



SRS Citizens Advisory Board

Salt Processing Focus Group

Meeting Summary

August 8, 2000
Holiday Inn Express
Aiken, SC

The Salt Processing Focus Group met on Tuesday, August 8, 2000, at 5:00 P.M. at the Holiday Inn Express in Aiken, SC. Attendance was as follows:

Wade Waters, CAB

Mike French

Lee Poe

Kelly Way, WSRC

Ki Kwon, WSRC

Eloy Saldivar, WSRC

Bruce Wiersma, WSRC

Brenda Lewis, WSRC

John Reynolds, DOE

Bob Hinds, WSRC

Neil Davis, WSRC

Wade Waters welcomed everyone and started the meeting.

The Focus Group (FG) discussed the following areas:

Waste Removal/Tank Closure: Neil Davis, CST Waste Removal Program Manager, spoke to the group on the status of waste removal (WR) and tank closure. Mr. Davis started by showing the group the WR time line of project and operations so that the group could determine WR status. He pointed out that in six tanks, bulk waste has been removed and a "heel" has been left behind that consists of anywhere from 2,000 to 40,000 gallons of waste. He continued with the status of tanks and their place in the "construction or operation" phase. Most of the effort right now is on Tanks 7, 11, and 19. There is also a new infrastructure project called Tank Farm Support Services that focuses on F-tank farm. Two other infrastructure projects that are close to completion, focused on H-tank farm. Mr. Davis updated the FG regarding the Tank 8 bulk waste removal process. SRS is currently slurrying in Tank 8 and this waste will eventually be sent to DWPF. This is the first time SRS has performed waste removal operations under all the new requirements, (e.g. procedural controls to safely release hydrogen trapped in the sludge or dissolved in the supernate as well as hardware to measure hydrogen levels in the tank vapor space). Project work continues on Tank 19 heel removal. The transfer pump system goes in the week of 8/14/00. There are 33, 000 gallons of sludge, salt, and zeolite in this tank.

Mr. Davis continued by discussing tank cleaning in the non-type IV tanks. Tank 8, where bulk waste removal is being completed, has twelve 24" diameter support columns plus vertical and horizontal cooling coils. Mr. Davis believes Type I tanks are going to be the hardest to close.

Mr. Poe asked what factor in tank cleaning determined that enough WR had been completed. Mr. Davis answered that SRS pulls samples at varying depths in the slurried sludge layer. These samples are modeled and back calculated to obtain data. This data is plugged into a Performance Assessment to determine the number of gallons of sludge that can be left behind. Some chemical cleaning may have to be done in some of these tanks. The Performance Assessment is tied to the Department of Health and

Environmental Control (DHEC) closure permit, which governs how much material to remove from each of the tanks. Mr. Poe clarified that the tanks closed to date have had no coils, no support columns, etc.

Mr. Davis stated that Tank 8 bulk waste removal is scheduled to be complete in 11/00 with two heel removal batches tentatively planned in FY01. SRS plans to use water and existing slurry pumps to work down the heel. This plan accomplishes two things—the first being, the smaller the heel, the cheaper, faster, and easier it would be to choose a heel removal option. Since this sludge becomes feed stock for DWPF, SRS wants to remove the majority of waste from the tank in a timely manner. Secondly, the schedule allows time for a very deliberate heel removal program using existing equipment. The FFA doesn't call for closure of Tank 8 until FY'22; therefore, there is no regulatory driver to accelerate heel removal. However, the site has its own driver to better define the entire WR program and Line Item. There currently is funding next year for the two batches of heel removal, although that is subject to change.

When asked about the annulus and salt in Tank 8, Mr. Davis replied that the annulus is clean and that soluble salts will be washed out of the sludge, evaporated, and stored as salt cake. Mr. Davis elaborated on annulus cleaning. The FFA schedule shows that Tank 14 is the first tank required to be closed with a contaminated annulus. The Tank 16 annulus contains mostly insoluble salts and also has an annulus duct that is filled with dried salt. A process for cleaning relatively insoluble waste from an annulus and particularly from the inside of the duct has not been developed and demonstrated. As such, there is no established baseline process for annulus cleaning.

Mr. Waters asked for the number of tanks with contaminated annuli. Mr. Davis answered that there are nine. Some of the tanks have small salt nodules on the tank wall indicating the presence of a small leak site while other tanks have several thousand gallons of dried salt on the annulus floor. Mr. Poe requested that the FG be kept apprised of leak location, leak information, and tank slurring. The FG needs this information to be able to make informed recommendations to the WM committee. He would like to see more emphasis on and a reasonable schedule for annulus cleaning. Mr. Davis told the group that Tanks Focus Area (TFA) funding is being used to develop a chemical cleaning process, which could be applied to annulus cleaning and heel removal. Flygt mixer experience in Tank 19 will be evaluated for possible annulus cleaning as well. (Flygt mixers, funded by the TFA, are a potential alternative to slurry pumps). Mr. Davis proposed a follow-up meeting focused on the issue of annulus cleaning.

Mr. Davis emphasized that for FY00-01, HLW is adequately funded to perform scope on closure consistent with the FFA closure requirements for Tanks 18 and 19. Tank 19 is scheduled for isolation next year, which involves cutting process pipes and disconnecting electrical services. By the end of FY01, the plan is to have 19 isolated from the tank farm and removed from the safety basis. A SRS HLW goal is to be in a position to award a grout contract by the end of FY01 and pump grout into Tank 19 by FY02.

Mr. Davis stated that work on 1F evaporator and the concentrate transfer system (CTS) is also funded in FY01. One school of thought is that the IF evaporator and CTS should be closed along with the "four-pack" of Tanks 17-20 to take advantage of the tank capacity. However, there is no regulatory driver to close these two process cells. They are covered in the HLW System Plan, but are not covered in the EIS. There is some regulatory work to be done to determine closure requirements and methods. In terms of the FFA schedule, Tank 19 has to be closed by March '03. All of the waste from Tank 19 goes to Tank 18, which is scheduled for closure by March '04.

The 241-1F control room contains the controls for all these tanks. Eventually this entire area will be filled with earth. Presently, the control room is the impediment to closing this section of tank farm as it is projected to cost several million dollars to move the controls to another building.

Mr. Davis anticipates no problem in meeting the FFA schedule to close Tanks 18 and 19; however, plans to close the Tanks 17-20 section of the tank farm will require several years. Mr. Waters questioned the planned transfers from 19 to 18. Mr. Davis explained that the waste in Tank 19 would be transferred to

Tank 18 over the next 3 months. The waste will reside in Tank 18 until FY03 when it is scheduled to be transferred to a Type III tank for eventual feed to DWPF.

Mr. Poe stated that Bill Lawless is one who really wants to close this four-pack. Mr. Poe emphasized that he, the focus group, and the WM committee support this thinking as well. Dr. Lawless's concern has always been that the regulators do not recognize closure until a geographical section (i.e. 4-pack) is closed that encompasses superstructures and evaporators with engineered barriers, soil and drainage. The importance of receiving such a final closure designation has led to the conclusion and CAB motion #43, 9/97, "HLW Tanks and 1F/1H Evaporator Closure", that it is as important to demonstrate regulatory closure at least once with the first 4-pack as it is to demonstrate physical tank closure. Mr. Poe believes the control room can wait and that SRS doesn't need to back fill this area. He believes time and money would be better spent to finish the job closing individual facilities (e.g., close the evaporator, close the transfer tank, finish Tanks 1-8, then fill and cap).

Mr. Davis expressed appreciation to the Focus Group for their work and the help and support they have given to the site. He stated that the recommendations have all been helpful and supportive of what the HLW team was striving to accomplish.

Structural Integrity of Tanks: Brenda Lewis, HLW Engineering Manager, gave a presentation on the structural integrity of the waste tanks. She began with a diagram of Type I-IV tanks, pointing out the risers, support columns, annulus, cooling coils, and general construction of each tank type. She pointed out that four of the Type I tanks, (which are Tanks 1-12), sit in the water table in H-area. Also, in the Type I & II, the secondary pan only goes five feet. The Type II tanks have all leaked, but all of them are above the water table. The Type III have several improvements, such as stress relief improvements, a full secondary containment, vertical cooling, and air slots for cooling. The eight Type IV tanks have no annulus, are single shelled, and have no cooling coils. There are two tanks that have had in-leakage high in the tanks. These Type IV tanks have leak detection systems.

Ms. Lewis continued with a discussion of tank materials. Improvements have been made on the Carbon steel with improved resistance to stress corrosion cracking and brittle fracture. She covered the concrete and rebar issues mentioning that a PISA is close to closure in which the site had examined the concrete because of concerns of concrete stress on the tank top and a fear of collapse. The latest work shows that this isn't an issue. The group is rolling this reference into the Authorization Basis (AB).

Ms. Lewis showed the FG copies of the documents HLW updates yearly. The Annual Radiological Waste Tank Inspection, a requirement of the FFA, documents significant changes of the tanks year to year. It is an important part of the structural integrity program. Another document is the Structural Integrity Data Base, which is a test method for all transfer lines in the system. Yet another document the site maintains is a record of structural components, such as pump tanks and evaporator pots.

Ms. Lewis discussed the tank service history, emphasizing that Tank 16, which is now out of service, is the worst case with over 300 cracks. She outlined the other tanks and the known leak sites. Mr. Poe questioned how SRS determines a leak exists. Ms. Lewis outlined the site's tank inspection process in which leaks are photographed. She covered the investigation of the Tank 15 leak. When Mr. Poe asked for an estimate of cooling coils that have leaked, Mr. Wiersma estimated approximately 15%.

Ms. Lewis said that stress corrosion cracking is the degradation mechanism for the tank walls. Extensive ultrasonic and crawler testing showed no thinning of the steel due to general or uniform corrosion. Mr. Poe questioned pitting corrosion. Ms. Lewis discussed what the site has actively been doing in the maintenance and surveillance fields. She stated that technical safety requirements exist for corrosion control and for structural integrity. The first requirement for corrosion control, initiated in the 70's, is the waste chemistry inhibitor concentration. There are also Authorization Basis corrosion control requirements, temperature requirements, and annulus ventilation requirements. The requirements for

structural integrity include inspections on steel wall temperature, pressure difference, fill limits, degradation, and the uplift program. A discussion ensued of fill limits and standards.

Ms. Lewis continued with the various inspection techniques the site uses. There are routine visual imagery techniques, non-routine ultrasonic testing measurements of steel wall thickness, and non-routine ultrasonic testing for flaw detection in the steel wall. She discussed the crack in Tank 15 and its unique features. It is ~15 inches long, is curved, and is in the vapor space. Ms. Lewis stated that progress is being made and tests are being done in the area of vapor space corrosion and fracture methodology. She showed the photographs from the past few years and illustrated the mapping that enables the site to compare from year to year. She showed how the salt helps determine that it is indeed a leak site. The site is presently seeking a computer-based program to examine leak photographs.

Ms. Lewis outlined the elements of the life management program. She presented the flow sheet used for the life management program and continued with the program's status. The site is using the American Petroleum Institute (API) Practice for Fitness for Service Assessments fracture methodology. These results will be utilized to determine tank fill limits for cracked tanks. Fracture Toughness tests, in-service inspections, and laboratory tests on tank materials in a vapor space environment are in progress.

Ms. Lewis then covered the development of technology for SRS applications. SRS UT equipment is being used and industrial UT equipment for flaw characterization and weld examination will be modified for use in the SRS tanks. SRS has worked with FORCE Institutes from Denmark to modify their equipment to negotiate the five-inch riser and add a camera. Ms. Lewis showed an illustration of the AMS 1T, which scans tank interiors with an ultrasonic technique and maintains contact magnetically.

Ms. Lewis outlined the planned inspection coverage for the Type I & II tanks, which includes vertical strips, lower knuckle, and weld areas. General thinning of nominal thickness, pitting of nominal thickness, and crack-like indications will be reported. To date, no thinning has been reported.

Ms. Lewis outlined the path forward for the life management program. The site plans to continue fracture toughness testing, to determine the preliminary fill limits for cracked tanks from API, and to examine Tank 15. The site also plans to submit a position paper on the cause of the Tank 15 crack.

Ms. Lewis outlined of the tank's design life versus the expected need. The site will continue with the maintenance and surveillance programs that are in existence for known degradation mechanisms. Ms. Lewis stated that significant degradation of materials is not anticipated during the expected service life.

Mr. Poe questioned the number of and audience for briefings the HLW team has delivered to date. Ms. Lewis mentioned The Defense Board (DNFSB) briefings and the good acceptance there. She has also tried for four years to get the Tanks Focus Area to consider tank integrity as a safety issue for the complex.

Mr. French congratulated Ms. Lewis's group for clearing the DNFSB review. He was impressed with the work the group has done and considers work to date a success. Ms. Lewis stated that the group was working to implement API 579, which is a new code requirement that gives a fracture methodology to employ for a cracked tank. The issued report provided a series of comments that SRS is addressing. Mr. Poe clarified that this review along with the other peer reviews reinforced that there will not be a catastrophic failure with the tanks.

Mr. Poe also questioned the use of the API 579 as opposed to other code requirements. Ms. Lewis stated that the site had looked at numerous codes; however, API is a published code. Mr. Poe pointed out this code looks at only a small percentage of the tank wall, which lessens the chances of finding the cracks. Ms. Lewis explained the statistical sampling process the code employs. She also outlined the level of control the site has with inhibitors, detection systems, and surveillance programs. Mr. Poe emphasized that the strongest data available reveals that the cracks occurred early in the life of the tank. He maintains

the crack could still leak if the crust were knocked away, and that it is maintained only by the dry environment.

Mr. Poe questioned the other FG members about areas of concern, for example the long crack in Tank 15. He would like to see a briefing to the WM Committee on the quality of the tanks and their suitability for their projected life. Mr. Waters's concern is the waste removal schedule and all that is involved in this process.

Wade Waters asked for a clarification between and final disposition of dirty and clean crawlers. Ms. Lewis clarified the differences; the dirty crawlers are hard to transport, maintain, and store. The clean crawlers can be put down the risers, pulled out, and used again with no problems. Mr. Poe asked Ms. Lewis when SRS would use the crawler to inspect the Tank 15 crack and ensure that it isn't growing. She replied that it would be used as early as this fall 2000, but no later than 1/01.

The FG discussed possible topics for the September and October meetings. They include the following:

- Head Quarters Report
- Down select Criteria
- Technology Selection
- Modifications to Small Tank Baseline

Mr. Waters thanked the presenters and the attendees. He then asked for questions or comment. There being none, he adjourned the meeting at 8:45 p.m.

Copies of handouts may be obtained by calling 1-800-249-8155.