CHAPTER 3

EXISTING ENVIRONMENT

This chapter describes the existing environment at the three sites under consideration in this EA: the CEMRC in Carlsbad (the location where research activities would occur under the Proposed Action), the WIPP site (the location where research activities would occur under the WIPP Alternative), and LANL (the location where research activities would continue under the No Action Alternative). Descriptions of the CEMRC site were obtained from the CEMRC EA (DOE 1995c). Descriptions of the WIPP site were obtained from SEIS-II (DOE 1997) and the *Final Environmental Assessment for Conducting Astrophysics and Other Basic Science Experiments at the WIPP Site* (DOE 2001a). Finally, descriptions of the LANL site were obtained from the *Final Site-Wide Environmental Impact Statement for the Continued Operation of the Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE 1999). The information in this chapter was used as the basis for the human health and environmental analyses presented in Chapter 4.

3.1 REGIONAL SETTING AND LAND USE

This section describes the regional setting and land use at the CEMRC, WIPP, and LANL sites.

3.1.1 CEMRC Site

The CEMRC building (to which the proposed ACRSL would be joined) is located within the city limits of Carlsbad in Eddy County, New Mexico (see Figure 1-1). The CEMRC property is adjacent to the southern portion of the New Mexico State University campus and is approximately 200 meters (656 feet) west of U.S. Highway 285 (also named West Pierce Street). Guadalupe Medical Center, commercial establishments, residences, and the Living Desert State Park are all located within a 0.8-kilometer (0.5-mile) radius of the CEMRC building.

The CEMRC property is somewhat trapezoidal in shape and encompasses approximately 8.9 hectares (22 acres) of moderately disturbed desert scrub habitat. About 725 square meters (7,800 square feet) of land adjacent to the CEMRC building would be impacted by construction of the proposed ACRSL. The northern border of the site is contiguous with the New Mexico State University campus in Carlsbad. Along the common border that runs between these two properties is an arroyo that drains several medium-sized hills and a mesa approximately 0.5 kilometer (0.13 mile) west of the CEMRC property. Atop the mesa, near the head of the arroyo, is a gravel thoroughfare that extends toward the Living Desert State Park, which is located directly northwest of the site.

Land to the west of the CEMRC property is vacant, and land to the south is essentially single-family residential property that includes small tract homes varying in age from 30 to 80 years. Land located between the CEMRC and U.S. Highway 285 is zoned for commercial use. Although the proposed site and surrounding area were once rangeland, none of the land adjacent to or near the proposed site is now used for agricultural purposes.

3.1.2 WIPP Site

The dominant use of the land within 16 kilometers (10 miles) of the WIPP site is grazing (two ranches are located within this distance), with lesser amounts used for oil and gas extraction and potash mining. The closest town, Loving, New Mexico, is 29 kilometers (18 miles) from the site. The federal government and the State of New Mexico administer most of the land within 50 kilometers (30 miles) of WIPP.

Within 80 kilometers (50 miles) of the site, land uses include dryland farming, irrigated farming along the Pecos River, forest, wetland, and urban areas (DOE 1980, 2001a).

A land withdrawal boundary, which defines the WIPP site, encompasses 16 sections (4,146 hectares [10,240 acres]) of federal land in Township 22 South, Range 31 East. This boundary was delineated to extend at least 1.6 kilometers (1 mile) beyond any WIPP underground development (DOE 1990).

On October 30, 1992, the President signed into law the Land Withdrawal Act (Public Law 102-579); it was amended in 1996 (Public Law 104-201). This Act transferred responsibility for management of the WIPP withdrawal area from the Secretary of the Interior to the Secretary of Energy. The land is permanently withdrawn from all forms of entry, appropriation, and disposal under the public land laws and is reserved for uses associated with the purposes of WIPP. However, EPA has determined that the exercise of existing rights under oil and gas leases within the Land Withdrawal Area would not affect WIPP performance and that, therefore, some oil and gas exploration below 1,800 meters (6,000 feet) is allowed under the Land Withdrawal Act. The Act also establishes certain rights and responsibilities, one of which was the preparation of a Land Management Plan (DOE 1993a). The WIPP Land Management Plan established a goal of multiple-use management for the surface area, as well as opportunities for participation in land use planning by the public and by federal, state, and local agencies.

The site has been divided into four areas under DOE control. A chain-link fence surrounds the innermost Property Protection Area, which includes the surface facilities. Surrounding this inner area is the Exclusive Use Area, set off by a barbed-wire fence. Enclosing these areas is the Off-Limits Area, which is unfenced to allow livestock grazing but, like the other two, is patrolled and posted against trespass or other land uses. Beyond the Off-Limits Area, but within the 16-section WIPP site, the land is managed under the public land-use concept of "multiple use." Mining and drilling for purposes other than support of the WIPP project, however, are restricted (DOE 1997). The type of land use surrounding WIPP has not changed substantially since the preparation of SEIS-II, although the level of development has increased.

The proposed location for the new ACRSL on the WIPP site is shown in Figure 2-1.

3.1.3 LANL Site

LANL is located in north-central New Mexico, 40 kilometers (25 miles) northwest of Santa Fe, and 32 kilometers (20 miles) southwest of Española in Los Alamos and Santa Fe Counties. The Santa Fe National Forest, which includes the Dome Wilderness Area, lies to the north, west, and south of the laboratory. The American Indian Pueblo of San Ildefonso and the Rio Grande border the site on the east, and the Bandelier National Monument and Wilderness Area lie directly south.

Land use in this region is linked to the economy of northern New Mexico, which depends heavily on tourism, recreation (such as skiing and fishing), agriculture, and the state and federal governments for its economic base. In general, area communities are small (for example, the town of Los Alamos has under 12,000 residents) and primarily support urban uses such as residential, commercial, light industrial, and recreational facilities. The region also includes American Indian communities such as the lands of the Pueblo of San Ildefonso on LANL's eastern border and six other pueblos clustered nearby.

LANL occupies an area of approximately 111 square kilometers (43 square miles), 86 percent of which is located within Los Alamos County and 14 percent within Santa Fe County. In this western portion of Santa Fe County, development is very limited, occurring primarily on American Indian lands within the Rio Grande Valley. A small isolated portion of Sandoval County borders LANL on the east and is composed entirely of undeveloped lands belonging to the Pueblo of San Ildefonso. A small portion of

Sandoval County also borders LANL on its southwest boundary, with the remainder of the county located to the south, west, and north. In the LANL area, Sandoval County is generally undeveloped and is primarily U.S. Forest Service and U.S. National Park Service lands.

LANL is divided into forty-nine separate TAs, which reflect the site's historical development patterns, regional topography, and functional relationships (Figure 2-2). TA-48 includes the Radiochemistry Facility (TA-48-1) (see Figure 2-3), which is currently conducting experimental activities in actinide chemistry for WIPP.

3.2 GEOLOGY AND HYDROLOGY

This section describes the surface geology and hydrology at the CEMRC, WIPP, and LANL sites.

3.2.1 CEMRC Site

The CEMRC property is situated on a bench of the Ocotillo Hills that slopes to the east toward the Pecos River. The topography of the CEMRC property is typified by a slight west-east downslope and several very shallow, dry washes punctuated by a deeper arroyo running between the proposed ACRSL and the New Mexico State University campus.

The Carlsbad area is classified in the *Uniform Building Code* (ICBO 1990) as Seismic Risk Zone 1. This classification means there is little seismic activity in the region. With the exception of the extreme southeast corner of New Mexico, which is on the western edge of a large region of seismic activity that extends south and east into Texas, there have been very few recorded earthquakes near Carlsbad. On April 14, 1995, an earthquake centered near Alpine, Texas, registered 5.3 on the Richter scale and was felt in Carlsbad and as far north as Roswell, New Mexico. The most prominent concentration of earthquake activity in New Mexico occurs in the Rio Grande rift between Socorro and Belen and north of Los Alamos in central and north-central New Mexico.

The nearest perennial water source is the Pecos River, which is downhill and less than 2 kilometers (1 mile) from the CEMRC. The Pecos River basin represents about one-half of the drainage area of the Rio Grande Water Resources Region. Due to inflow from brine springs (from the Rustler Formation) and slight exceedance of water quality levels of certain heavy metals over water quality standards (DOE 1996), river water is not used for human consumption. Irrigation and livestock watering are the primary uses of the water from the Pecos (DOE 1997). The largest recorded flood on the Pecos River occurred on August 23, 1966, near Malaga, New Mexico, about 58 kilometers (36 miles) from Carlsbad.

3.2.2 WIPP Site

The WIPP site is located in southeastern New Mexico, in the Pecos Valley Section of the Great Plains Physiographic Province. The terrain throughout the province varies from plains and lowlands to rugged canyons. In the immediate vicinity of WIPP, numerous small mounds formed by windblown sand characterize the land surface. A high plains desert environment characterizes the area. Due to the seasonal nature of the rainfall, most surface drainage is intermittent. The Pecos River, 20 kilometers (12 miles) southwest of the WIPP boundary, is a perennial river and the master drainage for the region. Prominent local physiographic features include Nash Draw (a shallow, 8-kilometer- [5-mile-] wide valley open to the southwest and located west of the WIPP site) and the San Simon Swale (a broad depression about 24 kilometers [15 miles] east of the WIPP site) (DOE 1997).

No surface displacement or faulting younger than early Permian has been reported, indicating that tectonic movement since then, if any, has not been noteworthy. The most recent earthquake recorded at

the WIPP site occurred on April 14, 1995; its epicenter was located approximately 240 kilometers (150 miles) south of the site in Alpine, Texas. It was assigned a magnitude of 5.3 and had no effect on any structures at WIPP (DOE 1997).

The Pecos River is the main surface water resource in the WIPP area (Section 3.2.1). The WIPP site has a few small intermittent creeks, the only westward-flowing tributaries of the Pecos River within 32 kilometers (20 miles) north or south of the site (DOE 1997).

3.2.3 LANL Site

LANL and the communities of Los Alamos and White Rock are located on the Pajarito Plateau. The Pajarito Plateau is 13 to 26 kilometers (8 to 16 miles) wide and 48 to 64 kilometers (30 to 40 miles) long, lying between the Sierra de los Valles to the west and the Rio Grande to the east (Purtymun et al. 1995). The Sierra de los Valles lies between the Jemez Mountains and the Pajarito Plateau. The crest of this north-south range of peaks and ridges forms a surface-water divide. The surface of the Pajarito Plateau is divided into numerous narrow, finger-like mesas separated by deep east-to-west oriented canyons that drain toward the Rio Grande (DOE 1999).

A historical catalog has been compiled of earthquakes that have occurred in the LANL area from 1873 to 1991 (Wong et al. 1995). A review of these earthquakes indicates that only six having an estimated magnitude of 5 or greater on the Richter scale have occurred in the LANL region. The most significant seismic event in this period was the 1918 Cerrillos earthquake. This earthquake had an estimated Richter magnitude of 5.5 and was centered approximately 50 kilometers (30 miles) southeast of LANL.

Water is scarce in the semi-arid climate of northern New Mexico where precipitation is variable and stems primarily from summer thunderstorms and winter snowfall. During most of the year in the LANL region, surface water is present only in the Rio Grande and Rito de los Frijoles and in reservoirs. Naturally perennial surface water reaches also are located in Ancho, Pajarito, and Chaquehui Canyons. The canyon-bottom streams within LANL boundaries are mostly dry, and only portions of some streams contain water year-round. Flash floods can occur from the Sierra de Los Valles to the Rio Grande. Sediments moved by stormwater events from upstream, hillsides, or mesa tops occur along most of LANL canyons. Flash floods move the sediments from the canyon bottoms to downstream locations such as Cochiti Lake.

3.3 BIOLOGICAL RESOURCES

This section describes the biological resources at the CEMRC, WIPP, and LANL sites.

A site's biological resources refer to the plant and animal species resident to the area and their supporting habitat. Special concern is given to species whose reproductive populations are dwindling and are in danger of local and possibly global extinction. Federal and state lists of endangered, threatened, and sensitive species are updated regularly for each county of the United States. Resource agencies have developed guidelines for proper surveillance for these species. Should threatened or endangered species be found at a site, mitigation measures must be implemented under consultation with the appropriate agencies.

3.3.1 CEMRC Site

The CEMRC is geographically located within the Chihuahuan Desertscrub Biotic Community. Two arroyos border the property on the north and the south. The northern arroyo, which is well developed and vegetated, lies adjacent to the south-facing slope below the Living Desert State Park. This arroyo consists

predominantly of limestone gravel and bedrock and runs west to north past the entrance to New Mexico State University. The southern arroyo lies between the proposed construction site and the residential area at the southern boundary of the site. This arroyo, although well vegetated, is shallower, much less rocky, and topographically heterogeneous. Dominant soil conditions throughout the area are desert pavement, dry coarse-textured soil, and gravel. The upslope area along the western boundary of the CEMRC area has sparse shrub cover and consists predominantly of limestone rock with sparse gravel and shallow topsoil.

A 100-percent biological survey (DOE 1995c) of the 89,000-square-meter (22-acre) property was conducted for threatened, endangered, and sensitive species of plants and animals. The surveyed area included all connecting roadway, power lines, and arroyos. A 100-percent survey was necessary to determine the presence, distribution, and critical habitat characteristics of all species of special concern listed by federal and State of New Mexico environmental resources agencies. ("Species of special concern" is a collective term used to distinguish species that are threatened, endangered, sensitive, or protected by federal or state regulation, and those species whose presence is rare for the geographic area.) The Endangered Species Act defines critical habitat as that geographic area within the area occupied by the species at the time of its listing, and the habitat that the U.S. Fish and Wildlife Service determines to be essential to the conservation of the species and requires special management consideration or protection.

The 100-percent survey (DOE 1995c) was useful for locating threatened, endangered, sensitive, or unique species of plants that would be affected by construction. The survey also was useful for determining general habitat characteristics of species associated with different elevations, topography, and drainage basin conditions in the arroyos, which are not affected by construction activities, except for those species that flower later in the year such as varieties of the Pincushion cacti (*Coryphanta*, spp.).

In addition, although many species of migrating birds had already left the area at the time of the biological survey (DOE 1995c), suitable nesting, perching, roosting, and foraging habitats for avian species were recorded. All lesser game and nongame species of wildlife were recorded by visual observation of individual animals or by the presence of tracks, scat, burrow systems, or nests. Bones in carnivore scat and those found associated with woodrat nests are particularly good indicators of the small mammal species composition in the local area.

In accordance with recommendations by the New Mexico Department of Game and Fish, all major wildlife communities and unique wildlife habitat within the proposed survey area were delineated, including the presence and distribution of lesser faunal and floral species and their sensitive habitats (for example, travel corridors, foraging areas, and nesting sites).

Of the plant species of special concern that could be potentially present, no threatened, endangered, or sensitive species of plants were observed. Dominant shrubby vegetation associated with the CEMRC site included catclaw (*Acacia greggii*), white thorn (*Acacia constricta*), little leaf sumac (*Rus microphylla*), and algerita (*Berberis trifiolata*). Dominant grass species included sporobulus grass (*Sporobulus* spp.) and muhly grass (*Muhlenbergia* spp.).

There were dense populations of various species of cacti distributed throughout the area, especially along the slopes and shallow drainage of the northern-most arroyo where, in some areas, densities of the Texas rainbow cactus (*Echinocereus dasyacanthus* var. *dasyacanthus* Eng.) reached two plants per square meter (11 square feet). Turk's head cactus (*Echinocactus horizonthalonius*) and robust hedgehog cactus (*Echinocereus fasciculatus*) also were common throughout the proposed construction site.

Of animal species of special concern potentially occurring throughout Eddy County, four taxa (8 percent) were documented. These taxa included primarily small-to large-sized raptoral bird species, including the turkey vulture (*Cathartes aura*), Northern harrier (*Circus cyaneous*), loggerhead shrike (*Lanius ludovicianus*), and American kestrel (*Falco sparverius*).

- Turkey vulture (*Cathartes aura*) (Federal protection under the Migratory Bird Treaty Act; State of New Mexico Protected Raptor) — During the biological survey, two birds were observed soaring overhead. Sensitivity of this species is considered to be low because the species is common and wide-ranging throughout the Southwest, and because of the small number of individual birds observed at the site. In addition, similar construction activities in north- and south-central New Mexico historically have not resulted in documented adverse effects on the biology or ecology of the species.

- Northern harrier (*Circus cyaneous*) (Federal protection under Migratory Bird Treaty Act; State of New Mexico Protected Raptor) — One bird was observed soaring over the proposed project area.

- American kestrel (*Falco sparverius*) (Federal protection under Migratory Bird Treaty Act; State of New Mexico Protected Raptor) — One bird was observed during the biological survey. This species was not common at the site but was observed in association with the powerline bisecting the construction site.

- Loggerhead shrike (*Lanius ludovicianus*) (Federal protection under Migratory Bird Treaty Act and a Category 2 Candidate; no State of New Mexico status) — One bird was observed during the biological survey.

The latter three species are not common to the proposed construction site; however, they were observed at the northern-most border of the property adjacent to the Living Desert. Sensitivity of these species is considered to be low because of the more abundant natural habitat associated with the nearby Living Desert and the small number of birds observed at the site. Further, similar construction activities in north- and south-central New Mexico historically have not resulted in documented adverse effects on the biology, reproduction, or ecology of these or similar species.

Of the plant and animal species present, none is listed as threatened, endangered, or sensitive. Table 3-1 provides a complete list of the threatened and endangered species in Eddy County. Currently, the U.S. Fish and Wildlife Service lists five federally endangered, five federally threatened, and two candidate species for Eddy County (FWS 2001). The New Mexico Department of Game and Fish currently lists 11 endangered and 21 threatened animal species (NMDG&F 2001a), while the New Mexico Rare Plant Technical Council lists 7 endangered and 17 state-sensitive plant species for Eddy County (NMRPTC 1999) (Table 3-1).

3.3.2 WIPP Site

The vegetation at the WIPP site is dominated by shinnery oak (*Quercus havardii*), mesquite (*Prosopsis grandulosa*), sand sage (*Artemisia filifolia*), and smallhead snakeweed (*Gutierrezia microcephala*) (DOE 1990).

Ninety-eight species of birds are known to inhabit or migrate through the area (DOE 1993b, 1994a, and 1995a). The Harris hawk (*Parabuteo unicinctus*), loggerhead shrike (*Lanius ludovicianus*), and black-throated sparrow (*Anphispiza bilineata*) are resident birds.

Table 3-1. State of New Mexico Threatened and Endangered Species (Eddy County)

Scientific Name	Common Name	Status
Birds		
Haliaeetus leucocephalus	Bald eagle	Federal and state threatened
Sterna antillarum	Interior least tern	Federal and state endangered
Strix occidentalis lucida	Mexican spotted owl	Federal threatened
Falco femoralis septentrionalis	Northern aplomado falcon	Federal and state endangered
Empidonax traillii extimus	Southwest willow flycatcher	Federal and state endangered
Pelecanus occidentalis carolinensis	Brown pelican	Federal and state endangered
Phalacrocorax brasilianus	Neotropic cormorant	State threatened
Falco peregrinus anatum	American peregrine falcon	State threatened
Charadrius melodus circumcinctus	Piping plover	Federal threatened, state endangered
Columbina passerina pallescens	Common ground dove	State endangered
Cynanthus latirostris magicus	Broad-billed hummingbird	State threatened
Vireo bellii	Bell's vireo	State threatened
Vireo vicinior	Gray vireo	State threatened
Ammodramus bairdii	Baird's sparrow	State threatened
Passerina versicolor	Varied bunting	State threatened
Tympanuchus pallidicinctus	Lesser prairie chicken	Federal candidate
Mammals		
Vulpes velox velox	Swift fox	Federal candidate
Cynomys ludovicianus arizonensis	AZ Black-tailed prairie dog	Federal candidate
Cryptotis parva	Least shrew	State threatened
Reptiles		
Pseudemys gorzugi	Western river cooter	State threatened
Sceloporus arenicolus	Sand dune lizard	State threatened
Lampropeltis alterna	Gray-banded kingsnake	State endangered
Nerodia erythrogaster transversa	Blotched water snake	State endangered
Thamnophis proximus diabolicus	Arid land ribbon snake	State threatened
Crotalus lepidus lepidus	Mottled rock rattlesnake	State threatened
Fish		
Notropis simus pecosensis	Pecos bluntnose shiner	Federal and state threatened
Gambusia nobilis	Pecos gambusia	Federal and state endangered
Astyanax mexicanus	Mexican tetra	State threatened
Cycleptus elongatus	Blue sucker	State endangered
Moxostoma congestum	Gray redhorse	State threatened
Cyprinodon pecosensis	Pecos pupfish	State threatened
Etheostoma lepidum	Greenthroat darter	State threatened
Percina macrolepida	Bigscale logperch	State threatened
Invertebrates		
Popenaias popeii	Texas hornshell	State endangered
Pyrgulopsis pecosensis	Pecos pyrg snail	State threatened
Vertigo ovata	Ovate vertigo snail	State threatened
Plants		
Coryphantha (Escobaria) sneedii var. *leei*	Lee pincushion cactus	Federal threatened, state endangered
Amsonia tharpii	Tharp's bluestar	State endangered
Coryphantha scheeri	Scheer's pincushion cactus	State endangered
Echinocereus lloydii	Lloyd's hedgehog cactus	State endangered
Echinocereus fendleri var. *kuenzleri*	Kuenzler hedgehog cactus	Federal endangered
Coryphantha sneedii var. *sneedii*	Sneed pincushion cactus	Federal endangered
Eriogonum gypsophilum	Gypsum wild buckwheat	Federal threatened, state endangered
Hexalectris nitida	Shining coral-root	State endangered

Table 3-1. State of New Mexico Threatened and Endangered Species (Eddy County) (continued)

Scientific Name	Common Name	Status
Plants (continued)		
Hexalectris spicata	Crested coral-root	State endangered
Aquilegia chrysantha var. chaplinei	Chapline's columbine	State sensitive
Astragalus gypsodes	Gypsum milkvetch	State sensitive
Astragalus waterfallii	Waterfall milkvetch	State sensitive
Chaetopappa hersheyi	Hershey's cliff daisy	State sensitive
Ericameria nauseosus ssp. *texensis*	Guadalupe rabbitbrush	State sensitive
Eustoma exaltatum	Catchfly gentian	State sensitive
Hedeoma apiculata	McKittrick pennyroyal	State sensitive
Justicia wrightii	Wright's justicia	State sensitive
Penstemon cardinalis spp. *regalis*	Guadalupe penstemon	State sensitive
Philadelphus hitchcockianus	Hitchcock's mockorange	State sensitive
Polygala rimulicola	Guadalupe milkwort	State sensitive
Proboscidea sabulosa	Dune unicorn plant	State sensitive
Pseudocymopterus longiradiatus	Desert parsley	State sensitive
Sibara grisea	Gray sibara	State sensitive
Sophora gypsophila var. *guadalupensis*	Guadalupe mescal bean	State sensitive
Streptanthus sparsiflorus	Guadalupe jewelflower	State sensitive
Valeriana texana	Texas tobacco root	State sensitive

Source: FWS 2001, NMDG&F 2001a, NMRPTC 1999

Small mammals that are common at the WIPP site include the black-tailed jackrabbit (*Lepus californicus*), the desert cottontail (*Sylvilagus auduboni*), and Ord's kangaroo rat (*Dipodomys ordii*). Mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*) are among the larger mammals that occur at the site. Stock watering ponds and tanks provide aquatic habitat for yellow mud turtles (*Kinosteron flarescens*) and tiger salamanders (*Ambystoma tigrinum*) (DOE 1993b, 1994a, 1995a).

In SEIS-I (DOE 1990), DOE concluded that there was no critical habitat at the site for terrestrial species identified as endangered, threatened, or candidate species by either the U.S. Fish and Wildlife Service or the New Mexico Department of Game and Fish.

In 1996, DOE conducted a survey on the WIPP Land Withdrawal Area and associated lands to investigate the potential for impacts to rare, threatened, endangered, or sensitive plant or animal species as a result of the potential actions presented in SEIS-II (DOE 1997). The 1996 survey included an assessment of suitable habitats for these species. No federal- or state-listed species were found on the WIPP Land Withdrawal Area during the survey. Ongoing wildlife research projects and general wildlife management programs are conducted by personnel at Westinghouse TRU Solutions LLC to ensure disturbance and encroachment on wildlife habitat are minimized (DOE/WIPP 2001).

3.3.3 LANL Site

LANL is located in a region of diverse landform, elevation, and climate—features that have contributed to producing in New Mexico one of the world's most diversified plant and animal communities. The combination of features, including past and present human use, has given rise to correspondingly diverse, and often unique, biological communities and ecological relationships in Los Alamos County and the region as a whole. Plant communities range from urban and suburban areas to grasslands, wetlands, shrublands, woodlands, and mountain forest, and provide habitat for a wealth of animal life. This richness of animal life includes herds of elk and deer, bear, mountain lions, coyotes, rodents, bats, reptiles, amphibians, invertebrates, and a myriad of resident, seasonal, and migratory bird life. In addition, numerous threatened and endangered species, species of concern, and other sensitive species use

LANL resources. Because of restricted access to LANL lands and management of the contiguous Bandelier National Monument for natural biological systems, much of the region provides a refuge for wildlife.

The interfingering of deep, steep-sided canyons with narrow mesas that descend the east slopes of the Jemez Mountains and an inversion of the normal altitudinal distribution of vegetation communities along the canyon floors result in many transitional overlaps of plant and animal communities and increased biological diversity. It is this dominant feature of the Pajarito Plateau, in combination with an elevational descent of almost 1.6 kilometers (1 mile) from mountain ridges to the Rio Grande, that has made a major contribution to the richness and diverse ecological relationships of the species that characterize the Pajarito Plateau.

From the western crest of the Pajarito Plateau to the Rio Grande, the six vegetation zones that characterize the LANL region consist of montane grasslands, spruce-fir forest, mixed-conifer forest (with aspen forest), ponderosa pine forest, pinion-juniper woodland, and juniper savannah. The montane grassland, spruce-fir, and mixed conifer vegetation zones are located primarily west of LANL with little representation on the LANL site. The vegetation zones and associated ecotones provide habitat, including breeding and foraging territory, and migration routes for a diversity of permanent and seasonal wildlife species. This diversity is illustrated by the presence of over 900 species of vascular plants; 57 species of mammals; 200 species of birds, including 112 species known to breed in Los Alamos County; 28 species of reptiles; 9 species of amphibians; over 1,200 species of arthropods; and 12 species of fish (primarily found in the Rio Grande, Cochiti Lake, and the Rito de los Frijoles). No fish species have been found within LANL boundaries.

Currently, the U.S. Fish and Wildlife Service lists two federally endangered, two federally threatened, and one federal candidate species for Los Alamos County (FWS 2001). The New Mexico Department of Game and Fish currently lists two endangered and six threatened animal species (NMDG&F 2001b), while the New Mexico Rare Plant Technical Council lists one state-sensitive plant species for Los Alamos County (NMRPTC 1999) (Table 3-2). LANL has a biology team that works with DOE to maintain the Laboratory's compliance with environmental legislation. This team maintains an active monitoring program that records listed species found on LANL lands. A Habitat Management Plan has been developed, minimizing impacts on threatened and endangered species as well as streamlining the compliance process.

Table 3-2. State of New Mexico Threatened and Endangered Species (Los Alamos County)

Scientific Name	Common Name	Status
Birds		
Haliaeetus leucocephalus	Bald eagle	Federal and state threatened
Strix occidentalis lucida	Mexican spotted owl	Federal threatened
Empidonax traillii extimus	Southwest willow flycatcher	Federal and state endangered
Falco peregrinus anatum	American peregrine falcon	State threatened
Cynanthus latirostris magicus	Broad-billed hummingbird	State threatened
Vireo vicinior	Gray vireo	State threatened
Coccyzus americanus	Yellow-billed cuckoo	Federal candidate
Grus americana	Whooping crane	Federal and state endangered
Mammals		
Euderma maculatum	Spotted bat	State threatened
Amphibians		
Plethodon neomexicanus	Jemez Mountains salamander	State threatened
Plants		
Delphinium sapellonis	Sapello Canyon larkspar	State sensitive

Source: FWS 2001, NMDG&F 2001b, NMRPTC 1999

3.4 CULTURAL RESOURCES

This section describes the cultural resources at the CEMRC, WIPP, and LANL sites.

Cultural resources are any prehistoric or historic sites, buildings, structures, districts, or other places or objects considered as being important to a culture, subculture, or community for scientific, traditional, or religious purposes. Regulatory guidelines for the identification and evaluation of cultural resources are found in the *National Historic Preservation Act* and its implementing regulations, 36 CFR Part 800 (revised). Standards and criteria for evaluating potential impacts to cultural resources in the environmental analysis process are based on the system developed for the National Register of Historic Places. The National Register is a listing of architectural, historical, archaeological, and cultural sites that have been designated as having local, state, or national importance.

Each of the proposed alternatives would occur at existing sites and facilities; therefore, baseline cultural resources conditions for areas that would be potentially impacted by the proposed ACRSL facility were derived from recent NEPA documentation for each site. In addition, the most recent New Mexico Historic Preservation Department listings of state and national registered sites for Los Alamos and Eddy Counties were checked.

3.4.1 CEMRC Site

A cultural resources field inventory was completed for the entire CEMRC property prior to construction of the facility. No prehistoric or historic archaeological sites or other cultural resources were encountered other than some instances of recent historic trash scatter. The historic trash was not considered eligible for the National Register of Historic Places, and the property was deemed to be free of cultural resources (DOE 1995c).

3.4.2 WIPP Site

The cultural resources affected environment at WIPP is summarized in SEIS-II (DOE 1997) and updated in the Astrophysics EA (DOE 2001a). Previous cultural resources investigations at the WIPP Land Withdrawal Area have been conducted for a little over one-third of the property; sixty prehistoric and historic archaeological sites and ninety-one isolated artifact occurrences have been recorded. Several of the archaeological sites have been evaluated as being eligible for listing on the National Register of Historic Places. To date, no Native American traditional cultural properties or other resources with traditional value have been identified at WIPP.

All of the previously recorded archaeological sites are located at a distance from the fenced WIPP site in which the new ACRSL facility would be built. This specific area was determined to be free of significant cultural resources properties prior to WIPP construction.

3.4.3 LANL Site

The cultural resources affected environment at LANL is summarized in the LANL SWEIS (DOE 1999). Management of cultural resources at LANL is complex because the area was intensively occupied throughout the prehistoric period and continues to hold important cultural values for the many Native American communities in the area. Similarly, the historic period nuclear energy resources, including the town of Los Alamos and LANL itself, are considered very significant in U.S. history. LANL was listed on the National Register of Historic Places in 1966 and on the New Mexico State Register in 1968.

Archaeological surveys have been conducted for about 75 percent of the LANL property, resulting in the recording of nearly thirteen hundred prehistoric and historic archaeological sites. A large majority of these have been evaluated as either eligible or potentially eligible for inclusion on the National Register of Historic Places. Native American groups have also identified more then fifty traditional cultural properties during the consultation between DOE and tribes.

Resources associated with the World War II-Manhattan Project and subsequent Cold War periods are presently being inventoried and evaluated at LANL. Building TA-48-1, the location of the ACRSL under the No Action Alternative, was constructed in 1957 and is included in a programmatic agreement between LANL and the New Mexico State Historic Preservation Office and Advisory Council on Historic Preservation as one that needs to be evaluated and placed into a historic thematic context. According to the LANL Cultural Resource Management Team (Masse 2002), TA-48-1 would likely be found significant because other similar buildings that have been evaluated have been associated with important research activities at the Laboratory.

3.5 SOCIOECONOMIC RESOURCES

This section describes the socioeconomic resources at the CEMRC, WIPP, and LANL sites. For the LANL description, the most recent source of data was the 1990 U.S. Census; however, that discussion will be updated if more recent data are published before the EA is finalized.

3.5.1 CEMRC Site

Both the Proposed Action to put the new ACRSL facility adjacent to the CEMRC and the alternative to locate the new facility at WIPP would take place in Eddy County, New Mexico. Thus, a description of the socioeconomic resources in Eddy County prepared as part of the Astrophysics EA (DOE 2001a) is directly relevant to both the Proposed Action and the WIPP Alternative.

The 2000 population estimate for Eddy County was 51,658, of which approximately 42 percent were minorities. For Eddy County, the 1997 (model-based) median household money income was approximately $31,228. The 1997 (model-based) population of Eddy County living below the poverty level was about 18.6 percent.

Economic figures for Eddy County in 1997 indicate a county-wide workforce of 16,368 employees, the majority of which were employed in the mining (17 percent), manufacturing (10 percent), retail trade (22 percent), or services (28 percent), especially health services (12.5 percent) industries. Payroll income for the county was approximately $416 million, the majority of which was earned in the mining (27 percent), manufacturing (16 percent), retail trade (11 percent), transportation and public utilities (13 percent), and service (19.5 percent) industries. More than half of the income in service industries came from the health services sector, and two-thirds of the income in transportation came from the trucking sector (U.S. Bureau of the Census 2000).

3.5.2 WIPP Site

Both the alternative to locate the new facility at the WIPP and the Proposed Action to put the new ACRSL facility adjacent to the CEMRC would take place in Eddy County, New Mexico; therefore, the description of the socioeconomic resources presented above for Eddy County (Section 3.5.1) is directly relevant to the WIPP Alternative. However, the WIPP Alternative is also very close to Lea County. Thus, a description of the socioeconomic resources in Lea County prepared as part of the Astrophysics EA (DOE 2001a) is also relevant to the WIPP Alternative.

The 2000 population estimate for Lea County was 55,511, of which approximately 46 percent were minorities (U.S. Bureau of the Census 2002). For Lea County, the 1997 (model-based) median household money income was approximately $31,337. The 1997 (model-based) population of Lea County living below the poverty level was about 20.7 percent (U.S. Bureau of the Census 2002).

Economic figures for Lea County in 1997 indicate a county-wide workforce of 15,759 employees, the majority of which were employed in the oil and gas (13 percent), retail trade (23 percent), or services (28 percent) industries. Payroll income for the county was approximately $358 million, the majority of which was earned in the oil and gas (19 percent), transportation and public utilities (13 percent), retail trade (13 percent), and service (23 percent) industries. About 40 percent of the income in service industries came from the health services sector (U.S. Bureau of the Census 2000).

3.5.3 LANL Site

The geographic area most affected by changes at LANL is the region comprising Los Alamos, Rio Arriba, and Santa Fe Counties. Approximately 90 percent of LANL-affiliated employees reside in the counties of Los Alamos, Rio Arriba, and Santa Fe. This tri-county region includes the following (LANL 1996):

- The communities of Los Alamos and White Rock;
- The cities of Santa Fe and Española;
- The American Indian Pueblos of San Ildefonso, Santa Clara, San Juan, Nambe, Pojoaque, Tesuque, and part of the Jicarilla Apache Indian Reservation; and
- Several small villages, unincorporated communities, and widely dispersed farm and ranch holdings.

The 2000 populations for the three counties around LANL were 18,343 for Los Alamos; 41,190 for Rio Arriba; and 129,292 for Santa Fe (U.S. Bureau of the Census 2002). In 2000, the percentage of minorities for each of these same three counties was 17.9 percent for Los Alamos, 86.4 percent for Rio Arriba, and 54.5 percent for Santa Fe.

For each of the three counties around LANL, the 1997 (model-based) median household money income and the 1997 (model-based) population of Lea County living below the poverty level were (U.S. Bureau of the Census 2002):

- Los Alamos County – median household income was $74,253 and percentage of persons living below poverty level was 2.7 percent
- Rio Arriba County – median household income was $25,036 and percentage of persons living below poverty level was 22.5 percent
- Santa Fe County – median household income was $37,882 and percentage of persons living below poverty level was 11.9 percent

In 1989, Los Alamos had the highest family and per capita incomes of all New Mexico counties. In fact, the median family income in Los Alamos was the highest of all counties in the United States (DOC 1996). In 1989, approximately 2 percent of Los Alamos County, 13 percent of Santa Fe County, and nearly 28 percent of Rio Arriba County populations lived below the poverty line, which had a threshold of $12,674 for a family of four (DOC 1993). Since 1989, the percentage of those living below

the poverty line is believed to have remained the same in Los Alamos and Santa Fe Counties and to have risen slightly in Rio Arriba County. The 1996 poverty threshold was $15,600 for a family of four and $7,740 for an unrelated individual (61 Fed. Reg. 42) (DOE 1999).

3.6 AIR QUALITY

This section describes the air quality at the CEMRC, WIPP, and LANL sites. The Clean Air Act requires EPA to set National Ambient Air Quality Standards for pollutants that are considered harmful to public health and the environment. The Act establishes two types of air quality standards, primary and secondary. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Pursuant to the Clean Air Act, EPA established National Ambient Air Quality Standards for six pollutants considered to be key indicators of air quality: carbon monoxide, nitrogen dioxide, ozone, lead, sulfur dioxide, and particulate matter (that is, airborne particles including dust, smoke, fumes, mist, sprays, and aerosols). These six air quality indicators are called criteria pollutants. The EPA also established separate National Ambient Air Quality Standards for two categories of particulate matter: (1) particles with an aerodynamic diameter less than 10 micrometers (PM_{10}), and (2) particles with an aerodynamic diameter less than 2.5 micrometers ($PM_{2.5}$).

Areas that meet the National Ambient Air Quality Standards are said to be in "attainment." The air quality in attainment areas is managed under the Prevention of Significant Deterioration Program of the Clean Air Act. The goal of this program is to maintain a level of air quality that continues to meet the standards. Areas that do not meet one or more of the standards are designated as "nonattainment" areas. For regulatory purposes, remote or sparsely populated areas that have not been monitored for air quality are listed as "unclassified" and are considered to be in attainment.

The State of New Mexico has also established ambient air quality standards for carbon monoxide, sulfur dioxide, nitrogen dioxide, total suspended particulates (not PM_{10}), hydrogen sulfide, and total reduced sulfur. The State also has established guidelines for toxic air pollutants in the New Mexico Air Quality Regulations, Title 20 (Environmental Protection), Chapter 2 (Air Quality Standards-Statewide), Part 72 (Construction), Subpart 400 (Permits for Toxic Air Pollutant Emissions-Preamble) (NMED 2002).

3.6.1 CEMRC Site

EPA has classified Eddy County, New Mexico, including the city of Carlsbad (where the CEMRC is located), as an attainment area for all six criteria pollutants under the National Ambient Air Quality Standard (DOE 2001a). Carlsbad is also in a Class II Prevention of Significant Deterioration area, and any new sources of emissions would have to adhere to the standards for such an area.

Carlsbad is in the EPA Pecos-Permian Basin Intrastate Air Quality Control Region. Air quality regulations are administered by the New Mexico Environment Department. According to the Department's Air Quality Control Regulation 706, *Air Quality Management Areas,* the region is in compliance with State air quality standards (DOE 1995c).

If the proposed ACRSL facility were to become operational, routine laboratory sample processing may generate small quantities of chemical emissions in addition to those currently emitted by the existing CEMRC laboratory. Chemical emissions are regulated by the New Mexico Environment Department's Air Quality Bureau, and radiological emissions are regulated by the Department's Hazardous and Radioactive Materials Bureau. The New Mexico Environment Department has preconstruction notification requirements and operating permit requirements for facilities that have the potential to exceed

toxic air pollutant emission standards or for radiological emissions expected to exceed 10 millirem (mrem) per year or 1 x 10^{-5} Sievert per year. Based on calculations in the CEMRC EA (DOE 1995c), the use rates of volatile solvents and reagents do not result in emission rates or concentrations that would require permitting under air quality regulations. Similarly, although the CEMRC is permitted to emit very low levels of radionuclides, it has never reported any release of radionuclides to the atmosphere.

3.6.2 WIPP Site

As indicated above, EPA has classified Eddy County (where WIPP is located) as an attainment area for all six criteria pollutants under the National Ambient Air Quality Standards (DOE 2001a). WIPP is also in a Class II Prevention of Significant Deterioration area, and any new sources of emissions would have to adhere to the standards for such an area.

Air quality monitoring data collected since 1990 are summarized in annual WIPP site environmental reports. On October 30, 1994, DOE, after notifying EPA, ceased to monitor criteria air pollutants at WIPP because there was no longer a regulatory requirement to do so. WIPP has completed inventories of potential pollutants and emissions in accordance with EPA and New Mexico Air Quality Control Regulations. Based on these inventories, WIPP has no permitting or reporting requirements at this time except for those applying to two primary backup diesel generators. An operating permit was issued under the New Mexico Air Quality Control Regulations for the two diesel generators in 1993 (DOE 1995a). These diesel generators are assumed to emit four pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, and PM_{10}) and have strict limits on emissions for these pollutants.

3.6.3 LANL Site

According to the LANL SWEIS (DOE 1999), EPA has classified Los Alamos County, New Mexico (where LANL is located) as an attainment area for all six criteria pollutants under the National Ambient Air Quality Standards. Criteria pollutants released from LANL operations are emitted primarily from combustion sources such as boilers, emergency generators, and motor vehicles. Toxic air pollutant emissions from LANL activities are released primarily from laboratory, maintenance, and waste management operations. Unlike a production facility with well-defined operational processes and schedules, LANL is a research and development facility with great fluctuations in both the types of chemicals emitted and their emission rates. DOE has a program to review all new operations for their potential to emit toxic air pollutants. Because past reviews demonstrate that LANL's toxic air pollutant emissions are below the state's permitting threshold limits, DOE is not required to monitor LANL's toxic air pollutant emissions. However, toxic air estimates were made based on chemical uses at LANL and assumed stack and building parameters.

Only a limited amount of monitoring of the ambient air has been performed for non-radiological air pollutants within the LANL region. The New Mexico Environment Department operated a DOE-owned ambient air quality monitoring station adjacent to Bandelier National Monument between 1990 and 1994 to record sulfur dioxide, nitrogen dioxide, ozone, and PM_{10} levels. LANL and the New Mexico Environment Department discontinued operation of this station in FY95 because recorded values were well below applicable standards.

Some LANL operations may result in the release of radioactive materials to the air from point sources such as stacks or vents or from nonpoint (or area) sources such as the radioactive materials in contaminated soils. The concentration of radionuclides in point-source releases is continuously sampled or estimated based on knowledge of the materials used and the activities performed. Non-point-source emissions are directly monitored, sampled, or estimated from airborne concentrations outdoors.

Radionuclide emissions from LANL point and non-point sources include several radioisotopes such as tritium, uranium, strontium-90, and plutonium.

Radiological air emission requirements are specified in 40 CFR 61, Subpart H, "National Emissions Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities." Upon enactment of Subpart H, LANL began assessing its existing air monitoring program in light of these new regulations (enacted in December 1989) and investigating the means to achieve compliance with those regulations. Between 1996 and 1999, DOE and the University of California operations at LANL were in full compliance.

3.7 WASTE GENERATION AND DISPOSAL

Construction and operation of an actinide chemistry laboratory would lead to new waste generation. These waste forms would range from the sanitary solid and liquid wastes that would be associated with any facility to the hazardous and radioactive wastes that would be generated from the actinide chemistry experiments. These wastes could result in an added burden to the existing storage and disposal systems that are currently emplaced. Sanitary wastes are generally disposed of via municipal sewers and treated at municipal waste treatment facilities. Care must be taken to ensure hazardous and radioactive wastes do not enter these systems as they could disrupt the waste treatment processes and pose public exposure issues. Hazardous and radioactive waste storage and disposal is highly regulated on municipal, state, and federal levels, and the chosen alternative must meet many licensing and permit criteria. This section describes existing waste generation and disposal at the CEMRC, WIPP, and LANL sites.

3.7.1 CEMRC Site

This section describes the waste generation and disposal practices at the CEMRC.

3.7.1.1 Sanitary and Solid Wastes

Disposal of sanitary waste and solid waste is provided by the City of Carlsbad. The CEMRC is connected to the Municipal Sewage Treatment Facility, which has an excess capacity of approximately 3.8 million liters (1 million gallons) per day and manages the wastewater discharge of 6,600 liters (1,750 gallons) per day by the CEMRC.

The CEMRC subscribes to the City of Carlsbad for solid waste disposal services of an estimated 5,200 kilograms (11,500 pounds) of sanitary solid waste annually. Some paper and cardboard are recycled. The estimated quantity of non-hazardous solid waste is only a small percentage of the waste handled monthly by the City of Carlsbad and does not include wastes that are regulated in accordance with the hazardous waste regulations of the New Mexico Environment Department (Webb 2002b).

3.7.1.2 Hazardous and Radiological Wastes

Routine laboratory operations generate small quantities of chemical and low-level radiological wastes. These materials are managed and handled in accordance with established New Mexico State University procedures to satisfy New Mexico Environment Department regulatory requirements. None of these wastes is discharged to the Carlsbad city sewer system. Typical sources of wastes include residues from empty containers, analyses and samples, off-specification analytical standards, sample intermediates, cleaning solutions, and photographic chemicals (DOE 1995c).

Typical waste generation at the CEMRC is 150 kilograms (330 pounds) per year radioactive waste, 250 kilograms (551 pounds) per year industrial waste (non-Resource Conservation and Recovery Act

[RCRA]), and 35 kilograms (77 pounds) per year hazardous waste (Webb 2002b). These amounts are managed by conventional waste-handling means; for example, wastes are packaged appropriately and transported by a commercial hazardous waste disposal service to an EPA- or state-permitted disposal site.

Currently, the maximum quantities of hazardous wastes the CEMRC can accumulate, which are based on an estimate in which approximately one-half of the total chemical inventory would be used and then disposed of as hazardous waste every 6 months, are:

- 136 kilograms (300 pounds) of solvents
- 27 kilograms (60 pounds) of chloroform and carbon tetrachloride
- 9 kilograms (20 pounds) of hydrofluoric acid
- 182 kilograms (401 pounds) of organic/inorganic acids

These quantities are conservative because most chemicals are consumed or neutralized in sample processing or analytical procedures. Sulfuric acid, for example, is highly reactive and is neutralized during acid digestion of sample constituents (DOE 1995c).

A 6-month waste accumulation would consist of three 55-gallon drums and three 5-gallon containers as follows:

- Solvents in one 55-gallon drum
- Chloroform and carbon tetrachloride in two 5-gallon containers
- Hydrofluoric acid in one 5-gallon container
- Organic and inorganic acids in two 55-gallon drums

At this generation rate, the CEMRC qualifies as a Conditionally Exempt Small Quantity Generator. Such generators are exempt from most formal reporting requirements, such as obtaining a waste generator registration number from the New Mexico Environment Department, but they are required to manage waste in accordance with requirements specified in the Department's regulations.

The CEMRC also generates small quantities of radiological waste. The amount of radiological waste is dependent upon the number and types of procedures performed at the CEMRC. If the total activity levels for all radionuclides are combined, approximately 35 microcuries of radioactive waste are disposed of each year. Liquids are allowed to evaporate to minimize the quantity of waste that would require disposal. A permitted radiological waste disposal service transports this material to a permitted disposal site.

The CEMRC has appointed a hazardous and radiological waste coordinator to ensure operations are conducted safely in accordance with New Mexico Environment Department requirements. The coordinator has established a plan that includes the following components:

- A hazardous waste management plan that incorporates radiological waste handling in accordance with the CEMRC's Radiation Safety Manual;

- A recordkeeping system that includes information on manifesting, marking and labeling containers, and tracking waste;

- A storage/accumulation area in a convenient, accessible location in the laboratory; and

- A storage area with spill-containment equipment, packing and absorption materials, spill-control materials, fire extinguishers, and personal protective equipment.

Bioassay analyses may involve the collection of 24- to 48-hour urine specimens and collection of various plant and animal tissues. These types of samples do not meet the definition of regulated medical wastes according to the EPA definition found in 40 CFR Part 259 (EPA 1991). These wastes are disposed of as part of the sanitary and solid wastes generated by the CEMRC.

3.7.2 WIPP Site

This section describes the waste generation and disposal practices at WIPP.

3.7.2.1 Sanitary and Solid Wastes

The WIPP facility has a New Mexico Environment Department Discharge Permit for a wastewater lagoon facility. The daily discharge limit to the lagoon is 87,000 liters (23,000 gallons) per day of domestic wastewater, 7,570 liters (2,000 gallons) per day of miscellaneous non-hazardous water, and 30,283 liters (8,000 gallons) per day of miscellaneous non-hazardous brine and water. WIPP currently does not require National Pollutant Discharge Elimination System permitting. There is no point source discharge to waters in the United States. A National Pollutant Discharge Elimination System storm water permit would be needed for construction activities on sites larger than 2 hectares (5 acres). The WIPP site generated 751 cubic meters (982 cubic yards) of sanitary solid waste during FY1999 (DOE 2001b).

3.7.2.2 Hazardous and Radiological Wastes

In FY1999, 30 cubic meters (39 cubic yards) of RCRA hazardous waste was generated; this was a reduction from 80 cubic meters (105 cubic yards) generated in 1998 (DOE 2001b). These wastes typically included absorbed liquids from spills and routine usage of maintenance products, including oils, coolants, and solvents. Safe storage of these materials and their associated hazards are administered by the Site Generated Non-Radioactive Hazardous Waste Management, the Industrial Safety Program, and the WIPP Emergency Management Program. A Hazardous Waste/Material Storage Facility is provided for storage of various types of incoming and outgoing hazardous materials prior to shipment to a Treatment, Storage, and Disposal Facility (DOE 1995d).

When used as a fire suppressant, water is the largest potential source of liquid radioactive waste. Another source would be liquid used for decontamination. In an unlikely fire event, suspect liquids would be sampled and tested for radioactivity. If the liquid exceeds the uncontrolled release limit of Order DOE 5400.5, it is collected and made acceptable for disposal at WIPP. All non-fire water radioactive waste is collected in portable tanks or drums and handled in accordance with procedure in WP 05-WH1036, *Site-Derived Mixed Waste Handling* (DOE 2001b).

The solid radioactive waste system provides for the collection and packaging of site-derived radioactive waste. It is anticipated that all site-derived waste would be contact-handled, due to its low activity and the potential for sources of site-derived solid waste in the WIPP facility. A conservative estimated volume of solid radioactive waste generated at WIPP is 12 cubic meters (424 cubic feet) (DOE 2001b).

3.7.3 LANL Site

This section provides descriptions of the waste generation and disposal practices at LANL.

3.7.3.1 Sanitary and Solid Wastes

Sanitary liquid wastes at LANL are delivered by dedicated pipelines to the Sanitary Wastewater Systems Consolidation Plant at TA-46. The plant has a design capacity of 2.27 million liters (600,000 gallons) per

day and, in 1995, processed a maximum of about 1.5 million liters (400,000 gallons) per day. Some septic tank pumpings are delivered periodically to the plant for treatment via tanker truck. Sanitary waste is treated by an aerobic digestion process (that is, a digestion process which uses living organisms in the presence of oxygen). After treatment, the liquid from this process is recycled to the TA-3 power plant for use in cooling towers or is discharged to Sandia Canyon adjacent to the power plant under a permit by the National Pollutant Discharge Elimination System and groundwater discharge plan. Under normal operating conditions, the solids from this process are dried in beds at the Sanitary Wastewater Systems Consolidation Plant and applied as fertilizer as authorized by the existing National Pollutant Discharge Elimination System permit.

According to the LANL Utilities and Infrastructure Group, the TA-3 sewer lines between Pajarito Road and Diamond Drive and between Diamond Drive and the Sanitary Wastewater Systems Consolidation Plant connection are 40 years old, and the current capacity is 58 to 68 percent of the original capacity due to deterioration and infiltration. The S-Site wastewater collection system is also 40 years old, and repair or replacement of 3,600 meters (12,000 feet) of this line is also needed.

In addition to the Sanitary Wastewater Systems Consolidation Plant, there are thirty-six approved septic systems still in use at facilities located in sixteen TAs.

Both LANL and Los Alamos County use the same county landfill that is located on DOE property. The Española area solid waste disposal site has been closed. Los Alamos has also contracted with Española to receive selected waste from that community. The Los Alamos landfill received about 20 million kilograms (22,000 tons) of solid waste from all sources from July 1995 to June 1996, with LANL contributing about 22 percent; the city of Española, 32 percent; and Los Alamos County, 46 percent. At the current rate of input, the anticipated life of the landfill is estimated to be about 18 years (Zimmerman 1996).

3.7.3.2 Hazardous and Radiological Wastes

LANL generates radioactive and hazardous waste as a result of operations and maintenance and construction activities. Annual waste generation rates have varied due to the level of operations at the various facilities, suspension of operations at various times in these facilities, construction activities, changes in the types of operations, and implementation of waste minimization initiatives. Waste generation across the key facilities was examined from 1990 through 1995; the years during this period that had atypical interruptions or operations were ignored, and the remaining years were used to establish an average waste generation rate for use as the "baseline" generation rate. Waste generation rates for the non-key facilities were averaged for the 5-year period for use as baseline for these facilities. Table 4.9.3.3-1 of the LANL SWEIS (DOE 1999) shows the range of waste generation rates over this period by facility and "baseline" generation rates used for the purposes of waste projections.

Radioactive liquid waste generation is not measured at all facilities; therefore, the amounts received historically at TA-50 were examined. These influents indicated a waste generation range of 16.5 million to 21.9 million liters (4.36 million to 5.79 million gallons) per year.

In addition to the waste generation rates presented in this section, LANL has a backlog of previously generated waste that is being stored on the site. It consists of 759 cubic meters (27,096 cubic feet) of low-level radioactive mixed waste and 9,014 cubic meters (321,800 cubic feet) of TRU waste.

Finally, LANL has historically received small quantities of waste (low-level or TRU) from offsite locations (average of about five shipments a year from 1991 to 1996). Typically, these are wastes generated by LANL activities at other locations (for example, at the Nevada Test Site). However, there

have also been cases where low-level or TRU wastes generated at DOE locations without an onsite disposal capability send such waste to LANL for disposal. In recent years these sites have included the Pantex Plant in Amarillo, Texas; the Kansas City Plant; and DOE facilities on Kirtland Air Force Base in Albuquerque, New Mexico. Such offsite waste shipments would be expected to continue in the future at about the same rate as has been experienced in recent years (five to ten low-level and TRU waste shipments per year). These shipments, although not specifically listed in the waste generation rates and waste shipments analyzed, are within the quantities and shipment numbers projected due to the conservatism in these projections and the relatively small amounts of offsite waste anticipated for shipment to LANL.

3.8 ENVIRONMENTAL JUSTICE

In Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, President Clinton required federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental impacts of federal programs, policies, and activities on minority and low-income populations. The order also requires agencies to ensure greater public participation in their decision-making practices. For the purpose of this EA, "minority" refers to people who classified themselves in the 1990 U.S. Census as African Americans, Asian or Pacific Islanders, American Indians, Hispanics of any race or origin, or other non-White races (DOC 1990). The DOE draft guidance also defines "minority population" as a demographic composition of the populace where either the minority population of the affected area exceeds 50 percent or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population (DOE 2000).

This section includes the most recent environmental justice data available for the three sites of concern. For the LANL description, the most recent source of data was the 1990 U.S. Census; however, that discussion will be updated if more recent data are published before the EA is finalized.

3.8.1 CEMRC Site

Both the Proposed Action to put the new ACRSL facility adjacent to the CEMRC and the alternative to locate the new facility at WIPP would take place in Eddy County, New Mexico. Thus, a description of environmental justice prepared as part of the Astrophysics EA (DOE 2001a) has information relevant to both the Proposed Action and the WIPP Alternative. Even though WIPP is located approximately 50 kilometers (30 miles) east of the CEMRC, Eddy County is the primary county and Carlsbad is the primary city for the environmental justice region-of-influence (ROI) associated with both alternatives.

Under the Proposed Action, environmental justice refers to the potential for minority and low-income populations to bear a disproportionate share of high and adverse environmental impacts from activities at the CEMRC. The environmental justice ROI covers all populations within an 80-kilometer (50-mile) radius of the CEMRC. This region includes parts of four counties in New Mexico (Chaves, Eddy, Lea, and Otero) and parts of two counties in Texas (Culberson and Loving).

Recent data estimates on low-income and minority populations are available at the county level (U.S. Bureau of the Census 2002). Tables 3-3 and 3-4 show estimated county-level low-income and minority data, respectively, for the affected counties in the ROI for both the Proposed Action and the WIPP Alternative.

Table 3-3. ROI County Estimates for Low-Income Populations

County	ROI County for Proposed Action	ROI County for WIPP Alternative	Percent Estimate[a]
New Mexico			
Eddy	X	X	18.6
Lea	X	X	20.7
Otero	X		17.7
Chaves	X	X	23.1
Texas			
Andrews		X	15.8
Culberson	X	X	32.6
Gaines		X	20.6
Loving	X	X	22.9
Reeves		X	27.5
Ward		X	19.4
Winkler		X	16.8

a. Estimates model 1997 income reported in the March 1998 Current Population Survey (U.S. Bureau of the Census 2002).

Table 3-4. ROI County Estimates for Minority Populations

County	ROI County for Proposed Action	ROI County for WIPP Alternative	Percent Estimate
New Mexico			
Eddy	X	X	42.3
Lea	X	X	46.0
Otero	X		44.3
Chaves	X	X	47.9
Texas			
Andrews		X	43.7
Culberson	X	X	75.4
Gaines		X	39.2
Loving	X	X	10.4
Reeves		X	76.2
Ward		X	47.8
Winkler		X	46.7

Source: U.S. Bureau of the Census 2002.

3.8.2 WIPP Site

Both the alternative to locate the new facility at the WIPP and the Proposed Action to put the new ACRSL facility adjacent to the CEMRC would take place in Eddy County, New Mexico; therefore, the description of environmental justice presented above (Section 3.8.1), which was prepared as part of the Astrophysics EA for the WIPP site (DOE 2001a), is directly relevant to the WIPP Alternative. The environmental justice ROI for WIPP includes parts of three counties in New Mexico (Chaves, Eddy, and Lea) and parts of seven counties in Texas (Andrews, Culberson, Gaines, Loving, Reeves, Ward, and Winkler). Seventy-five percent of the ROI lies within New Mexico, and the remaining 25 percent lies within Texas.

The following population data are derived from the 1990 Census of Population and Housing (U.S. Bureau of the Census 1994); these data are the best available environmental justice data at the block group level. (Block grouping is a division of territory, the size of which varies according to population density, which has approximately four hundred households.)

Within the environmental justice ROI, the total population of 101,129 persons includes 4.1 percent non-White, 32.6 percent Hispanic, and 36.8 percent minority (all except White non-Hispanic persons) (DOE 2001a). In addition, 21.5 percent of the total population had 1989 incomes below the poverty level, as defined by the U.S. Bureau of the Census. There are no Native American reservations in the ROI (U.S Bureau of Census 1994). Figures 3-1 and 3-2 display maps of the distribution of minority and low-income populations according to the percentage of the block group population in the environmental justice ROI for the WIPP Alternative.

The proportions of Hispanic, minority, and low-income persons in the ROI are all greater than in the United States as a whole (DOE 2001a). Also, the proportion of low-income persons in the ROI is greater than in both New Mexico and Texas. Finally, the proportion of Hispanic persons in the ROI is smaller than in New Mexico but greater than in Texas.

3.8.3 LANL Site

The area considered for the environmental justice analysis for the LANL SWEIS (DOE 1999) was the area within an 80-kilometer (50-mile) radius. The center of the area is the emissions stack at the Los Alamos Neutron Science Center in TA–53. The stack was chosen because it is the primary source of LANL airborne radionuclide emissions. The use of an 80-kilometer (50-mile) radius circle was patterned after the methodology used by the Nuclear Regulatory Commission for assessing potential risks to populations from nuclear power plants and is intended to encompass the potential impacts from LANL operations across all areas of analyses (such as water, air, cultural resources).

The racial and ethnic diversity and geographic distribution of the populations within this region require the region be separated into smaller spatial portions (sectors) to assist DOE in identifying minority and low-income populations. To divide the region, four additional circles, centered on the Los Alamos Neutron Science Center stack with radii at 16-kilometer (10-mile) intervals, were overlaid on the 1990 U.S. Census map for this region. The concentric circles were divided by sixteen arcs, each 22.5 degrees in width (the resulting sectors are not of equal area). The minority and low-income population data for each sector were derived from U.S. Census Bureau data using Geographic Information System software.

This map was used to overlay impacts to enable DOE to determine if any LANL operations result in disproportionately high and adverse human health or environmental impacts on minority and low-income populations. Figure 3-3 presents the area analyzed, the 1990 U.S. Bureau of Census-defined places within this area, and the resulting eighty sectors (discussed above). Eight counties, including all of Los Alamos County and parts of Rio Arriba, Taos, Mora, San Miguel, Santa Fe, Bernalillo, and Sandoval Counties, are within the region. Many villages and other rural settlements (not depicted in this figure) are scattered throughout the area but were too small to have been defined as distinct places for the 1990 U.S. Census. Figure 3-4 presents the eighty sectors, highlighted with the low-income or minority populations greater than 25 percent of the total sector population. All minority population and income data used in Figures 3-3 and 3-4 were derived from the 1990 U.S. Census (DOC 1993) because they were the best data available when the LANL SWEIS (DOE 1999) was conducted.

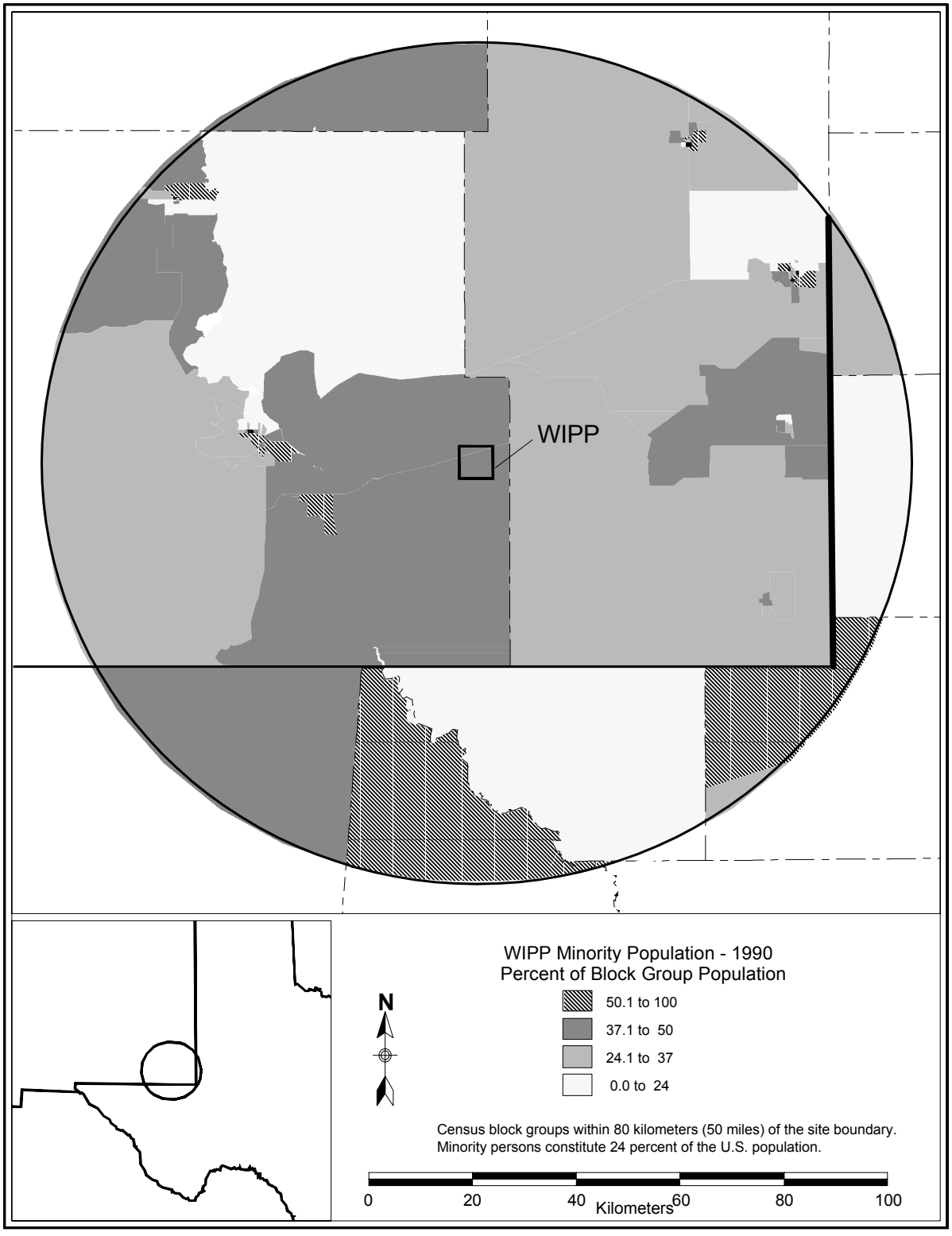

Figure 3-1. Minority Population, WIPP ROI

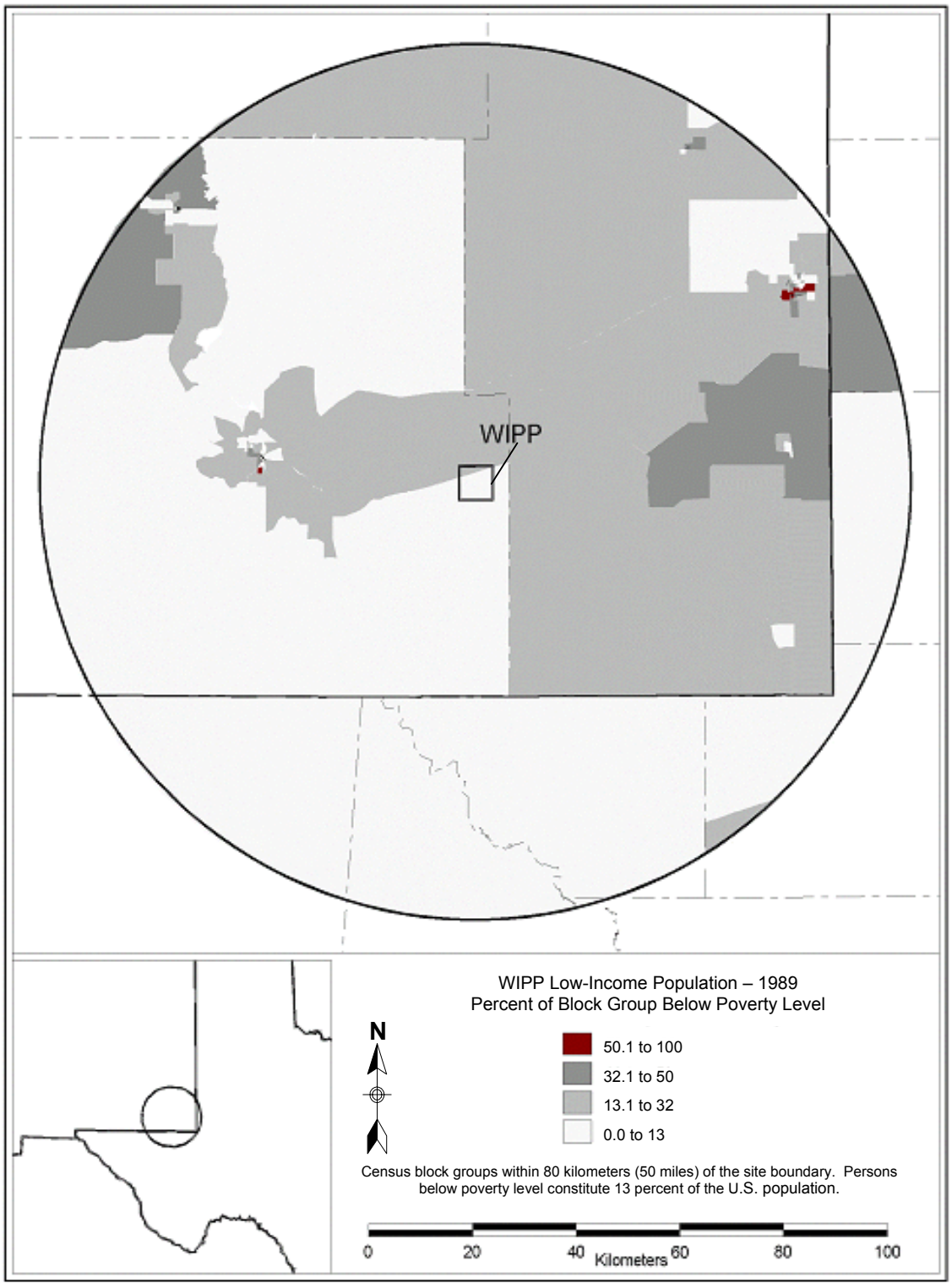

Figure 3-2. Low-Income Population, WIPP ROI