



SRS Citizens Advisory Board

Salt Processing Focus Group

Meeting Summary

June 13, 2000
Aiken Federal Building
Aiken, SC

The Salt Processing Focus Group met on Tuesday, June 13, 2000, at 5:30 P.M. at the Federal Building in Aiken, SC. Attendance was as follows:

Ernie Chaput	Wade Waters, CAB
Bill McDonell	Bill Willoughby, CAB
Lee Poe	Sam Fink, WSRC
Karen Patterson, CAB	Murray Riley, CAB
Tom Lex, WSRC	Ki Kwon, WSRC
Kelly Way, WSRC	John Reynolds, DOE
Steve Piccolo, WSRC	Bob Hinds, WSRC

Lee Poe welcomed everyone and started the meeting.

The Focus Group (FG) discussed the following areas:

High Level Waste Chromate Cooling Water System

Tom Lex, HLW Chief Engineer, presented the FG with an overview of the system considering the current performance and condition of the H-area chromate cooling water system heat exchangers. He presented the function, location, and history of the exchangers. The function of the exchangers is to remove radiolytic heat from 14 tanks in H-area, and to provide cooling to the tank ventilation systems.

Mr. Lex outlined how the heat exchangers work, along with the cooling towers and fans in the closed looped system for the west pump house. He illustrated that, even though the existing chromate water heat exchangers are 23 years old, they still meet structural integrity requirements. They are under a chemistry control program to control corrosion. He showed that the current system capacity far exceeds the current demand and that tank cooling can be isolated on select tanks for several months to reduce the heat load. Cooling can be isolated to particular tanks, if heat load demand requires it. The current cooling system will support the overall HLW system needs until replacement heat exchangers are needed. If needed, however, operational contingencies are in place.

Mr. Lex explained that there are three evaporators-2H, 3H and 2F. The far-east pump house services the 2H evaporator and a drop tank. The 2F evaporator has a drop tank serviced by F-tank farm pump house, and 3H is serviced by the West Pump House. There are three separate pump houses which service three separate evaporators. The heat exchangers in the West pump house have increased pressure drop and a reduction in performance.

Mr. Lex reported that the East Pump House System was taken out of service due to the reduction in heat exchanger wall thickness caused by corrosion. The heat exchangers weren't serviced by a closed loop

cooling water system; thereby, eliminating use of a chemistry corrosion control. Untreated well water ran through the system which led to corrosion.

Mr. Lex clarified SRS's regulatory commitments. Even though SRS is accountable to DHEC under a WasteWater Permit, heat exchanger performance is not an issue under that permit. However, control of chromate water releases is covered under that permit.

Mr. Lex outlined the HLW systems approach to identifying, prioritizing, and funding new projects. He then outlined how the projects are prioritized based on ranking criteria using a team consensus process. Mr. Lex concluded that based on the System engineering approach, replacement heat exchangers are recommended for funding in the FY01 Capital Equipment Project Prioritization Process.

Alpha and Strontium Removal

Samuel Fink, Liquid Waste Processing lead, WSRC, gave an overview of the alpha and strontium removal process. Mr. Fink outlined the advantages and disadvantages of using this technology. The main advantage is that this technology is already established and successfully demonstrated in the past at Savannah River. Other advantages include a well-known chemistry, a cross flow filter, and a robust and conservative design. Disadvantages include a low filtration rate for ion exchange and solvent extraction, large equipment, and neptunium blending.

Mr. Fink continued by pointing out that MST was not originally chosen for actinide removal, but rather for strontium separation. He also stated that Neptunium in the waste requires blending to meet requirements of the radionuclides.

Mr. Fink explained that at elevated temperatures, mixtures of MST and crystalline silicotitanate (CST) become tacky (i.e., show increased yield strength). However, performance problems such as observed with CST are not known to occur with MST.

Mr. Fink presented the work scope matrix schedule, which defines the exact work activities; and a detailed science and technology status of MST adsorption kinetics. MST is clearly the favored absorbent; SRS is also testing a commercial material made by Honeywell that is another sodium nonatitanate material.

Mr. Fink showed the group data of the Honeywell sodium nonatitanate results and showed there are slower kinetics for strontium and plutonium removal than for MST. He detailed the engineering scale filtration studies by activity tasks and design of experiment.

Mr. Fink and Mr. Piccolo outlined the tests and industrial standards that have been examined in regards to filters and centrifuges. Mr. Fink concluded centrifuge is perhaps the leading alternative technology to filtration now, but that a study will issue soon comparing the different available methods for solid-liquid separation.

As in the other presentations, Mr. Fink showed a layout of the small tank TPB precipitation facility, the CST Non-elutable Ion exchange facility, and the caustic side solvent extraction facility. He outlined various options being reviewed, such as adding a filter feed tank in series with alpha/strontium sorption tank, using continuous stirred tank reactors (CSTRs) for alpha/strontium sorption rather than batch process, and considering multiple operating lines for alpha/strontium sorption. Several options under review include reducing tank sizes, cross-flow filter sizes, and pump sizes; and evaluating alternate designs against criteria such as process complexity, process flexibility, and capital costs.

Mr. Fink outlined the open high risks for alpha removal technology. These were actinide and strontium removal performance with MST and alternate sorbents, equipment size, and solid-liquid separation efficiency. He went on to outline the findings from previous testing and the progress made on R&D activities. Mr. Chaput pointed out the additional operational risks in the large pieces of equipment and the

difficulty of maintaining reliability. He pointed out that there are more operational risks on the MST front end.

Mr. Fink continued. There is no potential for nuclear criticality due to loading of fissionable material on MST. The strontium removal criterion was met at all test conditions and plutonium removal was slower than strontium. Additional MST was needed to achieve plutonium removal at high ionic strength and high 238 Pu content. There was good agreement between tests with simulated and actual waste and the glass performance at higher MST concentration was demonstrated as acceptable.

Mr. Fink concluded that the MST Pu and Sr adsorption rates are equal to or better than pre-conceptual design basis, and that sodium nonatitanate adsorption rates are slower than, and DF performance less than MST. He told the group that a literature study of other alternative technologies and laboratory tests of leading alternatives is underway.

Action Item: Mr. Fink (WSRC) to provide description of the requirements for Neptunium removal and the Saltstone implications.

The Focus Group outlined their milestones and the next topics at future meetings. It was determined that the meetings would cover as follows:

July

Tank Space Management Update

High Level Waste System Plan Overview to include the following:

- HLW from canyons
- DWPF recycle
- Tank farm evaporator material
- Blending of sludge and supernate

Update on Item 3 in Recommendation #112

- Discuss how schedule slippage can be accommodated
- Discuss when contingency initiatives need to be implemented
- Discuss tank space needs, regulatory commitments, and other SRS activities

August

September

- DNFSB and WSRC to discuss their positions on Tank 49, safety risks, and schedule
- New technology down select criteria and weights
- HQ Quarterly Program Review

The next meeting was set for Tuesday, July 18, 5:00 P.M. at the Aiken Federal Building. Mr. Poe adjourned the meeting at 8:45.

For copies of meeting handouts call 1-800-249-8155.