

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

269TH GENERAL MEETING

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1 UNITED STATES OF AMERICA
2 NUCLEAR REGULATORY COMMISSION
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4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
5 269th GENERAL MEETING

6 - - -
7 Nuclear Regulatory Commission
8 1717 H Street, N.W.
9 Washington, D.C.

9 Friday, September 10, 1982

10 The Subcommittees met at 8:30 a.m.

11 PRESENT FOR THE ACRS:

12 PAUL G. SHEWMON, Chairman
13 JEREMIAH RAY, Vice Chairman
14 DAVID OKRENT,
15 MYER BENDER
16 DAVID WARD
17 J. CARSON MARK
18 DADE W. MOELLER
19 MAX W. CARBON
20 HAROLD ETHERINGTON
21 JESSE C. EBERSOLE
22 ROBERT AXTMANN

23 DESIGNATED FEDERAL EMPLOYEE:

24 DAVID FISHER

25 NRC STAFF:

26 HUGH THOMPSON
27 LEE REMICK
28 NORMAN SCHWARTZ
29 RAYMOND F. FRALEY

P R O C E E D I N G S

1
2 MR. SHEWMON: Good morning. This is the
3 second day of the 269th meeting of the ACRS. At today's
4 meeting the Committee will hear reports to discuss human
5 factors, integrated program plan, naval reactors,
6 policies and practices, transportation of radioactive
7 materials, meet with the Commissioners, ACRS
8 Subcommittee reports, and discuss ACRS actions, which I
9 guess is letters.

10 The meeting or the discussion on naval
11 reactors policies and practices will be closed. The
12 rest will be open. The items scheduled for discussion
13 on Saturday are listed on the agenda on the bulletin
14 board.

15 The meeting is being conducted in accordance
16 with provisions of the Federal Advisory Committee Act
17 and the Government in the Sunshine Act. Mr. David
18 Fisher on my right is the designated Federal employee
19 for this part of the meeting.

20 Portions of the meeting will be closed, as I
21 mentioned. A transcript of portions of the meeting is
22 being kept. If you would identify yourselves and speak
23 audibly.

24 We have received no written statements or
25 requests for oral presentations from members of the

1 public for today's meeting.

2 And so we will turn to Dave Ward, who has the
3 first item, Human Factors Subcommittee report.

4 MR. WARD: This morning I give a report on the
5 Subcommittee meeting and in particular the comments of
6 our consultants at the meeting. We do not plan to have
7 a staff presentation, although members of the staff are
8 here. Mr. John Zelinsky is here to answer questions or
9 make comments, as is appropriate.

10 We will have a draft of a letter written for
11 consideration. I would just as soon you didn't read
12 that yet. In fact, I think at the end of this
13 Subcommittee report we will want to discuss whether we
14 want to write a letter or not.

15 The subject of the Subcommittee meeting was
16 something called the agency's human factors program
17 plan. In response to the Commission's policy guidance
18 document 0885, the staff prepared a program plan for
19 human factors activities. It was prepared by the
20 Division of Human Factors Safety in NRR, though all of
21 the work to be carried out in the plan covers actually
22 three different offices in the agency.

23 The purpose of the plan was to improve public
24 safety by providing increased attention to consideration
25 of the human element in nuclear power plant design,

1 construction and operation. And as I said, the plan is
2 for three years. It is both an action plan and a
3 research plan.

4 As Hugh Thompson, the Director --

5 MR. MARK: Does this include maintenance and
6 operations?

7 MR. WARD: There are programs on maintenance
8 and operations, yes.

9 The Committee originally received an early
10 draft of the plan in mid-July, and we were asked to
11 comment by the end of July. We found that impossible to
12 do, and I think there were some informal comments on the
13 preliminary draft furnished to the staff. But then a
14 later draft came out which was considerably changed on
15 August 27. That was the draft that we reviewed at the
16 September 7th meeting.

17 The purpose of the plan as described by Hugh
18 Thompson, the Director of the Division, was to provide
19 more of a technical basis for regulations and guides in
20 the human factors area than is presently available.
21 Most of the present guides, regulation and so forth are
22 based on judgment, without an extended technical basis.

23 We heard presentations on the plan in the six
24 major program areas. These were just brief
25 presentations and overview of the programs. The six

1 arease are: staff and qualifications, training,
2 examinations -- that is, licensing examinations --
3 man-machine interface, plant procedures and plant
4 testing, an organization and management.

5 Then we heard parallel reports, a parallel
6 summary of research activity in the fairly -- in both
7 the near-term and out years in each of these areas.
8 Then finally, at our request we heard an extended
9 presentation on research in one particular area, which
10 was the research that has been started in the area of
11 organization and management effectiveness.

12 In retrospect, I think the Committee would
13 have been more satisfied or felt more able to understand
14 and comment on the plan if we had asked for similar
15 in-depth presentations on each of the areas. But
16 there's a problem that that might have taken two days.

17 Let me go over -- I think the best thing I can
18 do -- I'm not going to go over the plan itself. We will
19 get copies of that available for you and let me come
20 back to that point again at the end of the presentation
21 or at the end of the report.

22 Instead of doing that, I would like to go
23 over, I think, some of the more pertinent comments on
24 the plan that the consultants and members at the
25 Subcommittee meeting made. In area of staffing and

1 qualification, there was concern that the plan did not
2 include an assessment of what numbers of qualified
3 people, both engineering technical graduates and
4 candidates for other jobs, will be available in the
5 future.

6 As more plants come on line, there will be
7 greater demand, and there is some concern that the
8 universities and the Navy won't be providing the
9 traditional -- enough numbers from these traditional
10 sources.

11 There was concern expressed about the training
12 research, that there was not enough research directed
13 toward what the content of training courses should be,
14 not enough. It was felt what was needed was actually
15 experimental research in this area, perhaps using
16 simulator experiments to determine what type of training
17 was most effective.

18 MR. BENDER: Excuse me, Dave. There has been
19 some work in that area by EPRI.

20 MR. WARD: Yes, there has been some of that
21 work. It turns out that most of the work in that area
22 has been directed toward -- there are several types of
23 experimental work you can do with what you might call
24 simulator experiments. You could look at the operator
25 qualifications, operator training. You could look at

1 the effectiveness of various types of procedures,
2 various types of hardware in the control room. And I
3 think most of the EPRI experiments have been in the
4 latter two categories.

5 And it's really -- you know, on paper it's a
6 super way to get paper like this, but it's tremendously
7 expensive and most of the efforts in getting these data
8 have been to piggyback little experiments on regular
9 retraining assignments of operators at simulators.

10 MR. BENDER: I see.

11 MR. WARD: But in theory it is an ideal way to
12 get him.

13 MR. BENDER: Well, it's not as expensive.

14 MR. WARD: I don't know. When you look at how
15 many data points you get, it depends on which experiment
16 you are talking about.

17 MR. BENDER: I said some.

18 MR. WARD: There was also a suggestion that
19 there was a need for establishing more explicit
20 requirements for NRC licensing examiners. It turns out
21 that our understanding was that there is not a specific
22 set of requirements for the qualifications of
23 examiners. And --

24 MR. CARBON: Could you expand on that? Are
25 there any specific requirements for examiners?

1 MR. WARD: I think there are de facto
2 requirements. People pick, or I mean the staff picks,
3 people it considers to be qualified.

4 MR. CARBON: On the basis of experience?

5 MR. WARD: On the basis of background,
6 education, and experience, and I guess their comment was
7 that there really are not an awful lot of people
8 available to do this sort of work and they have a hard
9 time getting -- you know, they have a lot of
10 subcontractors that do the licensing examinations. I
11 think they are trying to go to more in-house people.

12 MR. SHEWMON: These tend to be people who've
13 run university reactors, in my experience. What other
14 group do they have?

15 MR. WARD: They have groups from -- they have
16 people from national labs. Some people from national
17 labs are working at it full-time, some half-time.

18 There was a comment on procedures. One of the
19 consultants expressed the belief that of the six program
20 areas the need for development and research in
21 procedures is probably the most important to reactor
22 safety. And I believe that, again, the simulator
23 experiments could be very useful here.

24 Another of the consultants expressed the
25 concern that the plan had no provision for objective

1 measures of the effectiveness of the research that was
2 going on, and I guess that we cannot be absolutely sure
3 that there's no provision for that. There was nothing
4 described in the written plan, and I think that was one
5 of the deficiencies that we did find in the written
6 plan, that the means of management and control of the
7 varied activities were not described. And most of the
8 Subcommittee members and consultants had some concern
9 about that.

10 There was some concern about the overall level
11 of activity here. There was a comment by one of the
12 consultants that the National Science Foundation spends
13 about ten percent of its budget on the behavioral
14 sciences. The NRC is spending about five percent of its
15 budget on human factors area, and we have some
16 indications that perhaps half of the risk in operating
17 reactors is at least related in part to human factors
18 concern.

19 So this consultant concluded that the research
20 in this area is seriously underfunded. I don't think
21 that is a general conclusion of the Subcommittee or of
22 the other consultants, but it is a point that has been
23 raised before.

24 I guess I would like to say that the activity
25 in this area, including the research, the agency is on

1 an up slope. It has been increasing, you know, rather
2 significantly over the last three years, and I think
3 this is a good trend. I am not sure that the
4 organization could absorb bigger increases in shorter
5 times.

6 There was a concern that there are not enough
7 human factors experts out there in the world or in the
8 country to implement all of the human factors programs
9 that successful research might turn up.

10 MR. BENDER: Well, you've got 250 million of
11 them in the United States.

12 MR. WARD: Yeah, and there are at least 15
13 right here.

14 There was a suggestion that there might need
15 to be established centers to provide for the education
16 of new human factors experts. This consultant was of
17 course from academia. But I think he had a good, or at
18 least a point that was interesting to me. He pointed
19 out that most of the research that the NRC is currently
20 funding he regards as sort of rather short-sighted. It
21 is not looking at new areas in which we don't have
22 knowledge.

23 In fact, there is a particular problem in that
24 most of the human factors analysts looking at risk in
25 human factors areas say the cognitive errors by people

1 in the control room are the most critical type of
2 error. Yet there isn't much research going on, and it
3 is an area in which there aren't many data and in which
4 research is needed.

5 In fact, there was a comment that the agency
6 and the industry are almost avoiding research in this
7 area.

8 MR. BENDER: Are there some kinds of
9 representative research going on in other technologies
10 that are illustrative of what people do when they need
11 to investigate or learn more about cognitive problems?

12 MR. WARD: You mean in other industries?
13 Yeah, I think there is. I think the human factors staff
14 of the agency and its contractors and our consultants
15 are pretty well tuned in to that, really. But in the
16 particular area of cognitive research there isn't much
17 of a data base now and there really isn't much going on
18 in the area. Probably the nuclear industry has the
19 greatest interest in that at the moment.

20 MR. SHEWMON: By "cognitive" you mean the guy
21 just doesn't know what he should be doing, at that
22 instant at least?

23 MR. WARD: It is not his automatic responses
24 are wrong because the knob isn't shaped right or the
25 dial isn't in the right place, but he fails to use the

1 information he has and reason and come to the proper
2 conclusion.

3 MR. EBERSOLE: Dave, let me ask you a
4 question. On the instrumentation and control, the basis
5 for avoiding mistakes is to use consensus. It would be
6 possible in human operations to do the same thing, don't
7 let somebody just carry the sole burden of doing it
8 all.

9 MR. WARD: This is the sort of approach the
10 airline industry uses where a plane is taking off.

11 MR. EBERSOLE: They usually have consensus,
12 except like on the Fourteenth Street Bridge.

13 MR. WARD: Well, I think they agreed there,
14 except it was on the wrong thing. I think it is an
15 interesting comment.

16 MR. EBERSOLE: Well, the number of things
17 you've heard -- the case where they don't take the heavy
18 water out -- a lot of these would have seemed to be
19 avoidable by coincident requirement.

20 MR. WARD: Hugh Thompson, do you have a
21 comment on that?

22 MR. THOMPSON: Hugh Thompson, NRC staff.

23 I would note that the Commission in one of its
24 proposed rulemakings is requiring that a senior reactor
25 operator be present in the control room at all times, in

1 order to provide the additional check and supervisory
2 responsibility and oversight for the reactor operators.
3 In part, that is to assure there is that second check.

4 MR. EBERSOLE: Just as long as it doesn't take
5 him out into the back of the DC switchboard.

6 MR. THOMPSON: That's right, it doesn't take
7 him back to the DC switchboard, but he is aware of what
8 the operator is going to do when he goes back to the DC
9 switchboard.

10 Likewise, the proposed rule to allow operators
11 to deviate from the technical specifications requires
12 that the operator get permission and consult with the
13 senior reactor operator prior to making any deviations,
14 if he thinks the situation needs that type of action in
15 order to protect the public health and safety.

16 MR. WARD: Do you have a comment on this
17 point?

18 MR. BENDER: Yes. A certain amount of this
19 problem is directed at the matter of who is really
20 cognizant. The airline approach really is based on
21 having a pre-established set of procedures and then
22 having one individual check with the other individual if
23 they're going to do so. But the check is just to make
24 sure the guy hasn't overlooked anything.

25 But as I understand the process, they don't

1 try to individually analyze and then check analysis
2 against each other, except in the rare cases when there
3 is nothing to be guided by at all and that doesn't
4 happen very often. But in the kind of case that Jesse
5 is talking about, the emphasis for the most part is on
6 the fact that the guy that's behind the control board,
7 for example, often doesn't know what he is affecting.
8 So it may be communications as much as it is cognizance
9 that is the issue.

10 MR. EBERSOLE: Well, the airline situation is
11 not coincidence and cooperation, because there is an
12 overriding commander and he will make the ultimate
13 decisions. So you've got one control in here that
14 overrides the other, which goes back to the Fourteenth
15 Street Bridge case.

16 MR. WARD: I guess another way to deal with
17 that is in critical operations they use checkoff
18 procedures. In a way, that is sort of reducing
19 cognitive behavior to rule-based behavior.

20 MR. BENDER: I think that is just an
21 impractical idea.

22 MR. WARD: Let me go on. In this particular
23 area, I mentioned there was some concern that research
24 was short-sighted, and this ties back to a couple of
25 other things. But most of the research that the agency

1 is asking for now in the human factors area might be
2 characterized as applied research.

3 There was a comment that the universities are
4 really not interested in doing this sort of thing, and
5 an awful lot of this research is being placed with the
6 national labs. And I guess they are developing
7 expertise in this area. I don't know that they are
8 hotbeds of expertise in the area several years ago.
9 There were some locations that were, but I think this
10 perhaps ties back to the comment that there are not many
11 human factors experts or people interested in the area
12 in people coming out of the universities, and I think
13 that is because the agency -- one reason is because the
14 agency is not asking for research in universities in
15 this area.

16 Okay. Most of the consultants commented that
17 they thought the overall program looked good, but there
18 were some other specific concerns. One, there's not a
19 specific implementation plan and there does not seem to
20 be a true integration of the efforts that are going on.
21 There are -- the agency has contracted research and is
22 doing other development work. INPO is doing some work.
23 There is work going on overseas that is related, and
24 EPRI is doing some work.

25 It is not clear from the written plan that

1 this is all well-integrated, and one result of this or
2 perhaps a related concern is that because of the way, or
3 perhaps there not being explicit integration of the six
4 program areas, which really are interrelated, there is
5 concern that there may be too many and too varied
6 outputs coming out of the program and into a variety of
7 future regulations or guides and so forth that should be
8 related, that won't be properly related. This is just a
9 concern expressed.

10 Another consultant commented there does seem
11 to have been a lot of progress in the area in the last
12 two years. Again, there is concern expressed about
13 things falling between the chairs. There are programs
14 going on at different places. The NRC wants to take
15 advantage of the work that other people are doing. It's
16 not clear that the work is all clearly complementary.

17 There was an opinion expressed that there's
18 not enough progress on computerized operating dates in
19 the control room and that other industries are doing
20 this better.

21 MR. BENDER: Was that the judgment of one of
22 our consultants?

23 MR. WARD: That was a judgment of one of the
24 consultants.

25 MR. BENDER: Does the staff have a handle on

1 what the French are doing?

2 MR. WARD: Yeah, I think they are aware of
3 it. We didn't get a lot of discussion on that. We are
4 getting some information on that.

5 MR. BENDER: I think they're doing a lot more
6 than we are.

7 MR. WARD: That is what the headlines say. I
8 think we're trying to find out what is behind that.

9 MR. SHEWMON: Dave, there certainly is a lot
10 of activity in the field in computer-aided presentation
11 of information. It may be somebody's judgment that we
12 are not doing as much as he'd like or he is not familiar
13 with it as much. Is that much more aimed at equipment
14 development and the kind of thing this consultant
15 thought ought to be done with it, or what?

16 It would not be academic research in this
17 case, because people are trying to establish proprietary
18 positions.

19 MR. WARD: That's right. Personally, I think
20 there is work of good quality going on in that area, and
21 I'm not sure. This was this particular consultant's.

22 MR. SHEWMON: Well, rather than hear all the
23 consultants' comments, we are here to comment on the
24 program plan adequacy. Is that what you're leading up
25 to?

1 MR. WARD: That's what I'm leading up to.

2 MR. SHEWMON: We'll keep waiting.

3 MR. WARD: Well, I guess the bottom line in
4 the members' and consultants' opinion on the program
5 plan was that in general the program seemed to be
6 properly oriented and with appropriate priorities, but
7 there were some particular deficiencies. And one of the
8 deficiencies was that it was felt that the written plan
9 was very poorly presented. I think we all had a
10 difficult time getting much out of the written plan, and
11 we learned a lot more about the program from the brief
12 oral presentations we were given.

13 A recommendation made at the Subcommittee
14 meeting to the staff was that the program plan really
15 needs to be -- the written plan needs to be drastically
16 overhauled and rewritten, not just editorial cleanup.
17 The staff had a bit of a problem with that in that they
18 were on the schedule to send the plan to the Commission
19 for its approval the middle of this month.

20 Now, our review was on kind of a short fuse.
21 We would have preferred to have had a month or more in
22 advance of the date which they considered critical.
23 Instead, we just had a few days.

24 So I guess our major concern is whether the
25 program is appropriate and going to accomplish the

1 things over the next few years that we think it ought to
2 accomplish. And I think that the general opinion of the
3 Subcommittee is that it probably is, but it's a little
4 hard to tell because the written plan wasn't a very good
5 communication of what is going on with the program. So
6 we've got some concern about it.

7 MR. BENDER: Dave, is the problem more with
8 just what will be done, as opposed to whether the right
9 scale of effort has been established?

10 MR. WARD: I guess it is more with what will
11 be done and how it will be done and how we can have some
12 assurance that we are really going to accomplish in the
13 next three years what it says you're going to
14 accomplish.

15 MR. BENDER: I was just thinking in terms of
16 the practicalities of having to deal with the staff's
17 priorities and our own interests, and it seems to me we
18 might take a position like this: while the scale of the
19 effort seems all right, before you get very deeply into
20 this program you ought to be a little more definitive in
21 what things you're going to do and what they're really
22 going to accomplish, and that would enable the
23 Commissioners to make some decisions without our saying,
24 don't do anything until we report.

25 MR. WARD: Well, that I guess leads us to

1 where we are now, and I would like to discuss the
2 options that we have. We didn't bring or ask the staff
3 to present a summary of the plan at this meeting because
4 some of our Subcommittee members thought it would
5 probably take four hours or more to probably do justice
6 to that, and further, they thought that the written plan
7 was not available in a form that would effectively
8 communicate the information to the full Committee.

9 So that we really asked the staff to go back
10 and rewrite the plan. That was the advice of the
11 Subcommittee. As I say, the staff had a problem with
12 that. So we have prepared a draft letter which would
13 propose that the -- not be a Shewmon to the Commission
14 letter, but perhaps a Fraley to Denton letter which the
15 Committee could endorse.

16 We don't necessarily have to go over that
17 today, although there is a draft available. But there
18 is time on the agenda Saturday, I think, to go over the
19 letter itself. But I think at this time I might ask
20 Hugh Thompson just what his plans are for the written
21 plans, whether he intends to go over to the Commission
22 September 15th, as originally planned, or whether that
23 has changed.

24 MR. THOMPSON: Hugh Thompson, NRC staff. We
25 are planning now to submit the revised plan to the

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1 Commission at the end of October. I talked with EDO and
2 indicated you had some very constructive criticisms
3 which we would certainly want to address, and it would
4 be appropriate for us to have the opportunity for us to
5 make the modifications to the plans, to put more of the
6 how we plan to get in and integrate the efforts that you
7 had identified as some of the deficiencies.

8 I would anticipate that we would be able to
9 meet with the EDO next week and give him, once we
10 receive your letter and discuss it with him, probably
11 then get a revised draft available toward the end of
12 this month if you wanted to take another look at it.
13 But we would really plan to submit to the EDO a
14 Commission paper by the middle of October, responding,
15 hopefully, to your comments, to the comments we receive
16 from the Office Directors.

17 You were reviewing this in some parallel with
18 the regional administrators. Other office directors
19 didn't -- in fact, I think, as we said earlier, it was
20 an early draft of that you had been looked at, as
21 opposed to a final product, which normally the
22 Commission often asks the Committee to look at. And we
23 were attempting to get the feedback that we did. And it
24 was unfortunate that the time scale we were working on
25 did not allow us initially the typical month that we

1 would need to respond to the ACRS.

2 I think that has now been factored into the
3 schedule, and at least another period of time available
4 for Mr. Dircks to look at the plan and in fact put some
5 of his own touch to the plan.

6 MR. WARD: Well, probably I guess what I would
7 suggest then is that we send -- I propose that we send
8 the letter that the Subcommittee has drafted, I guess to
9 Mr. Denton, at this meeting. And we have given a list
10 of our comments in one way or another informally to the
11 staff, but I think the letter kind of summarizes some of
12 those kinds of things.

13 MR. SHEWMON: You mean Denton or the DEO?

14 MR. WARD: Well, we've got it down as Denton.
15 We were really requested by the Division Management to
16 review the plan, and so I think it is appropriate to
17 keep it at a fairly low level, our response.

18 MR. SHEWMON: Okay, fine. So we have a draft
19 of that and we can look it over.

20 MR. WARD: We can look that over now.

21 MR. SHEWMON: Why don't we? We've got until
22 the next item comes at 9:30.

23 MR. WARD: Well, how about an initial reading
24 of the draft. Then we can polish it off. It's a pink.
25 It's draft number two.

1 MR. SHEWMON: Was this handed out this
2 morning?

3 MR. WARD: It was handed out last night.

4 MR. BENDER: Are you sure it was handed out
5 last night?

6 (At 9:07 a.m., the meeting was recessed.)

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NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

in the matter of: ACRS/269TH GENERAL MEETING

Date of Proceeding: September 10, 1982

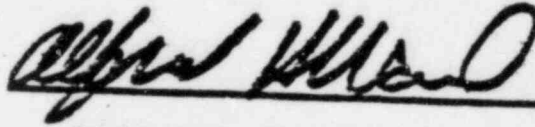
Docket Number: _____

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.

ALFRED H. WARD

Official Reporter (Typed)



Official Reporter (Signature)