

CHAPTER 3. AFFECTED ENVIRONMENT

The affected environment is the baseline for assessing potential impacts of the alternatives considered in this Draft Supplemental Environmental Impact Statement (SEIS). The information in this chapter comes primarily from the comprehensive environmental monitoring and surveillance programs that the U.S. Department of Energy (DOE) maintains at the Savannah River Site (SRS). DOE performs effluent monitoring and environmental surveillance within a 31,000-square-mile area surrounding the SRS (out to a distance of 100 miles from the Site boundary) that includes cities, towns, and counties in Georgia and South Carolina.

This chapter describes the following:

- Land use, biota, geology and soils, and cultural features of locations on the SRS that could host salt processing activities
- Site and regional ambient conditions for air, surface water, and groundwater
- Socioeconomic conditions of the counties and communities that compose the SRS region of influence, information on the location of minority and low-income populations, and projections of regional growth and related socioeconomic indicators.

In addition, this chapter presents information on existing facilities and the SRS infrastructure to provide a basis for an examination of the capacity of existing systems to handle projected waste streams, power and water requirements, and inter-area transportation.

As mentioned in Chapter 2, Section 2.5, DOE proposes to locate salt processing activities in either S Area or Z Area of SRS. S Area is approximately 270 acres and Z Area is about 180 acres. Both sites are within existing heavily industrialized zones. Regardless of where salt processing activities

occur, grout disposal would be in vaults in Z Area.

Westinghouse Savannah River Company (WSRC) uses a formal, documented facility site selection process. Criteria include: proximity to existing, related facilities; sufficient acreage; and ecological, human health, geoscience and engineering considerations. Applying this process to the requirements for a salt processing facility identified four potential sites (Sites A – D; Figures 2-2 and 3-1) for Small Tank Precipitation, Ion Exchange, or Solvent Extraction facilities. Selection of the primary site was based on subsequent geotechnical characterization. The site in Z Area selected for the Direct Disposal in Grout facility was chosen because a grout-production facility that would be modified is located there. Z Area was selected as the saltstone disposal site prior to construction of the Defense Waste Processing Facility (DWPF) (DOE 1982).

The primary site (Site B in S Area; see Figure 2-2) for a Small Tank Precipitation, Ion Exchange, or Solvent Extraction facility is approximately 25 acres. It is 950 feet east-southeast of the DWPF and approximately 650 feet east of the Low Point Pump Pit between H Area and DWPF. The site was used as a lay-down area during construction of DWPF, and is situated along an eastward slope of a previously existing topographic high point. The land surface is flat, gently sloping, and covered with grass and gravel. The surface elevation is about 280 feet above mean sea level (msl) (Figure 3-1) (WSRC 2000a).

Z Area is partially developed and contains the Saltstone Manufacturing and Disposal Facility, two vaults, a paved parking area, a rail spur, and perimeter road. Surface elevation ranges from about 270 to 300 feet above msl (Figure 3-2). The land at the site for a Direct Disposal in Grout facility is presently mounded with excavated soils and covered with grass (Shedrow and Wike 1999). The site covers approximately 15 acres.

The remaining sections of this chapter characterize the SRS and its environs, as well as pertinent information on Site B in S Area and the Z-Area site. Chapter 4 describes potential impacts of the No-Action alternative and the different alternatives for processing salt, including the impacts of constructing and operating processing facilities.

3.1 Geologic Setting and Seismicity

The SRS is in west-central South Carolina, approximately 100 miles from the Atlantic coast (Figure 3-3). It is on the Aiken Plateau of the Upper Atlantic Coastal Plain, about 25 miles southeast of the Fall Line that separates the Atlantic Coastal Plain from the Piedmont.

3.1.1 GENERAL GEOLOGY

In South Carolina, the Atlantic Coastal Plain province consists of a wedge of seaward-dipping and thickening unconsolidated and semiconsolidated sediments that extend from the Fall Line to the Continental Shelf. The Aiken Plateau is the subdivision of the Coastal Plain that includes SRS. Coastal Plain sediments underlying SRS consist of sandy clays and clayey sands, although occasional beds of clean sand, gravel, clay, or carbonate occur (DOE 1995a). The formations that must be considered in evaluating potential groundwater transport from S and Z Areas are part of the shallow (Floridan) aquifer system (Figure 3-4).

Surface soils at both Site B in S Area and the Z Area site are classified as Udorthents. The generic term Udorthents describes natural soil weathering horizons that have been disturbed or removed, usually by erosion or construction activities. These soils are generally well-drained and range from sandy to clayey, depending upon their origin. Dominant soil types in the undisturbed western portion of Z Area include Fuquay and Blanton soils, respectively, as shown on Figure 3-5 (USDA 1990).

3.1.2 SUBSURFACE FEATURES

A benchmark study of geophysical evidence (summarized by Wike et al. 1996) and an earlier study (Stephenson and Stieve 1992) identified the onsite geologic faults. Since these studies were published, new seismic reflection data have been acquired specifically for refinement of the fault map or in support of other characterization projects. In addition, several other relevant geologic studies relating to SRS basement geology have been completed. These studies resulted in the current map of subsurface faults shown on Figure 3-6. The lines on Figure 3-6 represent the location of the faults on the basement surface. The actual faults do not reach the surface, but stop several hundred feet below it.

Based on available information, none of the faults discussed in this section are capable, which means that none of the faults have moved at or near the ground surface within the past 35,000 years or are associated with another fault that has moved in the past 35,000 years. Appendix A of 10 CFR 100 contains a more detailed definition of a capable fault.

Rock strata under some areas of SRS include layers of pockets of carbonate rock that are subject to dissolution. Sites underlain by these "soft zones" are considered unsuitable for structural formations unless extensive soil stabilization is done. There are no carbonate soft zones underlying structures that would be built within the Site B footprint (WSRC 2000a). Of the three candidate sites, Sites B and D have equal hardness and Site C is softer. The difference would have minimal effect on the total site suitability score. In 1986, DOE conducted a geologic investigation in support of the new vaults in Z Area. Of the 23 borings extended through the calcareous layer, one major soft zone was encountered. Within the Z-Area footprint, there is sufficient area to avoid building a vault over this soft zone if soil stabilization is not successful (WSRC 1999a).

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3.1.3 SEISMICITY

Two major earthquakes have occurred within 186 miles of SRS.

