



SRS Citizens Advisory Board

Environmental Remediation &
Waste Management Subcommittee

Meeting Record

April 24, 1996

North Augusta, S.C.

The ER&WM subcommittee of the SRS CAB met at 6:00 PM on Wednesday, April 24, 1996 at the North Augusta Community Center, North Augusta, South Carolina.

Bill Lawless, ER&WM subcommittee co-chair, was present. Other CAB members were Tom Costikyan. Attending for SCDHEC was Craig Marriner. DOE-SR representatives included Jay Bilyeu and de'Lisa Bratcher, who attended as the Associate Deputy Designated Federal Official (ADDFO). Marilyn Garcia attended for WSRC. Other attendees included Don Orth, Lee Poe, Dr. Bill Sutcliffe, Carl Johnson, Mel Buckner and Rick Geddes. Dr. Tom Pigford of Oakland, California joined the meeting at 7:00 PM (EST) via a pre-arranged long distance conference call.

Bill Lawless opened the meeting and welcomed everyone. Lawless told the group that Tom Pigford would be joining the meeting at 7:00 PM (EST) via a conference call that was arranged through prior agreement between Lawless and Pigford. Lawless then recapped the earlier conversation the two had had. Lawless said that Pigford had requested a copy of an August 1995 report, "Chemical Stabilization of Defense Related and Commercial Spent Fuel at the Savannah River Site," and requested contact information, such as phone numbers and addresses, for Don Orth, Bill Sutcliffe and Rick Geddes for potential follow-up conversations after Pigford reads the requested report. Geddes offered to send the referenced report and the names and addresses of the people who attended the current subcommittee meeting to Pigford. Attendees had no objection to the release of their phone numbers and addresses to Pigford.

Rick Geddes offered some general remarks about the report Pigford requested. In August, 1995 Congressman Norwood requested a report to compare the cost and waste volumes of processing various categories of fuels, specific to SRS fuel processing capabilities. The report finds that processing of commercial and other fuels at SRS is technically achievable, processing reduces the high level waste volume and use of existing facilities for spent fuel treatment is very cost effective. Pigford had done estimates with findings an order of magnitude greater than the referenced SRS report. Geddes stated that he was interested in determining the sources of the discrepancies between the SRS and Pigford estimates. A discussion ensued among those present concerning the different points that could impact report results, etc., with agreement that different data and/or assumptions can certainly produce different results.

After these opening reviews, meeting topics followed the agenda. (Attachment)

The Spent Fuel Standard (SFS) was discussed.

Bill Lawless opened the discussion with the question of whether the SFS is safe. Lawless cited a National Academy of Sciences report that suggests we must be concerned for one million years about spent fuel containing Pu. Criticality issues, biological vs. criticality dangers, the extent to which criticality calculations were performed, conclusions reached from calculations and whether criticality is or is not a valid issue were discussed by Lawless, Sutcliffe and Poe. General consensus was that there are many questions about Pu going into a repository that are not resolved and that continued exploration of the issues is worthwhile.

Bill Sutcliffe stated that the SFS, as defined by the National Academy of Sciences, is a security standard, not a safety standard. His comments stressed that the SFS is misused if it is tied to safety rather than security. The SFS is intended as a measure of security from the threat of theft and is not intended as an objective standard for health and safety. According to the Academy, the danger is that the Pu can be recovered and used for weapons, so it must be kept in a secure form. If Pu is put into a repository, it has to be put there for a long time because it can be mined out and used for weapons. The danger is not due to safety or ecological issues. Sutcliffe suggested that the SFS is based on the rationale that since there is already a lot of spent fuel with Pu around the world, the United States should not go to heroic measures to make its surplus weapons Pu more secure from theft from terrorists. The SFS as a standard, as opposed to heroic measures, is thus used when making up a form to store Pu so that its radioactive barrier is about the same as average light water spent fuel.

A discussion began on the pros and cons of reprocessing and the additional amount of Pu that is generated. Non-fertile fuels (fuels without uranium so burning does not create more Pu), which would not generate more Pu in the reprocessing process, were advocated by Lawless. Poe and Sutcliffe held the position that minor amounts of Pu are generated in reprocessing, compared to what already exists in the world, and heroic measures to prevent the production of very small additional amounts of Pu are costly and not necessary, especially when the rest of the world will most likely not follow suit.

Tom Pigford joined the meeting via conference call, introductions were made and Lawless briefed Pigford on the discussions that had transpired. A general question and answer session, directed largely toward Pigford and roughly summarized below, then followed.

Q. What is the best solution to Pu disposition -- put it in a repository, burn it in a reactor or immobilize it by processing the waste into glass logs? (Lawless)

A. Pu is not released into the environment. Human intrusion is the problem and the real hazard. The potential for explosion is there in principle, but there are no definitive calculations for getting to this principle. I don't know the answers. (Pigford)

Q. Does this mean we don't know enough to put something in a repository? What's the harm in putting something in with 100 year segments? Isn't Pu safer in a repository than how it is now on the surface, especially if civilization collapses? (Geddes/Lawless/Poe)

A. We don't know enough to make a thorough safety analysis of a repository. Do we learn during these 100 years? If we learn, we learn short-term mistakes, not the long-term effects of putting it in. We have to do something to put it in a better form to get it in a repository. Is it safer to compact the form and store above-ground for 100 years or put it in a repository? I don't know the answer. (Pigford)

Q. Is it better to recover energy and burn it? What about the non-fertile fuel case, would it be burned at a much higher rate? (Lawless)

A. Pu is burned, but very little in a reactor. It would emerge in spent fuel with a lot of radioactivity. Modified HTGR proposal would consume more Pu, yes, and is worthwhile to evaluate. But you still have a lot of Pu left. There are safety concerns with this, too. Reprocessing is not evaluated a lot. The Spence report evaluates proposals to transmute Pu by reprocessing and multiple recycling. You can do it, but it takes many years to get much reduction and is very expensive. The Holdren report states that the urgency around Pu was great enough that multiple recycling with reprocessing was not the best option. There is so much of it, it is better to get Pu into a protected form, then look at doing a better job to include multiple recycling and burn up. (Pigford)

Q. Should we ignore the difference in Pu isotopes and their danger in making weapons? What is the order of magnitude of poor Pu to good Pu? (Orth/Poe)

A. Pu isotopes are certainly not equal. Reactor Pu is not a weapons material, however, the Holdren report concludes it is a weapons material but is not that desirable. Poor Pu to good Pu is classified information and depends on design and threat. Terrorist vs. national interest makes a difference. (Pigford/Sutcliffe)

Q. Transmuting Pu resulted in material with no Pu39 left in it and so on. I doubt the statement that "if we don't burn out all the Pu, then it is unsafe." (Orth)

A. Yes, I remember those experiments, so it can be done. (Pigford)

General discussion began among the attendees. Buckner stated that there are two Pu disposition options chosen by the NAS. (1) Pu to spent fuel or (2) Pu to equivalent to spent fuel. The thrust of the NAS is to do something soon and not continue to debate.

Orth stated that there is danger as long as there is Pu material in Russia that is not secure. One reason for urgency is we need to take advantage now of the possibility of working together with Russia. Poe questioned what the chances of reaching global agreement are and what the possibility is of affecting the amount of Pu that is available in the world. Pigford stated that, globally, much accomplishment is not likely.

Buckner commented that our reluctance to reprocess has not seemed to affect the rest of the world. He said we should try to get the Russians to agree to a program to better protect the Pu they have; they need increased security in all facilities, not necessarily just military facilities. If we agree to a disposition program, MOX perhaps, Pu would be less usable for weapons. Buckner stated he did not know how to leverage the United States' Pu disposition program to do this. He stated that good things are being done but the U.S. is not using the disposition program that way.

Lawless directed a few specific questions to individual meeting attendees.

Q. To Sutcliffe: Recycle, reprocess or not?

A. There is no economic incentive to do it. The waste minimization incentive is not there. Storing it on the surface or near the surface or at the Nevada Test Site is good.

Pigford commented that a repository is used as a time saver. Nations loaf along on old agreements that don't require capital money. People who are reprocessing are going on a slower pace for the repository because they want to sit back, store and see how the air clears on geological issues. The United Kingdom and France are doing this.

Q. To Pigford: What do you recommend for us?

A. Find out the answers that are available. Find out the hazards of geologic disposal. Have safety analyses done. Some groundwater studies have been done. Some criticality analyses have been done, but not enough to answer questions. The Russians may be willing to go into MOX fueling, which should be better than storage for them. Reprocessing cannot be justified in my opinion. Why focus on Pu? Uranium may be the more complicated issue. Uranium, in terms of future contamination of groundwater in geologic disposal, is a much greater hazard.

Q. To Orth: What do we do?

A. I've been a "burn it" man for 40 years. I believe in reprocessing.

An active and lengthy discussion followed concerning reprocessing, transportation, the economic feasibility of refurbishing SRS canyons or building a new reprocessing plant in the U.S., cost breakdowns of reprocessing estimates and report references. The participants agreed to look at costing in terms of others' views and to obtain and distribute certain reports, such as the one requested earlier by Pigford, "Chemical Stabilization of Defense Related and Commercial Spent Fuel at the Savannah River Site."

Directed questions began again.

Q. Do we produce in the recycle process worse "actors" that will complicate future disposal?
(Poe)

A. Yes, more Neptunium 37. For Yucca Mountain, this is the worst case of all for groundwater. I'm not sure I agree with the findings, but that is what the study cites. (Pigford)

Lawless addressed specific questions to meeting attendees.

Q. To Buckner: What should we do? Is it a good idea to use Pu in MOX fuel? If it is, should we keep it as spent fuel? (Lawless) A. It's a good idea to use Pu in MOX fuel and the spent fuel form is desirable. (Buckner)

A. Yucca Mountain is an oxidizing environment and in that environment the container package is also oxidizing. This oxidation makes spent fuel an undesirable waste form because the waste form is subject to dissolution and is easy to get into the groundwater. Vitrification could give a better waste form than using Pu as a fuel in MOX fuel and then burying that spent fuel in Yucca Mountain. (Pigford)

Q. To Sutcliffe: On non-fertile fuel, Bill what do you think?

A. Non-fertile fuel is only in the long-term future, because it would take a lot of money and time to get there. Politics has to be considered. Does it make sense for us to develop this if the rest of the world will not accept it?

Q. To Costikyan: Tom, what do you think?

A. The CAB must stay with basic questions and not what's been on the table tonight. General discussion followed. Discussed was the lack of economic analyses for recycling fuel and the dollars invested in the Pu that we now have and are considering discarding; the importance of the best course of action vs. the investment amount; cost vs. national commitment; and reports that may contain material on these subjects such as the John Holdren report, the 1994 NAS report and the Academy's Separations and Transmutation of Actinides report, known as the STATS report.

A general discussion of estimated costs and attitudes of the United States, different European countries and Japan took place. Generally, the economics look bad according to Pigford.

Buckner asked about the capacity in Yucca Mountain for spent fuel and whether a second repository is needed. Pigford said the agreement with the state of Nevada is for 70,000 tons of spent fuel, however, Yucca Mountain could hold four times more in space capacity. The limitation is purely political.

Lawless asked if there were any other closing comments.

Geddes stated that DOE is simplifying the Pu issues at the level that they should be. There is so much technical information available and it is just too much. The first step is to make weapons grade material less accessible. This country cannot build a new facility to economically compete with an existing facility, such as at SRS, to provide the treatment necessary to achieve any of the proposed disposition forms. Pigford agreed.

Lawless offered to have the written comments on the meeting and the CAB Pu motion sent to Pigford for his review and comments. This was agreed to. Pigford stated that we are asking the right questions. Lawless thanked everyone and closed the meeting.

Attachments:

- Agenda, Citizens Advisory Board, Environmental Remediation & Waste Management Subcommittee, April 24, 1996, North Augusta Community Center, North Augusta, S.C.
- Discussion points: April 24, 1996
- Plutonium Disposition EIS. General Comments by W.F. Lawless, April 24, 1996.

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