SRS Citizen's Advisory Board

Savannah River Site Citizens Advisory Board
Environmental Remediation &
Waste Management Subcommittee

Meeting Summary
October 7, 1995
Hilton Head Island, S.C.

The SRS CAB's Environmental Remediation and Waste Management (ER&WM) Subcommittee met on October 7, 1995, at 9:30 at the Hilton Resort on Hilton Head Island, South Carolina. Bill Lawless and Kathryn May, Co-chairs of the Subcommittee, opened the meeting with introductions. CAB representatives present included Mr. Lawless, JoAnn Nestor, Walt Joseph, P.K. Smith, Kathryn May, Vernon Zinnerman, Sr., and Pat Tousignant. Representatives from the Department of Energy (DOE-SR) and Westinghouse Savannah River Company (WSRC) included Karen L. Poore, Mary Flora, Kelly Way, Charlie Anderson, and Tonya Allen. Vanessa Davis attended as a member of the public. Karen Poore was the Associate Designated Deputy Federal Official.

Mr. Lawless welcomed the attendees, announced the meeting agenda for the morning, and turned the meeting over to Neil Davis, WSRC-High Level Waste, who provided the Subcommittee with a presentation answering the following questions relating to the Glass Waste Storage Building (GWSB) and HLW tanks raised at the last subcommittee meeting:

1. How long will the glass canisters last if the superstructure decays or is destroyed?
2. What are the consequences of a ventilation system failure?
3. What is the level of tank corrosion?
4. What is the life expectancy of different type tanks?

Mr. Davis reviewed the safety features of the GWSB. Many questions were raised concerning earthquakes and the building's and vault's ability to withstand the effect of a quake. Mr. Davis noted that the vault is seismically qualified. The worst case South Carolina earthquake (which was in Charleston) was used to decide the range (.2g) and seismic design of the vaults.

Other questions focused on the GWSB's cooling system. The current ventilation system uses HEPA filters that require replacement, which is relatively easy. The GWSB has been designed to support a natural convection system as well as the forced ventilation HEPA filter system. Convection cooling will be more effective as the building fills up with the glass canisters because of the air flow patterns. This point is important since the building could still be cooled on the convection system if the HEPA filters failed.

Mr. Davis pointed out the projected date to send canisters to a federal repository is 2015. If all the waste in the tanks were processed now, there would be 6000 canisters of glass. The new

Glass Waste Storage Building is planned for 2005, and if the present schedule is adhered to, the first glass waste storage building will be filled in 2009. However, the budget challenges in Fiscal Year 1997 (FY'97) dictate a slower attainment; therefore, extending the date for a new GWSB from 2005 until 2015. There is concern that the canisters will be stored at SRS for an indefinite period instead of being sent to the repository in 2015. P.K. Smith pointed out that the public needs to be informed if the schedule changes.

Mr. Lawless reminded the subcommittee of the commitment date DOE has with the South Carolina Department of Health & Environmental Control (SCDHEC) to have the tanks emptied by 2028. Maintaining that schedule may require building a new GWSB sooner. Mr. Davis pointed out that Revision 6 of the HLW System Plan will be issued in November and will demonstrate any alterations to the schedule due to the budget challenges. Because of these challenges, SRS is working to save money. One way is to change the order of waste removal from the tanks enabling SRS to empty more tanks in less time.

Mary Flora informed the group of an upcoming public meeting on October 17 in Atlanta, Georgia to discuss the Yucca Mountain EIS and the proposed repository. She also noted an earlier or later date of canister shipment from SRS to a repository needs to be brought to DOE-HQ attention.

Questions then centered on the amount of heat generated by the canisters and any potential problems caused by heat build-up in the structure. 460 watts of heat is generated by each canister, which is not enough heat to cause a problem. Earlier calculations had estimated each canister generating 710 watts of heat. Structural integrity of the GWSB concrete floor would be lost if temperatures reached 200 degrees. For instance, at 200 degrees, the shielded canister transporter could not be driven on the concrete floor of the GWSB. However, even a collapse of the structure would not cause a heat build-up high enough (1700 F) to pose a problem to the canisters. Even if the entire GWSB were destroyed, the waste in the canisters would stay immobilized in the glass for 10,000 years. This analysis assumes that the canister has disintegrated and only the glass remains. The GWSB will be in use at least 20 years, probably 25-30 years. The design life for the HLW system facilities is typically thirty years.

In a discussion of possible recommendations from the CAB, Mr. Lawless re-emphasized the fact that SR has a commitment with SCDHEC to complete waste removal from the tanks by 2028. The CAB wants to reaffirm the milestone and not allow budget considerations to change this date. Mr. Lawless also pointed out that the building may be required to last longer than the design life and that the glass canisters may never be sent to Yucca Mountain. Because of these concerns, there is a need to design self-monitoring buildings that will last longer.

Walt Joseph pointed out that the first consideration should be to get the waste out of the tanks and made into glass as expeditiously as possible. The second consideration would be the design of the new GWSB. There seems to be two alternatives-- a duplication of the existing building or a self-supporting facility. Last, the design and building of the new GWSB need not be delayed. P.K. Smith and Kathryn May observed that Lessons Learned from other countries with similar storage buildings need to be considered in SRS's new glass waste storage building and this thought needs to be captured in the motion.

Charlie Anderson provided the Subcommittee with another briefing on "The High Level Waste Tank Closure Strategy" (see attached slides). Mr. Anderson discussed the "re-engineering effort" and alternative ways to meet mission without additional funding. The present waste removal schedule showing 2065 as a possible date for the tanks to be emptied of waste is unacceptable. The current production schedule was envisioned in the early 80's and is no longer valid since our waste inventory is not growing rapidly now. Re-engineering and re-inventing the present HLW System is imperative.

The present plan calls for DWPF to go radioactive in December 1995, with the first radioactive canisters poured in January. Mr. Davis pointed out that the first canister poured will mark the end of a 15 year journey; an even longer journey if one considers that work on the conceptual design began in 1978. Mr. Lawless offered CAB support in sponsoring a media event, Open House, or celebration of some sort that involves the public and commemorates the first radioactive canister poured.

The "re-engineering" approach Mr. Anderson plans to pursue involves identifying alternatives to the current configuration. Mr. Anderson issued an open call for innovative and creative techniques and plans to evaluate and report on each one.

Mr. Lawless stated the CAB and CRESP (Consortium for Risk Evaluation with Stakeholder Participation) may be interested in offering suggestions and ideas if provided with status reports as the project progressed. Mr. Anderson readily agreed and offered his full support to the CAB. He acknowledged the impact the CAB made on the public and the productivity of their efforts.

Mr. Anderson cited tank closure criteria as one example in which the CAB could help with the decision making process. Closure criteria has not been developed as of yet and many challenges are in existence. Some of the challenges in cleaning the tanks are interferences caused by cooling coils and internal structures, as well as limited access to the tank interior. In addition, cleaning the tanks without generating any new waste is another consideration. Oxalic acid, which is incompatible with glass, was used to clean the interior of Tank 16. The annulus of 16 has not been cleaned and many factors, such as the presence of sand and duct work, complicate the cleaning process. The Tank 16 annulus will be cleaned with water.

Two major differences exist in Tank 16 versus the Waste removal baseline:

1. Chemical cleaning the inside of the other tanks is not planned
2. Water cleaning the annulus in all of the tanks is planned

Mr. Lawless suggested Mr. Anderson give an update and status to the subcommittee on his report in late November or early December. He requested that the CAB be shown the following in the report:

1. A range of alternatives
2. A baseline on tank closure
3. Advantages and disadvantages of each method
4. A schedule that illustrates where HLW work ends and D&D begins.

Questions turned then to threats of tank explosion and a comparison of SR tanks and Hanford tanks. Hanford tanks have a much greater threat of explosion. SR tanks are ventilated, cooled, and monitored. Hanford has massive characterization problems, in contrast to SR where each tank is well characterized and waste is segregated. The cracks in the Hanford tanks have allowed water to mix with the sand and radioactive waste, which in turn generates hydrogen gas. In contrast, most of the SR tanks are either double walled or contained in a saucer-like structure. There are cracks, but integrity is maintained between tanks. Since work with the waste in the tanks is remotely done, workers are not exposed directly to radioactive waste.

Mr. Anderson continued with an explanation of the different tank types at Savannah River. The tanks at SR are designed such that workers walking on top of the tanks would not be exposed to significant radiation since there is either a concrete or earth barrier in place.

There are 51 tanks in the H and F areas Tank Farms. The 12 Type I tanks were the first built. They have a five foot high steel pan around the outside of the tank to contain any leak until it can be pumped back into the primary tank. They are covered by nine feet of earth.

The 4 Type II tanks were the second type built at SR, and have a large concrete column in the middle for support of the concrete roof. They also have the steel pan around the outside of the tank.

The 8 Type IV tanks were the third type to be built and are the closest to the Hanford tanks. There is no internal equipment in the tanks. Tank 19, a Type IV tank, has a mass of Zeolite that has built up after many years and will be difficult to remove. Clean-up plans for the Zeolite are listed below.

The 27 Type III tanks are "state of the art" tanks and were the last type built. A cross section of the tank would resemble a doughnut shape. These tanks are built with an entire secondary tank instead of just a pan. A large concrete column in the middle of the tank supports the structure. There have been no failures or cracks in SR's Type III tanks. Most were built between1967 and 1981. Stress corrosion cracking has not occurred since tank construction and chemistry control measures are now in place. Internal equipment, i.e., columns, and cooling coils, make cleaning and closure somewhat difficult.

Mr. Lawless stated that a presentation on the different types of tanks and the failures SR has had with each one would be beneficial. It was noted that there is no commitment for closure of Type III tanks. Since there are closure commitments for type I, II and IV tanks, Mr. Lawless stated Types I, II, IV should be cleaned out and closed. If waste must be left, then Type III tanks would be better able to contain the waste safely.

P.K. Smith then questioned the type of radioactive nuclides present in the salt in the tanks. There are trace amounts of strontium and plutonium. Ms. Smith pointed out that SR has cleaned the tanks and is waiting for closure requirement from the state. Mr. Davis stated Tank 16 is the only one that has been cleaned and is awaiting a water wash of the annulus. Ms. Smith questioned the amount of waste left in the annulus. From the primary wall to secondary wall there is approximately a 12 inch mound of salt all the way around the tank. Some of this salt has entered

the ventilation duct which makes cleaning the annulus even more difficult. Ms. Tousignant questioned whether or not radioactive waste could seep out through the welds in the annulus. As long as the waste stays dry and dusty, there would be little chance of seepage. There are no known leak sites in the annulus; however, it was brought to the group's attention, that anytime water is introduced to remove waste, there is opportunity to activate a leak site.

Mr. Anderson continued the briefing with an overview of the Technology Development Tank Focus Area. This effort is basically a coordination among DOE sites to allow more than one site to benefit from advanced technologies. A new technology needed at more than one site is demonstrated and actually used in the field. Planned demonstrations at SR include density gradient and water jet salt removal technologies.

Two tanks at SR have been selected for technology demonstration. In Tank 19, an old style Type IV tank, the majority of waste has already been removed. However, there is a salt/sludge/zeolite "heel" left in the tank. A computer controlled water jet will be the removal technology demonstrated at SR to break up this mass. It would be considered quite an accomplishment if Tank 19 could be cleaned without acid.

Tank 41, a newer Type III tank, will be used for a salt removal demonstration, after which it will be returned to service. This tank will pose more of a challenge than Tank 19 because Tank 41 has cooling coils, Tank 19 has no coils. Density gradient, a single pump operation, and alternate hydraulic retrieval equipment will be used in this demonstration.

Vernon Zinnerman questioned SR's knowledge of a waste removal schedule. It was noted that SR had a waste removal plan in place, but had to revamp the schedule and pursue cost effective waste removal techniques to meet budget challenges. The Technology Development Focus Area Groups have been in existence about 8 months to demonstrate and employ new technologies. As new technologies become available and applicable to certain complex-wide problems, they will be demonstrated.

Mr. Lawless offered CAB support to help develop closure criteria and act as a catalyst to implement needed technology, coordination, and research. Mr. Davis stated closure options should be developed, modeled and compared based on environmental risks. Different assumptions will be made to determine the amount of waste left in the tanks, these options will be modeled, and the risks will be established. Mr. Zinnerman stated these decisions affect the Future Use Subcommittee as well.

Mr. Lawless asked for closing thoughts. Some ideas of possible motions may consider the following:

1. funding issue
2. design of the next glass waste storage building
3. media event for the first canister produced in January

Mr. Lawless then closed the meeting and thanked those attending. The next meeting of this subcommittee to discuss HLW issues and to review draft motions will be determined.

ERRATA FOR THE OCTOBER 7, 1995
WASTE MANAGEMENT & ENVIRONMENTAL RESTORATION
CITIZENS ADVISORY BOARD SUBCOMMITTEE MEETING

PAGE 2, Paragraph 1, Sentence 4:

Mr. Davis pointed out the projected date to send canisters to a federal repository is 2015. If all the waste in the tanks were processed now, there would be 6000 canisters of glass. The new Glass Waste Storage Building is planned for 2005, and if the present schedule is adhered to, the first glass waste storage building will be filled in 2009. However, the SYSTEM PLAN ASSESSMENT OF THE BEYOND FY 97 BUDGET HAS RESULTED IN A SLOWER ATTAINMENT; therefore, extending the date for a new GWSB from 2005 until 2015. There is concern that the canisters will be stored at SRS for an indefinite period instead of being sent to the repository in 2015. P.K. Smith pointed out that the public needs to be informed if the schedule changes.

PAGE 2, Paragraph 2, Sentences 1 & 4:

Mr. Lawless reminded the subcommittee of the commitment date DOE has with the South Carolina Department of Health & Environmental Control (SCDHEC) to have the TYPE I, II AND IV tanks emptied by 2028. Maintaining that schedule may require building a new GWSB sooner. Mr. Davis pointed out that Revision 6 of the HLW System Plan will be issued in November and will demonstrate any alterations to the schedule due to the budget challenges. [BECAUSE OF THESE CHALLENGES][Delete] , SRS is working to save money. One way is to change the order of waste removal from the tanks enabling SRS to empty more tanks in less time.

PAGE 2, Paragraph 3, Sentence 2

Mary Flora informed the group of an upcoming public meeting on October 17 in Atlanta, Georgia to discuss the Yucca Mountain EIS and the proposed repository. SHE ALSO NOTED THAT CONCERNS THE CAB MAY HAVE ON CANISTER SHIPMENTS FROM SRS TO A REPOSITORY WOULD NEED TO BE ADDRESSED WITH DOE-HQ.

PAGE 2, Paragraph 4, Sentence 1

Questions then centered on the amount of heat generated by the canisters and any potential problems caused by heat build-up in the GLASS WASTE STORAGE BUILDING. 460 watts of heat is generated by each canister, which is not enough heat to cause a problem. Earlier calculations had estimated each canister generating 710 watts of heat. Structural integrity of the GWSB concrete floor would be lost if temperatures reached 200 degrees. For instance, at 200 degrees, the shielded canister transporter could not be driven on the concrete floor of the GWSB. However, even a collapse of the structure would not cause a heat build-up high enough (1700 F) to pose a problem to the canisters. Even if the entire GWSB were destroyed, the waste in the canisters would stay immobilized in the glass for 10,000 years. This analysis assumes that the

canister has disintegrated and only the glass remains. The GWSB will be in use at least 20 years, probably 25-30 years. The design life for the HLW system facilities is typically thirty years.

PAGE 2, Paragraph 5, Sentence 1

In a discussion of possible recommendations from the CAB, Mr. Lawless re-emphasized the fact that SR has a commitment with SCDHEC to complete waste removal from the TYPE I, II, AND IV STYLE tanks by 2028. The CAB wants to reaffirm the milestone and not allow budget considerations to change this date. Mr. Lawless also pointed out that the building may be required to last longer than the design life and that the glass canisters may never be sent to Yucca Mountain. Because of these concerns, there is a need to design self-monitoring buildings that will last longer.

PAGE 3, Paragraph 2, Sentence 4

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PAGE 3, Paragraph 4, Sentence 2

The "re-engineering" approach Mr. Anderson plans to pursue involves identifying alternatives to the current configuration. Mr. Anderson issued an open call for innovative and creative techniques and plans to evaluate and report on THESE ITEMS.

PAGE 3, Paragraph 6, Sentences 5 & 7

Mr. Anderson cited tank closure criteria as one example in which the CAB could help with the decision making process. Closure criteria has not been developed as of yet and many challenges are in existence. Some of the challenges in cleaning the tanks are interferences caused by cooling coils and internal structures, as well as limited access to the tank interior. In addition, cleaning the tanks without generating any new waste is another consideration. MR. DAVIS POINTED OUT THAT Oxalic acid, which is incompatible with glass, was used to clean the interior of Tank 16. The annulus of 16 has not been cleaned and many factors, such as the presence of sand and duct work, complicate the cleaning process. PLANS ARE TO CLEAN the Tank 16 annulus with water.

PAGE 4, Paragraph 1, Sentence 2

Two major differences exist in Tank 16 versus the Waste removal baseline:

1. Chemical cleaning the inside of the REMAINING tanks is not planned
2. Water cleaning the annulus in all of the tanks is planned PAGE 4, Paragraph 2, Sentence 3

Mr. Lawless suggested Mr. Anderson give an update and status to the subcommittee on his report in late November or early December. He requested that the CAB be shown the following in the report:

1. A range of TANK CLOSURE alternatives AND COSTS
2. A baseline on tank closure
3. Advantages and disadvantages of each method
4. A schedule that illustrates where HLW work ends and D&D begins.

PAGE 3, Paragraph 3, Sentences 2 4 6 & 8

Questions turned then to threats of tank explosion and a comparison of SR tanks and Hanford tanks. MR DAVIS POINTED OUT THAT Hanford tanks have a greater threat of explosion THAN SR TANKS. SR tanks are ventilated, cooled, and monitored. Hanford has massive characterization problems, in contrast to SR where each tank is BETTER characterized and waste is segregated. The cracks in the Hanford tanks have allowed water to mix with the sand and radioactive waste, which in turn generates hydrogen gas. [In contrast,][DELETE] Most of the SR tanks are either double walled or contained in a saucer-like structure. There are cracks, but integrity is maintained between tanks. WASTE HAS BEEN LOWERED BELOW THE CRACKS IN THE TANKS TO ENSURE THERE IS NO LEAKAGE. Since work with the waste in the tanks is remotely done, workers are not exposed directly to radioactive waste.

PAGE 4, Paragraph 7, Sentence 3

The 8 Type IV tanks were the third type to be built and are the closest to the Hanford tanks. There is no internal equipment in the tanks. Tank 19, a Type IV tank, has a mass of SLUDGE AND Zeolite that has built up after many years and will be difficult to remove. Clean-up plans for the Zeolite are listed below.

PAGE 5, Paragraph 1, Sentence 7

The 27 Type III tanks are "state of the art" tanks and were the last type built. A cross section of the tank would resemble a doughnut shape. These tanks are built with an entire secondary tank instead of just a pan. A large concrete column in the middle of the tank supports the structure. There have been no failures or cracks in SR's Type III tanks. Most were built between1967 and 1981. Stress corrosion cracking has not occurred since tank construction and chemistry control measures are now in place. [Internal equipment, i.e., columns, and cooling coils, make cleaning and closure somewhat difficult.] [DELETE]

PAGE 5, Paragraph 3, Sentence 2

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PLUTONIUM. Ms. Smith pointed out that SR has cleaned the tanks and is waiting for closure requirement from the state. Mr. Davis stated Tank 16 is the only one that has been cleaned and is awaiting a water wash of the annulus. Ms. Smith questioned the amount of waste left in the annulus. From the primary wall to secondary wall there is approximately a 12 inch mound of salt all the way around the tank. Some of this salt has entered the ventilation duct which makes cleaning the annulus even more difficult. Ms. Tousignant questioned whether or not radioactive waste could seep out through the welds in the annulus. As long as the waste stays dry and dusty, there would be little chance of seepage. There are no known leak sites in the annulus; however, it was brought to the group's attention, that anytime water is introduced to remove waste, there is opportunity to activate a leak site.

PAGE 5, Paragraph 5, Sentence 5

Two tanks at SR have been selected for technology demonstration. In Tank 19, an old style Type IV tank, the majority of waste has already been removed. However, there is a salt/sludge/zeolite "heel" left in the tank. A computer controlled water jet will be the removal technology demonstrated at SR to break up this mass. MR. DAVIS POINTED OUT THAT It would be considered quite an accomplishment if Tank 19 could be cleaned without acid.

PAGE 6, Paragraph 2, Sentence 2 & 3

Vernon Zinnerman questioned SR's knowledge of a waste removal schedule. MS. FLORA noted that SR had a waste removal plan in place, but had to revamp the schedule and pursue cost effective waste removal techniques to meet budget challenges. ONE COST SAVINGS MEASURE IS The Technology Development Focus Area Groups WHICH have been in existence about 8 months to demonstrate and employ new technologies. As new technologies become available and applicable to certain complex-wide problems, they will be demonstrated.

PAGE 6, Paragraph 4, Sentence 6

Mr. Lawless asked for closing thoughts. Some ideas of possible motions may consider the following:

1. funding issue
2. design of the next glass waste storage building
3. media event for the first canister produced in January
4. DEVELOPMENT OF TANK CLOSURE CRITERIA

Meeting handouts are available by calling the CAB toll-free number at 1-800-249-8155.