: 49 (0.029) Rail: 1.9 (1.2×10^{-3}) Commercial Truck: 45 (0.027) Rail: 1.4 (8.5×10^{-4})	DOE/Commercial Truck: 270 (0.16) Rail: 11 (6.5×10^{-3}) Commercial Truck: 400 (0.24) Rail: 11 (6.5×10^{-3})	DOE/Commercial Truck: 38 (0.023) Rail: 1.7 (1.0×10^{-3}) Commercial Truck: 31 (0.019) Rail: 1.4 (8.2×10^{-4})
Transportation [j, k] – nonradiological accident risk (number of traffic fatalities)	DOE/Commercial Truck: 9.7 / Rail: 15 Commercial Truck: 10 / Rail: 15	DOE/Commercial Truck: 0.10 / Rail: 0.17 Commercial Truck: 0.12 / Rail: 0.17	DOE/Commercial Truck: 1.0 / Rail: 1.8 Commercial Truck: 1.3 / Rail: 1.8	DOE/Commercial Truck: 0.050 / Rail: 0.090 Commercial Truck: 0.060 / Rail: 0.090

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 land use are rounded to no more than two significant figures.

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

[c] The analyses for the Phased Decisionmaking Alternative presented in Chapter 4 of this EIS are based on making a Phase 2 decision 30 years after the initial ROD and Findings Statement, if the Phased Decisionmaking alternative is selected, and the impacts identified in this table result from those analyses. The Phased Decisionmaking Alternative now specifies that Phase 2 decisions would be made no later than 10 years after issuance of such a ROD and Findings Statement. The potential impact of the change in decision point timing is qualitatively addressed in the text in this section of the EIS.

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

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

[f] Source: Chapter 4, Table 4–12, of this 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 on the lower reaches of Cattaraugus Creek.

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

[h] Source: Chapter 4, Table 4–46, of this 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 could be generated due to management of orphan waste.

[i] 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).

[j] Source: Chapter 4, Table 4–53, of this EIS, "Risks of Transporting Radioactive Waste Under Each Alternative."

[k] For the purpose of comparison with other alternatives, transportation impacts for the No Action Alternative are provided for monitoring and maintenance activities over a 20-year period, which would continue to recur in 20-year cycles. Under the DOE/Commercial Disposal Option, DOE low-level radioactive wastes are assumed to go to the Nevada Test Site and commercial low-level radioactive wastes would go to a western U.S. commercial disposal site. Under the Commercial Disposal Option, only commercial facilities would be used for DOE and commercial low-level radioactive waste. However, for purposes of analysis only, it was assumed that transuranic waste and Greater-Than-Class C waste would be transported to the Waste Isolation Pilot Plant and the Nevada Test Site, respectively. There would be no disposition for transuranic waste, Class B and C low-level radioactive wastes, or Greater-Than-Class C wastes.

[l] 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 represent an annual risk of 0.0012 LCF 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; cubic meters to cubic feet, multiply by 35.314.

2.6.1.1 Land Use

The Sitewide Removal Alternative would result in the most land area available for release for unrestricted use, which would be the entire 1,351 hectares (3,338 acres) of WNYNSC. With the exception of land needed to manage any orphan waste that would remain on site until a disposition path is available, the entire site would be remediated to meet NRC's standards for license termination without restriction, potentially allowing it to be used for other purposes.

The Sitewide Close-In-Place Alternative would ultimately result in an estimated 1,118 hectares (2,762 acres) being available for release for unrestricted use. After completion of decommissioning activities and decay of the Cesium Prong, much of the site would be available for release for unrestricted use. Land would need to be retained for access control, as buffer areas, and for maintenance and erosion control. The exact amount and timing of land release from WNYNSC would be the result of interactions among NYSERDA, NRC, DOE (until completion of WVDP), and other Federal and state agencies having jurisdiction.

Following completion of Phase 1 of the Phased Decisionmaking Alternative, an estimated 693 hectares (1,712 acres) of land would be available for release for unrestricted use. The amount of land available for release following implementation of Phase 2 would depend on the Phase 2 decision. If the Phase 2 decision is removal of all remaining waste and contamination, the remaining 658 hectares (1,626 acres) would become available, and the total land available for release for unrestricted use would be the same as that for the Sitewide Removal Alternative. If the Phase 2 decision for the SDA is continued active management, the amount of land available for release would be reduced by approximately 6.1 hectares (15 acres), plus land needed for a buffer area. If the decision is in-place closure of all remaining waste and contamination, an additional 425 hectares (1,050 acres) would be available for release for unrestricted use, similar to that for the Sitewide Close-In-Place Alternative. There would be no change in the amount of land available for release if the Phase 2 decision for the SDA is continued active management.

Making the Phase 2 decision at 10 years rather than 30 years would result in additional land becoming available for unrestricted release about 20 years sooner.

For the No Action Alternative, an estimated 693 hectares (1,712 acres) would be available for release for unrestricted use. This land would not be needed for continued management and oversight.

Release of land under all alternatives would be subject to meeting all regulatory requirements, including those promulgated by NRC, the U.S. Environmental Protection Agency (EPA), NYSDEC, and NYSDOH.

2.6.1.2 Socioeconomics

For decommissioning activities, the Sitewide Removal Alternative would have the greatest impact on employment because the duration of decommissioning activities would continue longer under this alternative than any of the other alternatives. Phase 1 of the Phased Decisionmaking Alternative would result in average annual employment levels similar to those for the Sitewide Removal Alternative, while the average employment level for the Sitewide Close-In-Place Alternative would be about 28 percent higher than that for the Sitewide Removal Alternative. Decommissioning employment for the Sitewide Close-In-Place Alternative and Phase 1 of the Phased Decisionmaking Alternative, however, would not last as long as for the Sitewide Removal Alternative. The short-term socioeconomic impact of all alternatives is positive because local employment would be maintained. The negative impact associated with the completion of decommissioning actions would cause only limited disruption because WNYNSC 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 orphan waste storage. The Sitewide Close-In-Place and No Action Alternatives would require a reduced employment level for an indefinite period of time.

If the Phase 2 decision is removal of all remaining waste and contamination, the employment levels and related socioeconomic impacts for the entire Phased Decisionmaking Alternative would be similar to those for the Sitewide Removal Alternative. If the Phase 2 decision for the SDA is continued active management, the overall labor required for both phases of the alternative would decrease by about 25 percent because the reduction in personnel needed for removal activities would outweigh the additional maintenance personnel. If the Phase 2 decision is in-place closure, employment levels and socioeconomic impacts for the Phased Decisionmaking Alternative would be equal to or slightly less than those for the Sitewide Close-In-Place Alternative. If the Phase 2 decision for the SDA is continued active management, the overall labor requirement for both Phases of the Alternative would decrease by about 15 percent. In either case, approximately 10 employees would be required for continued active management of the SDA.

Making the Phase 2 decision at 10 years rather than 30 years would eliminate the approximately 20-year period of reduced employment that would occur between completion of Phase 1 decommissioning activities and the beginning of Phase 2 actions. In addition to avoiding a reduction in employment levels, implementation of Phase 2 activities at 10 years would have the advantage of a mobilized and trained workforce available to immediately begin implementing Phase 2.

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 WNYNSC.

2.6.1.3 Human Health and Safety

Decommissioning actions would result in radiological releases to the atmosphere and to local surface waters. These releases would result in radiation doses and associated risk of latent cancer fatalities (LCFs)[6] 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. Collective radiological doses to the public and to site workers from decommissioning actions would be highest under the Sitewide Removal Alternative. Actions to implement Phase 1 of the Phased Decisionmaking Alternative would generate doses to workers that are higher than those for the Sitewide Close-In-Place Alternative.

Excluding the No Action Alternative, the projected total radiological dose to the general population within an 80-kilometer (50-mile) radius of WNYNSC from decommissioning would range from about 40 person-rem for the Sitewide Close-In-Place Alternative to about 120 person-rem for the Sitewide Removal Alternative. These doses would result in less than 1 (0.0056 to 0.027) additional LCF within the affected population as a result of decommissioning actions under any of the alternatives. The decommissioning dose to this population for Phase 1 of the Phased Decisionmaking Alternative is 42 person-rem, which is slightly higher than the dose for the Sitewide Close-In-Place Alternative. Because the dose to the general population would be negligible during monitoring and maintenance after the Phase 1 decommissioning actions are complete, the general population would not be affected by the timing of the Phase 2 decision.

If the Phase 2 decision is removal of all remaining waste and contamination, the total dose to this population for this alternative (both Phase 1 and Phase 2) would be essentially equal to that for the Sitewide Removal Alternative (i.e., about 120 person-rem). If the Phase 2 decision is in-place closure, the total dose to this

[6] *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.*

population from both phases of this alternative would be less than 82 person-rem, which is sum of the population dose for Phase 1 and the Sitewide Close-In-Place Alternative. If the Phase 2 decision for the SDA is continued active management, the total dose to this population would be bounded by this 82 to 120 person-rem range.

The peak annual dose to a maximally exposed individual located at the site boundary would be highest for Phase 1 of the Phased Decisionmaking Alternative (about 2.2 millirem) because it has the highest annual radionuclide release rate. For perspective, the average individual dose in the United States from ubiquitous background and other sources of radiation is about 620 millirem per year (NCRP 2009).

The total estimated worker dose from decommissioning actions would range from about 120 person-rem for the Sitewide Close-In-Place Alternative to about 990 person-rem for the Sitewide Removal Alternative. The decommissioning worker population dose for Phase 1 of the Phased Decisionmaking Alternative is about 160 person-rem, which is slightly higher than that for the Sitewide Close-In-Place Alternative. The annual worker population dose during the monitoring and maintenance portion of Phase 1 is about 1.7 person-rem, so making the Phase 2 decision within 10 years rather than 30 years would reduce the total estimated worker population dose by about 34 person-rem.

If the Phase 2 decision is removal of the remaining waste and contamination, the total worker dose for this alternative (both Phase 1 and Phase 2) would be the same as that for the Sitewide Removal Alternative (about 990 person-rem). If the Phase 2 decision is in-place closure, the total worker dose from both phases of this alternative is estimated to be about 240 person-rem, which is less than the sum of the worker dose for Phase 1 and the Sitewide Close-In-Place Alternative. The higher worker dose (Sitewide Removal) would still be expected to result in less than 1 (0.60) additional LCF among the involved worker population. Reduced total decommissioning worker doses would result if the Phase 2 decision for the SDA is continued active management.

The average individual worker dose from decommissioning actions would range from about 54 millirem per year for the Sitewide Close-In-Place Alternative to 83 millirem per year for Phase 1 of the Phased Decisionmaking Alternative, which are well below the 500-millirem-per-year administrative limit established for activities on the Project Premises (WVNSCO 2006). All workers in radiation areas would be monitored to ensure that their exposures remain within these annual limits.

2.6.1.4 Waste Management

Depending on the alternative, construction, operations, and decommissioning actions would generate several types of waste, as discussed in this section.

The Sitewide Removal Alternative would generate the largest volume of waste from decommissioning, including nonhazardous, hazardous, low-level radioactive, mixed low-level radioactive, Greater-Than-Class C, and transuranic waste, but no waste from long-term stewardship. Nonhazardous waste is common demolition debris that would be expected to have no adverse impact on the capacities of 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 capacities of DOE or commercial disposal facilities. Until the issues related to disposal of commercial Class B and C low-level radioactive waste, Greater-Than-Class C waste, and non-defense transuranic waste are resolved, these potentially orphan wastes would be stored in the new Container Management Facility. A decision regarding a disposal facility for Greater-Than-Class C waste and potential non-defense transuranic waste would be expected to be announced in a ROD for the *Disposal of Greater-Than-Class C Low-Level Radioactive Waste Environmental Impact Statement (GTCC EIS)* (DOE/EIS-0375), currently under preparation.

Phase 1 of the Phased Decisionmaking Alternative would generate the second largest volume of waste from decommissioning activities, including nonhazardous, hazardous, low-level radioactive, mixed low-level radioactive, and transuranic waste. Nonhazardous waste is common demolition debris that would be expected to have no adverse impact on the capacities of 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 capacities of DOE or commercial disposal facilities. Until the issues related to disposal of non-defense transuranic waste are resolved, this potentially orphan waste would be stored in LSA 4. Making the Phase 2 decision in 10 years would reduce the total volume of Phase 1 waste by less than 2 percent because waste from monitoring and maintenance activities would not be generated for more than 2 years.

If the Phase 2 decision is removal of all remaining waste and contamination, the total decommissioning waste volumes for the Phased Decisionmaking Alternative would be similar to those for the Sitewide Removal Alternative. If the Phase 2 decision is continued active management of the SDA and removal of the remaining waste and contamination, there would be about 30 percent less Class A low-level radioactive waste, including low-specific-activity waste, generated from decommissioning than that for the Sitewide Removal Alternative, and almost no mixed low-level radioactive, Class B and C, and Greater-Than-Class C waste. If the Phase 2 decision is in-place closure of all remaining waste and contamination, the total decommissioning waste volumes generated for the Phased Decisionmaking Alternative would be the sum of the Phase 1 waste volume plus about 30 percent of the waste volume generated under the Sitewide Close-In-Place Alternative. If the Phase 2 decision is continued active management of the SDA and in-place closure of the remaining waste and contamination, the total volume of waste from decommissioning would be slightly lower than these estimates.

The Sitewide Close-In-Place Alternative would generate the least amount of waste from decommissioning, including nonhazardous, hazardous, low-level radioactive, mixed low-level radioactive, and transuranic waste. Some low-level radioactive waste would also be generated during long-term stewardship activities. Until the issues related to disposal of commercial Class B and C low-level radioactive waste and non-defense transuranic waste are resolved, these potentially orphan wastes would be stored in LSA 4.

The No Action Alternative would generate no waste from decommissioning activities but the largest annual volume of waste, primarily low-level radioactive waste, from monitoring and maintenance activities.

2.6.1.5 Transportation

Both radiological and nonradiological impacts would result from shipment of radioactive waste 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 alternatives. The dose to the population along the transport route would range from about 2.8 person-rem, which is associated with transporting all waste by rail under the DOE/Commercial Disposal Option (discussed in the text box at the beginning of Section 2.4) for the Sitewide Close-In-Place Alternative, to about 370 person-rem which is associated with transporting all waste by truck under the DOE/Commercial Disposal Option for the Sitewide Removal Alternative. Less than 1 (0.0017 to 0.22) additional LCF would be expected from such exposures to the general population. 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, DOE limits dose to a worker to 5 rem per year (10 CFR 835.202) and sets an administrative control limit of 2 rem per year (DOE 1999b). A 2-rem dose corresponds to a risk of about 0.0012 LCF.

For the Sitewide Removal Alternative, the highest collective radiation dose to transportation workers would occur under the Commercial Disposal Option (discussed in the text box at the beginning of Section 2.4) using all truck shipments; the highest dose to the population along the transport route would occur under the

DOE/Commercial Disposal Option, also using all truck shipments. For the Sitewide Close-In-Place Alternative, the highest collective dose to transportation workers would occur under the DOE/Commercial Disposal Option using all truck shipments, while the highest dose to the population along the transportation route would occur under the DOE/Commercial Disposal Option, also using all truck shipments. For Phase 1 of the Phased Decisionmaking Alternative, the highest collective dose to transportation workers would be from the all-truck Commercial Disposal Option; the highest dose to the population along the transportation route would be from the all-truck DOE/Commercial Disposal Option. Making the Phase 2 decision in 10 years would result in about a 2 percent reduction in the total number of waste shipments during Phase 1. This would result in about a 4 percent reduction in the collective dose to transportation workers and about a 5 percent reduction in the dose to the population along the transportation route.

If the Phase 2 decision is removal of all remaining waste and contamination, the total transportation worker and population radiological dose and risk for this alternative (both Phase 1 and Phase 2) would be essentially equal to those for the Sitewide Removal Alternative. If the Phase 2 decision is continued active management for the SDA and removal of remaining waste and contamination in the remainder of the site, the total transportation dose and risk for both phases of the alternative would be about 40 percent less than those for the Sitewide Removal Alternative. This reduction in dose and risk would result because the wastes that were projected to be removed from the SDA would not be removed nor transported to offsite disposal facilities. If the Phase 2 decision is in-place closure for all remaining waste and contamination, the total transportation worker and population dose and risk for both phases of this alternative would be about 5 percent higher than those for Phase 1 alone because the Phase 2 closure actions would cause only a small increase in the volume of low-level radioactive waste to be shipped. If the Phase 2 decision is continued active management for the SDA and in-place closure for the remainder of the site, the total transportation dose and risk for both phases of the alternative would be essentially equivalent to those for Phase 1 alone, because no radioactive waste would be generated from removal of the existing geomembrane cover and construction of an engineered SDA cap.

For the No Action Alternative, assuming 20 years of waste shipments, the highest dose to transportation workers and population along the transport route would occur under the all-truck DOE/Commercial Disposal Option.

The Sitewide Removal Alternative has the highest nonradiological health risk to the public, ranging from about 9.7 to 15 traffic or rail accident fatalities for the various shipping options.[7] The other alternatives would result in less than 1 nonradiological accident fatality, except for Phase 1 of the Phased Decisionmaking Alternative, which would have a risk of 1.8 fatalities for the rail shipping options. If the Phase 2 decision is removal of all remaining waste and contamination, total nonradiological health risks for this alternative (Phases 1 and 2) would be essentially equivalent to those for the Sitewide Removal Alternative. If the Phase 2 decision is continued active management for the SDA and removal of waste and contamination in the remainder of the site, total nonradiological impacts would be about 30 percent less than those for the Sitewide Removal Alternative, principally because there would be fewer offsite shipments of waste. If the Phase 2 decision is in-place closure for all remaining waste and contamination, the total nonradiological health risk for both phases of this alternative would be higher than the Phase 1 risk, principally because of deliveries of construction and erosion control materials. If the Phase 2 decision is continued active management for the SDA and in-place closure of the remainder of the site, total nonradiological impacts would be less because there would be no deliveries of the construction and erosion control materials required to build the engineered SDA cap.

Considering that the transportation activities would occur over a period of time ranging from about 7 to 60 years and that the average number of annual traffic fatalities in the United States is about 40,000 per year (NHTSA 2006), the traffic fatality risks under all alternatives would be very small.

[7] *The nonradiological accident fatality estimates for rail transport are based on the conservative assumption of one waste railcar per train.*

2.6.2 Long-term Impacts

This section summarizes the estimated long-term impacts associated with the alternatives (see Chapter 4, Section 4.1.10, of this EIS for additional information). For analysis purposes, "long-term" extends from the end of the decommissioning action implementation period to at least 10,000 years into the future, and perhaps longer if the projected peak annual impacts occur later. The impacts were estimated using models that account for site features and processes that facilitate contaminant transport, as well as natural and engineered barriers that mitigate contaminant transport. The models projected the dose and risk consequences as a function of time to a spectrum of offsite and onsite receptors engaged in a variety of potential exposure scenarios. For alternatives where the amount and configuration of remaining contamination could be quantitatively estimated (the Sitewide Close-In-Place and No Action Alternatives), the analysis includes scenarios where long-term institutional controls were assumed to be permanently retained, as well as scenarios where long-term institutional controls were assumed to be lost after 100 years. The latter case includes a separate, unmitigated erosion scenario that assumes institutional controls are lost for hundreds of years and not reinstated before impacts would be evident.

Table 2–4 provides an overview comparison of the estimated long-term radiological dose impacts among the alternatives (the analysis showed that the risks from long-term release of hazardous chemicals are very small relative to those from radionuclides). The top two sections of Table 2–4 compare doses to populations and individual receptors, respectively, assumed to use untreated water obtained from Lake Erie or the Niagara River; the third section compares doses to postulated receptors assumed to farm alongside and use untreated water from Cattaraugus Creek downstream of WNYNSC; and the fourth section compares doses to a spectrum of postulated receptors assumed to access WNYNSC after institutional controls are lost. The Lake Erie and Niagara River water user populations and individual receptors were assumed to consume and garden with untreated river or lake water and to consume fish from the lake. The Cattaraugus Creek receptors were assumed to consume water and fish and irrigate farms with untreated water obtained either directly downstream of WNYNSC or on the lower reaches of the creek. The receptor at the latter location was assumed to consume larger quantities of fish than other receptors, and could be a member of the Seneca Nation of Indians. The onsite receptors were assumed to undertake activities such as hiking and recreation, housing or well construction, or onsite farming or well water use in contaminated areas.

The Sitewide Removal Alternative would have minimal long-term impacts to the public in the vicinity of WNYNSC because this alternative transfers the long-term waste management risk and the need for long-term institutional controls to other locations where the removed materials would be disposed. Contamination would be removed from WNYNSC such that an individual in direct contact with any residual contamination would receive an annual dose of less than 25 millirem, assuming conservative land reuse scenarios that include houses, gardens, and water wells located in the highest areas of residual contamination. Other site reuse scenarios would result in substantially lower doses, and the dose to offsite receptors 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. The peak annual dose to any offsite receptor, if institutional controls were assumed to remain in place, would be less than 1 millirem, and would be similar to that for the No Action Alternative. The peak annual dose to any offsite receptor in the event of loss of institutional controls would be less than 1 millirem if only groundwater release mechanisms were involved and could be up to 4 millirem to the Cattaraugus Creek receptors if there were extended (many hundreds of years) loss of institutional control such that unmitigated erosion would occur. Assuming unmitigated erosion, the peak annual dose to the Lake Erie and Niagara River water user receptors would be on the order of 0.4 millirem.

Table 2–4 Comparison of Long-term Human Health Radiological Consequences

Sitewide Removal Alternative	*Sitewide Close-In-Place Alternative*	*Phased Decisionmaking Alternative*	*No Action Alternative*
Postulated Offsite Populations – Lake Erie and Niagara River Water Users			
Negligible dose with no need for institutional controls.	A peak annual population dose of about 95 person-rem with or without institutional controls. A peak annual population dose of about 240 person-rem assuming unmitigated erosion.[a]	If Phase 2 is removal of remaining WMAs, impacts would be comparable to those for the Sitewide Removal Alternative; if Phase 2 is close-in-place, impacts would be slightly less than those for the Sitewide Close-In-Place Alternative.[b]	A peak annual population dose of about 95 person-rem with institutional controls, and about 340 person-rem without institutional controls. A peak annual population dose of about 1,500 person-rem assuming unmitigated erosion.[a]
Postulated Individual Offsite Receptors – Lake Erie and Niagara River Water Users			
Negligible dose with no need for institutional controls.	A small peak annual dose of up to 0.2 millirem with or without institutional controls. A peak annual dose (0.4 millirem) assuming unmitigated erosion.[a]	If Phase 2 is removal of remaining WMAs, impacts would be comparable to those for the Sitewide Removal Alternative; if Phase 2 is close-in-place, impacts would be slightly less than those for the Sitewide Close-In-Place Alternative.[b]	A peak annual dose of up to 0.2 millirem with institutional controls, and up to 0.6 millirem without institutional controls. A peak annual dose of 2.7 millirem assuming unmitigated erosion.[a]
Postulated Individual Offsite Receptors – Cattaraugus Creek and Seneca Nation of Indians Receptors			
Negligible dose with no need for institutional controls.	A peak annual dose of less than 0.7 millirem to a resident farmer with or without institutional controls. A peak annual dose of up to about 4 millirem assuming unmitigated erosion.	If Phase 2 is removal of remaining WMAs, impacts would be comparable to those for the Sitewide Removal Alternative; if Phase 2 is close-in-place, impacts would be slightly less than those for the Sitewide Close-In-Place Alternative.[b]	A peak annual dose of less than 0.7 millirem with institutional controls; 2 to 3 millirem without institutional controls. A peak annual dose of 15 to 34 millirem assuming unmitigated erosion.
Postulated Individual Onsite Receptors (Intruders) Assuming Loss of Institutional Controls			
Peak annual dose to onsite receptors after unrestricted release of WNYNSC would be less than 25 millirem for onsite intruders who have gardens in contaminated soil or wells in contaminated groundwater.	Not applicable if institutional controls continue. Otherwise, a peak annual dose of less than 1 to 160 millirem for onsite intruders who have gardens in contaminated soil or wells in contaminated groundwater. A peak annual dose of 70 millirem to onsite residents and hikers assuming unmitigated erosion.	If Phase 2 is removal of remaining WMAs, impacts would be comparable to those for the Sitewide Removal Alternative; if Phase 2 is close-in-place, impacts would be slightly less than those for the Sitewide Close-In-Place Alternative.[b]	Not applicable if institutional controls remain in place. Otherwise, a peak annual dose of less than 1 millirem to 400 rem to onsite intruders who have gardens in contaminated soil or wells in contaminated water. A peak annual dose of 130 millirem to onsite residents and hikers assuming unmitigated erosion.

WMA = Waste Management Area; WNYNSC = Western New York Nuclear Service Center.

[a] Population and individual receptor doses for the Lake Erie and Niagara River water users were determined by conservatively assuming that all persons drink and garden using untreated water and consume fish from the lake, and assuming no monitoring of community drinking water treatment and distribution systems pursuant to Title 40 of the *Code of Federal Regulations* Part 141. Individual receptor doses are averages for receptors assumed to use water from the Sturgeon Point water distribution system.

[b] This is because the Main Plant Process Building, Vitrification Facility, source area for the North Plateau Groundwater Plume, and Low-Level Waste Treatment Facility Area lagoons would have been removed. Note that if the Phase 2 decision for the State-Licensed Disposal Area (SDA) is continued active management, the impacts for some exposure scenarios and receptors would be bounded by those for the No Action Alternative.

If institutional controls were lost after 100 years and there were intruders into closed WMAs containing contamination, there could be a peak annual dose (less than 1 to 160 millirem) to intruders assumed to exhume contamination from construction activities, consume food from gardens containing contaminated soil, or use untreated water from contaminated wells. Assuming unmitigated erosion, onsite residents and hikers could receive a peak annual dose of about 70 millirem). These intruder doses would be less than those for the No Action Alternative; because engineered barriers would reduce the likelihood of direct intrusion into contamination or slow the migration of contaminants. The highest intruder doses for the Sitewide Close-In-Place Alternative would be related to the North Plateau Groundwater Plume, the Main Plant Process Building, and the Waste Tank Farm.

Long-term human health impacts for the Phased Decisionmaking Alternative would depend on the Phase 2 decision. If the Phase 2 decision is removal of all remaining waste and contamination, 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 in-place closure of all remaining waste and contamination, long-term impacts would be slightly less than those for the Sitewide Close-In-Place Alternative because the Main Plant Process Building, Vitrification Facility, source area for the North Plateau Groundwater Plume, and Low-Level Waste Treatment Facility Area lagoons would have all been removed. Neither the magnitude nor timing of the peak annual dose from units that would be closed in place is considered to be sensitive to whether the Phase 2 decision is made 10 or 30 years after the initial ROD and Findings Statement, if the Phased Decisionmaking Alternative is selected. If the Phase 2 decision for the SDA is continued active management, long-term impacts for some exposure scenarios and receptors would be bounded by those for the No Action Alternative.

The No Action Alternative is considered the baseline when evaluating the long-term performance of the various decommissioning actions. No contaminated material or radioactive waste would be removed or engineering barriers added to isolate this material or waste, but existing barriers and institutional controls would be relied on to limit offsite and onsite doses. The peak annual dose to any offsite receptor, if institutional controls were assumed to remain in place, would be less than 1 millirem, similar to that for the Sitewide Close-In-Place Alternative. The peak annual dose to any offsite receptor in the event of loss of institutional controls could be up to 3 millirem if only groundwater release mechanisms were involved and could range from about 15 to 34 millirem to the Cattaraugus Creek receptors if there were extended (many hundreds of years) loss of institutional control such that unmitigated erosion occurs. Assuming unmitigated erosion, the peak annual dose to the Lake Erie and Niagara River water user receptors would be on the order of 2.7 millirem.

If institutional controls were lost and there were intruders into the industrialized area, there could be an annual dose of less than 1 millirem to 400 rem to intruders assumed to exhume contamination from construction activities, consume food from gardens containing contaminated soil, or use untreated water from contaminated wells. The peak dose varies depending on the intruder activities and the onsite locations where the activities might occur. Assuming unmitigated erosion, onsite residents and hikers could receive a peak annual dose of about 130 millirem.

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, Section 4.2, of this EIS.

The various decommissioning alternatives use 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 population dose due to removal or increased isolation less the worker and public population dose required to achieve the new end state). A cost-effectiveness analysis can be useful when comparing the alternatives and when evaluating compliance with decommissioning requirements. Additional information on the cost-benefit analysis is presented in Chapter 4, Section 4.2.

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

Sitewide Removal Alternative	*Sitewide Close-In-Place Alternative*	*Phased Decisionmaking Alternative [b]*	*No Action Alternative*
The Sitewide Removal Alternative would transfer essentially the entire site radionuclide inventory to other disposal sites. The incremental cost-effectiveness is estimated to range from about $430,000 to $1,300,000 per avoided person-rem.	The Sitewide Close-In-Place Alternative would keep most of the site radionuclide inventory out of the site's accessible environment. The incremental cost-effectiveness is estimated to range from about $210,000 to $950,000 per avoided person-rem.	The cost-effectiveness of this alternative would depend primarily on the Phase 2 decision. If the Phase 2 decision is timely removal of the remaining waste and contamination, the incremental cost-effectiveness is estimated to range from about $230,000 to $1,300,000 per avoided person-rem. If the Phase 2 decision is timely in-place closure for the remaining waste and contamination, the incremental cost-effectiveness is estimated to range from about $450,000 to $760,000 per avoided person-rem.	The No Action Alternative serves as a baseline for assessing the incremental cost-effectiveness of the decommissioning alternatives.

WMA = Waste Management Area.

[a] The analysis was performed for all alternatives assuming real discount rates ranging from 1 to 5 percent, and unit Greater-Than-Class C waste disposal costs ranging from $2,300 to $21,000 per cubic foot (WSMS 2009e). The values in this table are based on calculations that assume continued institutional controls.

[b] The analysis for the Phased Decisionmaking Alternative assumes the Phase 2 decision is either all removal or all in-place closure of the Waste Tank Farm, NRC [U.S. Nuclear Regulatory Commission]-Licensed Disposal Area, and State-Licensed Disposal Area.

As shown in Table 2–5, the Sitewide Close-In-Place Alternative has the lowest range of incremental cost-effectiveness, although portions of the ranges of incremental cost-effectiveness overlap for all action alternatives. The range for the Phased Decisionmaking Alternative is the broadest and is influenced, in order of importance, by the following factors: real discount rate, the nature of the Phase 2 decision (removal or in-place closure), timing of the Phase 2 decision, and if the Phase 2 decision is removal, the cost of Greater-Than-Class C waste disposal. The cost-effectiveness range for the Phased Decisionmaking Alternative in Table 2–5 includes the cost per avoided person-rem for making the Phase 2 decision at both 10 years and 30 years from the initial ROD and Findings Statement, if the Phased Decisionmaking Alternative is selected. All other factors being equal, the cost per avoided person-rem would be higher if the Phase 2 decision is made at 10 years rather than 30 years. This can be primarily attributed to the effect of the real discount rate over time.

All decommissioning alternatives appear to meet NRC's decommissioning as low as is reasonably achievable (ALARA) requirement.

2.6.4 Conclusions from Comparative Analysis of Alternatives

This section summarizes the comparison of the alternatives and illustrates the nature of the environmental tradeoffs between decommissioning and post-decommissioning impacts. This discussion also points out how the differences among the alternatives influence the magnitude and location of the decommissioning impacts (which would occur within a few to several tens of years) as well as the location of the post-decommissioning impacts (which would occur over thousands of years).

Sitewide Removal Alternative. This alternative would result in the greatest decommissioning impacts at the site, on site workers, and on the public in the vicinity of WNYNSC and along the transportation routes as waste is removed from WNYNSC over a period of about 60 years. Implementing the Sitewide Removal Alternative is estimated to result in a combined worker and population dose of about 1,300 to 3,700 person-rem. The higher estimated dose is associated with transporting 1.6 million cubic meters (56 million cubic feet) of waste by truck while the lower estimated dose is associated with transporting this waste by rail. Most of this exposure would be to site and transportation workers. Transporting this waste is estimated to result in as many as 10 to 15 fatalities from truck and rail transportation accidents, respectively. If this alternative were selected and initiated in the near future, there could be a need to store orphan waste onsite until disposal or offsite interim storage locations were available. This would require continued site presence, and monitoring and maintenance of waste storage, which would also result in an annual occupational worker exposure consequence. Lack of offsite waste disposition options would also delay completion of decommissioning.

Post-decommissioning impacts from residual contamination would be very small because this alternative transfers the long-term waste management risk and the need for institutional controls to other locations where the removed materials would be disposed.[8] However, at some point, the entire WNYNSC would be available for release for unrestricted use.

The Sitewide Removal Alternative appears to meet NRC's decommissioning ALARA requirement. This alternative is estimated to have the highest incremental cost-effectiveness range (incremental cost per avoided person-rem) using the No Action Alternative as the baseline for the calculation.

Sitewide Close-In-Place Alternative. This alternative would result in fewer decommissioning impacts at the site, on site workers, and on the public in the region of WNYNSC relative to the Sitewide Removal Alternative. This alternative would require about 7 years to complete, and would involve fewer construction-like activities and minimal waste handling activities, which would result in less worker exposure to radioactive and hazardous materials. Implementing the Sitewide Close-In-Place Alternative is estimated to result in about 164 to 215 person-rem of exposure to workers and the general population during decommissioning. The higher estimated dose is associated with transporting 26,000 cubic meters (920,000 cubic feet) of waste by truck, and the lower estimated dose is associated with transporting this waste by rail. Most of this exposure would be to site and transportation workers. Transporting this waste is estimated to result in 1 fatality from transportation accidents. Orphan waste would not be expected to be generated under this alternative. Upon completion of decommissioning activities, about 80 percent of the site would be available for unrestricted release.

After decommissioning is complete and the site is reconfigured for a long-term stewardship program, there could be post-decommissioning impacts on the public in the vicinity of WNYNSC as the radionuclides migrate from their original location and decay. The human health consequences are highly dependent on future human actions including the durability of institutional controls intended to maintain engineered barriers and to keep intruders out of waste disposal locations. The estimated peak annual dose to postulated human receptors would range from less than 1 millirem if institutional controls remain in place to approximately 160 millirem (still below background levels) for the scenario in which it is assumed that an intruder enters the site and consumes and uses water from a well installed downgradient of an area containing waste. The highest estimated peak annual dose for an unmitigated erosion scenario in which institutional controls are assumed to be lost for many hundreds of years is less than 100 millirem to a postulated onsite intruder. The natural processes that would move contamination from the site to the accessible environment would occur over a time period that would allow the migration to be monitored and time and location-specific corrective actions taken. Assuming the population in the region remains similar to the current situation and institutional controls remain in place, the estimated time-integrated population dose over 1,000 years is about 4,000 person-rem. For perspective, the total background dose that would be accumulated in 1 year solely by Lake Erie water uses would be about

[8] *The near-term and long-term consequences at offsite disposal locations would be a function of the type and amount of waste disposed at the offsite locations, the site characteristics, and the durability of institutional controls.*

350,000 person-rem. If institutional controls are assumed to fail, the population dose over 1,000 years could range from 4,000 person-rem to 170,000 person-rem. The higher value is associated with the postulated unmitigated erosion scenario.

The Sitewide Close-In-Place Alternative appears to meet NRC's decommissioning ALARA requirement. This alternative is estimated to generally have the lowest incremental cost-effectiveness range (incremental cost per avoided person-rem) using the No Action Alternative as the baseline for the calculation.

Phased Decisionmaking Alternative. Implementing Phase 1 of the Phased Decisionmaking Alternative is estimated to result in about 230 to 670 person-rem of exposure to workers and the general population during decommissioning. The higher estimated dose is associated with transporting 210,000 cubic meters (7.4 million cubic feet) of waste by truck while the lower estimated dose is associated with transporting this waste by rail. Most of this exposure would be to site and transportation workers. Transporting the waste is estimated to result in 1 to 2 fatalities from truck and rail transportation accidents, respectively.

The overall environmental consequences of decommissioning under this alternative would depend on the Phase 2 decision, which would identify the decommissioning actions for NDA, SDA, and Waste Tank Farm. If the Phase 2 decision is removal of all remaining waste and contamination, the overall decommissioning impacts would be bounded by those for the Sitewide Removal Alternative. There would also be the potential for generation of orphan waste as discussed for the Sitewide Removal Alternative. If the Phase 2 decision is in-place closure of all remaining waste and contamination, the overall decommissioning impacts would be greater than those estimated for the Sitewide Close-In-Place Alternative because of the combination of the Phase 1 removal actions followed by in-place closure of the remaining waste and contamination. If the Phase 2 decision for the SDA is continued active management, overall decommissioning impacts would be generally bounded by those for the Sitewide Removal and Sitewide Close-In-Place Alternatives, but would be bounded for some resource areas, exposure scenarios, or receptors by those for the No Action Alternative.

If the Phase 2 decision is removal of all remaining waste and contamination, the entire WNYNSC would ultimately be available for release for unrestricted use. Less land would be available for release if the Phase 2 decision for the SDA is continued active management. If the Phase 2 decision is in-place closure of all remaining waste and contamination, about 80 percent of the site ultimately would be available for release for unrestricted use. The same amount of land would be available for release if the Phase 2 decision for the SDA is continued active management.

Long-term (post-decommissioning) impacts would also depend on the Phase 2 decision. If the Phase 2 decision is removal of all remaining waste and contamination, long-term impacts to the public in the vicinity of WNYNSC would be very small (similar to those for the Sitewide Removal Alternative) because the long-term waste management risk and the need for institutional controls would be transferred to other locations where removed materials would be disposed. If the Phase 2 decision is in-place closure of all remaining waste and contamination, corresponding long-term impacts would be somewhat less than those for the Sitewide Close-In-Place Alternative because the source area of the North Plateau Groundwater Plume, the Main Plant Process Building, and the Low-Level Waste Treatment Facility Area lagoons would have been removed during Phase 1. If the Phase 2 decision for the SDA is continued active management, long-term impacts for some exposure scenarios and receptors would be bounded by those for the No Action Alternative.

Reducing the duration of Phase 1 from 30 years to 10 years would result in only a small reduction in total decommissioning impacts because most Phase 1 impacts result from removal actions that occur in the first 8 years of Phase 1. The most important change in impacts associated with the shorter duration of Phase 1 would be the reduced socioeconomic impact. A shorter Phase 1 would eliminate the approximately 20-year period of reduced site employment following completion of Phase 1 decommissioning before site employment would increase again for Phase 2.

The Phased Decisionmaking Alternative appears to meet NRC's decommissioning ALARA regardless of the Phase 2 decision. The ranges of incremental cost-effectiveness are generally comparable to those for the Sitewide Removal and Sitewide Close-In-Place Alternatives, depending on the Phase 2 decision.

No Action Alternative. There would be no decommissioning impacts for the No Action Alternative because there are no decommissioning actions associated with this alternative.

Long-term impacts of the No Action Alternative would be greater than those for the Sitewide Close-In-Place Alternative because there would be fewer engineered barriers to retard the migration of radionuclides from their original locations and to act as intrusion barriers in the event of loss of institutional controls. The estimated peak annual doses to postulated human receptors would range from less than 1 millirem if institutional controls remain in place to hundreds of rems if an intruder were to consume and use water from a well installed downgradient of an area containing waste. The highest estimated peak annual dose for an unmitigated erosion scenario where institutional controls are assumed to be lost after 100 years is over 100 millirem to a postulated onsite intruder. Assuming the population in the region remains similar to the current situation and institutional controls remain in place, the estimated time-integrated population dose over 1,000 years is about 4,000 person-rem. For perspective, the total background dose that would be accumulated in 1 year solely by Lake Erie water users would be about 350,000 person-rem. If institutional controls are assumed to fail, the population dose over 1,000 years could range from 40,000 person-rem to 450,000 person-rem. The higher value is associated with the postulated unmitigated erosion scenario.

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:

Under this alternative, decommissioning would be completed in two phases. Phase 1 of this alternative would involve substantial removal actions. In addition, during Phase 1, additional site characterization and scientific studies would be undertaken to facilitate consensus decisionmaking for the remaining facilities or areas. Phase 1 activities are expected to take 8 to 10 years to complete. During this time, the agencies would conduct a number of activities to help determine the best technical approach to complete decommissioning of the remaining facilities.

Phase 2 actions would complete decommissioning or long-term management decisionmaking according to the approach determined most appropriate during the additional Phase 1 evaluations for each remaining facility. Comprehensive Phase 2 decisions would be made within 10 years of the initial DOE ROD and NYSERDA Findings Statement, if the Phased Decisionmaking Alternative is selected. Making decisions at this time would allow DOE and NYSERDA to maintain clean-up momentum and retain the highly skilled workforce at WNYNSC.

Phase 1 would include removal of the Main Plant Process Building and the source of the North Plateau Groundwater Plume. In addition, the lagoons and all facilities in WMA 2 (except the permeable treatment wall) would be removed. The Vitrification Facility, the Remote Handled Waste Facility and a number of facilities in WMAs 5, 6, 9, and 10 would also be removed. Foundations, slabs, or pads from these facilities, as well as previously demolished facilities, would also be removed. Proven technologies and available waste disposal sites would be used to reduce the potential short-term health and safety risks from residual radioactivity and hazardous contaminants at the site while introducing minimal potential for generation of new orphan waste.

While the Phase 1 activities are being conducted, 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 NYSERDA and cooperating and involved agencies on this EIS, DOE would determine whether new information would warrant preparation of a Supplemental EIS. NYSERDA expects to prepare an EIS, or to supplement the existing EIS, to evaluate Phase 2 decisions for the SDA and the balance of WNYNSC, for which NYSERDA has responsibility.

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 capacity 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 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 summarized in this section.

2.8.1.1 Human Health

For occupational exposure, information that is incomplete or unavailable includes the following: (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 used 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 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.

For public exposure, information that is incomplete or unavailable includes the following: (1) more detailed information on the radionuclides in the waste; (2) the location and actions of future nearby critical receptors; (3) changes in the total population and population distribution during the time period associated with decommissioning actions. However, the uncertainty related to the lack of this information is addressed through the use of conservative assumptions related to normal and accident scenario release source terms, total population and its distribution, population breathing rate, water and fish consumption, and the location of critical receptors. Appendix I further addresses uncertainties associated with short-term human health impacts.

2.8.1.2 Transportation

Information that is incomplete or unavailable includes the following: (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 (by 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 low-level radioactive waste.

2.8.1.3 Waste Volumes

The waste management analysis has two areas of uncertainty due to incomplete or unavailable information: (1) the volumes and characteristics of waste that would be generated by each alternative and (2) the availability of disposal capacity for all waste, particularly commercial Class B and C low-level radioactive waste, Greater-Than-Class C waste, non-defense 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 soil characterization data do exist, the volumes of soil projected to be exhumed for the Sitewide Removal and Phased Decisionmaking Alternatives incorporate contamination assumptions that are 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 capacity for commercial Class B and C low-level radioactive waste, Greater-Than-Class C waste, non-defense 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 Class B or C waste from WNYNSC activities was in Barnwell, South Carolina; however, this facility no longer accepts waste for disposal other than that generated in the states comprising the Atlantic Interstate Low-Level Radioactive Waste Management Compact (Connecticut, New Jersey, and South Carolina). Alternatives that generate commercial Class B or C wastes, therefore, could 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 NRC; however, no such Greater-Than-Class C waste disposal facility exists at this time. The *GTCC EIS*, which 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*) included analysis of the receipt and disposal of transuranic waste from WVDP (DOE 1997b). At this time, DOE has not approved shipment of WVDP transuranic waste to the Waste Isolation Pilot Plant (WIPP) because of unresolved questions regarding whether the waste could be considered defense or non-defense in origin. WIPP is currently authorized to accept only DOE defense waste, as discussed in footnote 1 in Section 2.3.1. In addition, disposal of non-defense transuranic wastes (including WVDP transuranic waste) is currently being examined in the *GTCC EIS*. Until a determination is made with regard to WVDP transuranic waste, 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 residual materials in the 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. 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, 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 the long-term impact analyses.

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 with 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 NDA and SDA remediation are considered first of their 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 expected wastes have been listed based on historic documentation. However, there exists a significant potential to discover wastes 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 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 with various tools. 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 removal. 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 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 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 pile removal that involve potentially numerous work crews working together 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 Interim Storage Facility (Dry Cask Storage Area), and unloaded into a storage unit in an 8-hour shift (see Appendix C, Section C.4.1, of this EIS). This estimate is based on experience gained during the removal and placement of material with high and very high dose rates (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, 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 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 hydraulic barrier walls. Hydraulic factors, such as mounding and groundwater bypass, and other aspects, such as long-term durability could potentially impact the long-term performance of hydraulic barrier 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 assumptions that are generally expected to be conservative. The performance of the hydraulic barriers, as incorporated into the sensitivity analysis, is addressed in Appendix H.