



**Savannah River Site
Citizens Advisory Board
Recommendation 227
SWPF Seismic Qualifications Decision**

Background

On August 27, 2004, the Defense Nuclear Facilities Safety Board (DNFSB) sent a letter to the Department of Energy (DOE) with specific concerns about the DOE standards (DOE Order 420.1A) that govern the approach used to confine radioactive materials for all nuclear facilities and their application. Of particular interest to DNFSB was the performance category (PC) designation of PC-2 proposed for the Salt Waste Processing Facility (SWPF) at the Savannah River Site (SRS). To protect workers and prevent an unfiltered release, the DNFSB stated that "...this new facility should be designated as PC-3 to ensure that it will adequately confine hazardous material during natural phenomena events" (such as seismic events, tornadoes, floods, etc.). In addition to designating the SWPF confinement structure as PC-3, the DNFSB requested a report that contained a plan and schedule for revising the affected DOE directives to provide consistent and adequate guidance for natural phenomena hazards, as well as implementing the revised directives in current design projects (Ref. 1).

By letter dated October 13, 2004, Under Secretary of Energy David K. Garman informed the DNFSB that DOE standards would be strengthened by providing clarification and supplemental guidance by January 31, 2005, and that an enhanced conceptual design for the SWPF had been completed by DOE. The letter noted "continuing staff to staff discussions" between DOE and DNFSB and pledged DOE would "continue to work with the Board's staff to assure that worker and public safety are protected." (Ref. 2)

In December, 2004, the DNFSB forwarded to the Secretary of Energy a technical report, DNFSB/TECH-34, entitled *Confinement of Radioactive Materials at Defense Nuclear Facilities.* The DNFSB's cover letter noted its earlier August 27th letter and further stated: "The confinement concept for this new facility is based on isolation of the process building using passive confinement during accident scenarios. The Board suggested that the salt waste isolation facility should be designed with an active ventilation system. The cover letter went on to say: "The Board is concerned that...DOE and its contractors are underestimating the significance of the performance requirements for a confinement ventilation system and are relying on questionable calculations of offsite doses to evaluate performance." The technical report's Executive Summary and the report itself criticized the analytical tools and approaches used to predict passive leakage from a facility following an event. (Ref. 3)

In May, 2005, the Savannah River Site (SRS) Citizens Advisory Board (CAB) Recommendation #212 (Ref. 4) requested that DOE-SR and the DNFSB work together to expeditiously resolve the re-design issue based upon technical merit, risk impact to the overall SRS waste management system, and cost benefit analysis of various options. We also asked that DOE-SR provide an estimate of the relative risks of postponing the treatment of high-level wastes (HLW) in SWPF to meet the re-design objectives and leaving the wastes in 50-year old tanks compared with the risks of not upgrading the design of SWPF.

On November 23, 2005, DOE ultimately responded to the DNFSB regarding the design approach for providing PC-3 confinement for SWPF. In this letter, DOE acknowledged that several options had been evaluated for assuring reliable confinement of SWPF high-hazards materials in the event of an earthquake or other natural phenomena. These options included use of a local, safety-related PC-3 confinement barrier (e.g., piping) housed within a PC-3 building; use of a local, safety-related PC-3 confinement barrier housed within a PC-2 building; and use of a safety related PC-3 active ventilation system housed within either a PC-2 or PC-3 building. As a result of this evaluation, DOE concluded that adopting a local,

safety-related PC-3 confinement barrier housed within a PC-3 building to be the most prudent course of action for SWPF. The letter also stated that where safety analysis indicated confinement barriers are necessary for worker protection, the SWPF Preliminary Design will be revised to incorporate a PC-3 designation for safety-related piping, process vessels, and other components that would provide a local confinement barrier. Portions of the facility housing safety-related PC-3 local confinement barriers will also be designated as PC-3 and designed to resist natural phenomena events (Ref. 5).

On December 7, 2005, James Rispoli, the Assistant Secretary for Environmental Management (EM) presented EM's process for integrating safety into design and construction to the DNFSB. During these comments, the Assistant Secretary noted the natural phenomena hazard design modifications have caused delays in SWPF. He recognized the experience level of DOE staff and the quality and timing of design analysis as the two key areas contributing to the problem. To counteract these problems, weekly progress meetings will be held to provide expert technical direction and support on SWPF. In addition, the Director of Engineering Division at SRS has been assigned independent design authority functions for the project instead of having someone performing those functions within the SWPF project team (Ref. 6).

Comment

DNFSB and DOE have agreed to this enhanced approach for SWPF confinement design and the SWPF is being re-designed to address these confinement issues. This re-design will result in considerable design/construct delays of SWPF, estimated to include a 24-26 month extension to the initial operation date of SWPF. In addition, it will increase the life cycle costs significantly to a facility whose use is anticipated for a term of fifteen (15) years. Although the CAB's Waste Management Committee was briefed on the DOE decision to re-design the SWPF to a PC-3 standard and the impact to cost and schedule on December 13, 2005, (Ref. 7), to date, we have not received a DOE briefing on an overall risk-benefit analysis and we do not understand the methodology or approach used in reaching the DOE's SWPF confinement decision for a PC-3 structure and associated systems.

The SRS CAB recognizes and agrees that the confinement system for the SWPF must provide reasonable assurance for the safety of workers, the public and the environment. DOE standards, their application, and risk-informed project management are intended to achieve this goal of safety. It is our understanding that PC-2 criteria is adequate to protect the public. However, the SRS CAB is concerned also with the risk to the environment, workers and the public associated with extended storage of high-level waste in aged storage tanks without secondary containment and, as taxpayers, with potential excessive costs associated with a SWPF confinement design decision. Furthermore, we are concerned about the impact that the delay will have on the regulatory process. The SRS CAB is currently collecting a list of questions from its members and interested stakeholders concerning SWPF to be answered by DOE on January 31, 2006.

The SRS CAB's expectations have been identified in the past with the following priority: (1) salt waste disposition, (2) bulk removal from the tanks, and then (3) tank closure. Our main concerns now are how to accelerate the construction of SWPF, assuring the availability of the necessary federal funds for the upgrade and construction, the ability of DOE to meet existing regulatory commitments, the possible increased risk to site workers and the environment associated with delay, and the obstacles to HLW tank space management and the SRS HLW program arising from the re-design of the SWPF.

DOE's good faith performance on a satisfactory design and construction schedule and acceptable budget assurances will be under close scrutiny by the SRS CAB and the regulatory agencies. SRS should look to the lessons learned from the Consolidated Incinerator Facility (CIF) to see how regulatory flexibility can be achieved through a "good faith" effort by expediting waste removal ahead of schedule (demonstrate a treatment technology will work, accelerated legacy PUREX disposal, before costly regulatory closure). DOE's tailored salt waste treatment approach is highly dependent on approvals from SCDHEC. A crucial part of the tailored approach is the early removal of low-activity fraction salt waste through a process

involving deliquification, dissolution, and adjustment (DDA) of the waste. A successful execution of this part of the process could be used as a beginning measurement of DOE's performance.

Recommendation

The SRS CAB recommends the following:

1. DOE-SR resolve any open issues with SCDHEC related to the deliquification, dissolution, and adjustment (DDA) process by March 1, 2006, in order to start the process in order to meet the current schedule.
2. By March 28, 2006, DOE review with the SRS CAB the methodology used in reaching the SWPF confinement decision and explain how or if the methodology would be changed for future decisions on confinement/containment design.
3. DOE-SR manage the SWPF re-design process in order to shorten the schedule as much as possible, including the use of incentives and other tools to reduce the barriers to a speedy, safe and effective design of SWPF. Provide quarterly updates to the SRS CAB on how the process is being accelerated.
4. DOE-SR demonstrate to the SRS CAB and SCDHEC that a detailed budget has been developed and, funding is available or will be requested and prioritized to complete the re-design and construction of SWPF with the minimum of start-up delays with a target of the original 2009 start-up date.
5. DOE-SR specify dates for a series of meetings within FY 06 for SWPF working meetings (similar to the December 13, 2005 Waste Management Committee meeting between SCDHEC, DNFSB, DOE, SRS Subcontractors, SRS CAB, and the public).
6. DOE-SR officially include a representative from the SRS CAB as a participant in the Salt Disposition Working Group discussions whenever DOE meets with SCDHEC, DNFSB and other stakeholders.

References

1. Confinement Approach letter from John T. Conway DNFSB Chairman to the Honorable David K. Garman, Under Secretary of Energy, August 27, 2004.
2. DOE letter regarding seismic design of the Salt Waste Processing Facility at the Savannah River Site and DOE directives on natural phenomena hazards from Under Secretary of Energy David K. Garman to John T. Conway DNFSB Chairman, October 13, 2004.
3. DNFSB letter forwarding Recommendation 2004-2, *Active Confinement Systems with Technical Report DNFSB/TECH-34, Confinement of Radioactive Materials at Defense Nuclear Facilities* from John T. Conway DNFSB Chairman to the Honorable Spencer Abraham Secretary of Energy, December 7, 2004.
4. Citizens Advisory Board Recommendation No. 212 (adopted May 24, 2005), "SWPF Confinement System."
5. Design Approach for Providing Performance Category 3 PC-#) Confinement for Salt Waste Processing Facility (SWPF) letter from Jeffrey M. Allison, SRS Manager, to the Honorable A. J. Eggenberger, Chairman DNFSB, November 23, 2005.
6. Statement by the Assistant Secretary for Environmental Management before the DNFSB, December 7, 2005.
7. Savannah River Site Salt Waste Processing Project Status, presentation to the Waste Management Committee by DOE-SR, December 13, 2005.

Agency Responses

[Department of Energy-SR](#)