

ORIGINAL

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

JOINT MEETING

OF THE

SUBCOMMITTEES ON WASTE MANAGEMENT AND FUEL CYCLE.

Nuclear Regulatory Commission,  
Room 1046  
1717 H Street, N.W.,  
Washington, D. C.

Thursday, June 26, 1980

The meeting of the Subcommittees on Waste Management and Fuel Cycle of the Advisory Committee on Reactor Safeguards was convened, pursuant to notice, at 1:03 p.m.

PRESENT:

STEPHEN LAWROSKI, SUBCOMMITTEE CHAIRMAN.  
DADE MOELLER  
WILLIAM KERR

ALSO PRESENT FROM THE NRC STAFF:

Peter S. Tam  
Frank Arsenault  
J. J. Davis  
Lawrence Doyle  
E. E. Held  
S. A. Bellmund  
K. S. Kim  
John Martin  
M. Bell  
Mike Cullingford  
Karen Benson

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ALSO PRESENT FROM THE NRC STAFF: (continued)

- M. Kearney
- E. Regnier
- R. Boyle
- D. Kathbun
- Lawrence White
- Malcolm [Knapp]

ALSO PRESENT:

- Carl Newton, Department of Energy
- Stewart A. Sterling, General Atomic Company

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P R O C E E D I N G S

1  
2 MR. LAWROSKI: The meeting will now come to order.

3 This is an open meeting of the Advisory Committee on  
4 Reactor Safeguards Subcommittees on Waste Management and Fuel  
5 Cycle.

6 I'm Stephen Lawroski, Subcommittee Chairman for  
7 Waste Management and also the Subcommittee Chairman for the  
8 Fuel Cycle Subcommittees.

9 The other ACRS Members present today are -- and at the  
10 moment there is only one, Dr. William Kerr. However, I suspect  
11 that Dr. Dade Moeller will soon be joining us. I know he is here  
12 because he was at a meeting at which I was present this morning.

13 The purpose of this meeting is to discuss the NRC  
14 Waste Management and Fuel Cycle Programs, and acquire information  
15 for the Committee's report to the Congress and the Commission.

16 This meeting is being conducted in accordance with the  
17 provisions of the Federal Advisory Committee Act and the  
18 Government in the Sunshine Act.

19 Mr. Peter Tam is the Designated Federal Employee for  
20 this meeting.

21 The rules for participation in today's meeting have  
22 been announced as part of the notice of this meeting previously  
23 published in the "Federal Register" on July 11, 1980.

24 A transcript of the meeting is being kept and it is  
25 requested that each speaker first identify himself or herself

1 and speak with sufficient clarity and volume so that he or she can  
2 be readily heard.

3 We have received no written statements or requests for  
4 time to make oral statements from any member of the public.

5 A tentative schedule for this meeting was prepared  
6 earlier. No comments were received and the schedule has thus  
7 become final. Copies of the schedule can be found near the  
8 doorways.

9 I should like to remind the Subcommittees' members that  
10 the purpose of this meeting is to acquire information on the  
11 NRC Waste Management and Fuel Cycle research programs for the  
12 ACRS report. Although actual writing of chapters of the report  
13 may not take place during today's meeting, I urge that members  
14 bear in mind the purpose of this meeting.

15 Do you have any questions at this time, Bill?

16 MR. KERR: I have none, sir.

17 MR. LAWROSKI: Let me say that today's part of this  
18 meeting will deal with waste management. However, I will allow  
19 Mr. Arsenault a few minutes today to discuss how they are  
20 organized and, in preparation for tomorrow's session which will  
21 be on fuel cycle, how many pieces of the document prepared by RES  
22 we will have to be looking at.

23 I see Dr. Moeller now has arrived.

24 Dade, we just got through reading the preamble to the  
25 meeting.

1           This meeting was announced to be open and therefore the  
2 first part of it will be open, during which I would like Mr.  
3 Arsenault to tell us what things he can in an open session.  
4 I would like later to close the meeting so that we may be able to  
5 get into the detailed programs, which I understand involves numbers  
6 that require the meeting to be closed.

7           Frank, before you begin your presentation let me say this.

8           I will try to have the schedule proceed so that we  
9 will be able to adjourn today's discussion on waste management at  
10 5:45 p.m. If there is anything left over to be dealt with on  
11 waste management, in the latter part of tomorrow's morning I would  
12 like to take up that, hopefully after having gotten through the  
13 fuel cycle part. I do want to be sure that we allow enough time  
14 for the waste management research program because that is the one  
15 that involves the larger amount of moneys. Therefore it should  
16 also have a major priority in our considerations for the report to  
17 the Commission as well as the report to the Congress.

18           Frank, go ahead.

19           PRESENTATION ON THE WASTE MANAGEMENT RESEARCH PROGRAM

20                   BY FRANK ARSENAULT, NRC STAFF.

21           MR. ARSENAULT: Thank you, Mr. Chairman.

22           My introductory remarks, in toto, should not take more  
23 than about one-half hour. Then we can get into the detailed  
24 discussion.

25           Before getting into the waste management presentation,



1 in connection with the Chairman's comments about the way in which  
2 the documentation has been made available to you and relates our  
3 program to your interests, let me direct your attention to the  
4 blackboard.

5 On the left-hand side, there are three lines which  
6 correspond to three decision units that are relevant to the  
7 SAFER Division.

8 The first one is entitled Siting and Environmental Research  
9 This includes the work in Dr. Harbour's branch. He was part of the  
10 Reactor Safety Research Division. It also includes the environmental  
11 research being done by Frank [Swannberg] in SAFER. That is one  
12 decision unit.

13 The second line, Safeguards and Fuel Cycle Safety, is  
14 a second decision unit and includes the work of the Safeguards  
15 Branch and of the Systems Performance Branch within the SAFER  
16 Division.

17 The third line is Waste Management and that is the third  
18 decision unit that relates to the work of the SAFER Division.

19 Let me start from the bottom.

20 Waste management is pretty clean. There is a one to one  
21 correspondence between our decision unit and the interests of this  
22 Subcommittee, fortunately.

23 There is a one to one correspondence between half of the  
24 second decision unit and the Safeguards Subcommittee. However,  
25 the environmental portion of the first division unit and the

1 Fuel Cycle Safety Work portion of the second decision unit together  
2 cover the interests of two Subcommittees -- Reactor Radiation  
3 Effects and Fuel Cycle.

4           When we briefed the Reactor Radiation Effects Subcommittee  
5 some time ago, we extracted from those two portions of the two  
6 decision units that material which was relevant to their interests.  
7 We intent tomorrow, when we address the Fuel Cycle Subcommittee,  
8 to do the same, to extract from those two portions the material  
9 that would be of interest to that Subcommittee.

10           I should point out that we are prepared tomorrow to  
11 address any aspects of those two portions of the two decision  
12 units so that if anyone wants to raise questions concerning  
13 reactor radiological effects, we would be happy to accommodate.

14           Now, preparatory to these meetings we provided the  
15 Committee staff with some spread sheets that describe the three  
16 decision units in some detail. There are three sheets, each of  
17 which corresponds to a single decision unit. Those sheets  
18 provide budget data only as subtotals of various program elements  
19 and they are suitable for discussion in an open meeting.

20           In addition, we have provided the Committee with  
21 additional funding details that are not suitable for discussion  
22 in an open Committee meeting. The reason for these introductory  
23 remarks is to call to the attention of the Subcommittee meeting  
24 the fact that they will have to have as many of these documents  
25 as relate to their interests. I know that some of you serve

1 on more than one Subcommittee, so you may want to get all three.

2 MR. LAWROSKI: Certainly for today I want to make sure  
3 that the Subcommittee members have something that looks like  
4 this (indicating), the top lines reading: "High Level Waste  
5 Management," "Low Level Waste" and "Uranium." There are numbers  
6 there, detailed numbers behind them.

7 MR. ARSENAULT: With that attempt to get ourselves  
8 once again aligned between the program structure, which seems to  
9 change every year, and the Subcommittee structure, I will now  
10 begin our presentation of the Waste Management Research Program.

11 I will describe only the structure of the program and  
12 the rationale behind it. I will not get into technical detail.

13 We do not plan technical discussions since you have in the  
14 papers in front of you a considerable amount of detail on the  
15 program.

16 The principal Waste Management research staff is here  
17 to answer any technical questions, and there are a number of people  
18 present from the Division of Waste Management and the Office of  
19 Nuclear Material Safety and Safeguards who also will be glad to  
20 respond to questions.

21 MR. LAWROSKI: May I interrupt you to allow persons  
22 here to identify themselves, that is, those from RES and outside  
23 agencies.

24 MR. MARTIN: I am John Martin, the Director of the  
25 Division of Waste Management.



1           This is Dr. Michael Bell, who is Chief of the High  
2 Level Waste Branch.

3           Larry White is the section leader of the High Level  
4 Waste Branch Siting.

5           Over there is Dr. Malcolm [Knapp], who is the section  
6 leader for Performance Assessment in High Level Waste.

7           Mike Kearney is with our Licensing and Integration  
8 Branch.

9           MR. LAWROSKI: What about the other persons in the  
10 back of the room?

11           MR. CULLINGFORD: I am Dr. Michael Cullingford of the  
12 Waste Management staff, and this is Karen Benson, an intern  
13 in Waste Management.

14           MR. LAWROSKI: Who is the gentlemen in the next row back?

15           MR. STERLING: I am Stu Sterling of the General Atomic  
16 Company.

17           MR. LAWROSKI: Let's go to the side of the room and  
18 we'll start from the back row.

19           MR. NEWTON: I am Carl Newton from the Department of  
20 Energy.

21           MR. DOYLE: I am F. L. Doyle, in Waste Management  
22 Research.

23           MR. HELD: I am Ed Held, Waste Management Research.

24           MS. BELLMUND: I am Sarah Bellmund and I am in  
25 Waste Management Research.

1 MR. LAWROSKI: Please talk up because the Reporter  
2 is trying to hear you.

3 MR. KIM: I am K. S. Kim, in Waste Management Research.

4 MR. DAVIS: I am Jerry Davis, in Research for  
5 Environmental and Waste Management.

6 MR. LAWROSKI: Thank you all. Now we know who is who.  
7 I hope we can remember.

8 MR. ARSENAULT: These are the budget overviews for the  
9 Waste Management Program as proposed for Fiscal Year 1982.

10 The program was developed in each of these areas  
11 after considerable interaction between the Research staff and the  
12 Waste Management Staff. I think this is evident from the fact  
13 that after having constructed the program, it was then subjected  
14 to an endorsement review process at the request of the Budget  
15 Review Group, and of the program that was developed, the User  
16 Office endorsed \$16.6 million of the \$19.3 million proposed by  
17 Research.

18 I would point out that as a result of the endorsement  
19 exchanges we have identified a significant amount of the residual  
20 that does not need to be pursued. But there is some of the work  
21 proposed in the \$19.3 million which is not endorsed by the  
22 User Office which the Office of Research intends to pursue at  
23 its own initiative, pursuant to the new procedures for that type  
24 of work. It amounts only to \$400,000 of that, I believe.

25 In the area of low level waste, the actual original

1 program was at the level of \$7.3 million, and the Research  
2 Office Director, Dr. Budnitz, reduced our office request for  
3 research in this area to \$5.5 million. It is my understanding  
4 that the Division of Waste Management Staff felt that this was a  
5 constraint imposed on the research in response to their require-  
6 ments, but one that they could live with. I understand that the  
7 program has been coordinated and endorsed.

8           In the area of uranium recovery, which covers millings  
9 of uranium ore and mill tailings management, the original staff  
10 request for work here was at the \$5 million level. The Research  
11 Office Director reduced the office request for funds to \$3 million,  
12 and all of the work proposed at that level has been reviewed,  
13 agreed to, and endorsed by the User Office, in addition to which  
14 they feel that it represents an uncomfortable and unwelcome  
15 constraint on the Research Office's ability to respond to their  
16 requirements. They feel that there is a legitimate need for  
17 additional work in this area, and they may wish to address this  
18 point during today's discussion.

19           The comments I already have made should indicate that  
20 as distinct from a few years ago, when the Committee found it  
21 necessary to point to the lack of coordination between the  
22 research program and the Office of Nuclear Material Safety  
23 and Safeguards, this year's program represents the results of  
24 extremely close and cooperative work by the staffs of the  
25 two offices. It has been a beneficial arrangement to both

1 offices, I think, and we have certainly enjoyed the difference  
2 in environment and atmosphere over the past year.

3 MR. LAWROSKI: May I ask why the \$2.0 million within the  
4 parentheses was not in the original request, since that presumably  
5 was something developed between the User and the RES?

6 MR. ARSENAULT: Yes.

7 MR. LAWROSKI: It seems like a later addition. It  
8 seems like it was an afterthought so far as the table is concerned.

9 MR. ARSENAULT: I had better go back and clarify my  
10 remarks. Perhaps it would be best to follow the chronology of  
11 the development of the program.

12 MR. LAWROSKI: Fine, but provided it does not take  
13 very long.

14 MR. ARSENAULT: It will take just a moment or two and  
15 it is worth it.

16 When the Research Office requested budget proposals  
17 from the staff, the RES staff, the Waste Management Research  
18 staff put together a program and associated budget proposals  
19 that they felt reflected the results of their coordination  
20 discussions with the NMSS staff during the past year.

21 That program went to the Office Director of RES  
22 without detailed review and scrutiny by the Waste Management staff,  
23 which was a result of this general coordination.

24 When it reached the Office Director, Dr. Budnitz,  
25 together with all of the other budget proposals within the Office

1 of Research, the total sum proposed by the staff of the Office of  
2 Research for the 1982 budget was staggering.

3 Dr. Budnitz felt that he had to limit this budget in  
4 some way that represented his own perception of the degree of need  
5 in the various areas. So, what you see in this "requested" column  
6 represents the reduced levels after he had applied this judgment  
7 to the original proposal.

8 That requested program was then subjected to detail  
9 review, scrutiny, and endorsement by the User Office. What they  
10 have endorsed, then, is almost all of the high level proposals,  
11 all of the low level proposal, and they felt that the uranium  
12 recovery proposal in fact represented a constraint that they  
13 felt would present them with difficulties.

14 That is how this program has been developed.

15 MR. LAWROSKI: Is it all right with you if I ask  
16 Jack to add anything at any time, if he wishes?

17 MR. ARSENAULT. Of course.

18 MR. MARTIN: I think that is a fair representation.

19 MR. LAWROSKI: I hope that is all right with you, Frank.

20 MR. ARSENAULT. At the end of this discussion, in fact,  
21 I would have called upon Jack to add anything he wished. I am  
22 happy to entertain interruptions at any time.

23 This, then, represents the overview. I would point out  
24 that as we get into the program, you will find a strong linkage  
25 between the research proposed and the development of the regulatory



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program.

Indeed, our efforts have been concentrated on developing a program responsive to the current regulatory developments.

This suggests, then, that we have not done a great deal of independent thinking within RES to determine whether or not research, beyond that implied by the regulatory program, should be pursued. This, of course, is a function that the Office of Research has and is explicitly reflected in the opportunity of the office to propose work on its own initiative.

We have not done that. You will see little of that in this program.

The High Level Waste Research Program is presented in the documents in front of you, in a structure that corresponds to the current approach of the regulatory program, which anticipates that there will be independent performance criteria for the waste form and container, for the engineered repository, and for the geologic media. There is, in addition to the need for research, to support performance prevention for each of these there are interrelationships between these that also require some attention. For example, the site characteristics or site criteria will have to reflect not only the performance of the site in retarding radionuclide migration; it will also have to take into account those characteristics of the site that would have an effect on the repository design and construction activities.

The two items labeled "siting" reflect the fact that

1 there are two aspects to siting. One relates to the physical  
2 characteristics of the site that affect its performance and its  
3 appropriateness for a repository structure; but also there is the  
4 question of siting from the point of view of the environmental  
5 impacts -- the question of population, probabilities of human  
6 intrusion downstream, and so forth.

7 So, there is a performance as well as an environmental  
8 aspect to the siting.

9 The current emphasis is on the geologic performance of the  
10 site.

11 You will also note that this year the development of  
12 risk methodologies appropriate to waste management have been  
13 incorporated within this decision unit. In previous years they  
14 have been in a general risk assessment decision unit. So these  
15 are now here.

16 Mike Cullingford would be prepared to talk to those.

17 In the low level area, this to a degree reflects the  
18 developing tendency within the Waste Management Regulatory Program  
19 toward an approach parallel to that of high level waste -- that is,  
20 to look at the waste form and containers, and then the site and  
21 its characteristics, and then, finally, at the repository.  
22 This reflects a growing inclination to think in terms of engineered  
23 solutions to some of the problems that we have at low level  
24 waste repositories.

25 MR. MOELLER: Frank, on this, and perhaps Jack would

1 want to comment, there were two items that were raised in the  
2 general ACRS discussions of the research budget. One was that  
3 Dr. Budnitz -- and I hope I am not misquoting, but my impression  
4 was at the last monthly meeting that if you were tight and had  
5 cuts, the research in the low level waste area would be one of those  
6 which he would eliminate; in other words, that was a low priority  
7 item. Along those same lines, or relating to this, several of  
8 the members of the Committee have asked are the problems in this  
9 area truly research problems or are they more political or the  
10 lack of application of what we know.

11           Could you comment on each of those.

12           MR. ARSENAULT: I would like to respond to that and then  
13 would ask Jack also to say anything he wishes.

14           First, I would like more fully to characterize the  
15 situation that you referred to.

16           The Office of Research has been asked to propose a  
17 program at two budget levels, in effect. One is at an established  
18 funding level of \$217 million, and the other was at that level  
19 which the office considered to be appropriate for a program  
20 responsive to the needs of the agency.

21           The difference between these levels was on the order  
22 of \$60 million. I do not have the exact figures. I think one  
23 number was \$217 million and the other was \$283 million or \$285  
24 million. There was a big difference, at any rate.

25           The decision made by Dr. Budnitz was that although we

1 feel that a program at the level proposed for the low level waste,  
2 \$5.5 million, is indeed justified to do the research required in  
3 this area, if he were forced to reduce the overall office budget,  
4 in establishing his priorities he would feel that the contribution  
5 to societal risk arising from the low level waste sites is small  
6 enough compared to other sources of risk within the nuclear  
7 industry, so that he would prefer to close out the low level  
8 waste research program than to discontinue other programs to a  
9 similar extent. That was his decision.

10 I should point out that he also has done a structured  
11 or prioritized reduction of program from the \$283 million down  
12 to the \$217 million, and the low level waste program is, by no  
13 means, one of the earlier ones affected. It came midway or  
14 below midway on his priority list.

15 Now, with regard to whether or not the problems at  
16 low level waste sites are researchable, I think by no means are  
17 all the problems researchable or susceptible to solution by  
18 research. Indeed, I think none of them are susceptible to  
19 solution by research alone.

20 There are a number of unanswered questions. There are  
21 a number of gaps in our understanding of the phenomena taking  
22 place. And, there are gaps in the data available to us for the  
23 purpose of devising criteria and standards that would apply  
24 to remedial action at existing sites or to the criteria for the  
25 selection and construction of new sites.

1           Those are the questions to which our research is  
2 being directed. They will be merely the tools used by the  
3 regulatory staff to formulate those criteria standards and make  
4 those decisions.

5           That is my response to your issues. I would welcome  
6 any additional comments.

7           MR. LAWROSKI: How about the so-called licensing needs,  
8 as opposed to the regulatory needs? Can you make a distinction?

9           I think sometimes you folks do, too, in NRC. There are  
10 certain research needs in connection with regulation, but there  
11 are others in connection with the licensing itself.

12           MR. ARSENAULT: The distinction I make between those  
13 really is one of the requirement to establish for potential  
14 applicants criteria to which they must respond versus the ability  
15 to evaluate proposals to determine whether they meet criteria.

16           The same fundamental understanding of relevant  
17 phenomena are relevant to both.

18           Generic data are relevant to regulatory standard setting,  
19 while site specific data, not normally the subject of our research  
20 program, is relevant to licensing.

21           Have I responded to your question?

22           MR. LAWROSKI: Yes. I just wanted to make sure that it  
23 was clear.

24           MR. KERR: Couldn't there also be some consideration  
25 to regulation that would involve measuring systems with devices?



1           In the licensing process, you would have to recognize  
2 the principle that such a system existed, but perhaps be  
3 less concerned with details.

4           MR. LAWROSKI: Yes. That is another aspect.

5           MR. KERR: Even though the information in some sense  
6 is generic.

7           MR. MARTIN: I would like to comment at this point that  
8 NMSS does not agree with Dr. Budnitz's analysis of priorities.  
9 We very strongly feel that if cuts have to be taken, they should  
10 not be in low level waste or mill tailings. While, on the one  
11 hand, I spent most of yesterday afternoon following with the  
12 Budget Review Group to maintain the high level program, if cuts  
13 have to be taken, it is our position they will just have to  
14 come out of that. We just have too much to do and both low  
15 level and mill tailings are very real problems that are with  
16 us today that need solutions.

17           I might comment on the second half of the question.

18           It is my own perception that the political problem  
19 surrounding low level waste is probably starting to clear.

20           The State Planning Council in fact has had two meetings  
21 now. Governor Riley is the Chairman of it, and Dixie Lee Ray  
22 and Governor List are on it also. They have a very real under-  
23 standing of this problem.

24           I am very optimistic that that one is clearing. We  
25 see many signs of states that are just on the border of being

1 willing to move.

2 I don't know if you have seen the report from Illinois,  
3 which came out very recently and was given to the Governor. As  
4 I understand it, that is moving pretty smartly. I think  
5 probably what is needed is a piece of legislation, which is in  
6 final form, though I am not sure whether it will get enacted  
7 this year, but certainly should the first part of next year. This  
8 will authorize states to form compacts and exclude people that are  
9 in the compact.

10 Right now the thing that is inhibiting more than within-  
11 state pressure is the idea that anybody who opens the business  
12 suddenly gets everybody's business and there is no way of putting  
13 in any kind of restriction.

14 I am afraid that if we are not careful in the low  
15 level waste area, the political problems are likely to be  
16 overcome and we will be in the unenviable position of still having  
17 a bunch of unanswered technical stuff on waste forms and so on.  
18 For example, the ACRS raised the question when we were in  
19 Hanford last year of why in the world are we shipping these  
20 unsolidified resins [from] reactors and putting them in shallow  
21 land burial. Well, this is a major question, and when you scratch  
22 the surface and start looking at it, it is costly. There are  
23 several hundreds of thousands of dollars in Frank's program  
24 to try to come to grips with that.

25 So I think I would not minimize the technical questions

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1 that have been growing as people scrutinize this area. I think  
2 the political problems perhaps will be solve more quickly than we  
3 are able to deal with some of the residual technical stuff.

4 MR. DAVIS: I would like to speak out for the technical  
5 staff.

6 We actually support what Jack said. We absolutely feel  
7 that it would not be a very wise move to cut back either of those  
8 areas, of low level or containers.

9 I think that will come out in the technical aspects of  
10 the discussion, if you wish, later on.

11 MR. LAWROSKI: Thank you both.

12 Frank, go ahead.

13 MR. ARSENAULT: Let me run down this list briefly  
14 because I think you may be less familiar with this nomenclature  
15 than that on the high level side.

16 The first, waste form and container performance,  
17 relates to the effort to characterize existing wastes, to  
18 examine the characteristics of the products of various volume  
19 reduction approaches that are being investigated, largely  
20 by DOE, and to look at products of different waste treatment  
21 methods, solidification techniques and so on.

22 These first are to characterize these products and  
23 waste forms, but primarily with a view to determining whether  
24 or not some criteria need to be established and what form those  
25 criteria should be for waste forms delivered to low level

1 waste shallow land burial sites.

2           The second line, shallow land burial site characterization  
3 relates primarily to sampling and measurement programs going on  
4 at existing sites, looking at the characteristics of existing  
5 sites, and examining the phenomena that are taking place there,  
6 some of which are proving to be troublesome. The results of this  
7 effort will feed into the next, which is a review of alternative  
8 techniques for shallow land burial of low level waste and engineering  
9 approaches to solutions of existing problems and administrative  
10 and institutional approaches -- well, "institutional" is probably  
11 the wrong word, but administrative and procedural approaches to  
12 some of those problems in the operations part.

13           The next line deals with the requirements for monitoring  
14 of shallow land burial sites and the question of methodology,  
15 techniques, equipment, devices, et cetera, how to monitor  
16 sites both during operations and after closing.

17           Alternatives to shallow land burial is not a major  
18 program right now. We are going to look at geological  
19 alternatives, perhaps at intermediate depths. Ultimately, we  
20 would expect to look at engineered approaches to low level waste  
21 disposal and to answer the unasked question, we do not have any  
22 plans at present to look at deep ocean disposal.

23           MR. LAWROSKI: Does your work on the solidification of the  
24 low level wastes, about which you just made a statement, include  
25 looking at the matter of the fire hazard that is involved in the



1 use of some of these solidification techniques -- you know, the  
2 use of the monomers, which have become with the aid of promoters  
3 and so on polymerized to form a solid? But prior to that having  
4 occurred, though, the monomers were presumably compositions that  
5 are susceptible to catching on fire, and if that is near a nuclear  
6 facility, it can be of much more serious concern than if it were  
7 some other facility.

8 MR. ARSENAULT: I am going to toss that question to  
9 Ed Held. But, to be fair, before I do so, I am going to see if  
10 I understood the scope of it.

11 Are you asking this: with respect to those products  
12 of waste treatment processing --

13 MR. LAWROSKI: Not the products, but rather the  
14 intermediates that are used to arrive at the solid products,  
15 the ingredients. I understand one of the ingredients is a  
16 formaldehyde polymer. Another, I guess, is styrene, which could  
17 be one of the ingredients, though not necessarily from the same  
18 process. But those materials have a pretty high vapor pressure  
19 and they are combustible. They have enough high vapor pressure  
20 and ambient temperatures to represent a fire hazard.

21 Do I now make myself clear?

22 MR. ARSENAULT: Dr. Kim, can you address this?

23 MR. KIM: We have at Brookhaven National Laboratory  
24 a program which is studying the flammability of not only those  
25 final products but some of the materials that have some vulnerable



1 aspect during storage and before use. Yes, we are doing some  
2 research in this area. Although the condition is not set by  
3 us -- for example, such as looking at what is the condition  
4 that it should be kept under to keep the [bitumen] to be not  
5 flammable or not near hardening-- we are looking at the broad  
6 conditions under which those should be kept.

7 MR. LAWROSKI: I am kind of disappointed that we have  
8 waited this long to get at that because the hazard is there  
9 and has been for quite a while. Yet we have gotten away from  
10 some of the alternatives that were used earlier. They would not  
11 have made for such easy procedures, but at least things like --  
12 I forget the terms, what were some of them -- inorganic type  
13 of materials were used to give at least some element of a solid  
14 to what otherwise would be a fluid and therefore susceptible to  
15 leaking out of a container.

16 MR. KIM: The Brookhaven program is the only existing  
17 program we have now and is only looking at the cement urea  
18 formaldehyde, one in two parts, aspect. I think they have not yet looked  
19 at the various conditions in other types of material which are not  
20 very common to current power plant applications.

21 MR. LAWROSKI: I thought some of those were used way  
22 back. I am trying to remember what they were. Can anybody  
23 help me out on this? I thought they were inorganic. This is  
24 prior to the polymerization processes. What were some of the  
25 additives that were added to the liquids? Cement was one.

1 MR. MARTIN: The most I know about is cement or things  
2 that just soak it up.

3 MR. LAWROSKI: Wasn't [merylite] clay used in this  
4 way once?

5 MR. MARTIN: Yes, diatomaceous earth, even kitty litter  
6 was frequently used. Urea formaldehyde unfortunately came  
7 in rather widespread use in power reactors. But unfortunately they  
8 are abandoning that because it does not do a very good solidification  
9 job and the liquid that is still left over is highly acidic and  
10 eats through the containers. That is one of the major problems  
11 with proposing burial sites last year, the leaking containers.

12 But NRR has reviewed several of what they call  
13 topical reports or solidification schemes. They just finished  
14 one for a [Dow polymer.] I am certain that this included a fire  
15 safety review, but I cannot really remember what kind of problem  
16 there was.

17 MR. LAWROSKI: Yes, I have seen the report on that. It  
18 does mention that they looked at it. Of course, a better way  
19 would be to try to use formulations that avoid the problem, if we  
20 can.

21 MR. MARTIN: I am going to pull out some of those  
22 topical reports and take a look at that because I am not sure  
23 we are looking that closely at it.

24 MR. LAWROSKI: Please excuse this digression.

25 MR. MOELLER: Excuse me, Frank, but you also mentioned

1 that you were not looking at sea disposal.

2 Did I not just read a statement in the newspaper the other  
3 day that some European country either had obtained permission  
4 or simply was announcing that it was going out to dump so much?  
5 I guess this was low level wastes being dumped into the North  
6 Atlantic.

7 What are the constraints on looking at sea disposal  
8 at the moment? By this I include ocean bed disposal -- beneath  
9 the sea, in other words.

10 MR. ARSENAULT: I am not sure that the lack of this  
11 subject in our program represents a constraint so much as a lack  
12 of motivation to put it in.

13 Ed, can you add anything to that?

14 MR. HELD: Well, we are following what is going on here.

15 MR. LAWROSKI: Would you please speak a little louder  
16 or use the microphone.

17 MR. HELD: I am Ed Held in research. There will be  
18 an IEA symposium in October on sea disposal of waste.

19 MR. MOELLER: Will someone be there?

20 MR. HELD: I hope someone will be there. But you know  
21 how the travel money is going.

22 MR. CULLINGFORD: I am Michael Cullingford, PAS, with  
23 respect to high level waste. We have scoped the problem for  
24 sea disposal and we got to the point in a sort of scoping analysis  
25 of the types of assistance that we have to look at. I think we

1 are ready to do some analysis on it. We have not pursued it  
2 because it did not seem to be an option. We have not looked at  
3 the ocean.

4 MR. LAWROSKI: Thank you.

5 Dr. Martin.

6 MR. MARTIN: The sea disposal question is interesting  
7 in this country in that NRC has no jurisdiction whatsoever  
8 over that. That was given to EPA for reasons that I cannot  
9 understand. Nonetheless, that agency has it.

10 Although EPA has the permitting power, nobody ever  
11 has asked for a permit in the last ten years or so, since the  
12 sea disposal was stopped.

13 I believe it is pretty much U.S. policy -- and State  
14 Department and EPA usually uphold this in international meetings  
15 on sea dumping -- not to do it, at least at present. However,  
16 for certain types of waste, such as, for example, thermal shields,  
17 control rods, and perhaps reactor vessels, when the time comes  
18 maybe they will look entirely favorably on that. Some of the Navy  
19 equipment now has reached the point where they would want to  
20 decommission it.

21 We really do not have much control over that and there  
22 has not seemed to be much pressure to do it.

23 The Europeans, on the other hand, have a different  
24 situation. There is a London Sea Dumping Convention that was  
25 agreed to by many of the European countries, where there are



1 standards and an agreed to quotas for sea dumping. Many of the  
2 maritime countries, such as Britain, France, and I think Spain  
3 and Japan routinely sea dump what we would call intermediate  
4 level wastes. We really do not have those kinds of wastes in  
5 this country. They would be cesium and strontium to many [tens]  
6 and curies per cubic foot.

7           There are other countries, such as Norway and those who  
8 make their living on the sea, who are very hotly against this.  
9 It gets to be a very bitter issue every time we outline this as  
10 international waste management meetings.

11           That is a little perspective for you.

12           MR. ARSENAULT: The final item on this list is risk  
13 analysis.

14           Now is as good a time as any to describe the reason  
15 for this being on here. In the risk assessment staff within  
16 RES, Robert Bernero has been charged by Dr. Budnitz, and has  
17 accepted this charge, to develop a capability for evaluating  
18 risk across the entire nuclear industry, fuel cycle as well as  
19 reactors, to a degree which will allow comparative assessment of  
20 risk for purposes of identifying principal contributors for  
21 guiding prioritization and decision-making on the part of the agency.  
22 This will be among the programs that are pursued in that direction.

23           There also has been a discussion of the need to consider  
24 not just accidents, but also comparing the risks from accidents  
25 with the -- and here risk may not be the right word -- consequences



1 of routine operations, and the need to reflect at least the  
2 consideration of safeguards type incidents in connection with the  
3 overall and global risk assessment with regard to nuclear industry.

4 I hasten to point out that this does not reflect any  
5 belief on our part that we will be able to quantify that latter  
6 problem.

7 So, risk analysis you will begin to see creep into the  
8 program elements across the board for us.

9 Do you want to add anything to that?

10 (No response)

11 MR. ARSENAULT: The final of the three program  
12 elements under waste management is uranium recovery. The three  
13 areas here are shown on the chart.

14 Waste characterization is there largely to indicate  
15 a comprehensive program, but it is a little misleading because  
16 we don't have any waste characterization activities really going on.  
17 We have a couple of projects that are described by that term  
18 that are closing out now.

19 The emphasis will shift to the question of operations  
20 and how to manage these tailings in a way that will reflect  
21 better our concerns.

22 This deals with questions such as the characteristics  
23 of tails resulting from various milling processes and how best  
24 to handle these and adjust their characteristics so that they are  
25 moremanageable, as well as looking at how to handle the tails

1 themselves once they get outside of the plant.

2 Siting, pathways, and impacts point out that this is  
3 beginning to approach the problem of in situ mining, looking at  
4 the way in which the materials associated with that process can  
5 get into the environment and be transported when in contact with  
6 groundwater.

7 The focus here is on collecting data and examining  
8 methods for performing site characterizations and also for  
9 predicting the way in which these materials will be dispersed.

10 Finally, the decommissioning phase looks at different  
11 ways of stabilizing the tailings piles to reduce any long-term  
12 effects. It also includes the question of the long-term  
13 phenomenon that might affect the tails' stability, such as  
14 geological, hydrological, or meteorological processes that might  
15 affect the tails and distribute them.

16 It also includes consideration of potential future  
17 activities by man or intrusion [odor] into the tailing process.

18 So it is a question of what happens in the long-term  
19 with the piles after decommissioning.

20 MR. LAWROSKI: Who is responsible for seeing to it that no  
21 more of these tailings piles become available for use in the  
22 construction of residences and so on?

23 MR. ARSENAULT: That is an easy question to answer.  
24 As soon as you ask me who is responsible, I simply point over  
25 there (indicating).

1 MR. MARTIN: Right here.

2 MR. LAWROSKI: Is there some authority that goes with  
3 this responsibility?

4 MR. MARTIN: Yes, sir.

5 As a matter of fact, I spent the last six months of  
6 1978 working with our Congressional Committees getting a law passed  
7 to give us that jurisdiction explicitly. There was sort of a  
8 screwy arrangement before that where the AEC and NRC never did  
9 have jurisdiction over that material. There was always a messy  
10 situation about controlling it. But it is very clear now. We  
11 now only have jurisdiction, but it is controlled by our licenses.

12 MR. LAWROSKI: I remember in the old days in the AEC  
13 they did not want to get involved.

14 MR. MARTIN: That's exactly right. It was used both  
15 as a reason for not getting involved and, later, as an excuse  
16 as to why they didn't. It has a long history.

17 MR. ARSENAULT: This concludes my introductory remarks  
18 and describes the general structure of the program.

19 You have in front of you documents which describe the  
20 program in much greater detail.

21 MR. LAWROSKI: That is what we wish to get into next.

22 MR. ARSENAULT: Unless you ask for additional presentation  
23 material, we would be happy to respond to questions.

24 MR. LAWROSKI: Thank you.

25 Before I close the meeting, does any one of the Committee

1 members have a question to ask on the record? After questions,  
2 I will close the meeting to get into the details of the program  
3 for research and discussion?

4 (No response)

5 MR. LAWROSKI: Let us take a five minute recess, then,  
6 to allow the Reporter to remove her equipment. There are just  
7 a few people who I think cannot stay for the next portion. I  
8 would ask all those not authorized to remain to please leave.

9 Thank you all.

10 (Whereupon, at 1:55 p.m., the Subcommittees adjourned  
11 the public session, to reconvene in closed session in five minutes.)

12 - - -

NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

in the matter of: ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
JOINT MEETING OF THE SUBCOMMITTEES ON WASTE MANAGEMENT AND FUEL CYCLE

Date of Proceeding: June 26, 1980

Docket Number: \_\_\_\_\_

Place of Proceeding: Washington, D. C.

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Anne P. Horowitz

Official Reporter (Typed)

Anne P. Horowitz

Official Reporter (Signature)