CHAPTER 3
AFFECTED ENVIRONMENT

This chapter summarizes the existing environmental conditions at the Western New York Nuclear Service Center and the surrounding area. Drawing upon information generated for WVDP environmental programs, the 1996 Draft Closure EIS, and Annual Site Environmental Reports, this chapter characterizes the receptors and environmental media that may be affected by the proposed waste management activities described in Chapter 2. This chapter also characterizes, in less detail, the ecological resources, geology, socioeconomics, land use, and related aspects of the environment at the Western New York Nuclear Service Center that would not be affected by the actions described in Chapter 2. This approach is consistent with the Council on Environmental Quality's recommendations in their regulations for NEPA implementation (40 CFR 1502.15). For additional detailed descriptions of the affected environment, refer to the *West Valley Demonstration Project Safety Analysis Report - Project Overview and General Information* (WVNS 2000b) and the *West Valley Demonstration Project Site Environmental Report, Calendar Year 2000* (WVNS 2001).

The waste management actions proposed in Chapter 2 would have very little potential for impacts to workers, the public, or the environment on and around WVDP, because the actions would not involve additional discharges or releases, or new ground disturbance. The proposed actions would occur within existing buildings, or upon existing highways and rail lines. The packaging and handling of wastes for shipment would be accomplished within existing buildings with HEPA filtration systems that would reduce emissions to acceptable levels. The actions proposed in this EIS would involve no discharges of process effluents. The only receptors that would be impacted by the proposed waste management actions would be the workers actually involved in the packaging, loading, and shipping of the wastes, also referred to as involved workers. Other WVDP workers (noninvolved workers) and the public would have no potential exposure to the proposed waste management actions during routine operations and thus would be impacted only by ongoing WVDP operations or under accident scenarios. Nationally, the involved workers and the public could receive exposures along transportation routes.

Because the potential for impacts from the proposed actions assessed in this EIS is very limited, the description of the affected environment in this chapter has been reduced accordingly. This approach is consistent with DOE and Council on Environmental Quality NEPA guidance; both agencies recommend that an EIS focus only on that which is important for the impact analyses. A basic description of the region in which the Center is located has been provided to provide the reader with a broad overview of the potentially affected environment.

3.1 GEOLOGY AND SOILS

The Western New York Nuclear Service Center is located on the Glaciated Allegheny Plateau section of the Appalachian Plateau Physiographic Province. This 78,000-square-kilometer (30,000-square–mile) region is bounded on the north by the Erie-Ontario Lowlands, on the east by the Tughill Upland, on the south by the unglaciated Appalachian Plateau, and on the west by the Interior Lowlands. The Glaciated Allegheny Plateau has been subjected to the erosional and depositional actions of repeated glaciations, resulting in the accumulation of various glacial deposits over the area. Fluvial erosion (that is, erosion resulting from action or movement of a stream or river) and mass wasting (that is, the downslope movement of soil and rock material as the result of gravity) currently are altering the glacial landscape (WVNS 2000b). No geologic fold or fault of any consequence is recognized within the site area. The closest major structural zone is the St. Lawrence Rift Valley System, located about 480 kilometers (300 miles) to the northeast. The north-trending Clarendon-Linden Structure, located 50 kilometers

(30 miles) northeast of the site, is the only significant structural feature in the western New York region. From 1737 to 1999, there have been 119 recorded earthquakes within 480 kilometers (300 miles) of the WVDP with epicentral intensities of Modified Mercalli Intensities V to VII. Of the 119 recorded earthquakes, 25 occurred within 320 kilometers (200 miles) of the WVDP (WVNS 2000b). The highest Modified Mercalli Intensity estimated to have occurred at the Center within the last 100 years was an Intensity of IV, which is similar to vibrations from a heavy truck that might be felt by people indoors, but do not cause damage (DOE 1996).

3.2 HYDROLOGY

This section describes the existing hydrology at the Project Premises and surrounding area.

3.2.1 Surface Water

The WVDP facilities and its two water supply reservoirs lie in separate watersheds, both of which are drained by Buttermilk Creek (Figure 3-1). Buttermilk Creek, which roughly bisects the Western New York Nuclear Service Center, flows in a northwestward direction to its confluence with Cattaraugus Creek, at the northwest end of the Center. Several tributary streams flow into Buttermilk Creek at the Center. The flow length of Buttermilk Creek through the Center is about 7,600 meters (25,000 feet). About 2,700 meters (9,000 feet) of this is adjacent to the Project Facilities and the water supply reservoirs (WVNS 2000b).

Buttermilk Creek lies in a deep, narrow valley cut into glacial soils. A downstream portion of the creek has downcut to shale bedrock. The reach of stream to the east of the facilities has downcut through the Lavery till and the underlying Kent recessional units and is currently incising the Kent till. The stream invert drops from an elevation of 400 meters (1,300 feet) at the southern site boundary, to 370 meters (1,200 feet) at the northern edge of the Project Facilities, to 340 meters (1,100 feet) at the confluence with Cattaraugus Creek. The drainage area of the Buttermilk Creek basin was estimated to be 80 square kilometers (30 square miles) (DOE 1996). The drainage area to this point is estimated to be about 76 square kilometers (29 square miles) (WVNS 2000b).

Cattaraugus Creek flows westward from the Buttermilk Creek confluence to Lake Erie, 63 kilometers (39 miles) downstream. The total drainage area is estimated to be 1,360 square kilometers (520 square miles). A gauging station has been maintained at Gowanda, New York, since 1939. The drainage basin to this point is estimated to be about 1,120 square kilometers (430 square miles). The drainage area of Cattaraugus Creek upstream of the Buttermilk Creek confluence is 560 square kilometers (220 square miles) (WVNS 2000b).

The drainage basin on the Project Premises is relatively small, consisting of approximately 5 square kilometers (2 square miles). The outfall of the watershed (that is, the point where all surface runoff from the site reaches a single stream channel) is at the confluence of Frank's Creek and Quarry Creek, north of the main Project Facilities. The watershed extends in a southwest direction from this point. Ground cover consists of the main Project Facilities, forest, abandoned farmlands, and a small amount of active farmland.

The watershed on the Project Premises is drained by three named streams: Quarry Creek, Frank's Creek, and Erdman Brook (Figure 3-2; WVNS 2000a). Erdman Brook and Quarry Creek are tributaries to Frank's Creek, which in turn flows into Buttermilk Creek. Erdman Brook, the smallest of the three streams, drains the central and largest fraction of the developed WVDP premises, including a large portion of the disposal areas and the areas surrounding the lagoon system; the plant, office, and warehouse areas; and a major part of the parking lots. Following treatment, the WVDP's waste waters

are also discharged to this brook. Erdman Brook flows from a height of over 430 meters (1,400 feet) west of Rock Springs Road to 400 meters (1,300 feet) at the confluence with Frank's Creek northeast of the lagoons. It flows for about 900 meters (3,000 feet) through the Project Facilities.

Quarry Creek, which drains the largest area of the three named streams, receives runoff from the tank farm, the north half of the northern parking lot, and the temporary radioactive waste storage tents. It flows from an elevation of 590 meters (1,900 feet) west of Dutch Hill Road to 380 meters (1,250 feet) at its confluence with Frank's Creek. The segment that flows along the north side of the project is about 900 meters (3,000 feet) in length.

A small dam formerly used for hydroelectric power and water impoundment is located on Cattaraugus Creek about 300 meters (1,000 feet) upstream of the Scoby Road bridge, southwest of Springville, New York. Neither Buttermilk Creek nor Cattaraugus Creek downstream of the WVDP are used as a regular source of potable water. The steep-walled nature of the downstream valley and the region's annual precipitation combine to make irrigation from the creeks impracticable and unnecessary. Cattle from a neighboring dairy farm have access to Buttermilk Creek near the confluence of Cattaraugus Creek. Milk from the cattle is routinely monitored for radioactivity. Cattaraugus Creek downstream of Buttermilk is a popular fishing and canoeing/rafting waterway. Cattaraugus Creek water is also used to irrigate tomato fields in Chautauqua County. As such, Cattaraugus Creek water, fish, and sediments are monitored as part of the WVDP environmental monitoring program (WVNS 2000a, WVNS 2000b).

The two water supply reservoirs, which are interconnected by a short canal, are located to the south of the main Project Facilities. They were formed by blocking off two tributaries to Buttermilk Creek with earthen dams. The south reservoir drains to the north reservoir, which then discharges to Buttermilk Creek through a sluice gate water-level control structure. The emergency spillway is located on the south reservoir. The reservoirs collect drainage from numerous small streams over a 13-square-kilometer (5-square-mile) drainage basin. The watershed ground cover is a mix of forest, cultivated fields, and pastures. Several small farm ponds are located throughout the basin.

Frank's Creek receives runoff from the east side of the WVDP, including the Drum Cell, part of the state radioactive waste burial area, and the former construction demolition and debris landfill. It flows into Buttermilk Creek about 600 meters (2,000 feet) downstream of its confluence with Quarry Creek. It flows from an elevation of 550 meters (1,800 feet) west of Rock Springs Road, to 380 meters (1,250 feet) at the Quarry Creek confluence, to 360 meters (1,200 feet) at the Buttermilk Creek confluence. About 1,800 meters (6,000 feet) of its length is adjacent to WVDP Facilities.

Supplemental information on surface water hydrology may be found in Volume III of the Environmental Information Document (Part 2) (WVNS 1993b). Additional information pertaining to the geomorphology of stream valleys, both onsite and offsite, is presented in Volume III of the Environmental Information Document (Part 1) (WVNS 1993a).

3.2.2 Groundwater

The Center is located within the Cattaraugus Creek Basin Aquifer System, a system that has been designated by the U.S. Environmental Protection Agency (EPA) as a sole or principal source of drinking water for the surrounding towns (52 Fed. Reg. 36102(1987)). This means that all projects with federal financial assistance constructed in this basin are subject to EPA review to ensure that they are designed and constructed so as not to create a significant hazard to public health. WVDP waste management actions would not require any facility construction at the Center and are not expected to cause construction or any other impacts requiring EPA review on the surface water or groundwater resources described in this section.

The WVDP site is underlain by two aquifer zones, neither of which can be considered highly permeable or productive. The groundwater flow patterns pertinent to the site relate to recharge and downgradient movement for these two aquifers. Groundwater in the surficial unit tends to move in an easterly or northeasterly direction from the western boundary of the site, close to Rock Springs Road. Most of the groundwater in this unit discharges via springs and seeps into Frank's Creek or into small tributaries of that creek (for example, Erdman Brook). Groundwater recharging the weathered shale and rubble zone tends to move eastward toward the thalweg of the buried valley (the locus of the lowest points in the cross-section of the buried valley), located about 300 to 350 meters (980 to 1,150 feet) west of Buttermilk Creek. Once attaining the thalweg, the direction of groundwater movement shifts to the direction of the thalweg, about 25 degrees west, and proceeds toward the northwest (WVNS 2000b).

Wells identified near the Western New York Nuclear Service Center serve residences and farms; the maximum number of persons served per well was ten. Most of the wells are located on the higher elevations east and west of the Center, along the principal north-south county roads. A second concentration of wells is located on the lowlands north of the Center in the vicinity of Bond Road and Thomas Corners Road. The wells are upgradient of or are otherwise hydraulically isolated from groundwater at the site (WVNS 2000b).

Water supplies north of the Western New York Nuclear Service Center and south of Cattaraugus Creek derive mainly from springs and shallow dug wells completed in Defiance Outwash, which overlie the Lavery till in this area. The distribution of springs and the general geologic relationships indicate that the groundwater system here is perched above the Lavery and that flow patterns are much the same as those that characterize the North Plateau at the WVDP. This hydrostratigraphic unit clearly is disconnected from the WVDP both hydraulically and topographically. Nonetheless, water supplies developed from bedrock wells in this same area downstream and downgradient of the WVDP might be hydraulically connected to water originating on the site via the surface water system and shale exposures in the lower reaches of Buttermilk Creek (WVNS 2000b).

Supply wells on the uplands bordering the Western New York Nuclear Service Center, such as along Route 240 and Dutch Hill Road, are completed in bedrock. A nominal 15 meters (50 feet) of till overlie a fractured bedrock aquifer on the summit levels west of the site; a comparison of screen depths and static water levels indicate that the aquifer is confined (WVNS 2000b). A similar situation exists on the uplands east of the Center, except that most of these wells intersect from 20 to 45 meters (66 to 150 feet) of the Kent till and ground moraine layers above their completion depths in shale bedrock. Groundwater supplies in both of these areas can be assumed to be isolated hydraulically from groundwater in bedrock at lower elevations beneath the Center and the WVDP (WVNS 2000b).

The Lavery till and underlying lacustrine sequence currently are not drawn upon for groundwater supplies, and there is no reason to anticipate that the till, given its hydraulic properties, ever will be considered a source of groundwater. The Lavery till layer and Kent recessional sequence unit directly beneath the Lavery till layer are generally regarded as containing all the potential routes for the migration of contamination to the surface water system and to offsite areas (WVNS 2000b).

3.3 METEOROLOGY AND AIR QUALITY

The WVDP is situated approximately 50 kilometers (30 miles) inland from the eastern end of Lake Erie in western New York State. The climate of western New York State is of the moist continental type prevalent in the northeastern United States. The climate is diverse due to the influence of several atmospheric and geographic factors or controls (WVNS 2000b).

Western New York is exposed to a variety of air masses. Cold dry air masses that form over Canada reach the area from the northwesterly quadrant. Prevailing winds from the southwest and south bring warm, humid air masses from the Gulf of Mexico and neighboring waters of the subtropical Atlantic Ocean. On occasion, cool, cloudy, and damp weather affects western New York through airflow from the east and northeast (WVNS 2000b).

The prevailing wind direction is southwesterly, and windspeed averages approximately 5.4 meters per second (12 miles per hour). The strongest winds occur from November through March and are generally southwesterly to west-southwesterly (DOE 1996). Figures 3-3 and 3-4 characterize the wind conditions for calendar year 2000 from onsite monitoring stations at 10 meters (33 feet) and 60 meters (197 feet) from the ground.

Western New York is bordered by two of the Great Lakes: Lake Erie on the west and Lake Ontario on the north. These exert a major controlling influence on the climate of the region. Topography also affects the climate. Elevations in western New York range from about 110 meters (350 feet) along the Lake Ontario shore in Oswego County to more than 610 meters (2,000 feet) in the southwestern highlands of Cattaraugus and Allegheny counties. The lake plain extends inland about 40 kilometers (25 miles) from Lake Ontario, but along Lake Erie it gradually narrows from about 16 kilometers (10 miles) in the Buffalo area to 8 kilometers (5 miles) or less in Chautauqua County. The southern two-thirds of the region is composed of hilly, occasionally rugged terrain with elevations generally above 300 meters (1,000 feet). This area is interspersed with numerous river valleys and gently sloping plateau areas. Such topographic features may produce locally significant variation of climatic elements within relatively short distances.

The winter climate of western New York is marked by abundant snowfall. The areas with the lightest snowfall, with average seasonal accumulations of 102 to 127 centimeters (40 to 50 inches), are the lower Chemung Valley, the western Finger Lakes, and northern Niagara County. The heaviest snowfall occurs in the eastern lee of Lake Erie, where the average total is in excess of 305 centimeters (120 inches). The snow season normally begins in mid-November and extends into mid- or late-March (WVNS 2000b).

Snowfall produced in the eastern lee of Lake Erie is a distinguishing and very important feature of western New York's climate. Heavy snow squalls frequently occur, producing from 0.3 to 0.6 meter (1 to 2 feet) of snow and occasionally as much as 1.2 meters (4 feet). Counties to the lee of Lake Erie are subject to these lake-effect snows in November and December, but in mid-winter, as the lake gradually freezes, these snows become less frequent. Areas south of Lake Ontario are exposed to heavy snow squalls well into February, as the lake generally retains considerable open water through the winter months (WVNS 2000b).

The summer season is cool in the southwestern highland but warm elsewhere. High temperatures and high humidity are infrequent during the summer and seldom persist for more than a few days at a time. Readings of 38 degrees Celsius (100 degrees Fahrenheit) or higher are rare. The range of temperature on summer days is commonly from 15 degrees Celsius (60 degrees Fahrenheit) at night to 27 degrees Celsius (the low 80s) in the afternoon (WVNS 2000b).

Summer season precipitation increases to the south, ranging from about 20 centimeters (8 inches) along the Lake Ontario shore to 25 to 30 centimeters (10 to 12 inches) in the counties along the Pennsylvania border. Showers and thundershowers account for much of the warm season rainfall, and the distribution pattern reflects the contrasting influences of the cool Lake Ontario waters to the north and the hilly terrain in the Southern Tier (WVNS 2000b).

The autumn season is marked by frequent periods of sunny, dry weather. With less cloud cover, temperatures from mid-September to mid-October frequently rise to between 15 degrees Celsius and

26 degrees Celsius (60 and 79 degrees Fahrenheit) in the daytime and cool to 1 degree Celsius below zero and 6 degrees Celsius (30s and low 40s Fahrenheit) at night. The comparatively warm waters of the Great Lakes reduce cooling at night to the extent that freezing temperatures in lakeside counties are normally delayed until mid-October or later (WVNS 2000b).

3.3.1 Severe Weather

The lack of significant amounts of recorded data at and near the West Valley site make it difficult to assess past occurrences of extreme winds. Large-scale factors such as intense low-pressure systems passing near the area have produced winds in excess of 27 meters per second (60 miles per hour) at Buffalo, New York, and would probably lead to similar conditions at the WVDP. Strong winds associated with the remnants of tropical storms and hurricanes do occasionally occur in western New York, but damaging winds due to these storms are extremely rare.

Locally, severe thunderstorms would be the most likely event to cause wind damage at the site, particularly in late spring and summer. Thunderstorms occur about 30 days per year, with the most thunderstorms occurring in June, July, and August. Severe thunderstorms, with winds in excess of 22 meters per second (50 miles per hour), do occur in western New York every year (WVNS 1993c).

The frequency and intensity of tornadoes in western New York are low in comparison to many other parts of the United States. An average of about two tornadoes of short and narrow path length strike New York State each year. From 1950 to 1990, 17 tornadoes were reported within 80 kilometers (50 miles) of the WVDP site (WVNS 2000b).

3.3.2 Ambient Air Quality

New York is divided into nine regions for assessing state ambient air quality. The WVDP site is located in Region 9, which is comprised of Niagara, Erie, Wyoming, Chautauqua, Cattaraugus, and Allegany counties. The WVDP site and the surrounding area in Cattaraugus County are in attainment with the National Primary and Secondary Ambient Air Quality Standards contained in 40 CFR 50 and New York State air quality standards contained in 6 NYCRR 257. The city of Buffalo, located about 48 km (30 mi) from the WVDP site, is a marginal nonattainment area for ozone (EPA 2002).

Air emissions of radionuclides from WVDP, are regulated by the EPA under the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations, 40 CFR Part 61, Subpart H, National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities. Annual reporting of the radionuclide emissions for calendar year 2000 was less than 0.1 percent of EPA's standards (WVNS 2001).

Current WVDP operations use two Cleaver Brooks boilers. These boilers are used to generate steam for heating and other processes at the site, and each have a capacity of 20.2 million British thermal units per hour. Together, these boilers use about 2 million cubic meters (70 million cubic feet) of natural gas and about 24,000 liters (6,300 gallons) of No. 2 fuel oil per year, and emit some criteria pollutants - nitrogen dioxide, sulfur dioxide, carbon monoxide, and particulate matter. The other two criteria pollutants, lead and ozone, are produced in insufficient quantities by the boilers for consideration in this analysis.

As shown in Table 3-1, the concentrations of criteria pollutants from the WVDP site emissions are well below the National Primary and Secondary Ambient Air Quality Standards contained in 40 CFR 50 and the New York State air quality standards contained in 6 NYCRR 257. It should be noted that the background concentrations used in Table 3-1 were from near Buffalo, New York; actual background

Table 3-1. Criteria Pollutant Concentrations from WVDP Boiler Emissions and Regional Background

Criteria Pollutant	Averaging Time	Standard[a,b]	Concentration From WVDP Emissions[b,c]	Background Concentration[b,d]	Total Concentration[b]	Percent of Standard
Nitrogen dioxide	Annual	100[g,h,i] (0.053 ppm)	1.5	41	42	42
Carbon monoxide	1 hour	40,000[g,i] (35 ppm)	15	5,800	5,800	14
Carbon monoxide	8 hours	10,000[g,i] (9 ppm)	11	3,200	3,200	32
Sulfur dioxide	Annual	80[g,i] (0.03 ppm)	0.10	17	17	22
Sulfur dioxide	24 hours	365[g,i] (0.14 ppm)	0.50	63	64	17
Sulfur dioxide	3 hours	1,300[h,i] (0.5 ppm)	1.1	160	160	12
Particulate matter[e]	Annual	50[g,h]	0.11	21	21	42
Particulate matter[f]	24 hours	150[g,h]	0.56	61	61	41
Ozone	1 hour	235[g,h] (0.12 ppm)	(--)	210	210	89
Lead	Quarterly	1.5[g,h]	(--)	0.03	0.03	2

a. Standards from 40 CFR 50, National Primary and Secondary Ambient Air Quality Standards and 6 NYCRR 257, Air Quality Standards. Comparisons to the standards for particulate matter with an aerodynamic diameter less than 2.5 micrometers and the 8-hour ozone standard were not made because these standards have been remanded to the U.S. Environmental Protection Agency by the U.S. Court of Appeals.
b. Units in micrograms per cubic meter. Parts per million not calculated for substances that do not exist as a gas or vapor at normal room temperature and pressure.
c. The maximum criteria pollutant concentrations from WVDP boiler emissions were located 1,379 meters (4,524 feet) from the WVDP site.
d. Source: EPA 2001. Background concentrations were measured near Buffalo, New York.
e. Annual state standard is 45 to 75 micrograms per cubic meter according to level designation.
f. 24-hour state standard is 250 micrograms per cubic meter.
g. National primary ambient air quality standard.
h. National secondary ambient air quality standard.
i. New York State air quality standard.

concentrations near the WVDP site would be lower. WVDP emissions of nitrogen dioxide and sulfur dioxide are also well below the New York State Department of Environmental Conservation's annual emission cap of 90,700 kilograms (100 tons). Additionally, all other conditions of the permit continue to be met for other criteria pollutants (WVNS 2001). A more detailed analysis of these emissions is included in Section C.9 of this EIS.

3.4 ECOLOGICAL RESOURCES

This section describes the existing ecology at the Project Premises and surrounding areas.

The Western New York Nuclear Service Center lies within the northern hardwood forest region. Its climax community forests are characterized by the dominance of sugar maple, beech, and Eastern hemlock. At present, the site is about equally divided between forestland and abandoned farm fields. Plant communities found on the site have been categorized into five cover types: mixed hardwood forest, pine-spruce community, successional creek bank communities, late oldfield successional areas, and fields-meadows. The plant communities found on the site are characteristic of western New York. The relatively undisturbed nature of large portions of the Western New York Nuclear Service Center has

allowed for natural succession of previous agricultural areas within its boundaries. Because neither the setting nor the former agriculture land use is unique, the forest communities that will eventually develop in the abandoned fields will be similar to others in the region (WVNS 2000b).

In an effort to manage the overpopulation of deer within the Western New York Nuclear Service Center with a goal of reducing the number of deer/vehicle collisions on roads around the Center, NYSERDA has allowed controlled hunting (during the deer hunting season) within the Center premises but not within the Project Premises. A deer management program that was implemented in 1998 resulted in the removal of all the deer within the WVDP premises (WVNS 2000b).

3.4.1 Special Status Species

Animals. The U.S. Department of Interior and the New York State Department of Environmental Conservation maintain lists of threatened and endangered species of wildlife (USFWS 2001; NYSDEC 2001) that are protected under the Endangered Species Act of 1973 and the Fish and Wildlife Coordination Act of 1958. Except for occasional transient individuals, there are no federally listed or proposed endangered or threatened species in the vicinity of the WVDP (USFWS 2001). Based on population range maps, threatened or endangered species with potential for occurring at the Western New York Nuclear Service Center include:

- Birds
  - Common tern - state threatened
  - Bald eagle - federal threatened and state endangered[1]
  - Loggerhead shrike - state endangered
  - Northern harrier - state threatened
  - Osprey - state threatened (recommended for state special concern status)
  - Peregrine falcon - state endangered
  - Piping plover - federal and state endangered
  - Red-shouldered hawk - state threatened (recommended for state special concern status)
  - Spruce grouse - state threatened recently (recommended for state endangered status)

- Mammals
  - Indiana bat - federal and state endangered

- Herptiles
  - Eastern massasauga - state endangered
  - Timber rattlesnake - state threatened

Field investigations in 1990 and 1991 recorded one species (Northern harrier) on the state list of threatened species and six state species of special concern (Cooper's Hawk, upland sandpiper, common raven, Eastern bluebird [recommended for unlisted status], Henslow's sparrow [recommended for threatened status], and vesper sparrow). State of New York "special concern species" are species of fish and wildlife found to be at risk of becoming endangered or threatened in New York (New York Code of Rules and Regulations Title 6, Part 182.2(i)). Typically, species of special concern are those whose populations are declining, often in association with critical habitat loss. All the noted species were observed in areas of the Western New York Nuclear Service Center outside the WVDP. Moreover, none of these threatened species or species of special concern depend on areas within the WVDP for any aspect of their life cycle. Eight birds, two mammals, and six herptiles on the special concern list may potentially

[1] Proposed for removal from the Federal Endangered Species list (USFWS 2001, NYSDEC 2001).

occur at the Center. Four of the listed birds (common loon, Northern raven, common nighthawk, and Eastern bluebird [recommended for unlisted status]) have been recorded at the Center. While suitable habitat for some of these species exists on the site, their presence at the Center (except in the case of the Eastern bluebird) is not due to the presence of critical habitat within the Center. The Eastern bluebird habitat has been artificially created by a substantial bluebird nesting box program; this program has proved very successful. During 1990, approximately 85 birds were fledged from boxes at the Center (WVNS 2000b).

Plants. Field studies from 1982 and 1983 revealed no plant species in the study area on either the state or federal protected plant lists. Field studies conducted by several groups since 1973 have also failed to record any such species. Field studies were conducted in the spring of 1992 to re-examine the Western New York Nuclear Service Center with respect to the current state and federal protected plant lists. No federally threatened or endangered species were identified. One each of New York State endangered and threatened plant species were reported in 1992 within the Western New York Nuclear Service Center (WVNS 2000b). A recent field botanical investigation was conducted in June and August 2000, in an effort to confirm the 1992 reported presence of a New York State endangered plant. No endangered plants were found in the location and area as reported in 1992 (Dames and Moore 2000a and 2000b).

Habitats. The U.S. Department of the Interior, Fish and Wildlife Service, maintains a file of habitat locations designated as critical to the survival of federally listed endangered or threatened species. Based on a review of the most recent listings and contact with the U.S. Fish and Wildlife Service, Cortland, New York field office (June 1997), no such habitats occur in or around the site (WVNS 2000b).

Critical habitats are also designated by the New York State Department of Environmental Conservation, Bureau of Wildlife. The state-designated critical habitats are areas found to be of significance to game and other important wildlife species. Such areas could include seasonally important wintering areas and breeding grounds. A 16-square-kilometer (6-square-mile) area encompassing the entire Western New York Nuclear Service Center site has been classified as critical habitat due to its extensive use as a whitetail deer (a game species) wintering area. The area has been designated because softwood shelter availability is rated intermediate, and food availability is rated good. Five other areas within a 16-kilometer (10-mile) radius of the site are similarly designated (WVNS 2000b).

Examination of state and federal lists of threatened and endangered species and range maps, performance of field sampling and a literature survey, and interviews with local experts provided no indication that any threatened or endangered aquatic flora or fauna exist in the reservoirs, ponds, or streams on the Western New York Nuclear Service Center or in its vicinity. The New York State Department of Environmental Conservation has delineated an Eastern sand darter area on Cattaraugus Creek near Perrysburg, New York. This area is protected to preserve the state-listed endangered species. The Eastern sand darter species is a state-listed threatened species (NYSDEC 2001).

In comments submitted on the draft version of this EIS, the U.S. Fish and Wildlife Service concurred in DOE's determination that no federally listed or proposed endangered or threatened species are known to exist in the project impact area and that no habitat in the project impact area is currently designated or proposed critical habitat in accordance with the provisions of the Endangered Species Act, 16 U.S.C. 1531 et seq.

3.4.2 Wetlands

The Western New York Nuclear Service Center has meadows, marshes, lakes, ponds, bogs, and other areas that are considered functional wetlands. Fifty-one such areas have been identified as "jurisdictional" wetlands, or wetlands that are constrained from dredging or filling actions by Section 404

of the Clean Water Act and by the state Freshwater Wetland Act (WVNS 1992a). These wetlands range in size from 100 square meters (1,100 square feet) to more than 37,000 square meters (398,000 square feet). The total wetlands area is approximately 0.14 square kilometers (0.05 square miles). Eighteen wetlands with a total area of approximately 37,000 square meters (398,000 square feet) were delineated within the Project Premises. The New York State Department of Environmental Conservation has determined that eight wetlands encompassing 81,000 square meters (872,000 square feet) on the south and east sides of the Project Premises and SDA are linked and meet the criteria for a single wetland.

3.4.3 Floodplains

The site's topographic setting renders major flooding unlikely; local run-off and flooding is adequately accommodated by natural and man-made drainage systems in and around the WVDP (WVNS 2000b). Flood levels for the 100-year and the 500-year storms show that no facilities on the Project Premises are in either floodplain (FEMA 1984).

Cattaraugus and Buttermilk creeks lie in deep, narrow valleys. Therefore, the effects on the WVDP of flooding by these creeks are negligible, as supported by historical data. Frank's Creek, Quarry Creek, and Erdman Brook are also located in deep valleys. Historical evidence and computer modeling indicate that flood conditions (including the probable maximum flood) will not result in stream flows overtopping their banks and flooding the plateau. However, indirect damage from the erosional effects of high stream flows and excessive slope saturation during flood conditions is a possibility. The facilities likely to be most affected by bank failure and gully head advancement due to extreme precipitation are lagoons 2 and 3, the NDA, and site access roads in several places (WVNS 2000b).

In the case of a hypothetical flood with peak discharge nearly eight times that of a 100-year flood, computer modeling suggests that floodwaters would overtop Rock Springs Road and some part of the floodwaters would flow across the plant area. Based on the topography in the plant area, it is likely that some portions of the site would experience shallow flows of moderate velocity. Flows would recede quickly, however, since the ditches that drain the site have gradients of up to 5 percent.

3.5 LAND USE AND VISUAL SETTING

The WVDP site consists of approximately 0.9 square kilometer (0.3 square mile) within the 14-square-kilometer (5-square-mile) Western New York Nuclear Service Center. It is located within the Cattaraugus highlands, which is a transitional zone between the Appalachian Plateau to the south and east and the Great Lakes Plain to the north and west. The Cattaraugus highlands range in elevation from 300 to 550 meters (1,000 to 1,800 feet). Deep valleys dissect rather flat-topped plateaus and support a climax plant community of northern hardwoods substantially reduced by agricultural activities (WVNS 2000b).

Slopes range from less than 5 percent to greater than 25 percent, with 5 to 15 percent slopes predominant. The Western New York Nuclear Service Center is drained by Buttermilk Creek, which flows into Cattaraugus Creek. Prior to 1961, much of the Center was cleared for agriculture. As a result, the Center now consists of a mixture of abandoned agricultural areas in various stages of ecological succession, forested tracts, and wetlands and transitional ecotones between these areas. The generally acidic and poorly drained soils influence the occurrence, distribution, and relative abundance of plant communities and their associated faunal species. The region's temperate climate is not prone to natural forest or grassland fires (WVNS 2000b).

The WVDP is on a plateau in the central portion of the Western New York Nuclear Service Center. The WVDP plateau elevation is approximately 430 meters (1,400 feet). The plateau margins are subject to

erosion, especially along the banks of gully and stream drainage ways that cut into the plateau and feed to several named streams that, in turn, feed into Buttermilk Creek (WVNS 2000b).

The Western New York Nuclear Service Center is owned and controlled by NYSERDA. However, by cooperative agreement between NYSERDA and DOE, NYSERDA has agreed not to use or authorize use of the Center in a manner that would interfere with DOE's carrying out the waste solidification project under the West Valley Demonstration Project Act. DOE provides general surveillance and security services for the entire Center, including the WVDP site (WVNS 2000b).

Rock Springs Road, a county road, traverses the Western New York Nuclear Service Center immediately to the west of the WVDP site. If required by an emergency situation at the WVDP, access to this road can be controlled by Cattaraugus County authorities (WVNS 2000b).

The Western New York Nuclear Service Center (Figure 1-1) is fenced with barbed wire. The boundary is patrolled by security officers in vehicles at random several times a day. The WVDP site, also referred to as the Security Area, is surrounded by a high chain-link fence and can be entered only through one of three gates. Access is controlled through the use of magnetically coded picture badges, which also must be displayed at all times within the Security Area (WVNS 2000b).

All project-specific activities are performed within the WVDP site boundary. The New York State licensed LLW burial area (SDA), which is currently inactive, is located within the WVDP site boundary but is not part of the project. Figure 1-2 delineates the Project Premises area and the SDA (WVNS 2000b).

The WVDP is an industrial facility that is visible from several miles away, depending on location. It is well lit at night.

Site Vicinity Land Use

Land use within 8 kilometers (5 miles) of the site is predominantly agricultural (active and inactive) and forestry uses. The major exception is the Village of Springville, which comprises residential/commercial and industrial land uses (WVNS 2000b).

The industries near the site are light-industrial and commercial (either retail or service oriented). A field review of an 8-kilometer (5-mile) radius did not indicate the presence of any industrial facilities that would present a hazard in terms of safe operation of the site.

A similar land-use field review of the Village of Springville and the Town of Concord did not indicate the presence of any significant industrial facilities. Industrial facilities near the Western New York Nuclear Service Center include Winsmith-Peerless Winsmith, Inc., a gear reducer manufacturing facility; Robinson/Fiddlers Green Manufacturing Company, Inc., a plastic housewares and knives manufacturing facility; Ashford Concrete Co., Inc., a readi-mix concrete supplier and concrete equipment manufacturing facility; and Springville Manufacturing, a fabricating facility for air cylinders (WVNS 2000b). The industries within the Village of Springville and the Town of Concord, Erie County, are located in a valley approximately 6 kilometers (4 miles) to the north and east of the WVDP.

3.6 SOCIOECONOMICS

This section briefly describes the socioeconomic environment at the Project Premises and surrounding areas, focusing on the population distribution within 80 kilometers (50 miles) and the identification of minority and low-income populations within this area. Because employment levels are not anticipated to

change under any of the alternatives evaluated in this EIS, there would be no potential to impact the economy of the local area or the region. Therefore, this section is limited to the characterization of population distribution necessary to support the assessment of human health impacts from the proposed actions.

3.6.1 Population

Data collected during the 2000 Census continue to indicate relatively stable overall population levels in the 12 counties surrounding the Western New York Nuclear Service Center. The area within 16 kilometers (10 miles) of the site lies within Cattaraugus and Erie counties. The total population in these counties has decreased by 3.3 percent since the 1990 census, with a loss of 1.9 percent in Erie County and 0.3 percent in Cattaraugus County. The population and median household income of the 12 New York and Pennsylvania counties that lie within 80 kilometers (50 miles) of the site are presented in Table 3-2. Average income in all counties in the region for 2000 was above the poverty level of $17,600 for a family of four (USCB 2001).

Table 3-2. Socioeconomic Conditions in the 12 Counties Surrounding West Valley, New York

County	Population (2000 Census)	Percent Change Since 1990	Persons per Square Mile	Median Household Income
Allegany County, NY	49,927	-1.10	48.5	31,291
Cattaraugus County, NY	83,955	-0.30	64.1	31,348
Chautauqua County, NY	139,750	-1.50	131.6	31,051
Erie County, NY	950,265	-1.90	910.2	36,711
Genessee County, NY	60,370	0.50	122.2	37,859
Livingston County, NY	64,328	3.10	101.8	39,354
Niagara County, NY	219,846	-0.40	420.4	36,218
Steuben County, NY	98,726	-0.40	70.9	33,732
Wyoming County, NY	43,424	2.20	73.2	35,915
McKean County, PA	45,936	-2.50	46.8	32,517
Potter County, PA	18,080	8.20	16.7	30,554
Warren County, PA	43,863	-2.60	49.7	33,863

Source: USCB 2001.

Figures 3-5 and 3-6 present population densities by the 15 points of the compass. Using the Project Premises plant as the center point, concentric, annular rings were drawn from the plant starting in 1-kilometer (0.6-mile) increments out to 5 kilometers (3 miles); a single 5-kilometer (3-mile) increment out to 10 kilometers (6 miles); and 10-kilometer increments out to 80 kilometers (50 miles). Figure 3-5 plots the data within 80 kilometers but, due to scale limitations, it cannot adequately portray data within 5 kilometers; therefore, Figure 3-6 provides data within 5 kilometers. The total calendar year 2000 U.S. population within 80 kilometers was 1,535,963 (USCB 2001). The population in Canada in 2001 within 80 kilometers of the WVDP site was 148,304 (Statistics Canada 2001a, 2001b).

3.6.2 Employment

DOE estimates that the waste management activities evaluated in this EIS would be accomplished by the existing work force with the technical capabilities now in use at the Western New York Nuclear Service Center. Based on the current employment of approximately 500 persons at the Center, no increases in employment would be anticipated to implement any of the alternatives proposed for this project. Evaluations in this EIS are based on continuation of current program funding and employment levels at

the Center for the duration of all three alternatives. Funding for the WVDP and the Center is subject to change on an annual basis, and decreases or increases in the levels of program funding and related increases or decreases in employment levels are always possible.

3.6.3 Public Services

This section describes the public services currently available to the Project Premises and surrounding areas.

3.6.3.1 Human Services

The Cattaraugus County Health Department provides health and emergency services for the entire county, with the closest locations to the Western New York Nuclear Service Center being in the towns of Machias and Little Valley. Other resources providing health care services to the West Valley include Service Medical, Springville Pediatrics, Concord Medical Group, and several private physician practices located in Springville. The closest hospital to the Center is the Bertrand Chaffee Hospital, located approximately 6 kilometers (4 miles) north on Route 39 in Springville. A written protocol for WVDP-related emergency medical needs provides the basis for support in the event of emergency from Bertrand Chaffee Hospital (WVNS 1992b) and the Erie County Medical Center.

3.6.3.2 Community Water Supplies

The Western New York Nuclear Service Center has its own reservoir and water treatment system to service the facility. The system provides potable and facility service water for operating systems and fire protection. A reservoir system created by damming tributaries of Buttermilk Creek south of the Project site is the raw water source for the non-community, non-transient water supply operated by the WVDP. Two outlying buildings outside the Project site have wells that supply sanitary facilities (WVNS 1992b).

The hamlet of the West Valley community water supply is supplied by a spring that is piped to a reservoir. The reservoir supplies water to the hamlet through water mains. The other hamlets in Ashford Township, Ashford Hollow and Riceville, do not have community water supply systems; each individual residence has its own private well. The Village of Springville community water system is supplied by three groundwater wells (WVNS 1992b).

3.6.3.3 Fire and Police Protection

The West Valley Volunteer Hose Company provides fire protection services to the Western New York Nuclear Service Center and the Township of Ashford. Responders are trained and briefed yearly by the Radiation and Safety Department at the Center, and they have some limited training and capability to assist in chemical or radioactive occurrences. The West Valley Volunteer Fire Department has an agreement with the bordering towns' fire departments for mutual assistance in situations needing emergency backup. These neighboring volunteer fire departments are the William C. Edmunds Fire Company (East Otto), Ellicottville Volunteer Fire Department, Machias Volunteer Fire Department, Chaffee-Sardinia Memorial Fire Department, Delevan Volunteer Fire Department, East Concord Volunteer Fire Department, and Springville Volunteer Fire Department (WVNS 1992b).

The New York State Police and the Cattaraugus County Sheriff Department have overlapping jurisdictions for the West Valley area. Any assistance needed may be obtained from the state or county police departments (WVNS 1992b).

3.6.4 Transportation

Transportation facilities near the WVDP include highways, rural roads, a rail line, and aviation facilities. The primary method of transportation in the site vicinity is motor vehicle traffic on the highway system (Figure 3-7).

All roads in Cattaraugus County, with the exception of those within the cities of Olean and Salamanca, are considered rural roads. Rural principal arterial highways are connectors of population and industrial centers. This category includes U.S. Route 219, located 4.2 kilometers (2.6 miles) west of the site; Interstate 86, the Southern Tier Expressway located approximately 35 kilometers (22 miles) south of the site; and the New York State Thruway (I-90), approximately 35 kilometers (22 miles) north of the site. Traffic volume along U.S. 219 between the intersection with NY Route 39 at Springville and the intersection with Cattaraugus County Route 12 (East Otto Road) ranges from a low average annual daily traffic volume of 6,100 to a high volume of 7,500. Seasonal holiday traffic is as much as 128 percent of the average annual daily volume. Approximately 18 percent of the traffic consists of trucks. This route operates at a level of service B, which indicates a stable traffic flow, an operating speed of 80 kilometers per hour (50 miles per hour), and reasonable driver freedom to maneuver (WVNS 2000b).

Rock Springs Road, adjacent to the site on the west, serves as the principal site access road. The portion of this road between Edies Road and U.S. 219 is known as Schwartz Road. Along this road, between the site and the intersection of U.S. 219, are fewer than 24 residences. State Route 240, also identified as County Route 32, is 2 kilometers (1.2 miles) northeast of the site. Average annual daily traffic on the portion of NY Route 240 that is proximate to the site (between County Route 16 - Rosick Hill Road and NY Route 39) ranges from a low of 440 to a high of 2,250 (WVNS 2000b).

The Buffalo and Pittsburgh Railroad line is located within 800 meters (2,600 feet) of the Project Premises. Running from Salamanca, New York, north to Buffalo, the Buffalo and Pittsburgh Railroad line carries a variety of freight and coal north and freight and newly manufactured vehicles south from Canada. As a result of the general decline of heavy industry on the Niagara Frontier and of rail traffic in the northeast, use of this route has also declined. In recent years, the tracks have also experienced several washouts and kindred problems, forcing traffic rerouting for extended periods. While railroad accidents are not uncommon in the United States, the relatively low utilization of the line in the vicinity of the WVDP, coupled with the demographic factors outlined above, tend to minimize the likelihood of an accident with consequences for site operations. This conclusion is reinforced by the presence of a deep ravine with perennial streams between the tracks and the Project Premises. These features reduce the threat of rail accident, which might result in a fire or a spill affecting the project. An airborne threat from a rail accident still exists but is also significantly mitigated by both distance and topography of the site from the rail line. In 1999, the Buffalo & Pittsburgh Railroad completed connection of track between Ashford Junction and Machias, New York. Service by Buffalo and Pittsburgh Railroad on the rail line from the WVDP to Ashford Junction and then to Machias now provides the WVDP rail access (WVNS 2000b).

There are no commercial airports in the site vicinity. The only major aviation facility in Cattaraugus County is the Olean Municipal Airport, located in the Town of Ischua, 34 kilometers (21 miles) southeast of the site. Regularly scheduled commercial air service was terminated at this airport in early 1972. The nearest major airport is Buffalo Niagara International Airport, 55 kilometers (34 miles) north of the site (WVNS 2000b).

3.7 CULTURAL RESOURCES

Cultural resources include but are not limited to:

- Archaeological materials (artifacts) and sites dating to the prehistoric, historic, and ethnohistoric periods currently located on the ground surface or buried beneath it;
- Standing structures that are over 50 years of age or are important because they represent a major historical theme or era;
- Cultural and natural places, select natural resources, and sacred objects that have importance for American Indians; and
- American folklife traditions and arts (WVNS 1994).

The cultural resource potential of the study area was initially considered to be moderate to high for locating unrecorded prehistoric and/or historic resources. Subsequent investigations indicated that these sensitivities were moderated by the extremely high degree of natural erosion and manmade impacts that have occurred in the study area. Cultural resource materials were found and 11 cultural resource sites were identified. The resources included eight historic archaeological sites, two standing structures, and one prehistoric lithic findspot (WVNS 1994).

The Project Premises, in which the proposed waste management actions described in Chapter 2 would take place, contain 114 buildings and structures. The New York State Office of Parks, Recreation, and Historic Preservation has determined that facilities on the Premises are not eligible for inclusion in the *National Register of Historic Places* (SHPO 1995).

3.8 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 Fed. Reg. 7629), directs federal agencies to identify and address, as appropriate, disproportionately high and adverse health or environmental effects of their programs, policies, and activities on minority and low-income populations. Minorities are members of the following population groups: Hispanic or Latino, American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander. A minority population has been defined as a group in which minorities represent over 50 percent of the population. Low-income populations are groups with an annual income below the poverty threshold.

Demographic information obtained from the U.S. Census Bureau was used to identify low-income and minority populations within 80 kilometers (50 miles) of the WVDP site. This radius is consistent with that used to evaluate collective dose for human health effects from the proposed waste management actions, continued operations, and accidents. Census data are compiled at a variety of levels corresponding to geographic areas. In order of decreasing size, the areas used are states, counties, census tracts, block groups, and blocks. A "block" is geographically the smallest census area; is usually bounded by visible features such as streets or streams or by invisible boundaries such as city limits, township lines or property boundaries; and offers the finest spatial resolution. Block data were used for characterization of minority distribution. Because block data are so specific to the individuals within a block (for example, sometimes only one family may live in a block), income data are only available at the block group and above. For this reason, block group data were used to identify low-income populations.

Demographic maps were prepared using 2000 data for minority populations and 1990 census data for low-income populations because income data from the 2000 Census were not available for the preparation of this DEIS. If available they will be incorporated into the FEIS. Figures 3-8 and 3-9 illustrate the distributions for minority and low-income populations, respectively. These figures include information for the affected Canadian population.

Using block data, Figure 3-8 shows census blocks with minority populations that are over 50 percent within 80 kilometers (50 miles). The nearest block occurs on the Cattaraugus Reservation of the Seneca Nation of Indians. As shown in Figure 3-8, there are also two other Native American Indian reservations within 80 kilometers: the Allegheny Reservation (10 to 25 percent minority) and the Tonawanda Reservation (25 to 49 percent minority). There are several other census blocks with minority populations that are over 50 percent in the Buffalo metropolitan area. The total minority U.S. population within the 80-kilometer radial distance from the WVDP site accounts for approximately 13 percent of the population in the area, or about 207,852 people. The racial and ethnic composition of this population is predominantly African-American and Hispanic (USCB 2001).

Using block group data from 1990 (income data were not yet available for 2000), Figure 3-9 (DOE 1996) identifies no block groups with an average income below the 1990 poverty level of $12,670 for a family of four. A further assessment of the census data determined that within the 80-kilometer (50-mile) area, approximately 13 percent of the U.S. population was low-income (DOE 1996). The poverty level established by the Census Bureau for 2000 is $17,600. Because this increase from 1990 is based on the annual increases in the consumer price index, it is likely that the regional percentages of low-income have not changed significantly.

3.9 DESCRIPTION OF OTHER SITES

In addition to activities at WVDP, implementation of the proposed action or alternatives would involve activities at one or more offsite locations. Sections 3.9.1 through 3.9.8 briefly discuss the affected environment at these offsite locations. Information regarding Envirocare was taken from its website (Envirocare 2002). Information regarding most of the potentially affected DOE sites was excerpted from the WM PEIS (DOE 1997a) and the WIPP Supplemental EIS II (DOE 1997b). Information regarding the Yucca Mountain site was excerpted from 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* (DOE 2002). Additional information regarding these sites is available from the documents noted (and which are incorporated here by reference) and in the other NEPA documents described in Section 1.7, Relationship with Other NEPA Documents.

3.9.1 Envirocare

Envirocare is a private facility licensed by the State of Utah (an NRC Agreement State) to accept Class A LLW. Envirocare is also a RCRA facility that is licensed by the State of Utah and the EPA to receive, possess, use, treat, and dispose of mixed waste. Waste material is disposed of in aboveground, engineered disposal cells that meet regulatory disposal requirements. The facility is located in Clive, Utah, approximately 80 kilometers (50 miles) west of Salt Lake City. Located in a remote area with an arid climate (annual precipitation is approximately 170 millimeters [7 inches] per year), Envirocare received its first DOE waste shipments in 1992 and has received waste shipments from 25 DOE sites. Envirocare is located adjacent to a major rail line and U.S. Interstate Highway 80.

3.9.2 Hanford Site

The Hanford Site has a number of facilities, including retired plutonium production reactors, waste management and spent nuclear fuel processing facilities, and nuclear research and development laboratories. The site occupies approximately 1,450 square kilometers (560 square miles) of semi-arid desert land in southeastern Washington State, approximately 192 kilometers (119 miles) southwest of Spokane and 240 kilometers (150 miles) southeast of Seattle. The nearest city, Richland, borders the site on its southeast corner. The site is bounded on the east by the Columbia River, on the west by the Rattlesnake Hill, and on the north by Saddle Mountain. U.S. Highways 12 and 395, Interstate-82, and State Route 240 run near the Hanford Site. Two railroads also connect the area with much of the rest of the nation.

3.9.3 Idaho National Engineering and Environmental Laboratory

Currently, the focus of INEEL is environmental restoration, waste management, research, and technology development. Included within the boundaries of the site are the Naval Reactors Facility and Argonne National Laboratory-West. INEEL occupies 2,300 square kilometers (890 square miles) of desert in the southeastern portion of Idaho, approximately 44 kilometers (27 miles) west of Idaho Falls on the Eastern Snake River Plain. The site is bordered by mountain ranges and volcanic buttes. Land at INEEL is used for DOE operations (about 2 percent of the site), recreation, grazing, and environmental research. About 144 kilometers (90 miles) of paved public highway run through INEEL; railroads also serve the area.

3.9.4 Nevada Test Site

NTS has been the primary location for testing the nation's nuclear explosive devices since 1951. The site occupies 3,500 square kilometers (1,350 square miles) of desert valley and Great Basin mountain terrain in southern Nevada, 105 kilometers (65 miles) northwest of Las Vegas, Nevada. The only permanent onsite water bodies are ponds associated with wastewater disposal and springs. No continuously flowing streams occur on the site. Vehicular access to NTS is provided by U.S. Route 95 from the south. Interstate-15 is the major transportation route in the region. The major railroad in the area is the Union Pacific, which runs through Las Vegas and is located approximately 80 kilometers (50 miles) east of the site.

3.9.5 Oak Ridge National Laboratory

ORNL is part of the ORR, which also contains the Y-12 Plant, the East Tennessee Technology Park (formerly known as K-25), and the Oak Ridge Institute of Science and Education. ORNL's mission is to conduct applied research and development in support of DOE programs in fusion, fission, conservation, and other energy technologies. The ORR occupies 140 square kilometers (34,545 acres) and is located in the City of Oak Ridge, Tennessee, and 32 kilometers (20 miles) west of Knoxville, Tennessee, in the rolling terrain between the Cumberland Mountains and Great Smoky Mountains. The Clinch River and its tributaries are the major surface water features of the area. Interstate-40, located 2.4 kilometers (1.5 miles) south of the ORR boundary, provides the main access to the cities of Nashville and Knoxville. Interstate-75, located 24 kilometers (15 miles) south of the site, serves as a major route to the north and south. Several state routes provide local access and form interchanges with Interstate-40. Railroad service is also available in the area.

3.9.6 Savannah River Site

DOE activities conducted at SRS have involved tritium recycling, support for the nation's space program missions, storage of plutonium on an interim basis, processing of backlog targets and spent nuclear fuel,

waste management, and research and development. SRS is approximately 20 kilometers (12 miles) south of Aiken, South Carolina in southwest-central South Carolina. It is on approximately 800 square kilometers (198,000 acres) of land in a principally rural area, with most of the land serving as a forestry research center. The primary surface water feature is the Savannah River, which borders the site for approximately 32 kilometers (20 miles) to the southwest. Six major streams flow through SRS into the Savannah River, and approximately 190 Carolina bays are scattered throughout the site. Interstate-20 is located approximately 29 kilometers (18 miles) northeast of SRS, providing the nearest interstate access to the site. Railroad service is also available through SRS.

3.9.7 Waste Isolation Pilot Plant

WIPP is located in southeastern New Mexico, about 50 kilometers (30 miles) east of Carlsbad, New Mexico, in a relatively flat, sparsely inhabited plateau with little surface water. The constructed underground facilities include four shafts, an experimental area, an equipment and maintenance area, and connecting tunnels. These underground facilities were excavated 655 meters (2,150 feet) beneath the land surface. The site can be reached by rail or highway. DOE has constructed a rail spur to the site from the Burlington Northern and Santa Fe Railroad 10 kilometers (6 miles) west of the site. The site can also be reached from the north and south access roads constructed for the WIPP project. The south access road intersects New Mexico Highway 128 approximately 7 kilometers (4 miles) to the southwest of WIPP.

3.9.8 Yucca Mountain Repository

The Yucca Mountain Repository has been approved by the President and Congress for further development as the nation's first geologic repository for HLW and spent nuclear fuel. The site, located in the southwest corner of NTS, is in a remote area of the Mojave Desert in southern Nevada, about 160 kilometers (100 miles) northwest of Las Vegas, Nevada. The Yucca Mountain region is sparsely populated and receives only about 170 millimeters (7 inches) of precipitation each year. The area is characterized by a very dry climate, limited surface water, and generally deep aquifers. Shipments of HLW and spent nuclear fuel arriving in Nevada would travel to the Yucca Mountain site by truck or rail. At present, there is no rail access to the Yucca Mountain site. If material were shipped by rail, a branch line that connected an existing main line to the Yucca Mountain site would have to be built or the material would have to be transferred to heavy-haul trucks at an intermodal transfer station and transported over existing highways that might need upgrading.

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