SRS Citizen's Advisory Board

Recommendation No. 44

July 22, 1997

Decommissioning of the Heavy Water Components Test Reactor

Background:

The Heavy Water Components Test Reactor (HWCTR) at SRS was designed and built in the late 1950s and early 1960s. It is located in B-Area, an SRS industrial/development zone. The reactor vessel itself was installed in July 1961 and the HWCTR operated from March 1962 through December 1964 to test components which would be used in heavy water moderated and cooled power reactors. This reactor had a nominal thermal capacity of 50 megawatts. The heat generated by the nuclear reactor was dissipated through light water steam generators and vented through a muffler system to the atmosphere; no electricity was generated.

The reactor building has a diameter of 70 ft and a steel dome which extends 65 ft above ground level. The vast majority of the 37 ft tall reactor vessel is below ground level. The basement floor is 52 ft below ground level and is a 5 ft thick slab of concrete. The building subsurface containment is constructed of high density reinforced concrete. Containment was designed to withstand an internal pressure of 24 pounds per square inch and was regularly pneumatically tested to 5 pounds per square inch.

Following shutdown in 1964, all of the fuel and two neutron sources were removed. Conditions inside the building currently are essentially the same as at shutdown except much of the radioactivity has decayed away. Virtually all of the remaining radioactivity in the building is below ground level or in the steel reactor vessel. It is primarily induced radioactivity from exposure to neutrons with little or no fission products. Ninety nine percent of the total radioactivity is induced activity in the reactor vessel. It consists of Iron-55, Cobalt-60 and Nickel-63 with half lives of 2.7, 5.27, and 100 years respectively. Access within all portions of the HWCTR containment building (770-U) requires protective safety equipment (e.g., hard hats, safety glasses) and also requires wearing appropriate dosimeters to measure actual exposure. Certain portions of the building require wearing Health Protection (HP) protective clothing, because 12% of the HWCTR floor space is in a contamination area. The remainder of the areas are classified as buffer areas and do not require any HP protective clothing.

Possible decommissioning alternatives have been evaluated (References 1,2). They are: (1) dismantle the entire facility, (2) partial dismantlement and interim safe

Recommendations:

1. The CAB concludes that only three alternatives are viable: postponement, entombment, and dismantlement.

2. After extensive review, the Board recommends that DOE take action on HWCTR and not postpone decommissioning.

3. Based on the technical merits, the Board concludes that entombment is slightly better ranked than dismantlement in that it costs less, impacts the environment the least, and exposes workers to fewer hazards.

4. However, the Board will support the dismantlement option only if DOE assures the board that this option shall be completed once undertaken.

Agency Response Summary

Department of Energy-SR