Tritium Extraction Facility

Mission

The Tritium Extraction Facility (TEF) is a one-of-a-kind, $506 million facility constructed at the Savannah River Site (SRS) to supply tritium, a radioactive form of hydrogen necessary for the nation's nuclear weapons stockpile. The TEF is part of the National Nuclear Security Administration's (NNSA) Defense Programs operations at SRS.

The NNSA's Tritium Readiness Program has produced Tritium Producing Burnable Absorber Rods (TPBARs). The TPBARs are irradiated in Tennessee Valley Authority's Watts Bar or Sequoyah nuclear reactors and then transported to SRS, where the tritium is safely and efficiently extracted in the TEF. The tritium is piped to the existing Tritium Loading Facility at SRS for further purification prior to loading into reservoirs for shipment to the Department of Defense.

Background

From 1988-2006, when the last heavy water reactor at SRS ceased production, the nation had no source for tritium production. Stockpile requirements were met by recovering the gas from dismantled nuclear weapons and from routine tritium reservoir exchanges from the existing nuclear stockpile.

In December 1998, the Department of Energy (DOE) announced that commercial reactors would be the primary source for tritium production. In May 1999, DOE selected the Tennessee Valley Authority's Watts Bar Unit 1, Sequoyah Unit 1, and/or Sequoyah Unit 2 CLWRs for irradiating the DOE-supplied TPBARs. In October 2003, the first TPBARs were inserted in TVA's Watts Bar reactor for irradiation.

Project Description

The TEF is located in SRS's H Area. A staff of approximately 600 workers was employed during peak construction, and the facility has an operations staff of approximately 100 permanent employees.

There are three major structures— the Remote Handling Building (RHB), Tritium Processing Building (TPB) and Tritium Support Building (TSB).

In the RHB, the TPBARS are unloaded and the tritium gas extracted. The RHB is approximately 60 feet high, 86 feet high and 215 feet long. It has a truck receiving area, cask decontamination area, TPBAR and waste preparation area, furnaces, hot maintenance area, and associated gloveboxes for extraction pumps and tanks. It also includes an overhead crane and remote handling equipment.

The TPB provides preliminary purification of the extracted gases. It is a single-story facility, approximately 125 feet wide by 155 feet long, built above ground. The TPB houses the main control room, crane control room and miscellaneous rooms for gas analysis and radiation control activities.

The Tritium Support Building houses management and support staff as well as change rooms, maintenance support areas and a loading dock.

Current Status

TEF celebrated completion of the nonradioactive startup testing program on Feb. 28, 2006. Over 700 different systems and components were successfully tested. Included among the startup accomplishments were the startup tests of individual components and remote handling features, shielding survey and hydrogen testing. The startup testing program was accomplished six months ahead of baseline schedule.

In November 2006, the Tritium Extraction Facility successfully and safely began radioactive operations. In February 2007, SRS completed the startup of the TEF and safely made the first transfer of new tritium gas to the nation's tritium inventory.

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