This is a draft document for board discussion

Fuel Rod Recycling

Recommendation Manager: Jim Guille

Background

The Nuclear Waste Policy Act adopted in 1982 gave DOE the responsibility for siting, building and operating an underground repository to accommodate the 10,000 metric tons of spent fuel from military programs as well as 60,000 tons from commercial power reactors. The amount of high level waste from commercial reactors continues to increase as commercial reactors refuel or come on line. In 1987 Congress amended the Nuclear Waste Policy Act to designate Yucca Mountain as the chosen underground repository site. Opposition from numerous organizations and politicians led by Harry Reid resulted in several law suits and a court decision upholding Nevada's veto of Yucca mountain as the selected repository.

The Office of Civilian Radioactive Waste Management within the DOE was established to implement the 1982 Act. In addition, the EPA was given the responsibility of establishing health and safety standards and the NRC was required to promulgate regulations governing construction, operation and closure of a repository. These activities were to be funded by a fee of 1 mil per Kwh generated by power reactor companies. In 2013 the fee was eliminated by court order until such time as provisions are in place to collect waste from commercial reactors. After deducting expenditures related to Yucca Mountain evaluation there are approximately 44.5 (FY 2017) million dollars locked up in the budgeting process and currently unavailable to the DOE.

In addition, the DOE is required to reimburse commercial utilities for the cost of providing additional onsite storage due to the delay in accepting commercial spent fuel rods. This cost as of 2020 totaled approximately 9 Billion Dollars and is increasing as existing reactors refuel and new reactors are brought on-line.

In the US there is no spent fuel reprocessing capability and based on stakeholder input in 2021 it will be 10 to 20 years before reprocessing can reasonably begin in the US. Outside the US spent nuclear fuel is recycled in France at the LaHargue and Marcoule plants. These facilities have been in operation since the mid-1960's and have safely processed over 23,000 tons of spent fuel which is enough to power France's nuclear facilities for 14 years. There are a number of power reactor designs currently in development in the US. In the new reactor designs are fuel rod designs which improve the safety profile by reducing the heat sensitivity of the fuel rod*. Eventually one or more of these improved designs will make their way into commercial reactors and then into the spent fuel inventory.

Savannah River Site
Citizens Advisory Board
Nuclear Materials Subcommittee

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Savannah River Site's program Accelerated Basin De-inventory is scheduled to empty L basin of legacy spent fuel in FY 2034. This inventory is the material remaining from the US production of weapons grade fissile material and is not included in the inventory of power reactor spent fuel. This legacy material includes a range of fuel rod designs, some of which are similar to the commercial power reactor fuel rods.

Recommendation

The SRS Citizens Advisory Board recommends DOE obtain funding from the Nuclear Waste Fund or other sources to prepare a White Paper evaluating the feasibility of using L Basin and H Canyon to reprocess commercial spent fuel rods into a form appropriate for long term safe storage. Particular attention should be paid to the new fuel rod designs in being developed and their recycling potential.