- In order to ensure the availability of an adequate supply of calibrated instruments to support routine SRS operations, the current inventory would need to be increased significantly because of the larger number of instruments that would not be in service at any given time.

- Most instruments used at SRS require repairs prior to recalibration. Because instrument manufacturers provide repair services only for their own equipment the SRS program would still require a dedicated instrument repair staff.

## 3.0 AFFECTED ENVIRONMENT

A comprehensive discussion of SRS and associated environs is presented in the Reactor Operation Environmental Impact Statement (ROEIS) (DOE, 1990), and in the Reactor Operation Environmental Information Documents, Volumes I-III (WSRC, 1989a, 1989b & 1989c).

### 3.1 Geography, Demography, and Socioeconomics

The SRS encompasses approximately 80,535 hectares (ha) (199,000 acres) in southwestern South Carolina. The SRS borders the Savannah River for about 27 km (17 mi). Figure 3-1 shows SRS in relation to major population centers, with the closest being Augusta, Georgia, and Aiken and Barnwell, South Carolina. Figure 3-1 also shows the six-county area of South Carolina and Georgia where approximately 83 percent of the current SRS work force resides. In 1988, the six-county population was 425,000 including a six county region work force of 191,364. In 1989, approximately 15,000 SRS workers, or about 8 percent of the available work force, resided in the six-county area. The ROEIS (DOE, 1990) and the most recent socioeconomic survey of the six-county SRS area of influence (NUS, 1990) contain additional information.

The proposed actions subject for review under this EA would occur in B Area of SRS. B Area is depicted in relation to SRS in Figure 3-2. The proposed facility would be located on a 1.2 ha plot immediately adjacent the developed portions of B Area. This location is approximately 4.4 km from the nearest SRS site boundary.

### 3.2 Meteorology and Climatology

The SRS has a temperate climate with mild winters and long summers. The region is subject to continental influences, but is protected from the more severe winters in the Tennessee Valley by the Appalachian Mountains to the north and northwest. Gently rolling hills with no unusual topographic features that would significantly influence the general climate characterize SRS and the surrounding area. The meteorological and climatological data for SRS contained in this section are representative of that for the proposed Health Protection Instrument Calibration Facility location. The Reactor Operation Environmental Information Document, Volume III, (WSRC, 1989c) contains additional information on SRS meteorology and climatology.

#### *3.2.1 Average Wind Speed and Direction*

The average wind speed for the period of 1982 to 1986, from onsite data, was 3.25 meters per second (m/s) (10.66 ft/s). Hourly wind speeds less than 2 m/s (6.5 ft/s) occurred about 9 percent of the time. For about half of the time, wind speeds were less the 4 m/s (13.1 ft/s). From 1975 to 1979, from onsite data, the average wind speed was greatest during the winter (3.35 m/s) and least during the summer (2.48 m/s).

Data collected from H Area, which is near the center of SRS, indicate that observed wind directions tend to favor the southwest and northeast quadrants (28 and 30 percent of the time, respectively) in relation to the northwest (20 percent) and southeast (22 percent) quadrants. For all data, winds from the northeast sector occurred most frequently (nearly 10 percent of the time). That is, emissions would have been transported toward the southwest more frequently than toward any other direction. Winds from direction sectors in the southwest quadrant also occurred with a relatively high frequency (7 to 8 percent of the time) (DOE, 1990).

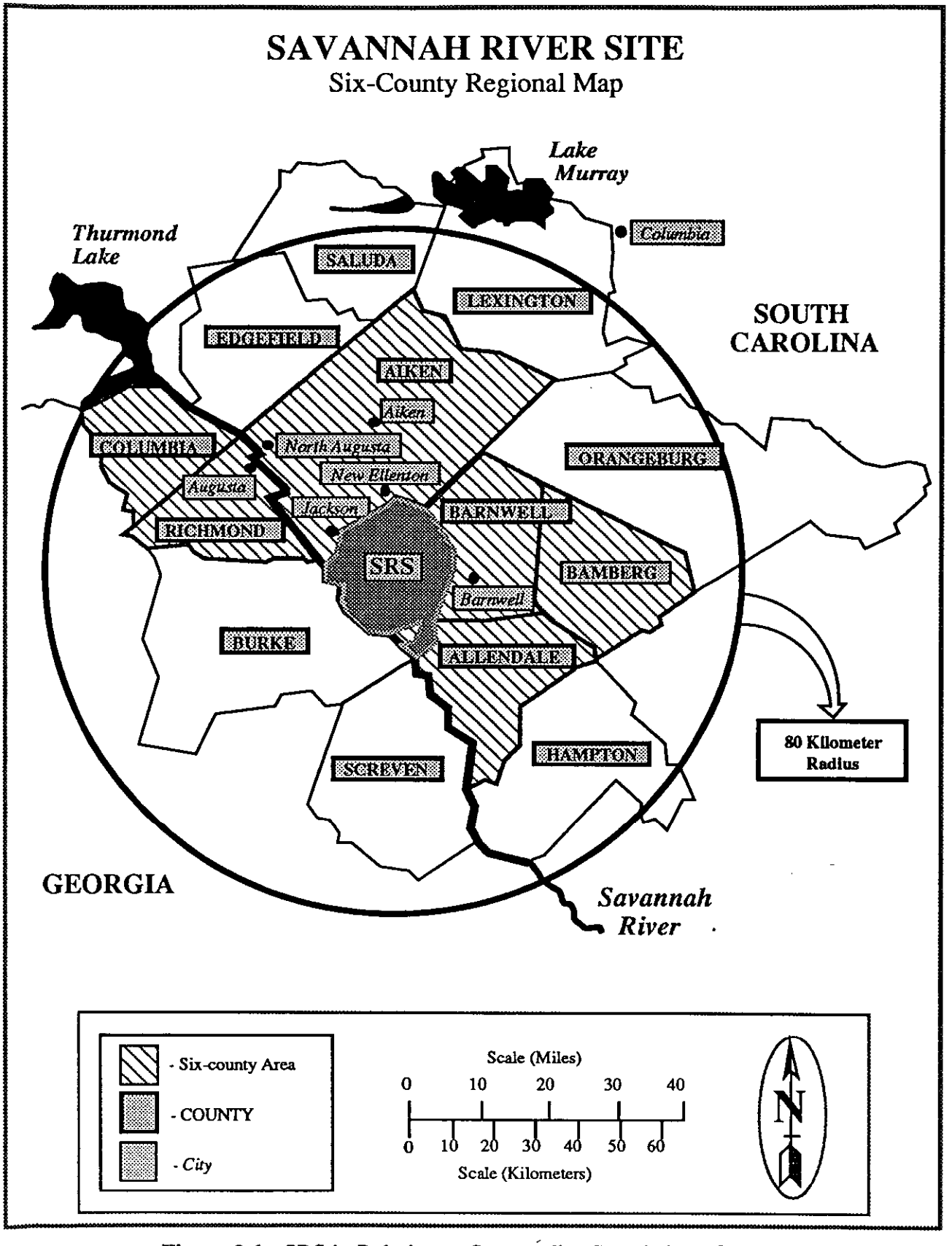


**Figure 3-1**. SRS in Relation to Surrounding Populations Centers

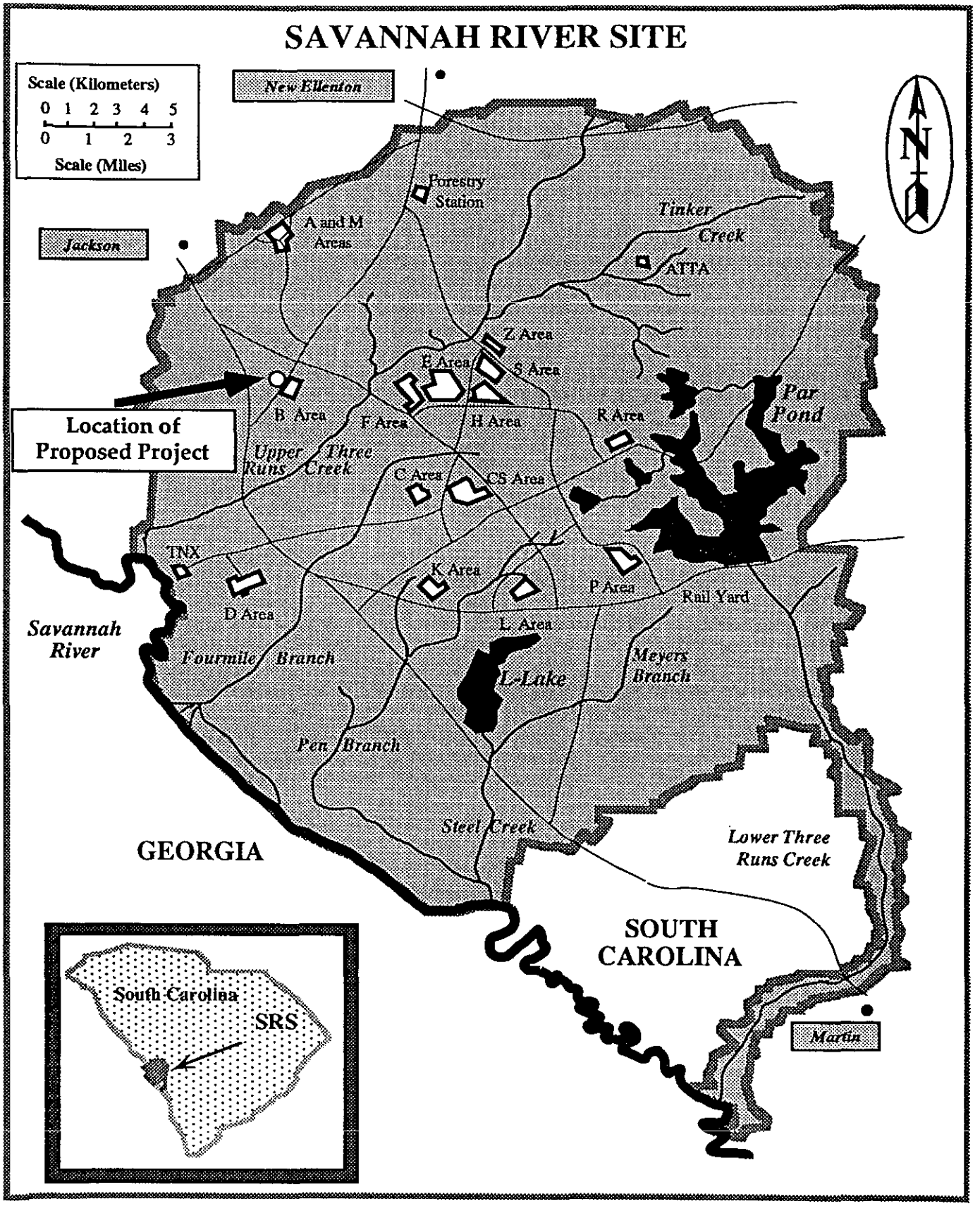


Figure 3-2. Location of B Area on SRS

### *3.2.2 Precipitation*

The annual average precipitation for SRS (from 1952 through 1987) was about 122 centimeters (cm) (48 in). Precipitation is fairly well distributed throughout the year. However, average precipitation totals for the fall months (September, October, and November) are less than the average totals for the other seasons. These three months account for about 18 percent of the average annual total. Precipitation totals greater than 0.025 cm (0.009 in), occurred on average, about 107 days per year. The calculated 24-hour/100-year rainfall at SRS is 20.8 cm (8.18 in) (DOE, 1990).

### *3.2.3 Tornadoes*

No damage has ever been done to a SRS production facility as a result of a tornado. However, tornadoes have been observed during every month of the year in the SRS area. Most of the tornadoes resulting in severe or devastating damage occurred in March, April, and May. Since SRS operations began, six confirmed tornadoes have occurred on or close to SRS. With the exception of the most recent tornado (October 1, 1989), only light to moderate damage resulted on each of these occasions. The October 1, 1989 tornado caused considerable damage to SRS timber resources on about 444 ha (1,097 acres), and lighter damage on about 606 ha (1,497 acres). These damages occurred in a swath 23 km (14 mi) long on the east side of SRS. Investigations of tornadoes occurring near SRS in 1975 to 1976 indicated wind speeds between 173 and 281 km/hr (107 and 175 mph) (DOE, 1990).

## 3.3 Geology and Seismology

### *3.3.1 Physiography*

The SRS is located on the Aiken Plateau of the Upper Atlantic Coastal Plain physiographic province of western South Carolina, approximately 40 to 48 km (25 to 30 mi) southeast of the Fall Line that separates the Atlantic Coastal Plain and the Piedmont provinces. The Coastal Plain province is underlain by a wedge of seaward-dipping unconsolidated and semi-consolidated sediments that extended from the Fall Line to the continental shelf. Subdivision of the Coastal Plain Province in South Carolina includes the Aiken Plateau, the Congaree Sand Hills, and the Coastal Terraces. The Congaree Sand Hills trend along the Fall Line north-northeast of the Aiken Plateau. The Aiken Plateau, where SRS is located, is bounded by the Savannah and Congaree rivers and extends from the Fall Line to the Coastal Terraces. The surface of the plateau is highly dissected and characterized by broad interfluvial areas with narrow, steep-sided valleys. The plateau is well drained, although poorly drained depressions do exist (WSRC, 1989a).

### *3.3.2 Topography and Drainage*

The proposed calibration facility site is on the Aiken Plateau in the central SRS region. The plateau which slopes generally southeastward, is dissected by creeks that drain into the Savannah River. The major tributaries which occur on SRS are discussed in Section 3.4. The topography at the proposed calibration facility location reveals that the facility would sit on a topographic high (a ridge top), with surface drainage to the east and west into the Upper Three Runs Creek basin (USGS, 1987). The proposed location is well drained and flooding is not considered a hazard.

Ground surface elevation for the proposed calibration facility location is approximately 91 m (300 ft) above mean sea level across the proposed layout (USGS, 1987). The soil type at the proposed calibration facility location is Orangeburg loamy sand. The Orangeburg soil association consists of well drained, moderately permeable soils that typically have 0 to 2 percent slope (SCS, 1990).

### *3.3.3 Geohydrology*

The sediments of the Atlantic Coastal Plain of South Carolina overlie the basement complex composed of Paleozoic crystalline and Triassic age rocks. These sediments dip gently seaward from the Fall Line and range in age from Late Cretaceous to Recent. Coastal Plain sediments in the vicinity of SRS consist of sandy clays and clayey sands, although occasional beds of clean sand, gravel, and clay occur. Two

bioclastic limestone zones occur within the Tertiary age sequence. These calcareous zones vary in thickness from about 0.6 m (2 ft) to approximately 24 m (80 ft). Most of the clastic sediments are unconsolidated, but thin semi-consolidated beds also occur. The many formations that make up the layers may be grouped into several different permeable zones (aquifers) separated by mostly impermeable clay layers (confining units). Groundwater is abundant and of excellent quality in this region of South Carolina. The depth to groundwater at the proposed calibration facility location is approximately 40 m (130 ft) (WSRC, 1989b). At SRS, properly designed and completed wells are capable of producing thousands of gallons of water per minute. The Reactor Operation Environmental Information Document, Volume I, (WSRC, 1989a) contains recent information on SRS geohydrology make-up.

### *3.3.4 Geologic Structures*

The closest offsite fault system of significance is the Augusta Fault Zone, approximately 40 km (25 mi) from SRS. In this fault zone, the Belair Fault has experienced the most recent movement, but is not considered capable of generating major earthquakes (Case, 1977). There is no conclusive evidence of recent displacement along any fault within 322 km (200 mi) of SRS, with the possible exception of the buried faults in the epicentral area of the 1886 Charleston, SC earthquake. The proposed calibration facility location does not overlap any of the known geologic faults on SRS (WSRC, 1989b).

## 3.4 Hydrology

The Savannah River forms the western boundary of SRS and receives drainage from five major tributaries on SRS: Upper Three Runs Creek, Four Mile Branch, Pen Branch, Steel Creek, and Lower Three Runs reek. These tributaries receive varying types of wastewater discharges from plant processes and sanitary treatment systems, all of which are permitted through the National Pollutant Discharge Elimination System (NPDES). On SRS various plant processes also require pumpage of Savannah River water and/or onsite groundwater. The Reactor Operation Environmental Information Document, Volume III, (WSRC, 1989c) contains information on groundwater systems on SRS and in the surrounding region. No wetlands or streams are found on or within the immediate area of the location of the proposed calibration facility (Gladden, 1990).

## 3.5 Ecology

Since 1951 when the U. S. government acquired SRS, forestry management practices and natural succession outside the construction and operating areas at SRS have resulted in an increased ecological complexity and diversity of the site. Forested areas support a diversity of wildlife habitats that are restricted from public use. Forestry management practices include controlled burning, harvesting of mature trees, and reforesting. Wildlife management includes protection and enhancement of threatened and endangered species and population control of white-tailed deer (Odocoileous virginianus) and wild swine (Sus scrofa) through supervised hunts.

The SRS, which was designated as a National Environmental Research Park in 1972, is one of the most extensively studied environments in this country. The Reactor Operation Environmental Information Document, Volume II, (WSRC, 1989b) contains additional information on the biotic characteristics of SRS.

The management and utilization of SRS forests, soils, watershed, and wildlife are detailed in the SRS Natural Resources Management Plan (DOE, 1991) and defined under the terms of a Memorandum Of Agreement (MOA) between DOE-SR, the Savannah River Forest Station (SRFS), the Soil and Conservation Service (SCS), and the Westinghouse Savannah River Company (WSRC). DOE-SR uses this MOA to define the roles and responsibilities of the various agencies and organizations in the management of natural resources on SRS.

### *3.5.1 Vegetation*

The vegetation across SRS represents a wide spectrum of the regional flora. The differing elevations, ground moisture levels, drainage rates, and proximity to wetlands across SRS create vastly differing areas of vegetation. On dry soil and sandy ridges the canopy is often dominated by turkey oaks (Quercus laevis), blue-jack oaks (Quercus incana Bartram), and black-jack oaks (Quercus marilandica), with longleaf pine (Pinus palustris Miller) present in various densities. In less xeric areas, oaks and hickories are also present. Understory species in the drier areas include hollies, lespedezas, and various lichens. On mid- and lower slopes, the mixed deciduous forests include tulip tree (Liriodendron tulipifera L.), black gum (Nyssa sylvatica Marshall), sweet gum (Liquidambar styraciflua L.), and red maple (Acer rubrum L.), as well as hickory and holly. Understory species on the more mesic sites includes vacciniums, hollies, various ferns, grapes, sassafras (Sassafras albidum), and dogwood (Cornus florida L.) (WSRC 1989b).

The location for the proposed calibration facility is in a currently undeveloped portion of B Area on SRS. The vegetation at the proposed location is composed primarily of dominant evergreen species, a 37-year old planted slash pine (Pinus elliotti) plantation, with a mixed pine and hardwood mid-story. Since the acquisition of SRS by the Federal Government in the early 1950s, this proposed location has historically been used for timber production by the United States Forest Service.

### *3.5.2 Wildlife*

Of the diverse number of faunal species found on SRS, ten are afforded protection by the Federal Government under the Endangered Species Act of 1973. These protected species include the bald eagle (Haliaeetus leucocephalus), the golden eagle (Aquila chrysaetos), the wood stork (Mycteria americana), the red-cockaded woodpecker (Picoides borealis), the peregrine falcon (Falco peregrimus), the American osprey (Pandion Haliaetus), the kirtland warbler (Deudrocia Kirtlandii), the American alligator (Alligator mississippiensis), the shortnose sturgeon (Acipenser brevirostrum), and the brother spike mussel (Elliptio fraterna). None of these species have been documented on or near the proposed calibration facility location (WSRC, 1989b).

The vegetative homogeneity (pine plantation) that exists throughout much of the proposed calibration facility location provides for a relatively poor wildlife habitat. Species that would be expected to occur in the vicinity of the proposed site include gray squirrel (Sciurus carolinensis), fox squirrel (Sciurus niger), gray fox (Urocyon cineroargenteus), white-tailed deer (Odocoileus virginianus), bobcats (Felis rufus), opossums (Didelphins marsupialis), and various species of small rodents, songbirds, and reptiles.

#### 3.5.2.1 Threatened and Endangered Species

The SRS provides habitat or transient habitat for 10 species of threatened or endangered animals, and 31 species of threatened or endangered or rare plants (Knox and Sharitz, 1988). Of these 41 species, only the red-cockaded woodpecker occurs in the vicinity of the proposed site. The red-cockaded woodpecker was included in the federal list of endangered species in 1970. Its decline is due primarily to a reduction in available nesting habitat (Lennartz and Henry, 1984). The red-cockaded woodpecker is a native of southern pine forests of the United States, nesting in cavities excavated in living trees. The birds use many species of pines, preferring older trees, usually over 70 years, and may actively select trees suffering from heart rot. Trees in most colonies are within a 457 m (1,500 ft) diameter area in open stands of pine with sparse mid-stories. Living pines are also the preferred foraging habitat for red-cockaded woodpeckers. A clan of red-cockaded woodpeckers requires 51 ha (125 acres) of well stocked pine or pine-hardwood stands over 30 years old for survival and productivity. Timber harvest practices throughout the south generally result in pines being harvested for timber or pulpwood when the trees are less than 30 years old. The scarcity of old growth pines has resulted in a scarcity of suitable nesting habitat for the red-cockaded woodpecker.

The SRS contains 35 colony sites of four different categories. The SRS has four active colonies that contain productive clans, seven inactive sites that supported active colonies within the last ten years, abandoned sites that supported active colonies more than ten years ago, and recruitment sites containing appropriate habitat (Austin, 1989).

The proposed calibration facility location is located within 15.8 km (9.8 mi) of an active red-cockaded colony. The proposed site was the subject of a formal Biological Evaluation (B.E.) performed by SRFS to address the possible impact on the adjacent colony. Due to the colony's distance from the proposed calibration facility location, no impact is expected on the colony from the construction or operation of the facility (Roecker, 1992).

## 3.6 Radiation Environment

Natural radiation sources contribute about 315 mrem per year, or 83 percent of the annual radiation dose of 379 mrem received by an average person residing in SRS regional area from all sources. Radiation received from medical diagnosis and therapy contributes about 54 mrem per year, or 15 percent, of this annual radiation dose. Consumer products contribute almost 10 mrem per year or slightly less than 3 percent of the annual dose. The SRS releases contribute less than 0.46 mrem or less than 0.09 percent of this total annual dose to the average individual within 80 km (50 mi) of SRS. For 1990, the calculated maximum individual annual dose at SRS boundary from atmospheric releases averaged 0.06 mrem. The 1991 Savannah River Site Environmental Report, (WSRC, 1992a) contains additional information on specific contributing radiation sources.

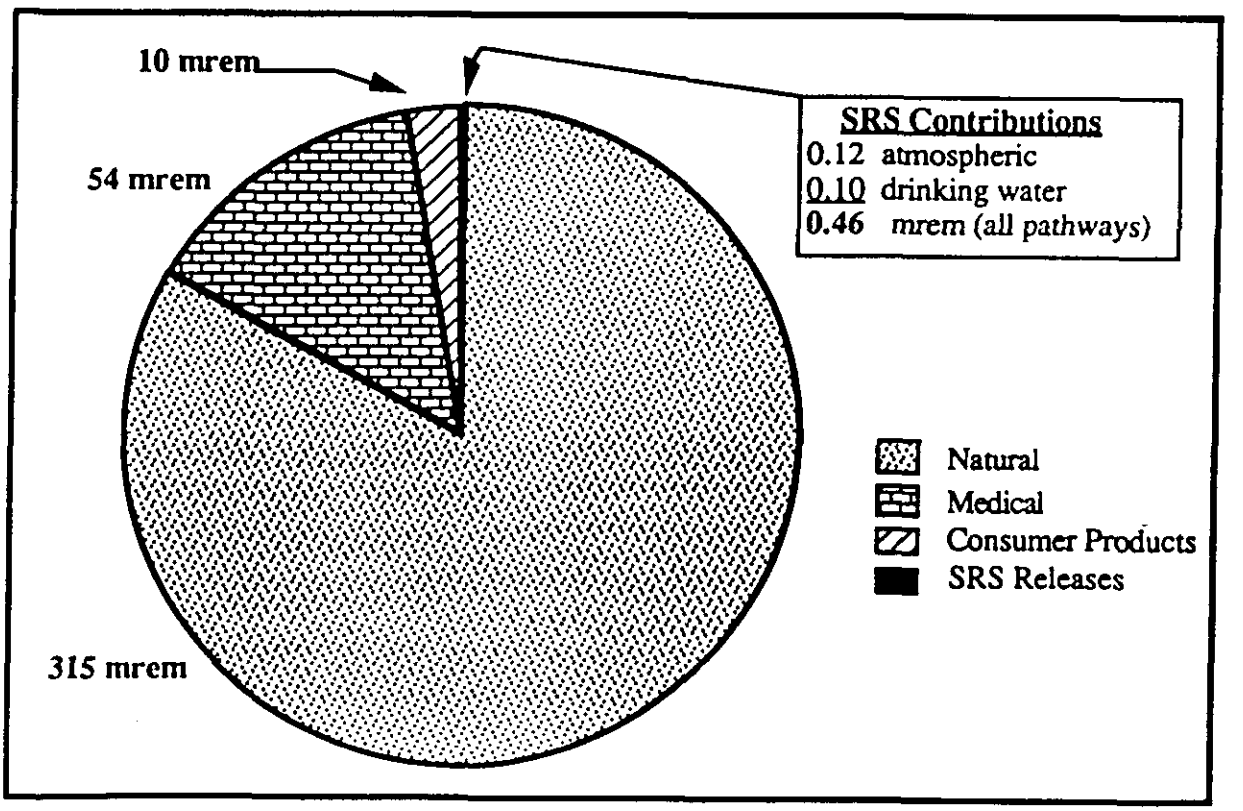


**Figure 3-3. SRS Regional Radiological Dose**

## 3.7 Waste Management

The SRS generates liquid, solid, and semisolid wastes originating in reactor and support facility operations, maintenance, and renovation activities. These wastes include those held in storage, pending treatment or disposal, and wastes from closure or remediation activities at existing waste sites. The Final EIS, Waste Management Activities for Groundwater Protection, Savannah River Plant, (DOE, 1987) describes waste

generation rates, management facilities, treatment methods, and management capacity. In 1987, DOE initiated a comprehensive waste management program following the analysis of a preferred waste management strategy (DOE, 1987).

All waste management activities on SRS are guided by the "Federal Sector Pollution Prevention Control Strategy" and by DOE policy on Waste Minimization and Pollution Prevention as identified in DOE-HQ EH-25 memorandum "Integrating Pollution Prevention with NEPA Planning Activities", (DOE, October 15, 1992).

# 4.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

## 4.1 Construction and Normal Operation

### *4.1.1 Land*

The proposed Health Protection Instrument Calibration Facility would be constructed and operated in B Area of SRS, in what is now an undeveloped location. The proposed facility would be located on a 1.2 hectare (ha) site, on the west side of SRS Road #2. This facility would be located within a general site bounded by north coordinates N87502.53 to N88463.04 and east coordinates E38953.92 to E40447.17. The location for the proposed Health Protection Instrument Calibration Facility is included in a DOE-SR approved Site Use Permit (SU-89-54-C Amendment #5; Hill, 1992) for the proposed 5 year footprint for the B Area Engineering Center Campus and in the current development plans for B Area (Zeigler, 1988). Amendment #5 of this site use permit which specifically addresses the area to be used by the proposed Instrument Calibration Facility, indicated no interferences with other land uses in the area. Conditions of this permit were that buildings must maintain a minimum 10-foot radius from monitoring wells; erosion control plans should be in place for construction; and a program plan must be prepared if a new water supply well is to be constructed.

Currently, 93 percent of SRS remains undeveloped (WSRC, 1989b). The 1.2 hectares to be cleared for the proposed facility represents the development of less than 0.002 percent of the total undeveloped SRS land area. The proposed project would be compatible with other land uses in B Area.

### *4.1.2 Socioeconomics*

The socioeconomic impact of the proposed project could be broken down into two phases. The first would come from construction, and the second from normal operations. The construction of the proposed facility would be carried out by a fixed price contractor. The contract workers would comprise fewer than 100 specialists, who would be brought onto SRS for installation of major facility construction. This work force would be drawn from both local and non-local sources as determined by skilled worker availability. The proposed construction workforce would comprise less than 0.5% of the total SRS workforce.

Once completed, the proposed facility would be operated with a staff of fewer than 35 personnel. The staff of the new calibration facility (technicians, managers, maintenance personnel, administrators, etc.) would be composed of personnel who are already employed in the existing SRS calibration facility. Thus, there would be no socioeconomic impact associated with normal operations.

### *4.1.3 Air Quality*

Construction related air quality effects fall within two areas: equipment use and soil disturbance. Diesel operated equipment (trucks, backhoes, and other diesel powered support equipment) would be used to haul soil and other solid wastes for disposal, for excavation, and in the performance of other routine construction activities. The operation of this class of equipment does not currently fall within the South Carolina Department of Health and Environmental Control (SCDHEC) requirements for air permitting activities. The environmental affects from the purchase and use of such equipment at SRS has been previously addressed and found to be individually and cumulatively not significant by DOE and is documented in two Categorical Exclusions (SR/CX9003015 and SR/CX9003025 both dated June 25, 1990).