



SRS Citizens Advisory Board

Nuclear Materials Management Subcommittee

Meeting Summary

July 22, 1996

Aiken, S.C.

The Citizens Advisory Board (CAB) Nuclear Materials Management (NMM) Subcommittee held a meeting on Monday, July 22, at the Stevenson McClelland Building in Aiken, SC. Subcommittee members attending were Tom Costikyan, chairperson, Brendolyn Jenkins, Suzanne Matthews and Ed Tant. CAB member Lane Parker also attended. Savannah River Site resource personnel attending included Donna Martin, Westinghouse Savannah River Company and deLisa Bratcher, Associate Designated Deputy Federal Officer, DOE-SR. Nick Kennedy, WSRC, gave an informal discussion on seismic issues and Barry Shedrow, WSRC, presented National Environmental Policy Act (NEPA) information. Tim Mettler represented the South Carolina Department of Health and Environmental Control. Public attendees were Rick Geddes, and Rod Wilcox. Bryan Williams attended from the Consortium for Risk and Environmental Stakeholder Participation and Roddie Burris attended from the Aiken Standard newspaper.

The meeting opened with discussion focused first on how the subcommittee would address a report by former SC State Representative Billy Keyserling dealing with unsafe conditions in the L Reactor Basins for storing foreign fuel. Costikyan explained that Keyserling was the son of former legislator Harriet Keyserling and that both carried a great deal of credibility in the Beaufort/Hilton Head area.

The members agreed to invite Keyserling to the September CAB meeting in Beaufort. Tant then said he had spoken to Henry Brown, chairman of the Finance Committee, SC House of Representatives, about the Keyserling report and he intends to mail Mr. Brown copies of DOE's response to the report. Tant added that the public reads the negative information but does not see the positive economic sides of managing spent fuel.

At that point, Costikyan stated the subcommittee would not develop a formal plan to address the Keyserling report although.

Next on the agenda was discussion on the seismic canyon study. Rick Geddes had recommended to Costikyan that the subcommittee ask Nick Kennedy, the WSRC scientists who identified problems with the 1980s data, to provide some background information about the seismic study.

Kennedy began by stating the canyons were some of the first seismic designs in the country. He then said seismic data is compiled from past historical events. For example there is more data on the West Coast as a result of the increasing number of earthquakes in the area. Scientists use the Mercalli scale, which employs terms recorded in historical books. For example, events such as dishes rattling, chimneys fallings and doors swinging open are used to estimate the level of a past

earthquake. Seismologists put all of the data together to get a hazard curve and estimate probabilities of events.

Kennedy further explained earthquakes are characterized for structural analysis by spectral shape and size (amplification). This response spectrum is used to characterize the reaction of the structure in the event of an earthquake. Soil variations play major roles in earthquake magnitude. Citing the Charleston earthquake of 1886 as an example, Kennedy said it was a .2g earthquake at its non-amplified or flat end, although a peak structural response of .8 gs can occur during the earthquake.

Kennedy then explained reaction of structures or material depends on whether it is damped or undamped. An undamped system will sway forever where a damped system will sway only one or two times. Concrete tends to more damped, therefore less responsive, where metal piping and railing are undamped and will move and sway. An earthquake of .2gs would not affect a concrete structure yet low damped piping would respond as though it was an earthquake equal to .8 gs.

Kennedy gave an example of soldiers on a bridge. As they walk, the bridge would begin to shake but if they marched in double time, they would elicit a natural frequency and cause the bridge to shake more violently. Kennedy then stated earthquakes are multi-frequency events.

In the past, earthquake expertise was focused on the West Coast. Today, seismologists have looked more closely at history of the east coast and bounded a rational design that is consistent with DOE criteria. In this design, scientists can safely say the canyons have a high probability of surviving an event between a 2000 or 10000 year frequency. He then explained to meet DOE criteria, there must be 90% confidence the structure will survive at the 1 in 2,000 event while at the other end of the spectrum (1 in 10,000), there must be 50% confidence. A 1 in 10,000 year earthquake would be a stronger motion.

But predicting earthquakes is more complicated than looking specifically at historical events, Kennedy said. Seismologists characterize the soils and include data from events that occur onsite, as well as events such as the 1886 Charleston earthquake and earthquakes in the Piedmont area.

Site geotechnical personnel have developed a site response spectrum specifically for the canyons. They can predict the motion characteristic at the base of each canyon building by calculating the data and characterizing the soil around the canyons.

WSRC analyzed the canyons for 23 different earthquakes. Parker asked if the team took a sample from the concrete structural members and conducted tests on the concrete samples. Kennedy said the team did take actual samples from the canyon and tested it for strength.

Parker asked if the infrastructure was stable. Kennedy said the team expected the concrete to increase in strength as it aged as much as 20%. However, the concrete columns in the center of the H canyons were understrength as were the center columns in F Canyons, but to a lesser degree. The team is continuing to conduct tests and it has also sent samples to the U.S. Corp of Engineers to check for degradation mechanisms (petrographic exams). Kennedy said the walls

and floors meet and slightly exceed the expected increase in strength. Despite the weakness, Kennedy said the modeling results (using the center column data) indicate canyons still meet DOE's acceptance criteria for an earthquake.

Costikyan asked about specific historical data used to predict earthquakes. Kennedy said about 450 small earthquakes have been recorded in the Charleston area since record keeping began in the early 1700s.

Tant questioned if scientists can take the historical data and predict an earthquake of a specific size and danger level. Kennedy said he could predict the damage of structure but not when the earthquake would occur. The structure meets acceptance criteria for an 8300 year return period. The peak ground acceleration would be .24g.

In reference to the canyons, Kennedy said he has extremely high confidence the canyon structure will remain intact if an earthquake occurs. He could not specify if material would be contained or confined to the facility.

Costikyan then stated the scientific ability to measure resistance of a structure was more precise than predicting the violence that would occur. Kennedy agreed that structural engineering was a more exact science.

Kennedy explained safety analyses are conducted to predict what may occur if there was any kind of failure within the envelope of the facility. In a safety analysis, the reviewer looks at safety features of equipment such as pipes, ventilation systems, and vessels that would prevent or mitigate accidents.

He further stated that although the holding vessels were robust, they were installed so they could be removed easily from the canyons. The cardinal rule, he said, is to ensure vessels have strong anchorage to ensure they are not susceptible to overturn.

Geddes added the primary safety check is the ventilation system. Kennedy said the ventilation system of the canyons have been analyzed and WSRC has determined it will withstand the .2gs earthquake. The only potential safety issue was the brick liner located within the ventilation stack.

Geddes explained that concerns with the brick lining resulted in halted operations of the canyons in 1991 and 1992. The issue was resolved in 1993 prior to preparation of the Interim Management of Nuclear Material EIS. The brick lining is located within a 200 foot exhaust stack. The stack is where trace quantities of radionuclides are released to the environment.

Parker said he was familiar with lining within stacks and how they are used to protect stacks from corrosive chemicals. He added he has constructed similar structures and there was no way to stabilize a brick lining.

Geddes said in the safety analyses, it was determined that a natural ventilation draft occurred even if the ventilation systems stopped operating.

Getting back to canyon specifics, Jenkins asked what precipitated the seismic study on the canyons. Kennedy said two specific requirements prompted the seismic study: (1) WSRC was conducting its routine update and revision of safety analyses; and (2) a DOE order requires that natural phenomenon data be revisited every 10 years as a result of more advanced calculation methods. Canyon data dated back to the mid 1980s.

Kennedy added there is now new technology from the West Coast on probabilistic analysis and new data on soil types and changes in ground motion. The science of predicting earthquakes and magnitudes is only 20 years old. Data from seismic study just completed indicates the stack liner is the weakest link in safety concerns.

Parker pointed out that the S Area stack is metal and without a liner. He suggested that the same be done for the canyons. Geddes said that new stacks have been considered but analyses show that a liner failure does not create excessive risk to workers.

Expertise of the WSRC team was then discussed. Kennedy said after the WSRC calculated data in March 1996 and structure strength appeared overly low, WSRC contracted world class engineers who had specific expertise to recheck the data. Two top engineers (a) Dr. Mete Sozen, an expert in structural engineering at the University of Illinois and (2) Dr. R.P. Kennedy, the West Coast's leading expert on probabilistic approaches and structural analysis, were contracted by WSRC to assist the team in reanalyzing seismic data for the canyons.

Kennedy explained the team used the probabilistic approach and backed it with traditional methods to evaluate two data points. One was a 90% confidence rate and the other a 50% confidence rate. The result was a high confidence (90%) that the canyons could withstand a 1 in 2000 year earthquake and a 50% confidence rate they could withstand a 1 in 10,000 year earthquake.

Kennedy noted the DOE-SR/HQ review team contracted comparable experts to review what the first group (WSRC) had concluded. He added that although the DOE team had difficult questions and insightful views, he felt the WSRC team successfully answered the questions and issues.

Once the ES&H team conducts an independent review of both the WSRC and DOE-SR/HQ, Costikyan said the subcommittee must make a decision on whether the seismic study was completed and reviewed for sufficient independence. Beyond that point, Costikyan asked about future activities of the canyons if they resume operation.

Geddes said the Mark 31 production targets would be processed within six months and all other onsite material listed in the IMNM EIS as vulnerable would be reprocessed. Costikyan then questioned if the remaining stabilization work would be conducted in one or both canyons. Geddes replied that most of the Mark 16 and 22 production fuels are scheduled for stabilization in H Canyon. He added a record of decision has already been made by DOE to process the vulnerable materials.

Jenkins asked how soon would the canyon restart if DOE agrees with the seismic study and if DOE knew of any issues other than the seismic issue. Geddes said F Canyon could continue with

operations already begun; it would take about a year and a half to start up H Canyon. He added that he did not know of any additional issues other than political ones of organization simply against canyon operations. The Defense Nuclear Facilities Safety Board (DNFSB) reviewed F Canyon before it restarted and would do the same with H Canyon to ensure no safety issues existed.

Matthews said she feels DOE should get ahead with the task at hand. Geddes said the next issues would be if the canyon should process materials not covered in the IMNM, for example, spent fuel and unstable materials at SRS and from other DOE sites. If other materials are considered for processing, SRS would have to fit then into the current schedule.

At the conclusion of the seismic study discussion, Barry Shedrow, WSRC, began discussing National Environmental Policy Act (NEPA) actions that would impact nuclear management activities. He first explained NEPA has three levels of review: categorical exclusions (CX), environmental assessments (EA), and environmental impact statements (EIS). In many cases, Shedrow explained, SRS actions do not require detailed studies as done in an EIS. EIS procedures do require a study of environmental and socioeconomical impacts of major actions, which can sometimes take up to two years.

The middle ground is environmental assessments, which Shedrow described as a mini EIS. An EA is prepared when an agency is not sure if the action warrants the more extensive EIS. A database is developed and if questions are satisfied, a Finding of No Significant Impact (FONSI) is issued. If impacts are noted, a larger EIS will be prepared.

Shedrow said the studies which may be of specific interest to the NMM subcommittee were the Storage and Disposition of Fissile Materials PEIS, Stabilization of Plutonium Residues and the SRS Spent Nuclear Fuel EIS. Shedrow emphasized the EISs should be as apolitical as possible. The study is a scientific look at reasonable alternatives for conducting such an action.

Costikyan then said the subcommittee could become involved in both the plutonium residue and SNF EISs, yet more benefit may come from asking one or two simple questions.

Geddes said the EISs do give the subcommittee members an opportunity to look at impacts of actions at other sites and to make a decision to support or not support work at SRS.

Costikyan asked if there was more than one option for stabilizing plutonium residues and spent fuel. Geddes said DOE is analyzing a number of options for spent fuel. For plutonium materials, the primary alternative involves diluting the residues for disposal as a solid waste. Some viable options include cut and drying material and processing.

deLisa Bratcher asked why the Rocky Flats was not a programmatic EIS. Geddes said DOE was trying to limit the scope of the EIS to a specific group of Rocky Flats materials and a limited set of reasonable alternatives so that a timely decision could be reached to reduce potential risks by the unstable Rocky Flats material.

Costikyan then stated he understood Rocky Flats did not have a treatment facility to stabilize plutonium even though the repository for the plutonium residues was only 500 miles away. Geddes explained the plutonium residues would have to be diluted before it could be shipped to the Waste Isolation Pilot Plant (WIPP) and as a result, the number of drums of the material would increase from a few thousand to tens of thousands. He added WIPP is on schedule to open in 1998.

Costikyan queried the subcommittee members on the possibility of the subcommittee focusing on the Rocky Flats EIS. Geddes said one thought would be the CAB taking a position on whether or not to support bringing the material to SRS for stabilization. He added there will likely be concerns over transporting the material to SRS then not processing it.

Costikyan said the transportation issue is overemphasized in the public arena although it is a real concern that must be addressed through education.

Geddes said scoping meetings for the Rocky Flats EIS will likely occur around September. There are two basic scenarios: (a) one is to send the material to SRS to stabilize in preparation for final disposition, (b) the other is to build treatment capability and possibly vaults at Rocky Flats and store the material. Geddes emphasized DOE's position is to de-inventory Rocky Flats.

Costikyan asked if the vaults were examples of "pork." Geddes said Al Alm, newly appointed Assistant Secretary for Environmental Management, has also stated the potential of vaults in his ten-year-plan to decommission Rocky Flats.

Donna Martin suggested the SRS NMM subcommittee work with the Rocky Flats Citizens Advisory Board to develop a joint recommendation. Geddes added the plutonium residue is unstable material. The surplus stable plutonium is being addressed under the Storage and Disposition of Weapons Usable Fissile Materials PEIS.

Martin stated she would pull together pertinent items from the Rocky Flats CAB for review and to elicit possible correspondence between the two CABs.

For future actions, Costikyan said the CAB NMM would (a) ask Brent Gutierrez to give a summary of the canyon seismic report at the July 23 full CAB meeting, (b) discuss the Keyserling report at the July 23 full CAB meeting and offer the DOE response prepared for the CAB, (c) invite Bill Weaver to the September CAB meeting to give an overview of the ES&H evaluation of the seismic study and (d) invite Billy Keyserling to attend the CAB public meeting in Beaufort.

Meeting handouts may be obtained by calling the SRS CAB toll free number at 1-800-249-8155.