



SRS Citizens Advisory Board

Nuclear Materials Committee

Meeting Summary

August 22, 2000
USC-Aiken
Aiken, SC

The Savannah River Site Citizens Advisory Board (SRS CAB) Nuclear Materials (NM) Committee held a meeting on Tuesday, August 22 to hear a program overview of the nuclear material stabilization program at SRS.

CAB Members

Tom Costikyan*
Bill Willoughby*
Jean Sulc*
Lane Parker*
Ken Goad*
Lola Richardson
Sallie Connah
Kathryn May
Carolyn Williams
Beaurine Wilkins
Brendolyn Jenkins**
Charlene Townsend**

Stakeholders

Russ Messick
Ed Wannemacher, WMFS
Mike French
Kelly Hunter, DE&S

DOE/Contractors

Sachiko McAlhany, DOE
Bill Clark, DOE
Becky Craft, DOE
Tom Treger, DOE
Donna Martin, WSRC

*Committee members

**Committee members not present

Nuclear Materials Management Program Overview:

After introductions of attendees, Tom Costikyan, SRS CAB NM chair, welcomed Sachiko McAlhany, Engineer, DOE-Material and Facility Stabilization Program, to provide an overview of nuclear material stabilization program at SRS. McAlhany manages the F Area Stabilization Program and the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-1/2000-1 program.

McAlhany began by describing the various facilities involved in nuclear material stabilization. F Area consists of the F Canyon, FB Line Facility (located on top of F Canyon), 235-F that will be used for plutonium stabilization and packaging, 773 Analytical Laboratory and other support facilities.

F and H Canyon basically conduct the same activities but with some variation. Materials such as spent nuclear fuel (production SNF or foreign & domestic SNF), highly enriched uranium solutions, and plutonium residues are converted to more stable forms for storage. FB Line converts plutonium to a metal button while HB line converts the material to oxide form. The stabilized plutonium material will be sent to

K Area or 235-F pending disposition. High level waste is sent to the Defense Waste Processing Facility via the Tank Farms for vitrification and eventual disposal at Yucca Mountain. The low level solid waste streams (Transuranic waste) are sent to the site's Solid Waste Program which will prepare the material for disposal at the Waste Isolation Pilot Plant (WIPP)

Additional materials dealt with in the site's stabilization program are potential programmatic materials such as americium/curium (stored in F Canyon) and neptunium, which DOE will continue to manufacture Pu-238 for generators for deep space missions.

Lane Parker, CAB, asked about DOE's confidence in renovating the 235-F building without problems. McAlhany said although the building is used for storage, there were also many contaminated areas in the building. One potential issue could be how to upgrade or modify the building while classified shipments were coming in. She also said that currently, the building is only authorized to store nuclear materials, not to operate processing capabilities. McAlhany said she is confident the facility could be upgraded to handle stabilization and packaging. Currently, the Savannah River Technology Center is researching one processing technology. DOE is also looking at the commercial industry for other possible technologies.

Parker said it appeared DOE had many obstacles to overcome, adding that DOE may eventually spend more money on upgrading 235-F rather than completing the Actinide Packaging and Storage Facility (APSF).

McAlhany said WSRC has estimated a cost range of almost \$150 million based on the length of time and scope it would take to upgrade the 235-F facility. Although the APSF facility would have been more flexible such as provisions for International Atomic Energy Agency (IAEA) safeguards, it would cost more and take longer to construct. The APSF was needed for larger capacity, complex wide consolidated, longer-term (50 year) storage. McAlhany said the 235-F facility combined with K-Area Material Storage (KAMS) would meet the needs for the plutonium disposition mission and Rocky Flats closure plans.

Parker said he felt DOE should have continued the APSF project because it could be expanded to accommodate other work. Costikyan said he understood that the timeframe to construct the APSF would not be beneficial, while an upgraded 235-F could handle the defined missions at lower costs. Ken Goad, CAB, agreed with Parker that the APSF might have offered a chance for SRS to address future opportunities in complex-wide stabilization activities.

McAlhany said once DOE made the decision to locate plutonium disposition activities at SRS; it was the Materials Disposition (MD) program's responsibility to determine the type of facilities needed. Currently, MD said it only needs a less sophisticated storage called lag storage. The 235-F facility will meet the MD and EM mission needs including the commitments to the DNFSB that all plutonium material be stabilized, packaged and stored by 2008. She added that the KAMS project does have flexibility to add storage and together, both facilities will meet SRS's current and future storage needs.

Bill Willoughby asked if SRS had any problems with damage to ceramic containers like what had occurred at Los Alamos National Laboratory as a result of long storage of plutonium oxides. McAlhany said SRS has safely stored plutonium oxide and metal for 20 years and has an extensive surveillance program in place. SRS has noted more problems with the metal in storage than the oxides resulting in repackaging of materials. Both were stored in plastic bags inside cans similar to food cans (can, bag, can configuration). All of the material will be repackaged into 3013 double containers, she added.

At this point, McAlhany displayed a graph of the canyon and explained its activities. F and H Canyons were nearly identical when constructed in the early 1950s, but modifications were made to undertake various defense-related needs. F Canyon is 835 feet long, 122 feet wide and 166 feet high. The control room is located on the fourth floor. Two canyons run the length of each side of the building, with office space located in the middle. One side is called the hot canyon while the other is called the warm canyon. No one has entered either side since the canyon building was constructed.

SNF fuels and targets are shipped to the hot canyon where it is dissolved and the plutonium and uranium are separated from the other materials. The rest of the process is conducted in the warm side of the canyons, then sent to the B line for conversion to metal or oxide. All work is conducted by remote control with cranes. With the exception of some replacements, most of the equipment is the original equipment from when the canyons were constructed.

Though very similar, the two canyons handle different material. F Area stabilizes plutonium and depleted uranium, while H Area handles highly enriched uranium (HEU) and some neptunium. Known missions of the F Canyon include dissolving (Mark 42s) production fuel produced in SRS reactors and EBR II fuel. DOE recently made the decision to process that fuel after completing the SRS SNF Final Environmental Impact Statement. Plutonium scrub alloy from Rocky Flats and possibly Hanford, as well as some SRS residue, will also be stabilized in F Canyon. No other missions are currently identified for F-Canyon past 2004. H Canyon activities are expected to stretch to at least 2006 as a result of offsite SNF receipts.

Mike French, public, asked if DOE was considering SRS as a location to stabilize Uranium-233. McAlhany said it was not likely because it is not "clean" material like the type of material SRS facilities normally stabilize. She added that SRS facilities did not have any better capability than Oak Ridge at this time, which stores DOE's supply.

Bill Willoughby asked about the status of a pending agreement between the Tennessee Valley Authority (TVA) and DOE to provide HEU to TVA for commercial fuel. McAlhany said many positive steps have occurred since the CAB NM meeting on July 10. She said DOE would proceed with the blend-down project on October 1, 2000 even if the agreement were not signed (provided Congress approves funding).

Concerning canyon operations, Parker said he was concerned that the canyons could not handle the acceleration of activities in F Canyon in order to cease operations in 2004. McAlhany said DOE asked for a high confidence roadmap rather than accelerated schedule.

Spent Nuclear Fuel Management Overview:

Bill Clark, DOE Spent Nuclear Fuel Manager, began discussing the SRS Spent Nuclear Fuel Management program by reviewing a roadmap of current and future activities. The SNF program is based in three areas—K Area, L Area and the Receiving Basin for Offsite Fuel (RBOF) in H Area. RBOF was constructed in 1964 specifically to receive fuel from overseas and university reactors. The water chemistry was better controlled and of higher quality in RBOF in order to store aluminum-clad fuel in water without having degradation.

In K Area, the SNF program consists of the K Disassembly Basin. The L Disassembly Basin and the Treatment and Storage Facility (TSF) (to be constructed) are L-Area SNF program facilities. The disassembly basins were designed to hold production reactor fuel. L Basin now also holds offsite SNF because the water chemistry was upgraded to prevent the deterioration of the fuel and new storage racks were installed. Clark said the L Basin water has a better chemistry now than RBOF. In fact, Clark said DOE-SR intends to shut down RBOF by 2007 and move all of the fuel to L Basin. Approximately \$12 to \$15 million will be saved per year with the shut down of RBOF.

A question was asked if other countries and universities pay a fee to SRS for fuel storage. Clark said that high-income countries pay a fee while low-income countries and U.S. universities do not. Parker asked if DOE had any plans to store commercial SNF at SRS. Clark said SRS does not have the capability to receive and store the commercial SNF.

Clark then stated that SRS currently stores 47 metric tons of SNF. Of that inventory, five metric tons is production reactor fuel that will be chemically processed in the canyons. DOE-SR will process 19 metric tons stored in RBOF by 2005, and 20 metric tons of zirconium/stainless steel will be shipped to Idaho National Environmental Engineering Laboratory. Clark added that three metric tons of existing aluminum-

clad fuel and 25 metric tons of future receipts would be stabilized with the melt and dilute technology. SRS expects to receive only small shipments of SNF between 2016 and 2035.

Concerning the melt and dilute technology, Clark said a large melter will be placed in the L Reactor building, and the SNF will be melted down. Depleted uranium will be added to take the material to less than 20% enrichment to meet nonproliferation and criticality standards. Clark said the technology has been researched since 1997; the next step is to build a small scale experimental facility in 2001, with startup operations beginning in 2002. Design will begin in 2003 and the entire TSF is expected to be operational by 2008. Clark emphasized, however, that the facility would only operate on a one-shift schedule, not around the clock.

The ultimate disposition of the material will be in a geologic repository, currently projected to be Yucca Mountain. Clark said the first SRS canisters of high level waste with SNF may go to the repository as early as 2010. The HLW and SNF may be used as barriers to reduce the heat load in the facility as a result of commercial SNF. Goad asked about the cost of melt and dilute versus using the canyon to stabilize the fuel. Clark stated that the costs were comparable and that the melt and dilute met the U.S. policy against reprocessing. However, he did explain that of the 47 metric tons at SRS, 24 metric tons would be processed. He added, that melt and dilute was also considered because future receipts will be small and shipped sporadically and the costs to operate a canyon for small amounts would be too great. Spending \$100 million per year to run F Canyon for only two weeks out of the year is not economical, he emphasized.

Mike French then asked how DOE addressed the DNFSB's concern about melt and dilute. Costikyan said DOE assured the DNSFB and the public that the canyons would remain open until the technology was successfully demonstrated. In addition, there is a written response to the DNFSB Report TECH-22 that contained their concerns about melt/dilute.

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