Finding of No Significant Impact
for the
Construction and Operation
of the
Highly Enriched Uranium Blend-Down Facilities
at 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-1322) to analyze the potential environmental impacts associated with the proposed construction and operation of the highly enriched uranium (HEU) blend-down facilities at the Savannah River Site (SRS), located near Aiken, South Carolina. Based on the analyses in the EA, DOE has determined that the action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969 (NEPA). Therefore, the preparation of an environmental impact statement (EIS) 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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Background: DOE and the Tennessee Valley Authority (TVA) have determined that it is technically feasible to convert off-specification HEU (approximately 60-percent U^{235}) to a less than 20 percent U^{235} low enriched uranium (LEU) product for use as commercial fuel in the TVA reactors. This would ensure a non-military use for this material and would be consistent with DOE's decision for surplus HEU disposition within the DOE complex. At present, some of the HEU is stored in tanks situated in the H-Canyon Outside Facilities at SRS, and as metal and unirradiated uranium-aluminum (U-Al) alloy ingots at the Oak Ridge Y-12 Plant (Y-12), Tennessee. The remainder is stored in K Area at SRS in the form of fuel elements and unirradiated U-Al alloy ingots. In addition, once modifications to existing facilities are complete, SRS will have the capability to blend HEU with natural uranium (NU) solution to produce an LEU product in the form of uranyl nitrate solution. The liquid uranyl nitrate from dissolution of the fuel elements would then be shipped offsite to a TVA vendor facility for solidification (powdered form) to commercial enrichment levels. The powdered LEU would then be shipped on to other TVA vendors for fabrication into fuel pellets and subsequently into fuel elements for use in the TVA reactors. The HEU in the form of unirradiated U-Al alloy ingots would either be shipped directly to Y-12 for interim storage, shipped to a designated TVA vendor facility for fabrication into fuel pellets for use in the TVA reactors, or processed (like the fuel elements) at SRS and shipped as uranyl nitrate to the TVA vendor.

To enable the proposed fuel conversion program to take place, SRS would need to have the onsite capability to purify, analyze, blend and load the liquid LEU into the specially-designed and U. S. Nuclear Regulatory Commission (NRC) licensed containers for shipment. In addition, to enable the U-Al alloy ingots to be shipped directly to Y-12 or a TVA vendor facility, or to be processed at SRS, additional upgrades to the K-Area fuel handling and shipping facilities would be required. Therefore, DOE has decided to propose the construction and operation of a loading facility at SRS and to modify/upgrade existing facilities in H-Area, K-Area and SRS Central Analytical Laboratory (CLAB) to provide this onsite capability and further the disposition of surplus HEU within the DOE complex.

Purpose and Need for Agency Action: The purpose of the proposed action is to provide SRS with the onsite capability to purify, analyze, blend and load the liquid uranyl nitrate into shipping containers for transport to an offsite commercial facility for solidification. Further, to enable the U-Al alloy ingots to be shipped directly to Y-12 or a TVA vendor facility, or to be processed at SRS, additional upgrades to the K-Area fuel handling and shipping facilities would be required. To support DOE's nonproliferation objective, DOE needs to implement this action to eliminate the onsite inventories of surplus HEU and ultimately enable the use of a blended-down form of this material as reactor fuel.

Proposed Action: The proposed action entails the following: (1) construction of the LEU loading station; (2) upgrade the CLAB modules located in Buildings 772-F and 772-1F that would support the LEU loading station and the various HEU blend-down facilities; (3) upgrade and add supplementary equipment to HA-Line/H Canyon; (4) upgrade the railroad tunnel airlock material transfer station; and (5) upgrade the fuel handling and shipping facilities in Building 105-K to enable shipment to H Canyon (for processing at SRS) and/or Y-12/TVA vendor facility. The supplementary equipment additions and upgrades are necessary to HA-Line/H Canyon and CLAB to increase the product throughput and analysis turn-around time, respectively. The upgrades to the railroad tunnel airlock material transfer station and K-Area fuel transfer facilities are necessary to enable the transfer of HEU feed stock material from K Area to H Canyon and/or to Y-12/TVA vendor facility. This project is integral with existing H-Area, K-Area, and CLAB process systems and infrastructure that were evaluated in the Disposition of Surplus Highly Enriched Uranium Final EIS (DOE/EIS-0240).

The construction activities associated with the proposed action would start in December 2000 and be completed by April 2004. The earliest operations start date for the shipments would be April 2003. The facility would be operational for about 5 years. The program would be considered complete when all of the U-Al alloy ingots have been shipped offsite and/or the converted LEU solution is loaded in the shipping containers pending transport to the vendor. The project construction costs would be in the range of about $10-40 million per year (for 2½ years), and the annual operating costs would be up to approximately $30 million.

The LEU loading station would be located outside and immediately adjoining the HA-Line facilities, which are located adjacent to the southeast end of H Canyon (Building 221-H). The preferred location for the facility would require minimal grading and use of fill material. Conceptually, the facility would be a pre-engineered metal building (i.e., Butler Building) on a reinforced concrete slab. The foundation design may involve the use of footings or pilings. The sides of this large carport-type structure would be enclosed from the ground level up to the base of the roof. The size of the LEU loading station would be approximately 20.8 meters (68 feet) long, 6.7 meters (22 feet) wide, and 7.3 meters (24 feet) in height. The total square footage would be approximately 139 m^2 (1,496 ft^2). Exterior doors would be located to allow personnel to enter both the ground

and elevated walkway levels of the facility. External and interior stairways would be provided to access the walkways. Spill containment features of the LEU loading station would include curbs, a sloped concrete floor, trenches, and a sump. In the event of a spill, the contents of the sump would be pumped to the existing Effluent Treatment Facility in H Area.

Shipping campaigns for uranyl nitrate would take place at 2 to 3 week intervals. Each trailer would nominally contain nine shipping containers (U. S. Department of Transportation Type B, NRC licensed). The line from the blended LEU storage tank would lead into a header tank that would be sized to fill only one shipping container (i.e., approximately 946 liters or 250 gallons). That would eliminate the potential for either spills or overflows during the filling operations. The loading system would have the capability to either fill, or, in the event of a problem, drain the shipping containers. The proposed LEU loading station would be operated continuously with four 12-hour rotating shifts, with 5-6 employees per shift. Shipments of ingots (depending on destination - Y-12/TVA vendor or H Canyon) would begin as early as FY03 and end as late as FY08. Existing facilities (CLAB, H Canyon, HA-Line and 105-K) would be supplemented with personnel as needed to support the program.

Prior to shipment, CLAB personnel would verify through analyses that the uranium enrichment and total uranium concentration of the uranyl nitrate solutions as well as any impurities were within the limits allowable for transportation to and acceptance at the TVA vendor facility in Tennessee. The CLAB upgrades would be implemented to ensure that the sample analysis process would be capable of supporting these chemical analyses. The CLAB upgrades would consist of renovation of several laboratory modules, procurement and installation of new analytical equipment, and service upgrades to supporting instrument operation.

The upgrades and additions of equipment at HA-Line would involve changes in the existing process lines designed to downblend HEU to less than 20 percent U^{235} LEU. These changes would be implemented at various points in the process from the existing 620,740-liter (164,000-gallon) HEU storage tank and NU unloading station to the proposed LEU loading station. Based on conceptual design, these supplementary equipment additions would include installation of: (1) five primary and eight secondary pumps to existing or proposed interim process line blending or storage tanks; (2) an NU volume fine adjustment and batch controller; (3) a 15,140-liter (4,000-gallon) blend-grade HEU tank (and associated in-line sample unit); (4) an HEU isotopics fine adjustment and batch controller; and (5) in-line piping between the previously mentioned process components and the existing process equipment. All of these upgrades and additions would be implemented within existing facilities or developed locations within H Area.

To support the fuel transfer from K Area to the blend-down facilities, the H-Canyon railroad tunnel airlock material transfer station (i.e., located at the south end of Building 221-H) would have to be upgraded. These upgrades would include for example: the installation of a modular personnel cool down unit, replacement of the material transfer shuttle railcar (with a smaller self-powered railcar that is easily decontaminated), installation of a transfer unloading jib crane, and construction of a truck road ramp. The truck road ramp would be built south of the existing railroad tunnel airlock to provide access for a low flatbed type trailer from the existing roadway down to the entry door to the tunnel. Installation of the new road/ramp would also require new reinforced concrete retaining walls, storm sewer pipe, security fencing, vehicular gates, and appropriate re-grading.

Several modifications and upgrades of the fuel transfer facilities in the existing Building 105-K would have to be made for the purpose of handling contamination from the fuel that has been in moderator. Only a limited number of these fuel tubes would have to be processed. The changes necessary to enable this transfer operation would possibly include for example: installation of a decontamination oven and enclosure (including the exhaust system), installation of a fuel tube scale, installation of fuel tube storage racks, construction of a decontamination/weighing station, installation of a modular change room facility, and installation of radiation detection and monitoring equipment. Modifications and upgrades would also have to be made to accommodate shipping the U-Al alloy ingots to H-Canyon, Y-12 or a TVA vendor facility.

Alternatives: In accordance with NEPA regulations, DOE examined the following alternatives to the proposed action: (1) no action, continue to store the surplus HEU at SRS; and (2) build the proposed LEU loading station at another onsite location. The no-action alternative is to continue to store the surplus HEU onsite, and not implementing any action to construct or operate the loading facility. The liquid uranyl nitrate would remain stored until a future decision regarding its disposition is made. This alternative would not satisfy the nonproliferation objective of eliminating the weapons-usability of the surplus HEU. In addition, under the no-action alternative, radiological releases to the environment as well as direct exposures would be expected to occur. However, these resulting impacts would remain within regulatory limits.

The other alternative to the proposed action would be to build the LEU loading station at another location onsite. The loading facility would not be in close proximity to the blending operation in HA-Line. Because of this added distance, there would be minor impacts associated with the increased piping needed to support building the proposed loading station at this alternate location. In addition, because of this increased distance from the HA-Line area of H Canyon, this alternative would neither be either cost effective nor operationally efficient.

Environmental Impacts: The land use impacts associated with the construction and operation of the proposed facilities would be negligible. No measurable impact on the local economy and no environmental justice concerns would be expected from the proposed action. No impacts to either surface or groundwater resources would be expected to result from the proposed action. The total additional power needs for the proposed action would result in a minor increase to the recent site area electrical demands, which are already 60 percent below design capacity. Since the air emissions from the proposed loading station would be discharged through the 291-H sand filters, no air quality impacts would be realized. No significant change in air emissions in CLAB and K Area would result from the proposed action. The various project activities would be expected to have only a minimal impact on site waste management operations. Traffic and transportation impacts associated with the proposed action would be negligible. No impacts on any site ecological, environmental or cultural resources would be expected as a result of the proposed action. Aside from unexpected construction accidents, there should be no potential for impacts to human health and worker safety associated with the construction portion of the proposed action at SRS. Because of the use of protective clothing and administrative controls, there would be little or no potential for impacts to human health and worker safety associated with the normal operation of the proposed or existing facilities. The workers engaged in the processes associated with the proposed action would not be expected to incur any harmful health effects from radiation exposures which they receive during normal operations. A total of 0.01 onsite latent cancer fatalities (LCFs) and 0.0012 offsite LCFs would be expected to result per year from the postulated bounding accident scenario. In addition, the analyzed accident would not

result in any fatalities, the development of any irreversible or serious health effects, or even the development of any mild transient adverse effects.

Determination: Based on the information and analyses in the EA (DOE/EA-1322), and after careful consideration of all comments, DOE has determined that the proposed construction and operation of the HEU blend-down facilities at SRS does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA. Therefore, an EIS is not required and DOE is issuing this FONSI.

Signed in Aiken, South Carolina, this 3rd day of NOV, 2000.

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