1. SUMMARY

1.1 PURPOSE AND NEED

This document assesses the potential environmental consequences from the construction and operation of a new Fuel Production Facility (FPF) at the Savannah River Plant (SRP), Aiken, S. C. The new FPF is to be constructed in H-Area to provide for SRP recycling of uranium and eliminate shipments of liquid uranyl nitrate between SRP and Oak Ridge, Tennessee.

The National Environmental Policy Act (NEPA) requires the assessment of environmental consequences of all major Federal actions that may affect the quality of the human environment. This document describes the environmental impact of constructing and operating the FPF and considers alternatives. The new facility will convert enriched uranyl nitrate solution to uranium oxide with an Onsite Uranium Recycle (OSUR) process. The uranium oxide will then be fabricated into fuel billet cores using a Powder Metallurgy (PM)-based process. The new facility will reduce fuel manufacturing costs, increase reactor productivity, reduce waste costs, improve personnel safety, and eliminate offsite shipments of enriched uranium solution and the risk of transportation accidents.

The FPF facility will be designed to recycle 16 metric tons of uranium per year and provide fuel cores for production operations of four reactors. By recycling nitrate solutions at SRP, liquid uranyl nitrate shipments from SRP to the Oak Ridge Y-12 Plant for processing and conversion will be eliminated. Total costs for fuel recycling and waste disposal will be reduced.

The OSUR process will replace a process now used to recover uranium from reprocessed SRP reactor fuel at the Oak Ridge Y-12 Plant. Presently, the enriched uranyl nitrate product from Building 221-H is shipped to the Y-12 Plant, where it is denitrated and calcined to uranium oxide. This oxide is hydrofluorinated to uranium tetrafluoride, then reduced to uranium metal by reaction with calcium metal. The uranium is returned to SRP for fabrication of reactor fuel in Building 321-M.

The PM process will replace the casting and machining process now used to form fuel billet cores from a U-Al metal alloy. This process offers less potential for failure from thin cladding, reduce waste, and require less aluminum than cast cores.

The PM process has been in use on SRP for 20 years and is being used today in the Actinide Billet Fabrication Facility at SRP to blend NpO_2 or PuO_2 with aluminum powder. Billet cores produced in the FPF will be welded closed and shipped daily to Building 321-M for extrusion into fuel tubes. FPF will be designed to recycle 16 metric tons of uranium per year and provide fuel cores for production operations of 4 reactors. By recycling nitrate solutions at

SRP, liquid uranium nitrate shipments from SRP to the Oak Ridge Y-12 Plant for processing and conversion can be eliminated and fuel recycle costs can be reduced. Presently, the enriched uranyl nitrate product from Building 221-H is shipped to the Y-12 Plant at Oak Ridge, converted to metal and returned to SRP for fabrication of reactor fuel in Building 321-M.

1.2 PROPOSED ACTION AND ALTERNATIVES

The proposed action is to provide a new fuel production facility to recycle enriched uranium and produce uranium oxide-aluminum billets with the PM process. The new facility will use the PM process to replace the casting and machining process now used to form fuel billet cores.

In accordance with NEPA regulations, the Department of Energy examined the following alternatives to the proposed action:

- o No action/Continue use of the present SRP cast alloy core facility and the Oak Ridge Y-12 Plant for processing liquid uranyl nitrate and conversion
- o Upgrade the Y-12 Facility at Oak Ridge
- o Construct new facility at alternate SRP site.

1.3 AFFECTED ENVIRONMENT OF PROPOSED ACTION

The total area impacted by the construction of the new building will be approximately 15 acres of partially cleared and developed land adjacent to the SRP H-Area. H-Area is a principal industrialized area at SRP located within existing safeguards and security systems and approximately seven miles away from the SRP boundary. The proposed FPF site is in an upland area entirely within the drainage basin of a tributary of the Savannah River, Upper Three Runs Creek. An erosion and sedimentation control plan has been developed to avoid any adverse impact to Upper Three Runs Creek. No endangered or protected plant or animal species are found on or adjacent to the proposed FPF site.

1.4 ENVIRONMENTAL CONSEQUENCES OF PROPOSED ACTION

The new FPF facility and processes will reduce high level and low level radioactive waste, radioactive air emissions, nonradioactive air emissions and radiation exposure to operations personnel. They will eliminate personnel hazards associated with the molten metal casting process, such as furnace heat from causing burns. Table 1-1 summarizes the potential impacts of the proposed facility at SRP.

Table 1-1
POTENTIAL IMPACTS FROM CONSTRUCTION AND OPERATION OF FPF

Socioeconomic	The total construction work force will be 205 people during the peak period. During operation, the SRP work force will be 186. Little additional direct and indirect impacts are expected.
Land Use	About 15 acres of land adjacent to H-Area will be utilized.
Water Quality	Potential impacts from erosion and siltation will be controlled by employing proven erosion measures such as hay bales, grass, wind screens, diversion ditches, and a sediment basin. Construction and operational wastewater discharges will be monitored to ensure they meet applicable standards or they will be recovered and treated to prevent the release to the environment of hazardous materials, such as caustic solutions from the PM process and nitric acid from the OSUR process. All FPF water supplies will be obtained from groundwater using existing H-Area wells with no impact on the water quality or offsite levels in the aquifer.
Air Quality	Construction impacts from fugitive dust are expected to be small and temporary. Operational emissions will consist primarily of NO_x, SO_x, and ammonia; their resultant ambient air concentrations will be negligible. Overall emissions will be reduced over present levels from fuel production activities at SRP and Oak Ridge. Necessary air emissions permits will be obtained from the State of South Carolina and the U. S. Environmental Protection Agency (EPA). A NESHAPS permit (radioactive air emissions) was applied for in June 1986 from EPA to meet 40 CFR 61 requirements for facility construction. The permit is currently being negotiated with EPA. All FPF air emissions, radiological as well as nonradiological, will be well below applicable State and Federal standards.
Ecology	Construction and operation will occur adjacent to a cleared and industrially developed site that is marginal for wildlife habitat.

Radiological	No exposures to the public will result from construction activities. An estimated 5.1E-05 Ci of uranium and 2.8E-04 Ci of ruthenium will be released annually to the atmosphere. The resulting maximum calculated dose to an individual at the SRP boundary from routine atmospheric releases is calculated to be 6.3E-05 mrem/yr to the bone (the critical organ). The maximum calculated dose commitment to an offsite individual at the SRP boundary from a process accident would be 2.8E-01 mrem (to the lung). The facility will be designed, constructed, and operated to mitigate the occurrence and consequences of accidents.
Transportation	By recycling nitrate solutions at SRP, liquid uranyl nitrate shipments from SRP to the Oak Ridge Y-12 Plant for processing and conversion will be eliminated.