SRS Citizen's Advisory Board

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Nuclear Materials Management Subcommittee

**Meeting Summary**
**September 25, 1995**
**Beaufort, S.C.**

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The Citizens Advisory Board (CAB) Nuclear Materials Management (NMM) Subcommittee held a two-tiered subcommittee meeting on Monday, September 25, 10 a.m. - 12 noon and 7 - 9:30 p.m. at the Holiday Inn, Beaufort, SC. Subcommittee members attending the morning meeting were Tom Costikyan, Pat Tousignant, and Alice Hollingsworth. Other attendees included Walt Joseph, CAB facilitator and two members of the public, Bob Newman, Fripp Island and Joe Weaver, Savannah, Ga. Savannah River Site resource personnel attending included John Duane and Donna Martin, Westinghouse Savannah River Company (WSRC) and deLisa Bratcher, Department of Energy-Savannah River (DOE-SR).

CAB members attending the evening subcommittee meeting were Tom Costikyan, Pat Tousignant, Alice Hollingsworth, and Thelonius Jones. Other attendees included Walt Joseph, CAB facilitator and Bob Newman, Fripp Island. Savannah River Site resource personnel attending included John Duane and Donna Martin, Westinghouse Savannah River Company (WSRC) and deLisa Bratcher, Department of Energy-Savannah River (DOE-SR). Shelly Phipps, South Carolina Department of Health and Environmental Control (SCDHEC) also attended.

**Morning meeting**

Tom Costikyan, NMM subcommittee chair, welcomed the participants and explained the NMM subcommittee was in an introduction phase to learn about how the Department of Energy will address the disposition of excess weapons-grade plutonium. Costikyan explained that a large number of nuclear weapons are being dismantled, and that DOE is developing a Plutonium Disposition Programmatic Environmental Impact Statement (PU PEIS) to address the excess plutonium. The PU PEIS will give the CAB opportunity to make recommendations, Costikyan said.

A diagram outlining the different steps to ultimate disposition was shown by Costikyan (see attached diagram). In essence, the excess plutonium comes from two sourcesÑdismantlement of nuclear weapons and material remaining when production of nuclear material stopped in 1992 and 1993. DOE's first goal is to ensure all material is stabilized and stored until the final disposition method is decided.

Costikyan said the draft PU PEIS will likely be released for public comment in January or February 1996. Until that time, the NMM subcommittee would study and discuss the primary options that are being considered by DOE.

The subcommittee then viewed a 45-minute video, "Dismantling the Bomb," shown on The Learning Channel on July 26. Costikyan felt the video was an outstanding introduction to the disposition issues and recommended that full CAB have opportunity to see the video when it is shown again on The Learning Channel on November 8 at 9 p.m. and again at midnight.

After the tape, John Duane, WSRC, discussed operations of the Pantex, the DOE facility responsible to dismantle nuclear warheads. He said the facility would have to expand its storage area to accommodate increased storage from about 8,000 to 12,000 plutonium pits.

Questions on the economics of Pantex were asked. Duane said the facility employed about 2500 people, which could easily be assimilated into the population if the site's mission was reduced.

Joe Weaver, public attendee from Savannah, GA, suggested the plutonium pits are in a suitable form for long-term storage.

In response, it was noted that the United States would set a bad example if it stored the excess plutonium intact as pits. Russia may then be inclined to keep its excess plutonium in pit form, although there is more danger for proliferation of the material because Russia lacks stringent safeguard and security measures.

Duane said the United States has assisted Russia in designing and funding a vault and storage containers for plutonium that would meet International Atomic Energy Agency (IAEA) inspections.

Discussion then turned to Russia's intention to use plutonium as an energy source by using mixed oxide fuel and then to recycle the spent fuel. The United State's policy is a once-through cycle; spent nuclear fuel is not reprocessed. Costikyan pointed out that France and Britain are also using MOX fuel, with France's goal to be an energy independent country.

Bob Newman, public attendee from Fripp Island, said the United States should follow some principal objectives: (1) avoid imbalance in trade (2) Protect national security (3) avoid environmental or greenhouse effects. Another point was made that reservoirs of energy will be reduced even more because undeveloped nationsÑChina, India, and AfricaÑare just beginning to drive automobiles.

Concerning plutonium disposition, Costikyan said four technologies are being considered by DOE (1) do nothing or long-term store the material (2) burn the plutonium, (3) vitrify the plutonium or (4) put the plutonium in deep boreholes.

Duane said SRS has put plutonium into glass for research. The Interim Management of

Nuclear Materials EIS also specifies that other radioactive elementsÑamericium and curiumÑwill be vitrified.

Methods that SRS is offering for plutonium disposition include putting the vitrified plutonium into soup-sized cans, placing the cans on a rack that would then fit into one of the Defense Waste Processing Facility cylinders. The high-level waste and molten glass can then be poured into the cylinder, around the rack holding the plutonium cans.

The site's posture, said Duane, is to offer some of the "cures" of plutonium disposal that will not present any health or environmental risks to the workers or the surrounding counties. Duane also added that the site has some plutonium facilities that have never been used but could be viable in the plutonium disposition mission.

**Evening meeting**

Tom Costikyan opened the evening meeting with a brief overview of the plutonium disposition situation. He said it would likely take the country decades to completely dispose of the material, although the largest amount of weapons usable materials is currently being stored at the Pantex facility in Amarillo, Texas in the form of plutonium pits.

Thelonius Jones asked if it was possible to use plutonium to generate power. Duane responded that the technology is known. Jones then asked if any health risks were involved. Costikyan answered saying risks are inevitable in any situation.

To summarize the task at hand, Costikyan said the subcommittee would concentrate on plutonium. He emphasized that DOE-SR is currently addressing the vulnerable plutonium through the Interim Management of Nuclear Materials EIS. Costikyan pointed out, however, that although most of the plutonium is in the stable form of a pit, the country should not turn its back and delay addressing plutonium disposition.

Costikyan said one viable option considered today is vitrifying the plutonium with high-level waste. Although the plutonium-laced glass could be stored for a long period of time, it would be virtually inaccessible to terrorists.

Public attendee Bob Newman also pointed out it would also be difficult for future generations to extract the plutonium if there was a need to use the plutonium as an energy source.

John Duane, WSRC, agreed it would be difficult to leach plutonium from glass mixed with high-level waste. Vitrifying the plutonium with glass only would be much more manageable. One scenario under consideration, Duane explained, is to vitrify only the plutonium scrap or residues but burn the weapons-grade material. The burning option being considered is combining plutonium and uranium (mixed oxide fuel) and burning it as a fuel in a reactor. Burning the fuel in one cycle will still leave plutonium, but the material would be closer to a spent fuel standard.

Duane said another option is to follow Russia's strategy by generating power and burning the plutonium to extinction.

Duane added weapon-grade material is high in plutonium-239. He said a contamination-type weapon could be made with lower grade plutonium.

Newman said before DOE takes another step, it should have a sense of direction on whether plutonium is an asset or a liability. He added the rule of the game is to defer decisions.

Pat Tousignant raised questions about a New York Times article discussing burning plutonium in an existing reactor. She also asked about an American company that has offered a proposal to DOE to burn plutonium and if was true that 80% of the plutonium still remains after it is burned.

Duane said the company was actually proposing to build a "triple play" reactorÑone that would burn plutonium, produce tritium and produce electricityÑbut with a substantial government subsidy. He added that the United States currently does not burn plutonium in commercial reactors for energy. In addition, Duane said the plutonium remaining from a burning cycle is transformed into intensely radioactive spent fuel.

Costikyan said there is a gargantuan difference of opinion on the best options for plutonium disposal. He emphasized the subcommittee must look within the bigger issues and find something it could get its hands around.

Newman said America should not want to encourage Russia to use plutonium in their reactors primarily because most of the reactors are graphite-moderated.

Duane said the most favorable scenario is to know where all of the plutonium is all of the time. Even when plutonium is processed, small amounts of residue can be left behind in pipes. The United States advocates once-through cycle that would burn only 20% of the plutonium but the remaining would become radioactive spent fuel and placed into stainless steel containers.

Tousignant said one issue the public must keep in mind is that a repository for spent nuclear fuel and high level waste is not ready. Costikyan said DOE must continue with actions regardless of the status of the national repository.

It was noted that DOE made a policy decision in the 1970s to take the nation's high-level waste and commercial spent fuel. Rate payers have contributed almost $10 billion to the Nuclear Waste Policy Act for DOE to take the waste by 1998. The geologic repository will not be ready by that date.

Costikyan asked Duane to offer suggestions on how the subcommittee could approach an issue that is global in scope. Duane recommended the subcommittee learn as much as possible about the different options and position itself to make a recommendation.

Duane said SRS will test a the "can in canister" cold chemical approach at DWPF this fall, then cut a cross section to test the effectiveness. He added SRS also has the knowledge and capability to make mixed oxide fuel.

Jones sited public concerns of SRS becoming simply a storage facility. SRS is only so big, said Jones. If DOE brings in more waste, cleanup becomes more complicated.

Newman said there is no reason the government shouldn't go in the MOX fuel direction, although President Carter basically stopped that idea for eternity unless the country decides it needs nuclear power. But more importantly, he added, the plutonium need to be rendered safe for the next 25,000 years.

Newman also recommended that SRS refrain from research until DOE decides the option it plans to pursue. He said industry would never spend $2 million dollars for research and then decide on a completely different route.

In response to a question on nuclear power in the United States, Duane said the country was very much in the uranium business in the 1970s and supportive of nuclear power. But the nuclear industry took a downturn and it has been almost 15 years since a new reactor has been constructed. In addition, some reactors were built but never operated.

Jones then questioned the preferred options and arguments by scientists. Newman responded and said scientist often will use information to fit a theory. He emphasized that the United States reactors are much safer than the Chernobyl-type reactor.

Costikyan said there is also a line of thought that some scientists and engineers want to begin reprocessing at all costs. He said the subcommittee should steer away from political diversions.

Duane gave an example of how political influence can affect public opinion. He said two nuclear submarine officers from Charleston went public at a DOE hearing and said they did not understand the mayor of Mount Pleasant, South Carolina's position against bringing the foreign research reactor spent nuclear fuel back to the United States via the Charleston port when the harbor was filled with nuclear submarines.

Tousignant focused attention on the repository stating she heard only the facility could handle only 10% of DOE's spent nuclear fuel. She also brought up that a paper by two Los Alamos scientists, and checked for authenticity by SRS scientists, proved there was chance for criticality occurring within the repository. Duane said Los Alamos did not retract the paper but has offered other opinions on the hypothesis.

Jones questioned Duane about the downsizing of federal facilities and roles each facility could play in plutonium disposition. Duane explained Hanford is basically in a cleanup mode, while Rocky Flats will close for good following a court order. Pantex is at a disadvantage in that it sits on top of an aquifer that supports one-third of the nation. Idaho National Engineering

Laboratory and Oak Ridge primarily handle uranium and Lawrence Livermore Laboratory conducts research.

Duane concluded that the only two facilities currently capable of playing a big role in plutonium disposition is SRS as a production site and Los Alamos as a research laboratory. He added there is a different mindset between production and research and development.

DOE will likely look to SRS when large quantities of plutonium are in question, Duane said. SRS has one of the best glass chemists in the world with over 18 years of experience, and the site also knows how to store and handle nuclear materials because it has been doing it for 40 years.

Costikyan also brought up a hydride/hydrox method discussed at a September 7 meeting that could be used at SRS to change the form of plutonium pits if DOE decides against long-term storage of the pits.

Duane explained that during the Cold War, a pit generally stayed in the field for 12 to 15 years, then it would be inspected or refabricated. Some of the pits have now been in the field for over 30 years, without inspection or upgrade. Lawrence Livermore Laboratory has said, however it is likely the pits could stay in the field for up to 100 years.

There has been discussion within DOE of designing a pit fabrication facility at SRS, Duane said. One advantage is tapping into experienced staff that have actually handled the material. He did add many SRS employees experienced in plutonium handling have retired or left the site. Duane said four individuals on his staff, each having over 30 years experience, retired during the last downsizing at SRS.

Concerning vitrification efforts, Duane said the public should not overlook the fact the DWPF's first mission is to handle over 40 years of high-level waste. DWPF was not designed to vitrify plutonium. Vitrification is, however, the only waste form certified for the geologic repository.

Tousignant asked if France is storing glass logs. Duane said no country has yet decided on the best way to dispose plutonium. If plutonium is used as fuel, one problem is all processing plants in the United States are closed.

SRS canyons are not currently operating, but could be restarted. Of SRS's two canyons, almost everything has been replaced, including the floors, said Duane. The east rail of the hot canyon is the only piece of equipment SRS does not currently know how to replace. As far as operating life for the canyons, Duane said an external report stated that the reinforced concrete would fail in 80 or 90 years.

After the primary discussion, Costikyan questioned how much "technical exposure" should the subcommittee receive. One possibility, he said, would be to concentrate on the health and

environmental risks of each option.

Duane emphasized no recommendation will happen overnight. For example, DOE decides to make MOX fuel, it would take about five years to prepare SRS for the task. It would be important for the subcommittee to measure the risks and costs of the options, then determine trade offs if SRS is considered to assist DOE in plutonium disposition.

Duane also said DOE is trying to set an example for the rest of the world to follow to secure the material. He suggested it may even be necessary for the U.S. to provide funding to the Russians to safely store the material or to buy the material and can store the material to protect it from proliferation threats.

A question of the stability of the Russian states was asked by Jones. Duane answered that the U.S. did buy uranium from the Republic of Kazahkstan, and it may have to follow similar routes to ensure the nuclear materials are safeguarded at within other Russian states.

Putting mixed oxide fuel in light water reactors is an option. The remaining spent fuel is radioactive. A drawback is that wastes are generated when fuel is burned.

Costikyan stated there is no way everyone will be pleased with the final disposition selection. But it is hopeful that DOE will not forgo a decision and "do nothing." It is important, he said, that the public understands the risks if nothing is done to alleviate the plutonium disposition issue.

In final discussion, Tousignant asked if the plutonium situation would become better or worse if DOE was incorporated into the Department of Defense (DOD).

Duane responded that DOD has had an extremely difficult time with its own environmental restoration and waste management issues and on many occasions, DOE has loaned technical staff to DOD.

**Path Forward**

At this point the subcommittee discussed hiring an independent advisor to assist in identifying risks of identified disposal options. It was recommended that the SRS liaison gather names and resumes of individuals who may be suitable for the task. The National Academy of Sciences was considered a good starting point.

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