DOE/EA-1022

**ENVIRONMENTAL ASSESSMENT
FOR THE
CONSTRUCTION AND OPERATION
OF THE
HEALTH PHYSICS SITE SUPPORT FACILITY
ON THE
SAVANNAH RIVER SITE**

JULY 1995

**UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER OPERATIONS OFFICE
SAVANNAH RIVER SITE**

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1.0 PURPOSE AND NEED FOR ACTION

This Environmental Assessment (EA) has been prepared by the U. S. Department of Energy (DOE) to assess the potential environmental impacts associated with the construction and operation of the proposed Health Protection Site Support Facility (HPSSF) at the Savannah River Site (SRS) located near Aiken, South Carolina (Figure 1-1). The SRS Radiological Control and Health Physics (RC&HP) Department is responsible for conducting the monitoring and analysis programs that determine external and internal radiation doses received by monitored SRS workers. The laboratory sections and offices of this department are located in existing site buildings which are in a continuing state of deterioration. Because of these conditions, it is increasingly difficult to meet process and quality control requirements, and therefore remain in compliance with DOE Orders for controlled temperature, humidity, and electrical supply for analytical instrumentation. In order for the site to meet current and future responsibilities and requirements associated with the SRS radiological protection programs conducted by the RC&HP Department, the option to replace the existing facilities with a new HPSSF was identified as a viable alternative.

1.1 Background

The RC&HP Department technical support laboratories and some of its offices presently occupy the same facilities within Building 735-A that were designed and constructed in 1952 (WSRC, 1993a). At the time of its construction, the laboratory modules and specialized work areas in Building 735-A were designed to process bioassay samples and dosimetry associated with the relatively limited sampling program for a total site population of less than 10,000 employees. Although not all of these employees were involved in activities requiring routine *in vivo* and/or *in vitro* sampling, office space was required for their support activities. Since these facilities were constructed, the site population of radiological workers alone has risen to approximately 10,000 employees, and many of the required sampling regimes for these radiological workers (both analysis type and frequency) have also increased. For example, in 1981 the bioassay laboratory processed 8,868 samples (5,761 tritium samples and 3,107 non-tritium samples). In 1994 the laboratory processed 42,800 tritium samples (an increase of approximately 743%) and 20,300 non-tritium samples (an increase of approximately 653%).

In order to meet the additional demands for radiological protection at SRS, the RC&HP Department has grown from 256 employees in 1981 to a department consisting of 792 permanent employees. This marked increase in the number of required RC&HP technical support personnel has left the RC&HP Department with critical shortage of laboratory and office space. In 1981, 32 technical support employees occupied the space that today is utilized by 93 employees.

Building 735-A is now over 40 years old. Both the number of radiological workers and monitoring requirements at SRS have significantly increased since site startup, but Building 735-A has remained essentially unchanged. This has created a much heavier workload than the building was designed to support. The mechanical equipment and Heating, Venting, and Air Conditioning (HVAC) systems for the facility remain essentially unchanged from the original design. Of particular concern are the hoods and ductwork associated with C-Wing (Bioassay Laboratory). Throughout the 40 year history of the facility, a major component of the sample analyses conducted in this section of the building consisted of driving off large quantities of concentrated acids via slow evaporation. These acids recondense in the hoods and ductwork causing significant corrosion problems. Downtime associated with the HVAC systems has occurred, and it is expected that this will increase as the building and its mechanical equipment continue to age.

Twenty thousand Thermoluminescent Dosimeter (TLD) and Thermoluminescent Neutron Dosimeters (TLND) badges are processed each quarter. The processing of these TLD and TLNDs, including preparation, staging, reading, and reporting, takes place almost simultaneously for both the outgoing and incoming badges. The External Dosimetry group still occupies the same area afforded it at site startup, while the number of routine TLDs, TLNDs, and special dosimetry badges has increased significantly (i.e., 160 percent). This increase in work load without any increase in work space has pushed this operation to the limits of compliance ability. While it is possible, or even probable that the number of radiological

Figure 1-1. Location of the proposed Health Physic Site Support Facility at the Savannah River Site, South Carolina.

workers on site will decrease in the future, a number of the remaining radiological workers would most likely be required to wear multiple radiation-detecting badges. Decontamination and decommissioning work in facilities on site, in addition to routine work, will require a great deal more TLD and TLND badging than presently used due to a greater emphasis on the possible occurrence of non-uniform radiation fields, hot particles, and extremity dosimetry.

With the additional number of required RC&HP employees, increases in site sampling and monitoring requirements, and the general deterioration of Building 735-A laboratories, the existing facilities are no longer capable of adequately supporting the current and projected radiological protection needs of SRS.

1.2 Purpose and Need for Agency Action

The purpose of the proposed action is to enable SRS to meet process and quality control parameters associated with the current and future responsibilities and requirements of the site radiological protection programs. The proposed DOE action is needed by SRS to ensure mandatory site compliance with this program as defined in the following DOE Orders and CFR notice: 1324.2A (Records Disposition); 5000.3A (Occurrence Reporting and Processing of Operations Information); 5400.1 (General Environmental Protection Program); 5400.5 (Radiation Protection of the Public and the Environment); 5480.1B (Environment, Safety, and Health Program for Department of Energy Operations); 5480.4 (Environmental Protection, Safety, and Health Protection Standards); 5480.10 (Contractor Industrial Hygiene Program); 5480.11 (Radiation Protection for Occupational Workers); 5480.15 (Department of Energy Laboratory Accreditation Program for Personnel Monitoring); 5480.19 (Conduct of Operations Requirements for DOE Facilities); 5480.20 (Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Facilities); 5482.1B (Environment, Safety, and Health Appraisal Program); 5483.1A (Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities); 5484.1 (Environmental Protection, Safety, and Health Protection Information); 5700.6C (Quality Assurance); 5820.2A (Radioactive Waste Management); 6430.1A (General Design Criteria); and Combined Federal Register Notice 10 CFR 835 (Occupational Radiation Protection).

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The proposed action is to construct and operate a new HPSSF that would allow for continued compliance with the previously identified DOE Orders. The HPSSF would evaluate personnel radiation monitoring devices (TLDs, TLNDs, etc.), monitor personnel internal exposures to radioactive materials (bioassay), maintain dosimetry records, and provide the capability to rapidly evaluate and document personnel exposures to radioactive hazards on SRS. Additionally important, it would allow SRS to consolidate RC&HP Department management and technical support personnel into a single location and to complete these actions in a facility that would be capable of supporting the current and anticipated future workload of SRS.

The proposed HPSSF would be constructed and operated at a site in B Area (Figure 1-1), which is now an undeveloped location. The proposed facility would be located on a 6.1 hectares (15 acres) site on the west side of SRS Road 2. The location for the proposed HPSSF 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 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 before construction, and a program plan must be prepared if a new water supply well is to be constructed. Preliminary designs call for the proposed facility to be constructed between the new RC&HP Instrument Calibration Facility and In-Vivo Counting Facility. These two facilities were previously assessed under separate National Environmental Policy Act (NEPA) documentation (DOE, 1993a, 1993b). Both of these new facilities are currently under construction. This area was chosen based on its central location on SRS, ease of access from all supported areas (Figure 1-1), and the absence of process contamination.

Construction of the proposed action would include site clearing, grading/site drainage improvements, access road and parking lot construction, building construction, site landscaping, facility equipment/furnishing, and utility connections. Site clearing would encompass small-volume timber harvesting, grubbing, and logging/clearing debris removal or burning.

The proposed facility would be an approximately 4,180 square meter (45,000 square feet) structure built with one full-sized ground floor above grade and one half-sized basement below grade. The below-grade basement exterior walls would be constructed of reinforced "cast-in-place" concrete. The walls of the above-grade floor would be constructed of insulated metal panels on steel framing, or split face masonry. The roof would be constructed of a single-ply roofing membrane on a rigid steel deck. The interior walls would normally be gypsum board on metal stud framing. The facility would have a paved parking lot with a capacity for 75 small- to medium-sized vehicles to accommodate employee, facility, service, and visitor automobiles, vans or trucks.

The building is designed to house the laboratories, specialized work environments, offices, and support spaces for approximately 93 RC&HP personnel. The building is divided into three functional areas as follows: Office Wing; Dosimetry Wing; and Bioassay Laboratory Wing. The Office and Dosimetry wings would be combined under a single story 20,000 square foot structure. The Bioassay Laboratory Wing, including a service basement, would have a combined floor area of 25,000 square feet. The three areas would be accessed through enclosed vestibules which provide fire separation and serve as emergency exits. The Office Wing would include an entry lobby, offices (management, staff, and service), central computer room, publications area, technical library, main building receiving and storage, conference rooms, break room, restrooms, and change rooms. The Dosimetry Wing would include a dosimeter receiving and staging room, a TLD quality control room, a dosimeter processing room, a TLND processing room, a TLND annealing room, and a fire resistant record storage room for personnel records, exposure files, and historical records. Design requirements for the Bioassay Laboratory Wing encompass approximately eleven large laboratory modules, six small laboratory modules, approximately ten foot wide central service corridors, a sample receiving and storage area adjacent to a general laboratory receiving area, utility rooms, and dispersed office areas. All laboratories would be provided with redundant ventilation exhaust capabilities, such as dual exhaust fans. The laboratories where handling of minor quantities of radioactive material occurs would use inflow hoods to provide confinement. Emergency showers and/or eyewash facilities would be provided in areas where corrosive or skin/eye irritant chemicals are stored, handled, used or dispensed.

The HPSSF would be specifically designed and constructed in accordance with DOE Order 6430.1A (General Design Criteria). This project has been determined to be in the Production Support (PS) design class, which applies to systems that handle radioactive materials, but are not classified as a nuclear safety class. The PS design category selection was based on providing support for continued operation of other SRS facilities.

A Hazards Assessment Document (HAD) determination performed for this project (Nadeau, 1993) determined that the proposed HPSSF facility is a non-nuclear facility and that a HAD is not required. The proposed HPSSF facility has been classified as a General Use Non-nuclear Facility. The Facility Segment Use Category of the proposed HPSSF facility was determined to be General Use (Nadeau, 1993). All applicable safety requirements of DOE Orders and SRS standards and specifications would be incorporated in accordance with DOE requirements.

The proposed action would be managed under the Category I Fiscal Year-96 Line Item Project 96-D-473 (Project S-5832) and is expected to cost approximately \$18.5 million dollars to complete. Current project schedules call for the beginning of detailed design (Title II Design) in January of 1996, for construction to begin in February of 1997, and project completion by March of 1999.

Facility construction would require "tie-in" to the B Area domestic water system, electrical supply grid, fire suppression water system, and domestic sewer system. Line Item Project 92-D-143, HP Calibration Facility, would extend B Area utilities to the west side of SRS Road 2 providing tie-in points for this facility. Liquid effluent from the facility restroom sinks, commodes, water fountain drain, and a lunchroom

sink drain would be directed to the sanitary sewer. Aqueous laboratory waste would be neutralized in a batch process and discharged to the sanitary sewer or a permitted discharge as determined during preauthorization and Title I evaluations. The roof, parking lot, and grounds would lead rainwater runoff to a storm sewer.

2.2 Alternatives to the Proposed Action

In accordance with NEPA regulations, DOE examined the following alternatives to the proposed action:

- No action, continue to use the existing RC&HP Department facilities
- Renovate and expand the existing RC&HP Department facilities
- Increase the use of off site subcontractors
- Build the proposed facility at an alternate site at SRS

2.2.1 No action, Continue to Use the Existing RC&HP Department Facilities

An alternative to the proposed action is to take no action. In accordance with NEPA (40 CFR 1502.14(d)), the "No Action" alternative is included to provide a baseline condition from which to evaluate the potential environmental impacts of the proposed action. This alternative, by definition, would consist of DOE-SR taking no action to upgrade or construct a new HPSSF and failing to comply with the relevant and applicable DOE Orders and CFR citation listed in Section 1.1. This alternative was examined in detail before being determined to be unreasonable. Some of the drawbacks associated with this alternative include the following: the increasing number of samples and dosimetry requirements would continue to overload the current facility; SRS would be forced to continue sending samples off site for analysis because of the lack of adequate on site facilities, with the attendant complications of added cost, transportation, and chain of custody requirements; deterioration of the existing facility would require more extensive renovation; and not all DOE Order requirements can continue to be met at the current facility. The existing ductwork is in such a condition that the probability of catastrophic failure of the system increase significantly with time. Continued occupancy of the laboratory would require complete dismantling and replacement of the entire ductwork system. Since it is understood that compliance with DOE Orders is mandatory, and in the best interests of personnel and environmental safety and health, and that the "No Action" alternative would not permit SRS to achieve continued compliance, it was therefore not considered as a reasonable alternative.

2.2.2 Renovate and Expand the Existing RC&HP Department Facilities

A second alternative to the proposed action would be the renovation and expansion of the existing 735-A facility. The disruptive effects of performing a major renovation while continuing ongoing activities would have severe impacts on the timely performance of the analyses performed at this facility. However, renovation alone would not provide a complete solution, as there would still be inadequate space available in the renovated buildings. The construction of additional facilities in the vicinity of 735-A is not considered feasible because of the lack of adjacent space. Relocating parts of the Savannah River Technology Center (SRTC) and reassigning that space to the RC&HP Department would be one way of obtaining more space, but all nearby portions of SRTC are also compressed and overcrowded. Therefore, in order to obtain the needed space for the portions of the RC&HP Department now located in the SRTC area, RC&HP would be forced to move to alternate locations.

2.2.3 Increase the Use of Off Site Subcontractors

Another alternative considered was to increase usage of off site subcontractors. This was also found to be unreasonable. The original purpose of such contracts was to augment the capabilities of the RC&HP Department to analyze samples (primarily samples with very low levels of activity). No single off site subcontractor is capable of handling the volume of SRS samples for analysis. Several subcontracts would be required, thereby increasing the administrative costs necessary to manage the array of laboratories. These contracts would also provide unacceptably long turn-around times. The proposed laboratory would all but

eliminate the need to send samples off site, and would in turn create shorter turn-around times for samples currently handled in this manner and reduce the associated shipping and screening costs. Limited off site services would need to remain in service to handle QA/QC inter-comparison sample exchange and occasional analyses that are not cost effective to perform in house, but the magnitude of such contracts would be small compared to those currently in place.

2.2.4 Build the Proposed Facility at an Alternate Site at SRS

Other sites (i.e., on the SRS northern boundary) were previously considered for locating the proposed RC&HP Department facilities (Zeigler, 1998). However, although these sites offered low background radiation levels, none were located conveniently for most of the site population. Furthermore, due to existing site infrastructure, the costs of extending utilities to the northern site boundary were considered to be prohibitive (DOE, 1993a). In addition, it has been shown that significant operating and administrative efficiencies result from having the various office and laboratory facilities within the RC&HP Department located in close proximity to each other (WSRC, 1993a). Therefore, locating the proposed HPSSF at a site other than between the two RC&HP Department facilities already under construction in the subject portion of B Area was considered to not be preferable.

3.0 AFFECTED ENVIRONMENT

The SRS encompasses approximately 80,535 hectares (199,000 acres) in southwestern South Carolina, approximately 40 km (25 mi) southeast of Augusta, Georgia along the Savannah River (Figure 1-1). SRS contains five nuclear production reactor areas; two chemical separations areas; waste processing, storage, and disposal facilities; and various supporting facilities. More than 18,000 people, approximately 10,000 of whom are radiological personnel, work at SRS in the various operating areas and would be served by the new facilities. A comprehensive discussion of SRS and associated environs is presented in the **Defense Waste Processing Facility Final Supplemental Environmental Impact Statement** (DOE, 1994), and in several SRS environmental information documents (WSRC, 1989a, 1989b; Wike et al., 1994). The most recent socioeconomic survey of the six-county SRS area of influence contains additional information (NUS, 1992).

The proposed location for this facility is on a site which is undeveloped, but immediately bordered by lands occupied by new facilities under construction. Currently, the site is composed entirely of a 40-year old planted slash pine (*Pinus elliottii*) stand, interspersed with long-leaf pine (*P. palustris*), and with a thick mid-story hardwood component. Dominant woody species within the mid-story and shrub layers include post oak (*Quercus stellata*), southern red oak (*Q. falcata*), sassafras (*Sassafras albidum*), water oak (*Q. nigra*), and laurel oak (*Q. laurifolia*). The ground is covered by moderately thick layer of pine needle litter, with very little herbaceous cover. Historically, this site has been used for only timber production by the Savannah River Forest Station (SRFS) since the acquisition of the property by the Federal government in the early 1950s (Gaines, 1992). The contour elevations of the proposed project site are essentially level at approximately 300 feet above mean sea level. The site is located on a high sand ridgetop made up of well drained, permeable soils in the Orangeburg and Blanton-Lakeland associations (Rogers, 1990). The site drains to the east and west into the Upper Three Runs basin. No wetlands or streams are found within the immediate area of the location for the siting of this facility (Gladden, 1990). The depth to the groundwater is approximately 40 meters or 130 feet (WSRC, 1989a). The proposed site does not overlap any of the known geologic faults on SRS (WSRC, 1989a).

4.0 ENVIRONMENTAL IMPACTS

4.1 Construction

Currently, 96 percent of SRS remains undeveloped (Workman and McLeod, 1990). The 6.1 hectares of land needed for the proposed project is currently forested with a planted pine stand, not all of which would be harvested for timber. Only those portions of the site which would be occupied by the building and parking lots would be cleared. In all, approximately 1.2 hectares (3 acres) of land would be cleared and

graded in order to support construction of the proposed facility. The harvesting of timber at the proposed site would produce approximately 3,100 board feet of marketable timber. This land area 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.

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 temporarily badged onto SRS for this major facility construction. This work force would be drawn from both local and non-local sources as determined by skilled worker availability. The proposed temporary construction work force would comprise less than 0.5% of the total SRS work force.

Construction-related air quality effects would primarily due to 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).

Facility construction would result in some soil disturbance. The minimization and mitigation of this potential source of sedimentary pollution would be documented under a Pollution Prevention Plan meeting SCDHEC requirements. Typical methods employed at SRS to minimize and mitigate potential erosion sources include: the use of silt fences to prevent transport of sediment; the seeding of soil stockpiles to prevent erosion; and the development of siltation basins to trap sediments in construction site runoff.

The proposed action would not require the development of any new groundwater or surface water resources. The only groundwater resources which would be utilized in connection with this activity would be domestic water supplies for use as processed drinking water and sanitary sewer supplies, and fire water for use in charging the buildings fire suppression systems. All domestic water usage would be permitted through SCDHEC.

The construction of the proposed HPSSF would result in the generation of some construction related debris. This debris would be disposed of in the currently used off-site municipal solid waste landfill or an on-site erosion control pit. Since the proposed location lies in a previously undeveloped area, no contaminated soils or waste sites are expected to be encountered during construction. However, in the event that any contaminated soils are encountered during construction, they would be disposed of on site in waste disposal areas in accordance with applicable regulations and site procedures. Any soils contaminated with hazardous materials would be handled and disposed of in accordance with Resource Conservation and Recovery Act (RCRA) regulations. Aside from small amounts of domestic sanitary waste, no new waste streams would be generated from this facility as it is designed to replace an existing waste generator.

Cultural resources at SRS are managed under the terms of a Programmatic Memorandum of Agreement (PMOA) among DOE-SR, the South Carolina State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation (DOE, 1990). DOE-SR uses this PMOA to identify cultural resources, assess these in terms of National Register eligibility, and develop mitigation plans for affected resources in consultation with the SHPO. DOE-SR would comply with the stipulations of the PMOA for all activities related to the construction and operation of the proposed HPSSF.

As part of the routine SRS Site-Use Permit system, each prospective site is also reviewed for potential archaeological impacts. These reviews are conducted by the University of South Carolina Archaeological Department. This review resulted in the determination that the proposed facility would have no impact on SRS archaeological resources. The proposed HPSSF location has also been reviewed under the site Archaeological Resource Management Plan (SRARP, 1989) and determined to be in the lowest or Class III area of archaeological concern. No impact on SRS archaeological or cultural resources is expected from the construction and operation of the proposed facility.

As part of the routine SRS Site Use Permit system, each prospective site is reviewed for potential ecological impacts. These reviews are conducted by SRTC. The review, which covers threatened and endangered species, rare plants, and pristine biotic areas, determined that there would be no impact from the proposed project (Gladden, 1990). In addition to the Site Use Permit Ecological Review, three formal Biological Evaluations (Gaines, 1992; Roecker, 1992; Hyatt, 1994) was conducted by the Savannah River Forest Station (SRFS) for the lands in and around the proposed project site. Findings from the first two Biological Evaluations (i.e., Gaines, 1992 and Roecker, 1992) stated that no sensitive habitats were found within the immediate areas selected for facility construction, and threatened and endangered species or their habitats would not be affected. In addition, no threatened or endangered species were identified in the vicinity of the proposed project location in B Area. The habitats in the vicinity of the project location are not suitable for any of the federally protected species that have been identified for SRS except the red-cockaded woodpecker (*Picoides borealis*). Distances to the nearest active and inactive colonies for the red-cockaded woodpecker from the proposed project location are 15.8 km (9.8 mi) and 4.8 km (3.0 mi), respectively. The proposed HPSSF location is beyond the typical foraging distance for this species as reported on SRS (Wike et al., 1994). The U. S. Fish and Wildlife Service (USFWS) in Charleston, South Carolina, concurred on the findings of no impact as determined in the first two Biological Evaluations (Banks, 1992a; 1992b). The more recent Biological Evaluation (i.e., Hyatt, 1994) found that, with the exception of the already implemented new construction activities, the site conditions were identical to those described in the two earlier evaluations. Based on the unchanged site conditions and two prior USFWS consultations regarding the same area conducted in accordance with the Endangered Species Act Interagency Cooperation Section (P.L. 93-205, Sec. 7), it was concluded that no additional consultations with the USFWS were necessary at this time.

The only mitigation action which would be required in conjunction with the proposed action is the preparation, approval, and implementation of a Pollution Prevention Plan meeting SCDHEC requirements. All erosion control plans used on SRS must follow the format as established in the Aiken County Erosion Control Ordinance. Once prepared, this plan must be screened by the Natural Resource Conservation Service (NRCS) Field Office and approved by DOE-SR prior to any construction activity. During project construction, site inspections by the WSRC Environmental Protection Department and NRCS personnel would be conducted to ensure compliance with the erosion control plans outlined under the Pollution Prevention Plan.

4.2 Operation

Once completed, the proposed facility would be operated with a staff of approximately 93 personnel. The staff of the HPSSF (laboratory technicians, technical support personnel, managers, maintenance personnel, administrators, etc.) would be composed of personnel who are already employed in the RC&HP Department. Thus, there would be no socioeconomic impact associated with normal operations.

After facility startup, the radioactively clean or ultra low level nature (i.e.,) of the material handled in this facility assures that air emissions would not include regulated quantities of radioactive species. All airborne effluents are expected to be below 0.1 mrem effective dose equivalent from emissions in any given year, including effluent from the Standards Preparation Laboratory Module, one of two facility Radiological Material Areas (RMAs). Per DOE Order 5400.5, facilities with annual emissions resulting in less than 0.1 mrem effective dose equivalent are not required to be monitored.

The following waste streams would be present in the facility as they are in the present facility:

- Low-level radioactive waste
- Clean acidified aqueous waste
- Clean solid waste
- Clean organic waste

The three types of clean waste are defined as streams consisting of waste materials that do not contain radioactive materials that can be detected using standard detection techniques. Trace quantities of radioactive materials may be present but are expected to be well below permitted levels.

Low-level liquid and solid radioactive waste may be generated in relatively low quantities in the standards preparation laboratory of the Bioassay Laboratory Wing of the HPSSF. Provisions would be included in the design to collect liquid effluents from this laboratory and transport them to an on site location designated to handle low-level waste (WSRC, 1993a). The quantity of effluent generated should allow these liquids to be accumulated in a carboy or like container, and then be physically transported to a location where it may be introduced into a low-level drain system. The design of the facility would include appropriate safeguards (e.g., separate closed radiological drain system with internal filtering process, administrative sampling, and controlled batch releases) to ensure that accidental introduction of this low-level waste in the facility's other effluent streams is prevented.

Acidified aqueous wastes must be neutralized and analyzed for appropriate pH in a batch process before release to the sanitary sewer or other permitted discharge may be considered. These wastes would be piped to the waste neutralization area of the facility and processed to meet the receipt requirements of SRS procedures and SCDHEC requirements. The facility would have the capability to transfer waste to a suitable treatment facility. Laboratory sinks, piping, mixing equipment, and tankage in the waste system discharging to the neutralization facility would be designed to be resistant to the acids expected to be used in the Bioassay Laboratory. The major acid load would be from the use of 8N or lower solutions of nitric acid and hydrochloric acid. Most liquids going into the drains would normally be much lower than this in concentration, but the potential exists for highly acidic solutions or undiluted acids to be poured directly down the drains without dilution. Therefore, appropriate materials of construction would be used for the drain lines.

Any solid RCRA waste generated in the facility would be segregated and packaged for shipment to the appropriate SRS facility. Efforts would be made to eliminate or minimize any solid waste which contains toxic materials as identified by the Toxicity Characteristics Leaching Procedure.

Organic waste generated in the laboratory which is insoluble in water (methylene chloride, toluene, etc.) would be segregated and packaged for shipment to the appropriate SRS facility. The concentration of radionuclides in these waste forms is expected to be so low that any potentially hazardous organics would not be classified as mixed waste.

Temporary external storage areas would be provided for each type of waste container anticipated to be shipped to other facilities. These areas would be covered or enclosed as required for these types of containers and waste. All Federal and State regulations affecting these waste types would be reviewed and incorporated into the design, as applicable.

Some of the personnel working in the proposed HPSSF may be working with the hazardous chemicals/materials listed in Table 4-1. These RC&HP personnel are currently working with these chemicals in the existing facility and would continue to work with them in the proposed facility. These workers would continue to be trained in the proper handling and precautionary measures to be taken when working with these materials. Workers would be fully trained and educated (OSHA Material Safety Data Sheets) on the specific health hazards associated with each of the materials listed in Table 4-1. Workers would be required to adhere to the safety guidelines outlined in the Site Industrial Hygiene Manual (WSRC, 1993) and to wear the protective clothing and equipment appropriate for the material(s) in use.

All tank installations, drum storage, and chemical storage facilities would be designed to meet applicable RCRA requirements. Containment capabilities would also be provided in mechanical rooms and fan rooms to prevent an accidental spillage of stored or waste lubricants from reaching the environment.

No surface water would be used during operation of the proposed facility. All domestic and fire water would be obtained from existing B Area water wells and delivered through existing distribution systems. The domestic water needs of the proposed facility are not expected to exceed .0018 cubic meters/second (cms) (30 gallons/min), and should not affect the water level of the supply aquifer. The fire water usage for this facility is normally expected to be zero cms.

Table 4-1
Hazardous Chemicals/Materials

CHEMICALS/MATERIALS

• nitric acid	• bidentate
• hydrochloric acid	• triisooctylamine (TIOA)
• sulfuric acid	• ammonium chloride
• oxalic acid	• TRU-SPEC resin
• perchloric acid ^a	• hexone
• ammonium hydroxide	• toluene
• sodium hydroxide	• xylene
• ammonium iodide	• N-octanol
• hydrogen peroxide	• acetone
• sodium bisulfate	• methanol
• aluminum nitrate	• tributyl phosphate
• sodium nitrate	• ferrous sulfamate
• silver nitrate	• sodium formaldehyde sulfoxylate
• calcium nitrate	• ammonium oxalate
• neodymium nitrate	• bis-4,4' (S') [t-butyl cyclohexano]-18-crown-6
• methylene chloride	• Uraplex (Chemcheck proprietary complexing agent)
• di-ammonium hydrogen phosphate	• Ecolite (ICN Biomedical proprietary liquid scintillation solution)
• di-2-ethylhexyl phosphoric acid (HDEHP)	• octyl (phenyl)-NN-diisobutylcarbonyl-methyl phosphine oxide (CMPO)
• anhydrous potassium carbonate	
• propane and P-10 Gas (compressed)	

^a Used only in the perchloric hoods

In all cases, the actions of the construction and operational work forces associated with this project would be guided by the Federal Sector Pollution Prevention Policies. To demonstrate the intent of the Federal Government as the national leader in pollution prevention policies and practices across all missions, activities, and functions, the work forces associated with the proposed action would;

- prevent or reduce pollution at the source wherever feasible.
- recycle in an environmentally safe manner the pollution that cannot be prevented.
- treat in an environmentally safe manner the pollution that cannot be prevented or recycled.
- dispose of pollution only as a last resort.

The project team's commitment to these federal guidelines would ensure DOE compliance with existing pollution prevention and control policies.

4.3 Human Health Effects

With one exception, the radiation dose rates in the proposed facility would not be above normal background levels. The one exception is a commercially available quality control irradiator for TLD processing. Exposure of operating personnel to radiation during normal operations is monitored by the RC&HP Department. Radiation dose rates at the proposed facility shall be ALARA (As Low As Reasonably Achievable) and shall not exceed 0.25 mrem/hr to personnel in continuously occupied areas. At SRS "continuously occupied areas" are assumed to be occupied 2,000 hours per year. The dose rates around the irradiator would ensure that the maximum annual individual dose rate to the staff in the new facility is significantly less than 50 mrem. Based on an occupational risk factor of 4×10^{-4} fatal cancers per person

rem, workers engaged in this proposed project would not be expected to incur any harmful health effects from radiation exposures they receive during normal operations.

4.4 Transportation Impacts

The proposed action was examined for any potential transportation impacts. Air quality, traffic load, chemical transportation, and traffic flow were all reviewed in relation to the proposed project and no transportation impacts are expected. The transfer of existing chemical stocks from the existing facility to the proposed facility, as well as the transportation of all future chemical deliveries, would be conducted in accordance with DOT shipping safeguards and regulations.

4.5 Accident Analysis

Prior to facility operation, the HPSSF would be required to formulate appropriate emergency procedures for the evacuation of facility personnel in the event of an emergency (e.g., fire, tornado, etc.). These procedures would ensure a minimization of loss of life or unnecessary radiological/chemical exposure associated with a facility emergency or destruction.

The risk of a process accident as the result of a natural disaster (e.g., earthquake, flood, tornado) was examined. The risk of a building strike from a tornado was determined to have the greatest risk for natural disasters. Statistics (Ramsdell and Andrew, 1986) show reports of 37 tornadoes from 1954 to 1983 for a one degree square of latitude and longitude that includes SRS. This is an average of about one tornado per year. Based on data for this 30-year period, the estimated average frequency of a tornado striking any given location in South Carolina was 7.11×10^{-5} per year. This results in a point-strike recurrence interval of about once every 14,000 years. A direct strike by a tornado would result in total facility destruction and possible fatalities to the building's occupants. However, this risk is considered very minor when compared to the 14,000 year point strike reoccurrence interval.

Fire was also determined to pose a threat to the proposed facility. However, the proposed facility would be protected with an automatic fire detection and suppression system. The detection system would be connected to the SRS central alarm system. In the event of fire detector activation, the alarm would be sounded at the nearest SRS Fire Station (F Area) which is 4.9 km (3.1 mi) away. The suppression system to be installed in the proposed facility would comply with all National Fire Protection Association (NFPA) standards for this type of facility. All NFPA life safety requirements would also be met. A large fire frequency has been determined by utilizing the approach that, at SRS, the frequency of a large fire is 6.05×10^{-5} per year per 929 square meters (10,000 square feet) of facility (Paddleford and Perdue, 1991). The proposed HPSSF would occupy approximately 4,180 square meters (45,000 square feet) thus yielding a large fire frequency of 3×10^{-4} /yr.

4.6 Cumulative Impacts

The principal cumulative impacts of the proposed project would be the loss of approximately 1.2 hectares (3 acres) of planted pine habitat and the potential for erosion/sediment transport into SRS streams and waterways. Based on the SRFS timber management practices over the last five years (1990-1994), the area to be cleared for the proposed action represents a loss of approximately 0.2 percent of the 729 hectares (1800 acres) of planted pine habitat harvested on the site annually, and less than 0.003 percent of the total planted pine habitat on SRS. The potential pollutant source from erosion/sediment transport would be minimized by means of an approved Pollution Prevention Plan that meets all SCDHEC requirements prior to beginning any construction activity. The quantity of waste generated would only add a small increment to the waste generated at SRS. The withdrawal of water should not affect the water level of the aquifer. No other cumulative impacts to the environment are expected from the operation of the proposed facility.

5.0 REGULATORY AND PERMITTING PROVISION CONSIDERATIONS

DOE policy is to perform its operations in compliance with all existing applicable federal, state, and local laws and regulations, and in conformance with all DOE Orders. This section discusses the major regulatory permit programs that may be applicable to the proposed action.

This EA was prepared to comply with National Environmental Policy Act (NEPA); the Council on Environmental Quality Regulations on Implementing NEPA (40 CFR Parts 1500-1508); DOE National Environmental Policy Act; Implementing Procedures and Guidelines Revocation, Final Rule and Notice (10 CFR Part 1021); and DOE Order 5440.1E.

Disposal of any hazardous or mixed waste (low-level radioactive hazardous waste) would comply with RCRA requirements and the South Carolina Hazardous Waste Management Regulations R.61-79.

SCDHEC Regulations 72-300 (which establishes the procedures and minimal standards for all land disturbing activities) and National Pollutant Discharge Elimination System (NPDES) General Permit SCR 100000 (which authorizes storm water discharges associated with industrial activity that would result in the disturbance of 2.02 hectares (5 acres) or more of total land area) would regulate project erosion control activity and must be followed with respect to the implementation of the proposed Pollution Prevention Plan.

All operational permits (i.e., WSRC Power Services Utilization, Parts B and C; SCDHEC Domestic Water Tie-In) would be required prior to operational start up of the proposed action.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

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**Finding of No Significant Impact
for the
Construction and Operation
of the
Health Physics Site Support Facility
on the Savannah River Site**

Agency: U. S. Department of Energy

Action: Finding of No Significant Impact

Summary: The Department of Energy (DOE) has prepared an environmental assessment (EA) (DOE/EA-1022) for the proposed construction and operation of the Health Physics Site Support Facility on the Savannah River Site (SRS), near Aiken, South Carolina. Based on the analyses in the EA, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an environmental impact statement is not required, and DOE is issuing this Finding of No Significant Impact (FONSI).

Public Availability:

Copies of the EA and FONSI or further information on the DOE NEPA process are available from:

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Environmental Compliance Division
SR NEPA Compliance Officer
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Background: The SRS Radiological Control and Health Physics Department technical support laboratories and some of the departmental offices presently occupy the same facilities within Building 735-A that were designed and constructed in 1952. At the time of its construction, the laboratory modules and specialized work areas in Building 735-A were designed to process bioassay samples and dosimetry associated with a relatively limited sampling program for the site's several thousand radiological workers. Since that time, the site population of radiological workers has risen to approximately 10,000 employees. The required sampling regimes for these radiological workers have also increased to levels ranging from 600 to 700 percent over that of earlier years.

In order to meet the additional demands for radiological protection at SRS, the Radiological Control and Health Physics Department has more than tripled in size over the last decade. This marked increase in the number of required technical support personnel has left the department with a critical shortage of both laboratory and office space. In addition to the space shortage, Building 735-A is now over 40 years old and has remained essentially unaltered since its construction. The current workload is substantially heavier than the building was designed to support. Downtime associated with the building's heating, venting, and air conditioning systems has been a recurring

obstacle to the department's operations. It is expected that this and other problems will increase as the building and its mechanical equipment continue to age.

Twenty thousand Thermoluminescent and Thermoluminescent Neutron Dosimeter badges are currently processed each quarter. The processing of these badges, including preparation, staging, reading, and reporting, takes place almost simultaneously for both the outgoing and incoming badges. The group conducting this processing still occupies the same area afforded it at site startup, while the number of both routine and special dosimetry badges has increased significantly. This increase in work load without any increase in work space has pushed this operation to the limits of compliance ability. With the increase in technical support personnel, increases in both site sampling and monitoring requirements, and the general deterioration of Building 735-A laboratories, the existing facilities are no longer capable of adequately supporting the current and projected radiological protection needs of SRS.

Proposed Action: The proposed action is to construct and operate a new Health Physics Site Support Facility that would enable SRS to meet process and quality control parameters associated with the responsibilities and requirements of the site radiological protection program. The proposed DOE action is needed by SRS to ensure mandatory site compliance with this program as defined in DOE Orders and other Federal regulations. The proposed facility would evaluate personnel radiation monitoring devices, monitor personnel internal exposures to radioactive materials, maintain dosimetry records, and provide the capability to rapidly evaluate and document personnel exposures to radioactive hazards on SRS. Additionally important, it would allow SRS to consolidate the office/laboratory housing of Radiological Control and Health Physics Department management and technical support personnel into a single facility that would be capable of supporting the current and anticipated future workload of SRS. The proposed action is expected to cost approximately \$18.5 million dollars to complete. Construction of the proposed Health Physics Site Support Facility is scheduled to begin in February of 1997, with facility operation to begin by March of 1999.

The proposed Health Physics Site Support Facility would be constructed and operated at an undeveloped site in B Area. The proposed facility would be located on a six hectares (15 acres) site on the west side of SRS Road 2. Preliminary designs call for the proposed facility to be constructed between the new Radiological Control and Health Physics Instrument Calibration Facility and the new In-Vivo Counting Facility. Both of these facilities are currently under construction. This area was chosen based on its central location on SRS, ease of access from all supported areas, and the absence of process contamination.

Alternatives: In addition to the proposed action, DOE considered the following alternatives: (1) No-Action (i.e., continued use of the existing Radiological Control and Health Physics Department facilities); (2) renovate and expand the existing Radiological Control and Health Physics Department facilities; (3) increase the use of off site subcontractors; and, (4) build the proposed facility at an alternate site at SRS. The no-action alternative would not permit SRS to achieve continued compliance with the appropriate DOE Orders or Federal regulations. The no-action alternative is therefore not a reasonable alternative, but was analyzed for baseline purposes. The impacts of the reasonable alternatives that will meet the need for DOE action were analyzed and were not selected for the following stated reasons. The alternative involving the renovation and expansion of the existing 735-A facility would have the disruptive effect of performing a major renovation while attempting to continue ongoing facility operations. Further, the construction of additional facilities in the vicinity of 735-A is not considered feasible because of the lack of adjacent space. The alternative to increase usage of off

site subcontractors would only increase the administrative costs necessary to manage the needed array of laboratories and yet still not provide acceptable turn-around times. The alternative of building the proposed facility at another site on SRS was not preferable to the proposed alternative because the alternate site was not located conveniently for most of the site population, the costs of extending utilities to the northern site boundary were considered to be prohibitive, and the operating and administrative efficiencies from having the various office and laboratory facilities within the department located in close proximity to each other would not be realized.

Environmental: The potential consequences of the proposed construction and operation of the Health Physics Site Support Facility were assessed to determine whether there will be significant impact to water, air, and land resources; floodplains and wetlands; ecology and cultural resources; health and safety; socioeconomic conditions; and transportation. The proposed action involving the construction of the Health Physics Site Support Facility is expected to result in the loss of less than 0.01 percent of the total planted pine habitat on SRS. Construction related air impacts, primarily related to equipment use and soil disturbance, would not be either individually or cumulatively significant. Aside from small amounts of construction debris and rubble to be disposed of on site, no new waste streams would be generated from the construction of this project. The proposed construction work force would comprise less than one percent of the site employment. There are no wetlands or sensitive ecological habitats either in or immediately adjacent to the proposed project site. No threatened or endangered species would be affected by the proposed project. There would be no impact to cultural resources.

Operational impacts from the proposed action would be negligible. Once operational, the staff of the proposed facility would be composed of personnel who are already employed in the Radiological Control and Health Physics Department. All airborne effluents are expected to be below 0.1 mrem effective dose equivalent from emissions in any given year, and as such, are not required to be monitored. Low-level liquid and solid radioactive waste may be generated in relatively low quantities in the standards preparation laboratory of the proposed facility. Provisions would be included in the design to collect liquid effluents from this laboratory and transport them to an on site location designated to handle low-level waste. The quantity of waste generated would only add a small increment to the waste generated at SRS. No surface water would be used during operation of the proposed facility. The domestic water needs of the proposed facility should not affect the water level of the supply aquifer. Workers engaged in this proposed project would not be expected to incur any harmful health effects from radiation exposures they receive during normal operations. No transportation impacts are expected during facility operations.

Determination: Based on the information and analyses in the EA, DOE has determined that the proposed construction and operation of the Health Physics Site Support Facility on SRS does not constitute a major Federal action significantly affecting the quality of the human environment with the meaning of NEPA. Therefore, an environmental impact statement is not required and DOE is issuing this FONSI.

Signed in Aiken, South Carolina, this 12 day of July, 1995.

Mario P. Fiori
Manager
Savannah River Operations Office