

## 4.0 AFFECTED ENVIRONMENT

This chapter describes the environment that will be affected by the TRU waste management activities, including construction and operation of the TRU Waste Facility (TWF) in H-Area and in the burial grounds at the Savannah River Plant (SRP). Detailed information for this chapter on SRP physical and environmental characteristics was obtained from a 1984 report prepared by Dukes and a 1986 SRP environmental monitoring report.

### 4.1 SITE LOCATION

The proposed TWF facility will occupy approximately 4.5 acres of land in H-Area. TRU waste activities will occur on industrially developed land within H-Area and in SRP burial grounds near to H-Area as shown in Figure 4-1. H-Area is centrally located on the site and well removed from public access. H-Area is a principal industrialized area at SRP located within existing safeguards and security systems and approximately 7 miles away from the SRP boundary.

No wetlands areas exist on the proposed site or in the burial grounds. No endangered or protected plant or animal species are found on the proposed site or in the burial grounds. The site is mostly open land.

The SRP occupies an approximately circular area of 300 square miles in South Carolina, 25 miles southeast of Augusta, Georgia. The site borders the Savannah River for about 17 miles. Figure 4-2 presents the site location in relation to major population centers, the closest being Augusta, Georgia, and Aiken and Barnwell, South Carolina. The Atomic Energy Commission, a predecessor agency to the DOE, selected the location of the SRP in November 1950, after studying more than 100 potential sites.

The Savannah River Plant is a controlled area with public access limited to through traffic on South Carolina Highway 125 (SRP Road A), U.S. Highway 278, and SRP Road 1. SC Highway 125 connects the site to Augusta to the northwest and to Allendale to the southeast. U.S. Highway 278 also leads westward into Augusta. The SRP roadway systems consist of over 200 miles of primary roads.

Drums of certified TRU waste will be transported from SRP to WIPP in a TRUPACT (Transuranic Package Transporter) or a similar overpack. The anticipated shipping route on SRP is from the burial ground to SRP Road C, onto SC Highway 125 and then westward to Augusta. An alternate route is to SRP Road C to SRP Road 2 northward to SC Highway 19. The primary highway and railroad systems on the SRP site are shown on Figure 4-1.

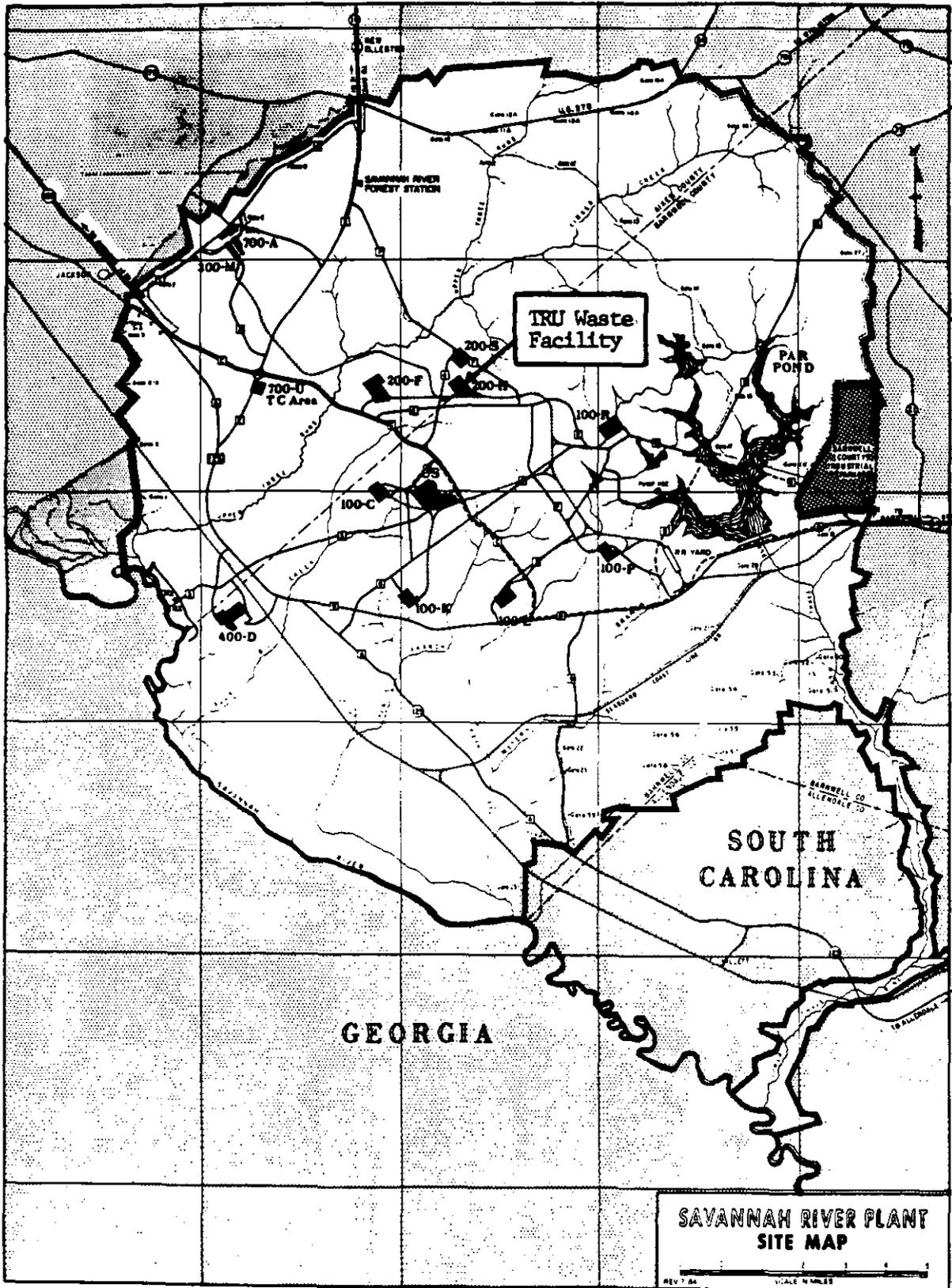
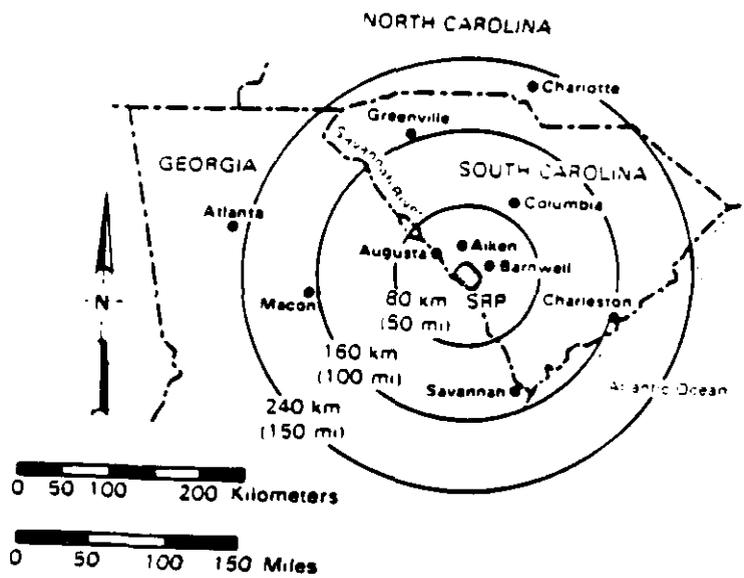


FIGURE 4-1: Savannah River Plant Site



**FIGURE 4-2 The SRP Location in Relation to Surrounding Population Centers**

SRP facilities include five nuclear production reactors (three currently operating), two chemical separations areas, a fuel and target fabrication facility, and various supporting facilities. Onsite waste storage/disposal facilities include F- and H-Area tank farms for storage of high-level waste and 195 acres for burial of low level radioactive waste. Construction is underway on the Defense Waste Processing Facility north of H-Area.

#### 4.2 DEMOGRAPHY AND SOCIOECONOMICS

Approximately 90 percent of the current SRP work force resides in Aiken, Bamberg, Barnwell, and Allendale Counties, South Carolina, and Columbia and Richmond Counties, Georgia (Figure 4-3). The urban counties--Aiken, Columbia, and Richmond--experienced a combined population growth of approximately 19 percent between 1970 and 1980. The rural counties--Allendale, Bamberg, and Barnwell--which had a net population decline from 1950 to 1970, experienced significant reversals of this trend between 1970 and 1980, when their population increases ranged from 9 to 16 percent.

In a 13-county area\*\* surrounding the Savannah River Plant, urban uses account for approximately 5 percent of the total land area. The most intensively developed land areas occur in and around the cities of Aiken, South Carolina, and Augusta, Georgia. Agriculture accounts for about 24 percent of the total land use; forests, wetlands, and water bodies account for almost 70 percent of the land area.

Generally, the six counties surrounding the Savannah River Plant provide adequate public services and facilities to the existing population. In the 1979 through 1980 school year, approximately 5,000 classroom spaces were available for new students; however, some districts and schools operated near or above capacity levels. Similarly, public water and municipal waste-treatment systems have the capacity to provide greater services; however, some communities are experiencing waste-treatment problems. Health and fire protection services tend to be concentrated in the urban areas of Aiken and Augusta.

Since 1970, the largest increases in the number of housing units have occurred in Columbia, Aiken, and Richmond Counties. Columbia County has grown the fastest, nearly doubling its number of housing units. Between 1970 and 1980, Aiken and

\*\* This area includes Columbia, Burke, Screven, and Richmond Counties, Georgia, and Aiken, Allendale, Bamberg, Barnwell, Edgefield, Hampton, Lexington, Orangeburg, and Saluda Counties, South Carolina.

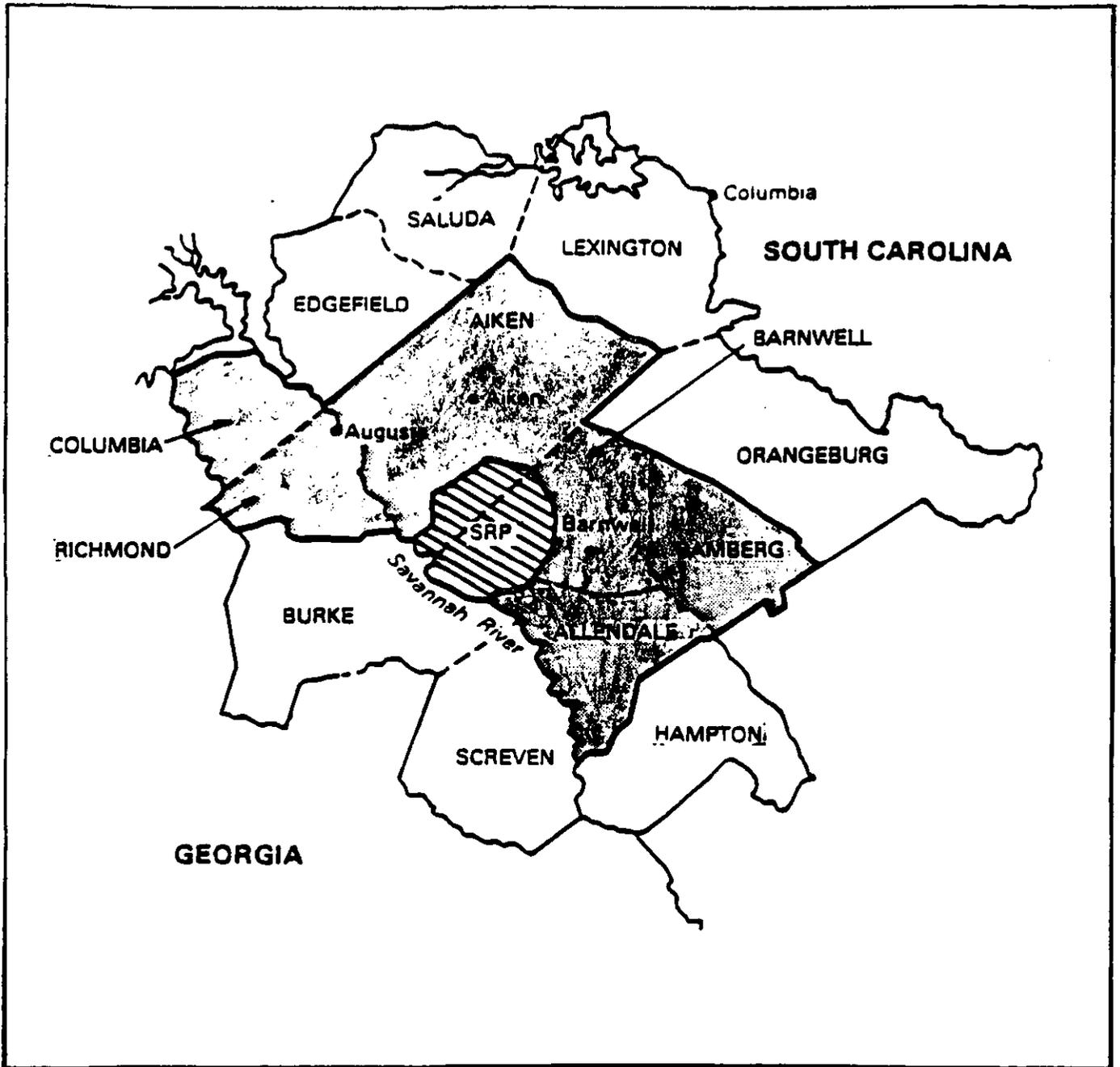


FIGURE 4-3: Counties in the SRP Area

Richmond Counties each experienced about a 36-percent increase in the number of housing units. In Aiken County, half of this increase resulted from the high growth rate in the number of mobile homes.

Nonfarm employment is concentrated in the manufacturing industries. Manufacturing constitutes the largest employment category in each county except Richmond County. Retail sales and wholesale trade are major employment categories in Allendale and Richmond Counties.

Employment levels have increased in recent decades as both the total labor force and participation rates have increased. Per capita incomes in Aiken and Richmond Counties were the highest in the study area, and in 1974 ranked in the top 50 percent of the national averages. Most of the other counties, however, ranked in the bottom 11 percent of the national averages.

#### 4.3 GEOLOGY-HYDROLOGY

The plantsite is located in the southeastern Coastal Plain region of the United States, where the geology is characterized by flat, mostly unconsolidated sediments. The bedrock under the plant site is about 1,000 feet below the surface.

At SRP, many surface streams exist onsite. Most of the onsite streams drain to the Savannah River, and no location at the SRP is very far from a continuously flowing stream. The source of most of the water at the SRP is either well water or water pumped from the Savannah River for various plant processes.

Groundwater occurs in three distinct hydrogeologic systems that underlie SRP: 1) the Coastal Plain sediments, where water occurs in porous sands and clays; 2) the buried crystalline metamorphic rock beneath the sediments, where water occurs in small fractures in schist, gneiss, and quartzite; and 3) the Dunbarton Basin (Triassic age) within the crystalline metamorphic complex, where water occurs in intergranular spaces in mudstones and sandstones. The latter two systems are not important as groundwater sources for the region. The Coastal Plain sediments contain several prolific and important aquifers across the SRP, generally consisting of the Barnwell, McBean, Congaree, Black Creek, and Middendorf Formations. The Black Creek and the Middendorf Formations were formerly known as the Tuscaloosa Formation. Among these formations the Black Creek and the Middendorf Formations are particularly prolific groundwater units because of their thickness, together approximately 600 feet beneath H-Area, and their high permeability.

#### 4.4 SEISMOLOGY

The down-faulted Dunbarton Triassic Basin, which underlies SRP, contains several interbasinal faults. However the sediments overlying these faults show no evidence of basin movement since their deposition during the Cretaceous Period. Surface mapping, subsurface boring, and geophysical investigations at SRP have not identified any faulting of the sedimentary strata that would affect SRP facilities. Two major earthquakes have occurred within 200 miles of SRP. They were the Charleston, SC earthquake of 1886 (MM Intensity of X) and the Union County, SC earthquake of 1913 (MMI of VII to VIII). Both were less than 0.2 acceleration at SRP.

#### 4.5 METEOROLOGY AND CLIMATOLOGY

SRP has a temperate climate, characterized by mild winters and long summers. The region is subject to continental influences, but it is protected from the more severe winters in the Tennessee Valley by the Blue Ridge Mountains to the north and northwest. Temperatures average 48°F in the winter, 85°F in the summer, and 65°F annually. The average annual rainfall at SRP is 48 inches with the greatest part coming in the spring and summer months. Although tornadoes and hurricanes occur infrequently, they are most common in the spring and early fall respectively. Hurricanes along the coastal region have some influence on SRP, although their high winds are greatly diminished by the time they reach the plantsite some 100 miles inland. Only three tornadoes have been confirmed on or near the plantsite. On no occasion has there been tornado damage to any production facility on SRP.

Annually, the predominant wind direction is west-northwest to east-southeast. The strongest winds in the SRP area occur in tornadoes, which can have wind speeds as high as 260 mph.

#### 4.6 ECOLOGY

The SRP area was approximately one-third forested and the remaining area was cropland when it was acquired by the U.S. Government in 1951. During the past 35 years, forestry management practices, natural succession, and construction and operating activities at SRP have resulted in the ecological complexity and diversity of the site. Presently 90% of SRP lands are forested with pine trees and bottom land hardwoods. These forested areas support a diversity of wildlife habitats that are restricted from the public use. Forest and wildlife management practices include controlled cutting, reforestation, and hunting. The SRP is one of the most intensively studied environments in this country.

The proposed TWF site is on a partially cleared upland area just outside the security fence that surrounds H-Area and adjacent to other industrial development. Habitat quality is minimal except for perhaps small mammals and songbirds. According to recent site studies, no wetlands or protected species of plants or animals exist on the proposed site. No historic or archeological sites have been found on the proposed site.

#### 4.7 RADIATION ENVIRONMENT

During 1985 the population dose from SRP atmospheric releases to the 555,100 people who live within 50 miles of the center of the Plant was 42 person-rem with an average dose of 0.08 mrem per person. This same population received a radiation dose of about 105,000 person-rem from natural background radiation, medical radiations and weapons testing fallout. See Table 4-1 for contributing sources of these radiations.

TABLE 4-1 INDIVIDUAL AND POPULATION DOSES - 1985

Location/Source	Calculated Individual Dose, mrem <sup>a</sup>	Population Size	Calculated Population Dose, person-rem <sup>a</sup>
<u>SRP SOURCES</u>			
	Average	Maximum	
SRP Boundary			
SRP Atmospheric Releases <sup>c</sup>	0.35	0.90 <sup>b</sup>	-
Within 80 km of SRP			
Dose from Atmospheric Releases <sup>c</sup>	0.08	-	555,100 42.2
<u>OTHER SOURCES</u>			
Other Sources	Annual Dose, mrem		Pop. Dose, person-rem
Natural Radioactivity <sup>d</sup>			
Cosmic Radiation	32		
External Terrestrial	33		
Internal Terrestrial	28		
Subtotal (Natural)	93	555,100 (within 80 km)	51,600
Medical Radiation			
Diagnostic X-Rays <sup>e</sup>	77		
Radiopharmaceuticals <sup>e</sup>	14		
Subtotal (Medical)	91	555,100 (within 80 km)	50,500
Weapons Test Fallout	4.6	555,100 (within 80 km)	2,600
Total Other Sources	188.6		104,700

- Not applicable.

a Committed effective dose equivalent.

b Based on a hypothetical individual with maximum dietary habits located on the plant perimeter at locations of highest exposure. No such individual is known to exist.

c Based on atmospheric dispersion of SRP releases per Table 2.1 in DPSPU-86-30-1.

d These values vary with location but represent an average in the vicinity of SRP.

e Dose is prorated over the U.S. population. This is a means of arriving at an average dose, which when multiplied by the population size, produces an estimate of population exposure. It does not mean that every member of the population received a radiation exposure from these sources.

Source: DPSPU-86-30-1, SRP Environmental Report for 1985