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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

Subcommittee on Reactor Radiological Effects

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

Friday, April 29, 1983

The Subcommittee on Reactor Radiological Effects convened at 8:30 a.m., pursuant to notice, Dade Moeller, chairman of the subcommittee, presiding.

PRESENT FOR THE ACRS:

D. MOELLER, Member

J. EBERSOLE, Member

R. AXTMANN, Member

C. MICHELSON, Member

J. SHAPIRO, Consultant

R. KATHREN, Consultant

R. HEALY, Consultant

R. FOSTER, Consultant

R. C. TANG, Designated Federal Employee

AUDIENCE PARTICIPANTS:

W. MINNERS

L. COHEN

R. ALEXANDER

D. FLACK

R. FOULDS

P R O C E E D I N G S

MR. MOELLER: The meeting will come to order. This is a continuation of the ACRS Reactor Radiological Effects Subcommittee meeting which began yesterday morning. Today we're going to be devoting our time to the prioritization process for the generic and safety issues. There will be a meeting with the NRC Staff to review the individual items, and then at the end of the meeting to summarize our comments on the priorities that have been assigned to them for resolution.

In terms of these issues, we have been requested to review them with respect to five different areas. The first is the adequacy of the application of the prioritization methodolody. The second one is the adequacy of the professional judgment independent of the methodology used in the Staff's approach for assigning a priority. And the third is the appropriateness of the ranking that has been given to each issue. The fourth is the adequacy of the categorization of the licensing improvement issues. That is, activities aimed at developing analysis or review of procedures or improving understanding of phenomena. And fifth is the adequacy of the Staff's resolution, proposed resolution, of the issues designated by them as already resolved or the resolution has been identified. So that is a key point.

If they say it is resolved and therefore, it needs no more attention, we have to be sure that we're happy with the resolution.

Now, in preparing for the meeting we looked at some of the issues. I'm sure you have looked at all of them, but a few months ago we looked at just a few of them to determine whether they made sense, and Dr. John Evans, one of the ACRS fellows, also assisted me in looking at several of the items.

One place he began on air systems, air cleaning systems and so forth, and he pointed out several questions which I combined with some that I have. Let me go over those questions to orient you as to some of our thinking.

The first thing that Dr. Evans pointed out was that the Staff, as far as he could see, did not check to determine if failure of the air system under question was included as part of the accident sequence being evaluated. They would have an accident occur within a certain probability and then they would say the air cleaning -- the probability of the air cleaning system to fail simultaneously is another 10^{-3} and they would multiply the numbers and get up to 10^{-8} or 10^{-11}, whatever it comes out.

He said that in some of these accidents, you assume the air system fails along with it. That is part of the accident, part of the scenario.

MR. EBERSOLE: I'd like to comment on that. I see a persistence of this language in here. I think it may be pretty much rampant in the health physics area. The notion that you have to have an accident to get in trouble, a typical reactor type accident like a LOCA. What is not recognized -- certain critical working systems which are online all the time, you already had an accident as long as you put about one load of heat in the reactor, and then you become suspended on about a dozen dynamic working systems. The failure of any one of those precipitates you into overheating, wherever the point of heat is and you do not have to have any further accident; your accident is guaranteed.

It is the accident that prevails throughout our whole line of work here, the lack of recognition that the plant is suspended on something like a dozen systems once it has attained a reasonable investment of after-heat and you cannot punch a button and turn it off.

MR. MOELLER: We quizzed the staff about this, again, in December, as I recall, December or late November. They said this was beyond the scope of their assessment. I think we need to get it clarified today.

A second point was the staff, in their formula for assigning priorities, as far as we can tell only deal with radiation. In other words, if the accident might result in mechanical injury or a death of a worker non-radiation related, it's not necessarily taken into account.

I'm not sure, you know, that we have too many examples where that would be important. It just seemed to us that it might be.

The third thing was the NRC Staff considered down time in assessing the cost of implementing a change. In other words, if you were going to backfit, they would say how much down time at a half a million dollars a day, and they calculate a number. They don't consider the loss of operating time if the change is not made. In other words, if you don't make the change, how much more downtime might you have because certain things fail and shut youdown.

I hit a couple of these, Jesse; one of them was in 1979, Dresden Unit 2 was down for two days due to failure of the ventilation system fans which caused rupture of the blow-up panels in the reactor building. Remember, we were talking about that yesterday. That is two days of down time. Again, at a few hundred thousand a day, they may have been smart to go in and fix it.

The fourth item is the failure in air cleaning systems. The staff stated there would only be a problem if there is a simultaneous failure of the air monitoring equipment, the ventilating equipment, the air cleaning equipment combined with improper operator action. You know, if you get -- if you require four different failures simultaneously and you multiply the exponent, you get a very small failure probability.

Our question was, is it correct to require the simultaneous failure of all four systems in order to have the accident, or for it to be significant.

The last item I wanted to cover in the introduction was to review with you the instructions we received from Dr. Siess, Chairman of the Generic Items Subcommittee, under whose direction we are carrying out this assignment. In other words, there are a few hundred or whatever it is of these items. They have been divvyed out to the different subcommittees and we have been given our proper categories load to carry.

He wanted to point out to us that for all practical purposes, the low category -- it's high, medium, low and drop. Low and drop are the same for all practical purposes. In other words, drop says don't do anything and low says don't do anything. He wanted us to consider the following additional items: licensing improvement issues can be looked at with respect to whether some of these should be upgraded to become generic safety issues. You know, a number of the items are listed as licensing improvement issues.

And then he said as far as the environmental issues are concerned, you may want to review only those items that you think may have some safety significance. I would agree with that. We will try to look at the environmental issues and only talk about it if it involves a safety matter.

And then he pointed out that since the unresolved safety issues have already been receiving high priority attention, they are not prioritized within what we're covering today, and we don't have to review them at this time.

And lastly, regarding the items that are identified as covered in other issues, you may want to make sure that they are adequately addressed in the other issue.

So as we go through them, we'll look at these different rankings or ratings to assure ourselves that these questions are being addressed.

MR. EBERSOLE: Along the same lines you were talking about, the safety significance in here -- and I'm only talking about the ventilating aspects, not the air cleaning and air monitoring. I note here it says, proper ventilating system performance is also important in the operation of the HPCI and RCIC systems in BWRs with gas processing systems in PWRs. I don't think that is limited to just those systems.

MR. MOELLER: They are examples.

MR. EBERSOLE: They are merely examples of a larger problem. Do you want to go into how many other cases -- I could find 2000 pumps running in little rooms which have a waste heat output of about 10 percent, which will quickly cook themselves if you don't have ventilation.

Even on the intake, you find the intake pump is running on an exhaust fan that may be plugged into a wall.

MR. MOELLER: A couple of other comments. They will enumerate or elaborate on the procedure, the methodology, they will explain all of that to you again. Of course, it is in the written material, but I think we need to all hear it and carefully criticize it as we do. But when you listen to it, please keep in mind a couple of points.

One is as far as I know, the current assessment procedure does not consider severe contamination of a large societal resource such as a large water supply, watershed and so forth. By the formula, such a loss would rank very low, whereas, my judgment says it should receive reasonable priority.

At 1000 dollars per person rem, TMI-2 would have been cost-accounted assuming 3000 person rem collective dose at 3 million dollars. That's all that accident would have cost. And, therefore, I don't think their accounting system is too good. It fails to account for in-plant economic costs for psychological impacts, which we know they don't have to account for, but there are many things that we may want to discuss.

And lastly, I looked at the matter of weighing occupational doses versus population dose. We have a fellow working very hard on this. My basic question is this: How much occupational dose should you be willing to incur in order to save, -- you know, how many person rems of occupational dose should you be willing to suffer in order to save X person rems of population dose? It is a tough question to answer, but what I was pointing out, the bottom line was that in some cases today, occupational doses experience in in-service inspection and maintenance is more than that saved through the reduction of the risk of the accident and the population dose associated with this.

I don't know how to weigh that. Again, one of our fellows does and is preparing material on this, or at least, he's offering some guidelines for us. Do you have questions or comments?

I'd simply ask that you be aggressive today. As we take up each question let's thrash it out, raise any questions that you have.

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MR. SHAPIRO: What bothers me at the very beginning, everything comes down to the dollar sign on all of this. This is something that is quite new to me. As you said, TMI becomes $3 million on the basis of some of this. This is $50,000 per man rem. This is $300,000. It neglects a great many important factors that should come out today.

MR. MOELLER: They do in the formula. They do say put in engineering judgment, common sense. So let's look at it and look at the methodology and then look at the key items or the specific items, and if you challenge one of the items, let's challenge it and satisfy ourselves that we are happy with what they have done.

MR. KATHREN: This value impact judgment equation is linear. It seems to me that it can't be linear because, just looking at the failures in the air cleaning and ventilating system, if you take that 10^{-3} and make it one, which says that it is going to fail, or extrapolating that to say that you don't have any ventilating systems at all, you still come out with a relatively low value impact number.

We cannot go on the basis, I don't think, of a linear model.

MR. MOELLER: Thank you.

I would readily say the same thing and put it on the table. I always want to be honest with people. We

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took the air cleaning thing and we fudged the numbers, we twisted them, we made them as big as we could. We could not, using their formula, make it of any importance whatsoever. So if that is true, let's acknowledge it. It just did not seem right.

Let's go ahead, then, and Warren Minners will begin with a description of the methodology that is used.

Warren, we are with you, and obviously, if it were black and white, we wouldn't have to meet. It is a very complicated subject and I hope we can constructively meet with you today and help reach good decisions.

(Slide)

MR. MINNER: I have given this show a couple of times. I think it is worth repeating. Maybe some of the consultants have not heard it before. I think I can address some of the concerns that have been expressed here and would welcome the opportunity to do it. This is a prioritization of generic issues.

We have to keep in mind that we are prioritizing to allocate -- we are prioritizing to allocate NRC resources. There will be a later step at the end of the resolution process in which people will look at value impact and decide whether the proposed requirements should be implemented or not implemented.

The NRC has terminology which I think you have to

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keep clear. The first process is a resolution. That means somebody identifies the idea and then you go on to allocating resources. The resolution comes through. There is a huge review and approval process and then it is implemented.

(Slide)

So prioritization is one thing, resolution is another thing, and implementation is a third thing, and you have to keep those concepts clearly in mind or else you will be asking this system to do more than is required. The system is not designed to decide if new requirements should be imposed or anything like that. It is to decide whether the NRC, and specifically the NRR staff, should be working on particular issues on how to best allocate their resources.

(Slide)

We think the process of doing this is very important. We are only a small group of people doing this. I have ten engineers in my branch and we have hired a contractor which has had maybe 30 or 40 people, not full-time but at various times working on it. It is a relatively small group of people and it is a wide range of subjects, and we have limited range and limited depth.

The first thing is to identify issues, and they come from various sources. We then assign it to my branch

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or the contractor, and then we come to the defining issue, which is a very difficult process and a very necessary one. I get into a lot of arguments with people about prioritization, and then you find they were talking about one issue and you were talking about another issue. The differences can be quite subtle, way down in the detail level. Definition is a very important thing. We spent a lot of time trying to define the issues.

Now, the next step is to prioritize using a defined method. We need a defined method because you have different people doing it. We want everybody to come out with the same answer if they are doing the same problem.

Now, in order to work on the safety issues, you have to identify what the nonsafety issues are. That is not an easy process because you get into big arguments about that. We have adopted terminology of licensing improvement and environmental. The licensing improvement issues are issues which do not directly affect safety as a general definition. Almost everything we do in NRC affects safety in some way or another, but only things which directly affect how a plant is designed or operated or constructed I am defining as generic safety issues and prioritizing.

Other things in which the review process is speeded up, we write review plans, we train resident inspectors, a lot of things like that, which can have an

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effect on safety, no doubt about it. It is an indirect effect, and we are calling those licensing issues.

Now, the next step is very, very important. We want a peer review process. As I said, we are only a small group. We cannot know everything. We have to have a peer review process which allows us to use the knowledge that other people have.

Of course, the ACRS is one of the important elements of that review process, and that is why we value your comments.

My rule has been, and I have been pretty successful in applying it, is that if somebody has a comment which will tell me I should do it a different way or use a different number, in almost cases we have accepted that. If the comments are you are not doing it right or you should do it better, I cannot do anything with those comments. In most cases if somebody has given me just a different number, not necessarily a better number, I am willing to write it down. People are not willing to give numbers unless they think it is a better number.

MR. MICHELSON: Before you leave that slide, would you explain to me how you decide that something has been resolved? In other words, you indicate the issue as having been resolved even though sometimes the resolution seems to be rather strange. What does the word "resolve" then really mean?

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MR. MINNERS: Resolved means that there is a proposed requirement on the book, or in the negative, people have decided not to make any changes. That is what resolved means. It does not mean it is bolted on the plant. It does not mean that the applicant or the licensee is starting to do it.

MR. MICHELSON: If you decided to revise a regulatory guide, is that not considered resolved, then?

MR. MINNERS: If the reg guide has been revised.

MR. MICHELSON: No, a proposal. You are saying you will revise it in the future, and that resolves the issue. But should that resolve the issue? Only after the reg guide has actually been revised would I think the issue is resolved.

MR. MINNERS: The latter is the case. After the reg guide is revised, you try to enforce the rule. If the guy is writing up the issue and says it is resolved, I say, okay, give me a reference. The best references are you can point to an SRP revision, a NUREG report, a reg guide revision, et cetera, et cetera. We have three classes of resolution. We needed it to describe the process that we happen to be stuck with. We have a note 1, note 2 and note 3. Note 1 says the resolution is available. That means somebody has a resolution in his hand or in draft form or something like that; the technical work is essentially complete but it has not been too well-documented and it has not gone through the review process.

We have a note 2, which we call the resolution is available. Usually that is when a NUREG report has been published and it maybe has some recommendations in it and it has gotten some management review. It has got a little more documentation to it, a little more -- people would hope it would be a resolution.

MR. MICHELSON: If you decide to turn it over to somebody else to do, that was your decision. Is that issue then resolved as far as you are concerned?

MR. MINNERS: No. Note 3, which is resolved, means you can give a reference which says here is the new requirement that resulted from this; the new requirement has gone through a review and approval process. And we would say then, you know, in our sense of the word "requirement" -- we play games with the word requirement. I hope you understand that. I use requirement rather loosely. The SRPs are not requirements, but I call them requirements for ease of talking about it.

MR. EBERSOLE: Would it be possible wherever you put "resolved" to have a characterization of the resolution? There may be some stubborn types who say, I don't care whether it is resolved or not, it is not resolved for me; and you would drag it on until Hell freezes over.

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MR. MINNERS: We tried to give a short characterization of what the resolution is in our writeups. That is hard to do sometimes. We try to give the reference. We really have to rely on the technical branch that is responsible. If they say it is resolved, it is hard for us to say it is not, although we do a little of that. We really cannot tell the technical branch that he has not properly resolved.

MR. EBERSOLE: I am talking about characterizing his resolution. You might say that he chose to ignore something.

MR. MINNERS: We try to do some of that, Jesse, but we don't really have the technical depth in all subjects to be able to do that. That is a continuing problem. That is one of the reasons that we use a peer review process, so that we get other people who have different views and don't have self-interest to see that the issue is resolved and say you forgot to do that, that is an important element and you have not resolved it.

MR. EBERSOLE: The peer review is only an advisory process. You can get all of the advice into a hopper but then it gets spit out in a resolution and - n take place without recognition of a number of the suggested propositions.

MR. MINNERS: I am not claiming that the system makes the world perfect, Jesse. That is a problem that does

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not have a lot to do with a prioritization process. That is where the review and approval process comes in, and are we doing a good job in resolving issues, are we really resolving issues or are we just counting beans and saying we are resolving issues.

That is a continual problem. This will not solve it except I think it helps a little because I think before, people would resolve issues, there was nobody who looked over their shoulder to make sure they were resolved.

Now, my branch does that. They look over people's shoulders, and we have our limitations and we recognize them. At least there is somebody saying maybe this isn't resolved. That, again, is going to get a wider peer review. It will go down to you and you will say it is not resolved. I have sent it out to the public and I have got comments back that it is resolved. Then you have to resolve those comments and there is some review of that.

MR. MICHELSON: Let me give you an example of what confused me. Maybe you can help me. I was looking, for instance, at the improved operations center as being a resolved issue. There were two reasons for that. One is that you have better space --

MR. MOELLER: Excuse me, Carl. What number?

MR. MICHELSON: Number 20 our generic issues number III.A.3.2. The second thing is there will be

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long-term improvements. You are going to redesign the center, including inlet factors and so forth. That leaves me a little cold because the fact that you say you are going to do it now resolves the issue without ever really knowing what you are going to do. It just says you are going to redesign the center. How does that resolve an issue?

MR. MINNERS: I do not have the piece of paper in front of me. If it says resolve, there ought to be a reference that you can go to that reference, which should specify what that regulatory requirement is. There has got to be something that says what it is. We all know that in our process, when a requirement goes out as a rule, it is very vague. We try to tighten up by issuing reg guides and Standard Review Plan criteria. Even then we don't cover everything. There is always a review, post- or pre-installation review that we do on these things, and there are a lot of arguments that go down in that process, too.

MR. MICHELSON: It is very likely that your long-term improvements will be a resolution of the problem, but of course one does not know until he sees these long-term improvements in some solid form.

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MR. MINNERS: Let me look at it later.

MR. MOELLER: It didn't seem, Warren, to fit with what you just told us. You had just said you have to be able to -- if it is resolved, you have to be able to quote a reference. The statement says it will be resolved by 12/83.

MR. MINNERS: We had a lot of problems with that area. There are defects in some of the write-ups. It is a difficult area to deal with. People want to have their beans counted and get credit for it. They want to call things resolved. And then when you say, okay, it is resolved, you don't get any resources, they say, well, I have got some continuing work I want to do. They want it both ways. That is the problem that we fight.

I am sure the write-ups sometimes reflect that, and sometimes the write-ups may not be well written. That's a possibility.

MR. FOSTER: In the same general vein, one of the things that I had a little problem with is on a few issues which are in fact kind of continuing to maintain the capabilities up to the state of the art.

To be more specific, one of those kinds of items is in dose calculations to the general populations. This is a gradual changing field, and every once in a while something comes along like a new philosophy from ICRP. You get better terms which can be plugged in. With your system here, I could see that that whole capability for the future being wiped out because of a designation that the issue is resolved.

We have an existing code which we are using, and therefore, no more effort on it, whereas I personally think you ought to have the capability. And I am not sure how your process here takes care of a situation like that other than to dump it.

MR. MINNERS: Well, like I say, I worked for the Commission too long and lost whatever engineering I had and had become a regulator. I think that is the way it ought to be. I think the Commission ought to be putting out requirements which are adequate. And if they are adequate, that is the end of it.

I have a lot of trouble with state of the art. I know people like to do that, but unless you can show that the benefits of bringing it up to so-called state of the art are justified, the costs justify it, I don't think you should be doing it.

Now, if the utility wants to do it, and they have got reason to do it, fine. I think the Commission should be putting out standards which say, this is adequate, if you meet this you are okay and if you don't meet this you are not okay. It is pretty black-and-white to me, and that is at contrast to a lot of people, scientific and engineering people.

And I agree with you, but there is a difference. Our formula does not do it your way. That is a policy decision, and I think the Commission is going towards this (indicating) and not towards what you suggest.

MR. FOSTER: By your philosophy then I would assume that the NRC would never go on to SI units or keep up with the rest of the world in terms of that kind of changing technology.

MR. MINNERS: Well, I listened to some of your comments. I think you unjustly criticize the method for just being a ratio of two numbers. I don't think we should stop work on some of that stuff. What I am clear on is that we should stop working on it and calling -- not stop working, but we should stop calling it "safety issues."

That is why I had that category down, like licensing issues. If people think that they ought to be changing to metric units and that is something the mission of the NRC requires, that has very little to do with safety. But we might want to do it. It is not a safety issue, it is a licensing issue and it should be budgeted on that basis.

One of the purposes of this list I think is to display the current list of problems that the NRC thinks are important in reactor safety. The list we had before gave the impression that we had 433 open issues. It is not the case.

MR. KATHREN: Just out of curiosity, you differentiate between safety issues and licensing issues. Am I to infer from that that a licensing issue is not safety related and may be something that you do capriciously, perhaps?

MR. MINNERS: No, I don't think capriciously. I tried to say before that one of the tests I apply is that safety issues directly affect the plant, and licensing issues are indirect effects.

I tried to tell you that everything the Commission does, almost everything that we do, has some relation to safety. The difference between the two classifications is the amount of directness. There is always a gray area between your judgment versus my judgment on which side it goes. There are some issues, like changing the metric issues, that is clearly a licensing issue. You might want to go do it, but it has nothing to do with safety. And there are other issues which are clearly safety.

MR. KATHREN: Just to play devil's advocate, let me disagree with changing to the SI units. Let's say that everybody else in the world made the change, including the instrument manufacturers. Would it not be appropriate then for this to be considered a safety issue because the people in the plants were using different units than the people in the rest of the world and the rest of the country?

There might be a little problem with communication, say, between the plant staffs and -- not the plant staffs or NRC because presumably you would be using the same units -- but perhaps the local emergency response group would be using a different set of units, and their instruments would be calibrated in different units. It could create havoc in the event of an emergency.

MR. MINNERS: That is why defining the issue is so important. Part of the definition of the definition of the issue is trying to decide what the objective of the issue is. If the objective of the issue that you present as an illustration is to get us in pace with the rest of the world, that is a licensing issue. But if the objective is to improve the human factors, reduce the error rates in control rooms, then it may very well be a safety issue.

So the same issue can be in either camp, depending on what the point is, what the people want to do with it. There are amny issues like that, and we have many discussions saying, why are doing this?

One of the examples was containment testing, Appendix J. People wanted to change the regulations, and you would say that is a safety issue. Obviously. But we had a lot of trouble with it because our perception was that the purpose of the change was not to change the safety of containments but to correct some errors that had gotten into Appendix J and to make life a little simpler for the utilities without really changing anything.

So without knowing what the objective of the issue was, you could very easily misclassify it.

MR. MICHELSON: One of the things that always bothers me when I try to come to grips with this thing is that you are dealing always with the value of a change in risk. Could you in a couple of minutes give me a little better idea of which risks? And when you do, give me the difference of risks of coremelt versus the risks of higher exposure for non-coremelt cases, such as exposure to the public for non-coremelt cases. Are you valuing that kind of risk as well?

MR. MOELLER: Jack Healy.

MR. HEALY: One question. I am a little confused. Is this the priority on the research budget from the NRC?

MR. MINNERS: No. I am from NRR. I am a parochial. I am just trying to prioritize NRR generic issues.

MR. HEALY: Excuse me, I am parochial too. I do not really know the NRC organization anymore.

MR. MINNERS: We are the good part. They are the bad part.

MR. HEALY: Where does the money for this come from? Is this the full pot of research money and development money?

MR. MINNERS: No.

MR. HEALY: There is research going on, to answer Dick's question perhaps, in other parts of the NRC?

MR. MINNERS: Yes. The research guys have the bulk of the money. They are doing their thing, and they have ways of prioritizing and allocating resources. They are struggling with a system. They are trying to develop one of their own. This is not it. This is to take the NRR issues.

NRR is the licensing branch of the Commission and deal daily with licensees. If there are requirements to be issued, it comes out of NRR. The contact with the licensees is through NRR and some through I&E. But we are the licensing branch.

The things that we look at are usually much more pragmatic and directly affect the plants. The research peo le are off looking at how bad fuel -- better PRA methods.

Later on, we were asked by the EDO to prioritize all of the TMI Action Plan items. Some are assigned to

Research and are researching kinds of things. And we prioritize those by the same method. We had some troubles too.

MR. MOELLER: Jack, I think you hit a key point. In other words, what is the purpose of our ranking? It is for regulation. I think that is the key point.

I think another point, back to what Dick said, I don't believe Warren is saying if later new data come forward that says an issue which we thought was resolved now appears to need reinvestigation, I think you would be the first to say let's bring it back on the table and reexamine it, would you not?

MR. MINNERS: That is part of the process.

MR. MOELLER: It is resolved for the moment.

MR. MINNERS: What 0933 I hope is going to become is an archive of issues, and it serves several purposes.

MR. MOELLER: I think Dick's point is that you believe there are certain issues that are -- that will be smoldering or developing for the next hundred years.

MR. FOSTER: I am thinking about maintenance capability too. You can use the nuclear power manufacturing capability of the United States which is -- as an example, if you don't have any foreign orders and you don't use it, it will disappear. If you decide instantly to crank it up again, you can't do it that fast.

So some of these things involve not only a smoldering issue but it is a matter of who is going to do it. If nobody has been in fact doing it for a 5-year period.

MR. MINNERS: And that has elements of safety in it. It has elements of non-safety in it. Some of those issues are hard to decide. But as I say, we are trying to focus in on the safety issues for licensing use. That is pretty narrow scoped.

MR. SHAPIRO: One question in terms of information you get out of operating plants that might help and the design of better systems and so forth that are not an immediate regulatory concern, do those go into your group or would those go into Research?

MR. MINNERS: I don't think the process is that well firmed-up to tell you what would happen with any particular issue. I could tell you what the organization is now. ORAD and NRR has been designated as the contact point for outside NRR, so issues that AEOD calls old division IE and the regions come in through ORAD. They inspect, and if they need immediate action, they take immediate action.

If they are plnat-specific, they take care of it. If they are generic issues, possible generic issues, they ship it down to me, and then we go through this numerology and we tell them this is a good, bad, or indifferent issue.

Things also come in other ways, like the Salem event. I am not really -- I did not identify it, I did not prioritize it, I did not do anything. Some of the high-visibility issues are handled in a different way.

Research also can define what they want to work on. And there is also a large backlog of research which NRR asked for which was not prioritized by this method. There is a whole bunch of stuff out there which has never seen this. It is not really a well-defined process.

The Commission is a complicated, integrated organization. No such simplification as I am talking to you will really describe the actual situation.

MR. EBERSOLE: I think you have the question --

MR. MOELLER: Thank you, Jesse.

MR. MINNERS: I am trying to get to this slide.

(Slide)

I don't think anyone can argue with the method in which we use PRA in the system sequence analysis looking into the issues and explaining what the issue is and what the resolution might be and all that kind of good stuff. That is just good engineering analysis, and we try to quantify it as much as possible. Nobody can disagree with that. That is the way everything is done.

What you can disagree with because it is a policy question, a judgmental question, is what criteria should you use for deciding high, medium, low, what you are going to work and what you are not.

This displays our criteria.

(Slide)

We based this on the safety goal as it was published in the NUREG-0800. So we have adopted what we thought was the policy direction at that time. That has two features. Wherever the issue falls in here, it gets a basic safety priority ranking, which is only a tentative one, but it starts out from here.

On this axis is the change in risk, and we have stated it on this graph in percentages of the safety goal. Numerical guidelines, the old safety goal before it was published as a policy statement. On this axis --

MR. MOELLER: Is that the change in overall risk that this improvement would bring about, or is the change in risk related just to that particular system?

MR. MINNERS: This is a change in risk. We go through, identify the issues, and identify what we think are proposed fixes. So this change in risk is a change in risk that would happen if you put this proposed resolution on a plant. That is, you guess.

MR. MOELLER: The change in the total risk of plant.

MR. MINNERS: Due to that resolution, it says you have to have a turbine-driven auxiliary feedwater pump. We analyze and see what the change in risk is. If there are downsides, if the thing decreases the risk for some sequences and increases the risk for other sequences, like putting more safety valves on for ATWS -- which isn't true -- we would try to get the net change in risk.

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MR. EBERSOLE: There are two pieces to this. One being more realistic than the other. The somewhat abstract risk in the context of dose translated into dollars is one kind of risk, and that is the one you're working on most of the time.

MR. MINNERS: We have not transferred dose into dollars.

MR. EBERSOLE: You're going to talk about the other kind, like the core melt and the dollar aspect of that, and its lower consequences?

MR. MINNERS: Let me get through this, and if I have not answered your questions, I probably don't know the answers.

The other axis is a value impact score, which is the ratio of the man rem to implementation cost. There are other things that are usually included in value, and there are other things that are usually included impact. Maybe we shouldn't use value impact. This is narrowly defined and labeled the S score, as the converted public dose for this proposed resolution over the estimate dollars to install this thing, which includes any shutdown costs that you might have to incur for extended shutdown.

Let me go through this because there is a reason for all this.

MR. MOELLER: Is there consideration there of the occupational dose incurred in doing it?

MR. MINNERS: No. In calculating the S score and finding out where it falls in these boxes, no. This is limited to public dose. This is limited to industry, direct cost and NRC costs, but NRC costs are always so small you can really forget about them.

MR. MICHELSON: The industry direct cost includes the cost of replacement power if it is out for a long time?

MR. MINNERS: Yes, sir. If you have to extend the shutdown.

MR. MOELLER: I don't want to delay you, but it's troubling me. Someone within the NRC would look at the balance of occupational dose versus public dose, say.

MR. MINNERS: Don't let me get beyond this graph because we do this.

MR. MOELLER: All right, thank you.

MR. MINNERS: So this line here would be 10 percent of the safety goal, which would be a core melt probability due to a single issue of 10^{-5} per reactor year. That sort of says there are 10 big issues that would be 10^{-4}. It is very rough, but you have to allocate the 10^{-4} issues, and unless you do a full-blown PRA, you don't know how to allocate it.

As a rough guideline, we've said it is an attempt at a core melt safety goal. It's also an attempt -- the other thing is man rems. This is 10 percent of the individual risk converted to man rem. Up here 100 percent --

MR. MOELLER: We have a question.

MR. HEALY: How do you convert individual risk to man rem?

MR. MINNERS: I have a little thing, and I can give it to you but I don't have it up here with me. It is, basically -- we have said you get one latent fatal cancer per 10,000 man rem, and the individual near the plant would get a dose which is about 100 times greater than the average dose.

MR. HEALY: Has this been shown?

MR. MINNERS: Those are rough rules of thumb. I think if you talk to the dose calculators, which we did, I think you would see that. Once again, it's a very rough rule of thumb. You don't go down -- there's a lot of slop in there. In our analysis to calculate man rem, we take what we call a typical site which has the average -- the mean population density -- Midwest meteorology. The meteorology doesn't make that much difference, but the population density can. We're talking about generic issues. That is a continual problem of how you assess the priority of generic issues when the plants vary so widely. There is a factor of 10 or more in population density.

MR. MOELLER: But you use the same numbers in all of the evaluation hopefully, relatively speaking.

MR. MINNERS: The directions are you're supposed to use the standard methods for comparability, but that doesn't mean that you turn your brain off. If there's good reason for using a special thing, if the mat melt-through is an important event, you ought to deal with that in some way. You've got to consider that if that is an important factor in the particular issue being considered. This value impact ratio is from the old safety goal -- $1000 per man rem, so issues which are on that line, we say hey, that's where you ought to be; that's about a medium issue. Once you get above the line, you get a little more credit and you push yourself into a high. And this line here, if you are about the safety goal of risk criterion, and if you are above it, you do it -- you look at it no matter what the cost is. If it is a little bit too low, you look at it, but at a pretty easy pace.

And when you get down into these areas here, either it's such a low risk that you can forget about it, or up in here (indicating), there the value impact is so bad that it's really not worth looking at, and it doesn't have much risk.

The purpose of this is to standardize. I have 50 people doing it. I really have only got 10 people doing this. You have to have some kind of guideline so people are going the same way.

The next slide is very important because the analyst is required to look at other considerations. The 0933 introduction has a long list of explanations.

(Slide.)

Then you take the basic priority ranking that you got from that matrix and you modify it based on your judgment and maybe some quantitative calculation. Uncertainties are considered. We have not gone through -- we've started out doing it, but we don't do it anymore -- calculating the uncertainty associated with it. We know the uncertainties a lot less well than we know the point estimate -- they are always large. It was just a kind of useless exercise to be calculating uncertainties for every issue.

If there is a particular problem with uncertainty in issues, usually the problem is a complete lack of information. Then you have to deal with the question usually in a quantitative way to make an adjustment up or down.

Occupational dose. We consider occupational dose, and I think I heard Dr. Moeller say that we don't. But we do. We balance it against converted dose to the public. We started out basing this on curies released, and we were told that did not properly take into account the biological effects of different isotopes. That was one reason.

My reason for accepting that is that it allows us now to make a comparison between the public dose converted by the issue if it were implemented and the occupational dose that would be incurred and the occupational dose that would be converted. I think that is important.

MR. MICHELSON: Before you leave number 1 too far, on this uncertainty question as I understand it, we examine various postulated accidents that might involve, say, single failures of certain components and so forth. But the general rule of the agency is they do not look at multiple component failures except in some very special cases; say, like loss of all AC power.

Do you go back and look at multiple component failures from the viewpoint of risk now to see if maybe there aren't some fairly high probability multiple failures that have also very high risks, and, therefore, might be more important to work on than some of the other stuff we work on. Do you look at that kind of uncertainty? How does that one get factored in? Is it under one of these other issues?

MR. MINNERS: The life of the risk assessor is a hard one. We really do not know that much about the issue when we get it. There's very little information and it depends on the abilities and the knowledge and the intuition of the assessor, and he is encouraged to do the best job that he can.

MR. MICHELSON: Let me give you examples. We looked at the loss of all AC power. How about loss of all service water? How about loss of all DC power? There are a number of these other multiple failure issues. Do you go back to see if some of them actually have some pretty high values and, therefore, should be worked on? In other words, are you looking for issues or just addressing the ones that are handed to you?

MR. MINNERS: That is a problem we haven't resolved yet and haven't been able to resolve. We have been working on this huge backlog. We have had enough issues to work on. Nobody wanted anymore to work on.

We have now come to the point of the question: are we going to be a searcher-out of issues or are we going to be an evaluator. I don't know the answer to that question. I think we're going to be a little bit of both. Mostly, we are going to depend on other elements of the organization like AEOD to feed in the operating experience.

MR. MICHELSON: What I'm getting at, which I think you are answering all right, but I want to make sure it's understood, it may be that using your particular techniques, you will find some very important issues in terms of value impact, as you are doing here. But you're apparently not looking for those. They have to be found by somebody else. Somebody else has to bring them to your attention; the fact that if you use your technique there are some issues that have a high value that you're not working on.

MR. MINNERS: How do you identify those issues? I don't think there's any systematic way to do that.

MR. MICHELSON: I think not.

MR. MINNERS: We have a lot of PRAs being done. That information is getting back. We have systems interaction studies. That's being fed back.

MR. MICHELSON: I want to use the example of component cooling water, service water. Two trains of that does as much or more as loss of AC power, but no one brings that up and says here is the risk and this is why we're not working on it, or why we are working on it. Nobody even talks about it really, except Jesse talks about it every day.

MR. MINNERS: But ACRS wrote up a report based on their review of LERs and had a lot of issues. We have prioritized those, and we have looked at them. If you want to send us a letter or a note or whatever, yes. You're as good as the public or the staff, we'll accept it.

MR. MICHELSON: If we sent to you a thought about an issue, would you come back and tell us what you think the value of it is and so forth by your method?

MR. MINNERS: The process I have is after we have made our determination -- and that includes a lot of interaction with a guy who thought of the issue in the assigned branch, which may be different but usually is not, and whoever else we can dig up to give us some help. We write up our thing in draft form. The routing slip requires that the assigned branch, up through the division director, sign off on that. I have insisted upon the division director looking at this stuff. It's not required that we have complete agreement, although in most cases we do. They're supposed to give us comments and we try to incorporate the comments or compromise.

If there's a case where we have disagreement, we go to a higher authority and get the issue resolved, we get it straightened out. In addition to the routing slip where people have to sign off, we have copies that we send to various people. We always send copies to all of the other divisions. They are technical assistance, they are supposed to look at it and see if their division has any input into it.

If there is an issue generated by AEOD or whoever the author is, he gets a copy of it, then he can make comments. We don't wait for them. He's got 10 days like everybody else. He can comment.

And then on occupational dose,issues that involve occupation dose get sent out to -- I forget who takes care -- Conjel's branch -- so that he can take a look at them if he wants to. That, I think, is a serious subject. It's difficult to get all of the issues. I don't know who should be a generator of issues.

MR. EBERSOLE: The issues, when they stand out as starkly as the Salem case and you used to work on the ATWS case years ago and I worked with you -- back then it was easily visualized. Then we had in front of us the problem of the so-called simple redundant breaker case with no diversity in function, and clear potential for common mode failure, and the modest cost to provide some degree of diversity. And the same thing still exists with the common dump in the boiler. We had to wait until something physical had to happen. Is this a new day dawning or are we still not buried in trouble with your item 1 up there?

MR. MINNERS: No, that's always going to be a problem.

MR. EBERSOLE: I was dismayed --

MR. MINNERS: There's no assurance that we can find the important issue. Nobody figured out the Browns Ferry scram.

MR. EBERSOLE: But the intrinsic potential was there and still is.

MR. MINNERS: But we identified what the common mode failure was. People had done PRAs on that and said yes, the scram discharge problem is a common mode failure, but they thought it was a level switch. That was not the problem.

MR. EBERSOLE: The same is true with the Salem breakers. These are in clear view, and they persist until something deadly happens.

MR. MINNERS: I don't think deadly has to happen.

I hope this process is going to pick up precursors and get people working on them. My perception is, Mr. Ebersole, the agency has been very good in identifying safety problems. I challenge anybody to point out a safety problem that has not been identified and run around and looked at.

The problem with the agency has been that they have not worked those problems through to resolution. I am trying to get this process to focus -- I don't care what other things people do in the agency. I want to make sure that they do work on these safety issues. If they want to work on other stuff or write ANSN papers or whatever they want, that's fine by me, but we have a generic issue management control system which has milestones on it. And hopefully, that will get people to resolve these issues in a timely way.

That is the purpose of this thing. It is not to make a big, long list of issues. That's not the purpose. The purpose is to identify the ones that you ought to be working on, and get people working on them.

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MR. MOELLER: I think Warren, too, on your behalf the Subcommittee should certainly understand that you have worked long and hard on this and this is your proposed scheme for selecting the issues that need to be given the most attention. If somebody here has a better scheme, you would love to hear about it.

MR. MINNERS: No, I wouldn't want to hear about it.

(Laughter)

MR. MOELLER: As improvements on this scheme.

MR. MINNERS: The Agency, and I include the ACRS in that, how are we going to decide what issues are important? This is one method of deciding that. I think it has been following the Commission policy direction, is if somebody else comes up with another idea, unless it gets some degree of approval and agreement within the Commission, I don't think it should be used.

These are rather arbitrary decisions that you make of what criteria. No, I don't think people when they look at this method are approving the process of going through and analyzing issues. What you are really agreeing to is that this system of value impact ratio and risk is the way that you are going to judge the safety significance, the cost-benefit of issues.

If you differ with that, there is almost no use

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talking to you because we are talking on completely different things.

MR. SHAPIRO: You have to prioritize the issues that you prioritize?

MR. MINNERS: Yes.

MR. SHAPIRO: If someone comes up with an issue, there is a chance it will not be looked at for a long time?

MR. MINNERS: Yes. We are trying to get into a process that we do respond immediately and tell them, don't call us, we will call you type of answers, or we are going to do it in a week, or whenever we think we are going to do it. I am trying now what I call leap-frogging. We still have some backlog of issues. We are working on those. As soon as a new issue comes up, I am trying to get that prioritized in a short period of time, giving it priority over the backlog so we have credibility in the system, so that when somebody defines an issue, they can see that some action is taken. The other backlogged issues are stale. If they get staler, I don't think it is going to hurt.

MR. SHAPIRO: Have you come up with a number as to how long it normally takes you to resolve an issue? I know it depends on the complexity. Do you have a mean value?

MR. MINNERS: No, it is hard to do. I think what we have said is that we allocate about three man-weeks to an

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issue. That three man-weeks may be spread over a month or more. It is very hard to say, and I do not have good numbers on it. A large part of the problem is going out and finding out what the issue is. That assumes a tremendous amount of time. It is the usual problem of phone calls back and forth, finding people in their offices with enough time to talk to them and that kind of stuff, and you have to go out and try to dig up some data. Somewhere you have to get a number which says what is the frequency, what is the problem. Running through the writeup and that kind of stuff is the smallest part of the job. That's easy compared to the rest of it.

The peer review process takes a considerable amount of time. We ask people to return their stuff in ten days, but sometimes they don't. It gets to be a lengthy process.

MR. MICHELSON: How does this process tackle a more complex issue? Let me give you a simple example, the operability of motor-operated valves. Now you are dealing with a whole spectrum of possibilities where motor-operated valves are used, a whole spectrum of adverse or incorrect operations. It is a very complex issue.

Do you try to tackle that as an issue, in other words, operability of valves, or do you tackle specific applications of valves and how this might affect them?

MR. MINNERS: There is an issue that has to do with valve reliability, pump end valve reliability. That is

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from Oconee, I think. We tried to change the numbers of pumps and valves and come up with a new risk generation. It is a rather crude method. About all it does is show the worst that pumps and valves can do. No, this does not deal very well with highly complex issues. It can't. There is not enough time spent on it.

MR. MICHELSON: You do not try to break the issue down into specific applications? That is a good example?

MR. MINNERS: That is always a problem with issues, what size should the issue be. It has got to be big enough so it really deals with the problem of all of the important facets, but you can end up doing a whole PRA. It has got to be small enough to be bite-sized, that you can actually --

MR. MICHELSON: I am getting back to my original question of what do you mean by risk. Operability of valves can have a significant effect on risk to the plant if you consider the issue as a total one. If you consider it as a specific one on a particular system, the risk may not be very high, so if you took and broke it all down, it would look like a non-problem if you looked at it in little pieces at a time; whereas, if you look at it as a whole, it could be, you know -- it gets back to the other question of multiple happenings during an accident. You may find several valves do not work because they all saw the same new challenge and none could work under that circumstance.

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MR. MINNERS: Defining the issue is very important. You can define the issue away.

MR. MICHELSON: If you break it down small enough, you may argue that it is a non-problem.

MR. MINNERS: Averted plant damage is considered in other considerations, not in the calculation of the S score. I think this is important because if you don't consider this, you won't be weighing solutions properly. Averted plant damage says it is better to have prevented than mitigated solution. The Staff would rather have mitigated solutions. It would be more all-encompassing. We would rather have a better, bigger containment rather than improve operator error rate. If you do not include averted plant damage, they may come out to have the same value impact when they really don't. A preventive fix is better than a mitigative fix.

MR. HEALY: How do you include it? You say you do not include it in the S number.

MR. MINNERS: We have some standard numbers in the report that we use for this. This is really not too important if you are talking about frequencies down to 10^{-5} per reactor year. This is a small number.

MR. HEALY: I don't know what factor they are using for the containment now. When I was doing reactor examinations, it was about 1 in 100 for containment failure.

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If you figure $1 billion for the accident in the plant, such as Three Mile Island where you louse up the whole thing, it would seem to me that this could be a very significant factor in your S number.

MR. MINNERS: You take the billion dollars and you present worth it, which makes it half a billion dollars.

MR. HEALY: Wait. Present worth from when to when?

MR. MINNERS: You presume the accident will occur in the midpoint of the plant life, don't you, on the average? Unless you want to get real fancy and say that the error rate, it is a bathtub curve or something like that.

I guess all I can say is we assume that the accident occurred at the midlife of the plant.

MR. HEALY: You are going to discount it to the midlife of the plant, yet at the time that the accident happens, it is actually going to be inflated.

MR. MINNERS: We do not include inflation. We look at constant dollars. We are looking at 1982 dollars.

MR. HEALY: 1982 dollars, and you discount it to the midlife of the plant.

MR. MINNERS: Right.

MR. HEALY: Is that in constant 1982 dollars?

MR. MINNERS: No.

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MR. HEALY: It seems to me you are under-estimating your risk to some extent, your cost.

MR. MINNERS: Inflation makes it better. It makes it even less present worth.

MR. HEALY: That is if you have a certain amount of money to put into insurance now.

MR. MINNERS: And they do.

MR. HEALY: Oh, yes, I realize they do, but not the full amount. That amount of insurance is not available.

MR. MINNERS: You are trying to make an economic calculation. Averted plant damage is purely that, what is it worth. Should I put one million dollars away today in a bank account or should I put the one million dollars into the plant design? That is an easily answered economic question. And then if you think your plant is going to have accidents at the rate of 10^{-5} per year, when you multiply it times the half-million dollars, it is not a big number.

I think that is a fact that people ought to recognize. I think there is too much reliance on the economic impetus to utilities. I think when you look at it, it is not that big if you get down. There is no impetus economically to go down to 10^{-6} or 10^{-7}. It is not worth it purely economically.

We also have defense in depth. We think it is a Commission policy that we ought to have more than one way of preventing and mitigating accidents and realize our

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fallibility. That is why we have defense in depth. It is kind of hard to quantify. But even if you come out with low public risk, you may want to do this just to keep a level of defense at some reasonable level of reliability.

I guess we can even put the ACRS in this. This is a fact of life (indicating). You have to give it weight. I'm not sure how much weight you give it, but it is a fact of life. Technical controversy is really somewhat uncertainties, but again, if somebody who had a lot of expertise in the area thought it ought to be done and other people thought it ought not to be done, that is really an uncertainty question.

There may be some issues which you would say would be immediate priority, but if you did it on that time scale, thermal shock might be a problem. You would prevent yourself from being able to do one of the solutions. On that base you may go from a medium to high priority. And then we have the near resolution.

If it is close to resolution, all that is really left to do is the value impact analysis. That is the same thing but better than what we do, so why do it twice? Just do the value impact analysis and make a definitive decision and that is the end of it. Do not do a prioritization, which is sort of a very quick and dirty thing.

MR. HEALY: If I may return to this again, you

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discount the public dose?

MR. MINNERS: No.

MR. HEALY: The cost?

MR. MINNERS: I did not understand your question.

MR. HEALY: You discount the cost that applies to the public dose.

MR. MINNERS: We do not monetize public dose.

MR. HEALY: You certainly have a dollar per man-rem or some such thing.

MR. MINNERS: I have a ratio of man-rem per million dollars, and I compare that to a line which is one thousand --

MR. HEALY: Is the million dollars discounted for the time at which the dose is received by the public?

MR. MINNERS: The million dollars is not associated with dose. The million dollars is associated with implementation costs.

MR. HEALY: Exactly. That is discounted.

MR. MINNERS: No.

MR. HEALY: The implementation may go on over a 30-year life of the plant. Is that discounted?

MR. MINNERS: I'm sorry, I didn't hear you. I just didn't hear you.

MR. HEALY: The resolution of the problem may require the expenditures of funds over the full life of the plant.

MR. MINNERS: Yes.

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MR. HEALY: And that is discounted. What I am thinking, the amount you spend $30 years from now.

MR. MINNERS: We do include operation and maintenance costs. You have to retrain operators every three years. I'm sorry, I cannot answer your question.

MR. HEALY: Let's go back. I think I put in a red herring. Would you tell me how you include the averted plant damage if it is not in your S number? How do you include it?

MR. MINNERS: We may do a separate calculation on the back of an envelope and do the S score over again, write that in qualitative descriptive terms without putting numbers down again.

MR. HEALY: And decisions are made on the numbers.

MR. MINNERS: No, sir. That is the point I want to get to, that you take the S score and you modify it with these other considerations, that is, the assessor, these as appropriate, but he must explicitly state why he is changing it, what would appear to be in the matrix, do some other ranking based on this thing, and that is how we come up with our ranking.

So you notice on here there are no off-site damage costs. For our purposes we did not do that because man-rem and off-site damage are roughly correlated, and there is no use doing it twice. If you had to calculate off-site

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damage, it would be some arbitrary algorithm of population, of so many dollars. We do not have actual plant site data . We have to use some hokey thing, and it seemed to me it was not really adding any information for off-site damage to include off-site damage dollars in this calculation.

MR. MOELLER: In a subcommittee meeting held on the Wednesday before the April full committee meeting, Tom Murley gave us a presentation on a technique he is attempting to develop to have a formula for estimating the economic costs of nuclear power plant accidents, and I hope I am not misinterpreting or misquoting what he told us, but one of the bottom lines was that the population collective dose was in no way a measure of the economic impact.

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MR. MINNERS: I just went through the Sandia report which calculated doses. When you look in there, there is a correlation. It may be different by a factor of 5, which for our work, I'm sorry to say, is not a big deal. But then again, that may be because the CRAC code that has algorithms that take curies of dose and calculates property damage. I don't have any real data on actual size which say you have this amount of man rem versus the amount of property damage. In our thing, we don't have that data.

The only thing we can do would be this rather arbitrary algorithm. It's not worthwhile, so we have not -- although we recognize it is there.

MR. SHAPIRO: Is there a lower dose that you put in in calculating population dose? 25 millirem, 50 millirem?

MR. MINNERS: We use the CRAC code and integrate out to 50 miles. We use the WASH-1400 source terms.

MR. SHAPIRO: You integrate to 50 miles because of what it might be after 50 miles, regardless of how low it might be at 50 miles.

MR. MINNERS: Correct. We don't have a refinement on dose rates.

MR. EBERSOLE: Number 5 up there has inherent within it the notion that if we have another TMI-2, if we have something like TMI-2 or a realized Salem ATWS or something, that there will be an impact on the business in general that would shut it all down. Is that the kind of thing that's in 5? That is, is there more or less broad-scope consideration taken that we approach the loss of the nuclear power option as we foul up a few more times?

MR. MINNERS: I don't think that's in our assessment, no. That doesn't mean there may not be a particular issue. If we could explicitly state what is a consideration and how to use it, it may be accepted. I can't think of any issue that would have said that we can't afford another core melt, so we ought to do this.

MR. MOELLER: Dick Foster.

MR. FOSTER: Some of these issues have more than one feature in them. As an example, issue number 1 says failures of air monitoring, air cleaning and ventilating systems. There are three different things which are involved there. As I recall, in your analysis it was the air cleaning function which was used; at least one which was talked about.

Do you, in making your evaluation, just focus on one of those, or do you take all of them into account? More specifically, I'm concerned about the air monitoring. I didn't see any words about it. I'm not sure how that fits into your formula.

MR. MINNERS: I can't give you a generally applicable answer to that. The evaluator has to look at it

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and has to decide how he is going to define the issue. That is always the balance between making it big enough so that all of the interactions and side issues are included, and making it small enough that there's something he can deal with.

We're struggling. There are a lot of little side issues. He looks at the station blackout, the decay heat cooling, service water loss, debris bed pump seals and how do you deal with that issue? How big an issue do you make it? How many things do you consider?

MR. FOSTER: In this particular one, my personal reaction was failure of the air monitoring system might get a plant in more trouble than the air cleaning system. If you had a release that wasn't properly monitored, people who are running the plant have no idea as to whether they should call the NRC and say we have had a significant release, or whether they shouldn't. What sort of local action do you take?

I'm sure it would be very embarrassing to them to call up and say I think we have had a release, but we have no idea of what magnitude it was, or what action we should take. I don't think your formula here takes care of a situation like that. I think it would drop out of the cracks.

MR. MINNERS: I think we have a problem, too. We try to deal with the issue as it is presented. We try not to impose our ideas of what the issue should be or should not be on it. Sometimes you have to. The issue, as written, just does not make sense. We try to take the issue as we think the author of the issue meant it to be. Sometimes, nobody knows who the author is. Things get difficult.

Once again, it's a matter of defining the issue, and that's all important in what you come up with. You can define it in a way so that nothing happens, or you can define it so that it's the worst thing that ever occurred.

MR. MOELLER: This is a curiosity of mine and I was wondering if it was treated anywhere. Let's say that you have a particular failure that results in a lot of LERs, and let's assume you assign dollar costs to the writing up of an LER and so forth. And by spending -- let's say there are 300 LERs in this category per year, and call them $10,000 apiece or some number, and you come up with a number. Then you could also calculate that by spending half a million dollars or something, the industry or the equipment manufacturers or someone could build whatever gismo it is that is failing, build one that is much more reliable, and, therefore, the plants would not have these LERs and would not suffer this cost.

Would this be considered anywhere in your system? Would it be a licensing category thing?

MR. MINNERS: I think I know what you're talking about. We're sensitive to being accused of economic regulation of nuclear power plants, which we don't want to do. But in deciding what a fix should be, you should consider all relevant factors,and some of those are economic. A fix which not only protects the public, but saves the utility money is certainly better than a fix that only affects the public.

I think those considerations ought to be included.

MR. MOELLER: Would they fall under any of your eight items in your other considerations?

MR. MINNERS: There are converted damages in there, and maybe not specifically on there, but plant availability is considered. In fact, we have had some trouble that people have been over-eager to take credit for plant availability, but we didn't think it was proper.

But before you start considering the economic factors,there has to be a kernel of public safety in there. I will probably insult somebody but that's okay. If you take an issue like setpoint drift and it has no or very low public risk associated with it, that is your judgment, right? It incurs a lot of LERs, and if a guy could get better instruments, he would save money. I don't think we would allow that. That would be fairly economic.

If the risk were higher from setpoint drift, we would say if you fix setpoint drift you improve public risk, and besides, you save yourselves money.

MR. MOELLER: Then I would recommend it.

MR. MINNERS: I would consider it. It is a judgment call. We're sensitive to being told that we are economically regulating, and we have no intention to. But I think it's absolutely essential that all of the factors, including economic ones, be taken into consideration when you make a decision. If you don't, you're going to make wrong decisions.

MR. EBERSOLE: Would this kind of an issue fit into your picture? It's a broader scope. You take one end of the spectrum, I will take another. The current LER system does not report progressive failures of systems until there is an integral system failure that is a complete functional failure. That is a fact of life.

Now, the INPO folks are supposed to have a system that will report progressive failures of channels, components and channels, to ultimate system failure but they are not doing it.

MR. MINNERS: I would classify that as a licensing issue. It doesn't have any direct effect on safety.

MR. EBERSOLE: What it does, it permits a standing state of affairs in the field which permits progressive approach to total failure, and nobody knows of the progress.

MR. MINNERS: You might be able to make that into a safety issue if you said should you have a reliability assurance program or guides. It is, again, how you define the issue and what the objective of your resolution is that would say whether it is a licensing issue or a safety issue.

Now, the purpose of the priority is to get people working on things, and as I said, the nearly resolved issues we don't put a value impact score on them, because that would be a process that would be done in the resolution, and that is the last thing to be done. If you are at that point, why should we do it? Let's get the guy who knows the most about it to do it.

Issues that are high priority are scheduled for resolution. We now have a generic issue -- management control system. That came out to be gimmicks. I don't know if that has any meaning, and we have schedules. In the handout we passed out, there are the latest schedules that we have.

As everybody knows, schedule monitoring is a difficult task, and I don't know how accurate that is, or how well we're going to do it, but we have good intent. The purpose is to get people working on these issues and get them resolved.

Medium priority issues are issues that we are going to schedule in the out-budget years, 1984 and 85, 86. The budget assumptions-- we will have them all done in 1986, but don't quote me on that. We originally had a low priority to provide a buffer for things you were going to work on and things you were absolutely never going to work on. We got shot down. They said no, this stuff is of such low safety significance that it also should be dropped. So these two issues are in the drop category, and we don't intend any further work on them. Drop or low priority does not mean disappear. All that means is it just becomes -- 0933 becomes archives with your reasons why you put this in this category.

If there's new research information, new analyses, someone gets a different idea, new insights, you can bring these back to life again anytime you want to. There will be great resistance to doing that, but if there is a good reason, it will be done. This is so that when issues come back up, you can see that is not a new idea. We looked at that five years ago, and here is what we said we were going to do with it. Do you have any new information; if you have new information that's significant we will deal with it. If not, we did it once, we will not do it again.

MR. KATHREN: How would you retrieve one of those items that you had dropped? Would this be done by somebody remembering that it had been considered, and going to the file? Or is there some sort of --

MR. MINNERS: We're trying to develop a computer search capability. Our list has now gotten so long -- I don't know where it is. We should work hard on it. I do think it's important. We have to have some kind of an aid.

The other thing you do is look at the list and start moving your finger down the page. Unfortunately, some of the titles are not too descriptive. There is always the problem of going back and getting material out of the archives.

MR. MICHELSON: Would you define again note 1 and note 2?

MR. MINNERS: Note 1, note 2 and note 3 define various stages of resolution. We found it was necessary because that's the way life is. In NRR, there are various stages of resolution.

MR. MICHELSON: What does note 1 mean, then?

MR. MINNERS: It means that somebody has worked on the problem and has proposed resolutions. It is not well documented. It is available. If you talk to the guy he can tell you what he thinks it ought to be, or he may give you a draft of something. But there is no real document that can be referred to. The idea is there; the justification is somewhat formed.

The next higher step is note 2. The resolution is known and proposed and written down in some kind of a document, usually referenced like NUREG, draft SRP, but has not been approved yet. It has gone through the technical management maybe; they have said yes, that's what I would recommend, but it has not gone through all of the management, it has not been reviewed by ACRS, the public comment and all of the other things we go through. It should be a piece of paper that you can read.

Note 3 is when it is really resolved. It has gone through the review process, the approval process. It is something that the agency says yes, we are going to do and when we are going to do it, and that kind of stuff. Exactly how we're going to implement it in the plant is still an open issue. If it is a note 3 issue, you should be able to read some criteria which say you have to have two pumps or a single failure, or whatever the resolution is, and that is reviewed and approved by the proper review and approval procedure.

MR. MICHELSON: Would you now indicate how the terms "licensing issue" and "environmental issue" relate to notes 1, 2 and 3?

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MR. MINNERS: We really went in 0933 a little beyond what I think we should have done, but we had to go through all of the issues and identify them as safety or licensing or environmental.

And during that process, we found out more about the issues than we wanted to know. Sometimes you found out they were partially resolved. And we did not throw away that information. We were looking at an issue based; on the information we could find, it was a licensing issue, and also, at the same time we determined that it was partially resolved, we wrote that down.

But the posture I am now taking is that when I find a licensing issue, I put a memo on it, send it over to what I think is the responsible division and say, "We happened to come across this. Do with it what you will. It is up to you. You know what your division needs. It is your decision. Go to it."

MR. MICHELSON: You still leave me confused. If I have one labeled "licensing issue," it might be an old one, two or three; is that right?

MR. MINNERS: If it is in there now. We have changed it around a bit; as a licensing issue, it will have "LI" after it. Some LIs may have no one, no two or no three in parentheses. If it is a licensing issue, it will say LI.

Now there are a couple of licensing issues that are listed on Table 2 which are safety issues. We went through the thing again, part of the peer review process, and they say it is not licensing. It is a lot of safety content, why are you doing it? And we say okay, we did it wrong.

MR. MICHELSON: You still leave me confused. Maybe I am the only one.

MR. MINNERS: I don't understand where you are going.

MR. MICHELSON: I'm not going anywhere. I'm just trying to understand what you are presenting. Most of the rankings I have seen in the material handed to me indicate high, medium or low, or environmental or licensing. I don't even find any notes one, two or three.

MR. MINNERS: What do you have?

MR. MICHELSON: I don't know the source of this.

MS. TANG: That was obtained from 0933.

MR. MICHELSON: You have not transcribed the notes that might have come from it? They are in there, but just not in here. I don't recall seeing it.

MR. MINNERS: If you go to Table 2 in 0933, you will see note one, note two, note three, note four, LI and environmental.

MR. MICHELSON: We need a copy of it to understand it. What you are saying, I guess, you define the environmental issue as a priority and a note beside it indicating what the condition might have been.

MR. MINNERS: We did not do as thorough a job on licensing improvement issues. It may not be as accurate. We did not -- it may mean that we did not look at it that hard. We did not try as hard on those issues as the others. Whatever information we happened to turn up in finding out -- all we wanted to know is whether it was licensing or environmental. That was the only information we wanted.

MR. MICHELSON: I don't know if I would want to know whether it is almost resolved or not. I think it is a major consideration of whether it ought to be finished up or dropped, for instance.

MR. MINNERS: That is not part of this program. We are not dealing with licensing or environmental issues. We are only going to work on generic safety issues.

MR. MICHELSON: Maybe it was in the translation. We did not get the notes to go with the rest of it.

MR. MOELLER: Ms. Tang is getting the document. We will look.

MR. MINNERS: I think that is the end of what I have to say. I hope I have cleared it up and showed the purpose of the issue and how we work it. I think it is a good system. I think it combines the rigor and system approach of quantitative probabilistic risk analysis with good engineering judgment. Both are allowed and both are required.

I keep telling the story of one issue in which the engineer, in doing it, came up with numbers which fell into the medium or low priority bounds, I forget which, and yet his judgment was that it was a high priority issue. He wanted to rank it as a high priority and I said, "No, you can't do that. Either your judgment is wrong or the numbers are wrong. Go fix one of them."

He went back and looked harder and he found more data and found out the failure rate was a factor of 10 higher than his first search had found. And then the numbers jibed.

Although the exact same may not be done, that is the kind of system we want to deal with. We are not just going to say, "My judgment is better than the numbers, or my numbers are better than the judgment."

If you have disconnects, you're going to have to explain why there are disconnects.

MR. MICHELSON: Could you go back to your previous slide and answer one more question? Maybe it is the way in which the thing was written. Maybe you did not mean that.

Under item one, you indicated "nearly resolved, notes one and two," and under items two and three there was no reference to any notes. Was this to infer that if you had a note one or two item that it would be -- you would have a scheduled resolution? Or was that just by happenstance?

(Slide.)

MR. MINNERS: Note one and note two are not finished. They are only partially resolved. They need more work done, so they will get scheduled.

MR. MICHELSON: Let me give you an example.

MR. MINNERS: The threes are all done.

MR. MICHELSON: Could I have a note one that could be dropped?

MR. MINNERS: Yes.

MR. MICHELSON: It is possible, so really note one, two and three could pertain to any one of your parts one, two and three on the slide; is that right?

MR. MINNERS: What I'm trying to tell you, Mr. Michelson, we did not do a numerical prioritization of note one and note two and decide whether they were high, medium or low priorities. In order to do that, we would do a little quick and dirty value impact analysis. If they are note one and two, the next step in the resolution process is to do a full-blown value impact analysis, which is almost the same as theydo, except better. We said, why should we do quick and dirty prioritization when these guys are going to do a good one and get a definitive answer? So it is perfectly possible when these guys take a note one and do a value impact analysis that it may come out a "no, never mind." That has happened on several USIs.

We don't know what the priority is on notes one and two. We don't know what the safety implications are, or the costs, but you are proposing to issue, you will write a value impact statement. We will review it and decide then whether the issue becomes a requirement or not a requirement.

MR. MICHELSON: Let me give you one more example: Let's say I got an item which, under your evaluation, you say drops to part three there. I'd say it really was resolved and so forth. And what you decided to do was to never schedule its implementation.

MR. MINNERS: That should not have happened.

MR. MICHELSON: That will never happen?

MR. MINNERS: That is a different statement. That should never happen. There are a lot of strange things. We looked at 400-some-odd issues. They vary in quality. I'm sorry for that. I would like to have them all high quality, but there are certain time-information limitations. My brains do the basic work, but I would like to say that we considered the peer review process. It includes the technical branches in NRR and ACRS and other people. If we do not get a good peer review process, people just pro forma sign off. We will get badly prioritized issues. There is no way we can do it all by ourselves. There could be a dropped issue that is really resolved and we missed it.

MR. MOELLER: Carl, to comment on your question, I understand what you are asking. As far as I can tell, under medium priority you could have note one and note two, meaning that before people realized it was not high priority, they were not trying to resolve it and they just have not finished. You could have the same --

MR. MINNERS: We would never do that. I would not let anybody spend enough time to get a priority on it. If it was a note one. I guess in the process --

MR. MOELLER: I am confused totally.

MR. MINNERS: How have I confused you?

MR. MOELLER: I thought note [illegible] meant that you were moving toward resolution, but you were just in phase one. Phase two means you are a little farther along towards resolution. Note three means you are finished.

MR. MINNERS: That is correct.

MR. MOELLER: Why couldn't I have a medium priority item that I was working on toward resolution?

MR. MINNERS: You could have that, but we would never find it out because as soon as the engineer went out to look into the issue, he says it is almost done. So the rules of the game, that his boss tells him, that says if it is almost done, don't do the test score and other consideration and ranking, because you are wasting my time.

MR. MOELLER: What you are telling me is if you have a problem and when you are talking about giving it a priority, you find out that it is in phase one of resolution, you don't do anything more with it. Okay. That answers it.

MR. MINNERS: What will happen is we have this archive in 0933 and some of those issues will get resolved. We will update 0933, but we will not throw away the information we had in there. You should find if we have an issue that is rated high priority, then it will have a note three after it that says, "Back in '82 or '83, when we did this, it was a high priority, and now in '85 we finally got it done." So as we move on, you may find note threes after medium and high priorities, and maybe even note ones and twos. I don't know.

MR. EBERSOLE: We are going to see the end point of your paper there as the scheduled resolution. That is like writing a specification, I guess. It does not mean the in-place physical realization of the accomplished resolution. Where does that come?

MR. MINNERS: Out of somebody else's bailiwick.

MR. EBERSOLE: But who rides herd on that? You could do this forever and get nothing really done.

MR. MINNERS: The Operating Reactors Assessment Branch has a section which does just that. It tracks. It has this big orange colored book called ORLAS, Operating Reactor -- I don't know what it stands for, I have forgotten. And in there they have all of their multi-point actions which says there is a requirement, this is the schedule for implementing those requirements.

MR. EBERSOLE: Do you run herd on that?

MR. MINNERS: Do I?

MR. EBERSOLE: Yes.

MR. MINNERS: No.

MR. EBERSOLE: There is no closure in an integral sense on these issues.

MR. MINNERS: We are trying to work out how we transfer resolved issues to the multi-planned actions. The ORLAS issues now have different numbers and sometimes different titles than the generic issues. If you look at something at ORLAS, you may not be able to tell at what time it was a generic issue. So we have some problems.

There is not -- what you call closure, I have to presume that those guys are doing their job. They are giving approved requirements and schedule to implement them and a procedure is being done, and they are going to be checked up on just like we are going to be checked up on.

In fact, there is a summary report that comes out. People's performances are judged on how many multi-plan actions are completed in a year. These issues, I understand, are going to go into the operating plan. People will be judged on how many generic issues are resolved, compared to how many they were supposed to have resolved.

Like every system, it depends on the people, on how well it will work. But the purpose of this exercise is to separate the wheat from the chaff and don't have people working on stuff that is not important and be sure they do work -- if they have extra time and want to work on other stuff, that is not my concern. All I want to know is that the high priority safety issues are scheduled and people are meeting those schedules. Anything else they do is their business.

MR. FOSTER: I am trying to make sure I understand the overall system here, I guess. Let's see if I am tracking correctly.

All of the issues fall into one of three categories:

One of them is safety priority; one of them is the environmental; and the third one is licensing improvement.

The first question is does your group see all of those issues, or only the safety ones, the safety issues? You have indicated that when you look at the issues, that those which you consider to be in the environmental or licensing area, that you ship off to somebody else. But it was not clear to me whether or not all of the issues -- let's say a licensing issue -- might come into your shop to begin with, for you to reroute it or whether some of the licensing issues would go directly to whoever.

MR. MINNERS: We have a lot of procedures for controlling actions in the Commission; we do not have any procedure for controlling inaction. By that I mean we have -- let me tell you the procedure, to try to explain it -- the Operating Reactors Assessment Branch is the contact with AEOD and I&E. Their job is to look at those issues and pass the generic safety issues on to us. They are allowed to us their judgment;if they think it is not a generic safety issue, they do not have to pass it on to us. If they think it is not a significant generic safety issue they do not have to pass it on to us. We don't want every piddly thing that people thought of coming to us. Some judgment is applied at the beginning of the process.

The big problem comes because you cannot tell if ORAB or a reviewer sees a significant generic safety issue, but decides he is not going to do anything about it, I don't know how I can pry it out of him.

MR. FOSTER: But you are not the clearinghouse for all issues, including the licensing issues and the environmental issues. You do not serve as a clearinghouse or as a rerouting spot for those, only on a casual basis?

MR. MINNERS: We have a little problem with that. There is a lot of stuff going on in the divisions where people are working on technical systems which we have not seen. In theory, then, it should be only licensing issues. I suspect some of it is more than that. So we have some backlog and there is always the possibility that some division director can start working on something. They don't work for me, they can do whatever they want. They might be working on an issue that is a generic safety issue when he does not tell me about it. That is possible. He is not supposed to. Maybe he does not think it is a safety issue, maybe he thinks it is a licensing issue.

MR. EBERSOLE: There is a prefiltering process that goes in front of you so you don't get all of the chit-chat?

MR. MINNERS: There has to be. I hope it is a coarse filter. I have tried to write the procedure. People were pressing me to have a good deal of review and a good deal of information to be provided before they would send it to me. I thought that was too much of an imposition. Yes, I put a little pressure on other people to get an idea. Don't just tell me your idea, just write down some facts about it, why it is bad or good and get a little management review, et cetera. That is not required. If you need some help, come to us and we will help you.

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MR. EBERSOLE: Do you look at the product that is thrown in the waste basket in the prefiltering process?

MR. MINNERS: No. If a guy looks at it and decides it is not a generic safety issue and throws it in the waste can, I do not search the waste can.

MR. EBERSOLE: What about region review? Wouldn't it result in less waste basket --

MR. MINNERS: I think we get a lot of task initiation action from the region. There is the possibility that they could hold it and do it themselves, but that was the case when I&E had people out in the regions. The inspectors did not want to pass it on. There was not much you could do about it. It was pretty difficult to find out. I don't think the regions are any worse.

MR. EBERSOLE: Whoever is out in the field, they have certain rules that they follow that you know about, though. You know the nature of the strainer they have, don't you? Or do you?

MR. MINNERS: I guess I don't know.

MR. EBERSOLE: Don't you need to know the nature of the strainer?

MR. MINNERS: I have asked people to bring me the pieces of paper for ORAB, what procedure they have for doing that. Yes, I'm trying to find out a little more about that to be sure there is a procedure. That may need some tuning up.

MR. EBERSOLE: Otherwise, there is no integral process unless you know the nature of the strainer.

MR. MINNERS: I think the inaction has come to our attention again recently. We are sensitized to it. I have asked some guy to try to think if there is some mechanism by which things that get thrown in the waste paper basket, good things don't get thrown in the waste paper basket.

I think Stello and CRGR have said that we have democratic exercise, which may turn people off. I think the only justification for having a highly paid, large NRC Staff is that they ask good questions.

MR. FOSTER: If the ACRS made a recommendation on an environmental issue, would that ever come to your shop or would it go automatically to somebody else?

MR. MINNERS: We have volunteered to keep track of the resolution schedule of environmental issues. The Division of Engineering has been assigned the responsibility for prioritizing those issues. They are going to decide which environmental issues are high, medium or low, and then they are going to submit schedules to us. We are going to put it in our schedule book and keep track of it.

MR. FOSTER: You are setting priorities by your scheme here on the safety issues. The engineering group is doing this on environmental issues. Somebody else is doing this on the licensing issues.

Is there any overall integration of the priority of these, or do they really work as three different bags?

MR. MINNERS: I have a parochial view on that. I think generic safety issues come first and then O-licensing issues, and then licensing and environmental issues come second.

MR. FOSTER: There is no integration of these if you are competing for resources like money.

MR. MINNERS: I don't think we are competing for issues. I think generic safety issues come first and licensing and environmental come second. I do not think it is competition. I recognize there could be cases in which environmental or licensing issues might be more important than some generic safety issues. I think that is the exception rather than the rule and can be dealt with in that way.

I have an office director and he has ideas. I don't know what his ideas are. I would hope that this process would indicate, since it has been approved by the office, that yes, generic safety issues are going to come first, and whatever is left over from the resources assigned to those issues can then be applied to other things. And USIs are part of it.

MR. EBERSOLE: To you, what is a licensing issue? What do you call a licensing issue?

MR. MINNERS: I have a big, long definition.

MR. EBERSOLE: I will read that. You can't explain?

MR. MINNERS: The test I use is does it affect directly the design, operation or construction of a nuclear power plant.

MR. EBERSOLE: And if it does?

MR. MINNERS: That is a safety issue. If it doesn't, then it is either an environmental --

MR. KATHREN: Would you repeat that definition? It went by very fast.

MR. MINNERS: A generic safety issue is a deficiency which might affect the public health and safety in the design, construction or operation of a nuclear power plant. Therefore, to be a generic safety issue, you have to affect the design, construction or operation.

Now, environmental issues might also do that, but they are not a deficiency in safety. The question is, what is a licensing issue? A licensing issue is an issue which does not directly affect the plant.

So we do independent code calculations, and people have to keep those codes up to date. That would be what I would call a licensing issue. It does not directly affect the plant, but obviously, if our code is different than their code, there will be argument, but that is an indirect effect.

MR. EBERSOLE: Now, call an environmental issue in your words.

MR. MINNERS: An issue that is needed to take care of the National Environmental Protection Act.

MR. EBERSOLE: Environmental impact.

MR. MOELLER: And the licensing improvement issues and environmental issues, once you have categorized them as such, then are not given any priority.

MR. MINNERS: Not by me. I am sure they are going to be worked on by the division responsible and they assign priorities. They have some way of doing business. I do not do the prioritizing. I am sure people prioritize their workloads.

MR. MOELLER: Any other questions or comments?

(No response)

MR. MOELLER: This has been a useful introduction.

(Laughter)

Why don't we take a 15-minute break.

(Recess)

MR. MOELLER: The meeting will resume.

We are now going to begin with the individual items, generic safety issues.

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The first issue is failures in air monitoring, air cleaning and ventilating systems. How did you people suggest this be handled? Do you want to give us a bottom line on it for each one, and then we will interact with you.

MR. MINNERS: The bottom line is pretty well laid out. I would suggest if people have questions or criticisms or whatever, that would be the easiest thing to address. What you see is what my branch knows, not much more than that. But we have Staff members from the involved technical branches which go more deeply into the technical details and explain to you better, I think, what the pressing issues are.

MR. MOELLER: Okay, we can do it. We will just see. Again, I agree with what Warren just said, but I thought I should say that there are several of these items that we will discuss in the next half-hour or so which the Staff has had an opportunity to look into. There are others the Staff has not looked into at all, or very little.

Warren discussed the process whereby his branch prioritizes this work. I think I might mention what effect that has on how the Staff then considers these.

The prioritization is taken into consideration in the development of the office and division of operating plants. The bottom line is if this is not included in the operating plant, the Staff has no resources allocated to

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devote to those items. Consequently, there are many of these things that the Staff does not really spend any time on, so why don't we take them in order where we have done some work on them, and we will be prepared to address those.

MR. MOELLER: Okay. We are on issue number 1, and let me ask just a couple of questions, then. The proposed priority ranking is to drop it, which means that they, as I would assume or as I understand in their evaluation, not only was it of low priority, but it was just so low that it should be dropped as far as regulatory priorities are concerned.

Now, we spent half of yesterday on control room habitability, which this relates to. Is that covered by this item?

MR. WILLIS: I'm the effluent treatment system leader. As you can see, this issue is related a little bit to the control room habitability. However, in our scheme of things, control room habitability is being addressed separately as an issue that is being worked on, as you heard yesterday at some length.

This issue essentially is not being worked on as a generic issue. Some of the parts of it are being picked up other places.

MR. MOELLER: To me, the whole subject of control room habitability and the safety of the operators of the plant, that is clearly involved as part of this, even a major part of this, so I guess I need to know, then, where

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that is listed as an issue and what priority has been assigned to it. And if the implication is that control room habitability is dropped because this item is dropped, then we need to know that. I am just asking for information to help me.

MR. MINNERS: As I said, there are some things which are being dealt with outside of the system. Control room habitability is one of them. The Committee sent a letter to the Staff, and that was not treated by this generic issue procedure but was dealt with by the proper people there. A response was written up which I remember. It is probably best characterize as we think what we are doing on control rooms is enough, we are not going to do any more.

Now, maybe for archival purposes maybe that should be put on block 3. I guess if I had looked at that, my judgment now is I might have put that as a Note 3 as a resolved issue and quoted the letter to ACRS as the basis for that.

MR. MOELLER: Okay. Further questions on this item by one of the ACRS Fellows who, as we mentioned earlier, had looked at the item briefly and came up with the questions, like: As we read your review of this item, you put into it the fact that all three -- that four different things had to fail simultaneously in order for it to be of any import. Is that true and would you explain that to us?

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MR. EMRIT: The valuation of this issue, we looked at the design -- the reactor building air flow to see how the air was flowing through the reactor building regarding the question of control room habitability. It was separate in terms of air flow. It has a separate flow system based on the flow diagram that I looked at.

MR. MOELLER: What is it that has -- that is in a separate zone?

MR. EMRIT: The air flowing to the control room. When I looked at a flow diagram for a typical plant, I found three zones, basically, in terms of air flow throughout the plant. The control room has its own ventilation system and is not connected to any other system in the area of the reactor vessel. That has a separate path.

MR. MOELLER: The review that I read on this said that this will only be a problem if there is a simultaneous failure of the monitoring equipment, the ventilating equipment, the air cleaning equipment, and these three things are combined with improper operator action, and then how do you reach that conclusion?

MR. EMRIT: That is trying to create a worst case scenario. You have to realize, now, that there are other ongoing programs since this evaluation was done. It was one of the first ones that was completed about 12 months ago.

MR. MOELLER: Move the microphone much closer if

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you can.

MR. EMRIT: One of the key Action Plan items completed is the -- TMI Action Plans that has been completed is Item III.D.2.4, a requirement to place 50 TLDs around each site, so there are other things. Somebody had a question about monitoring air quality in the plant. There are other items.

MR. MOELLER: TLDs around the plant have nothing to do with the topic we are discussing. You have two types of monitoring systems for air-borne effluents. You have high range things for accidents, you have low-range monitors for routine releases. They give you on-line data. If those fail and the material gets out, the TLDs register some external dose. They don't tell you anything about the concentrations. They do not give you the data until you go out and collect them and read them.

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Now, what are we talking about?

MR. EMRIT: Assuming the plant monitoring system fails, --

MR. MOELLER: Let's assume it fails. You don't know what is being discharged to the environment, and an accident is in progression and you want to tell the public or the local public health officials what to do. You want to advise them. Now, what are you going to do?

MR. EMRIT: In the worst case scenario, we assumed that an accident occurred in order to get some kind of quantifiable data on the releases. So we have to get some kind of probability of the failure of the air monitor, failure of the air cleaning system to do its job before the air gets out of the plant. And all things taken into consideration, we came up with a probability of 10^{-3}, not having any backup data to rely on, the quantified risk associated with this issue. That's where the total man rem comes into play.

MR. MOELLER: You were looking at various accident scenarios, and again, to go back to questions I asked in the opening remarks this morning, in some of those accident scenarios, we tend to believe -- and I haven't spent the time on it that you have -- that certain failures in the air system are part of the accident scenario. You are attaching them on as if they are not a part of the accident scenario. Have you looked at various scenarios to see whether failures of the air cleaning system might be a concurrent part of the scenario?

MR. That's taken into consideration here. Do you mean separately, as a separate failure? It was included here, that everything fails, everything does not do its job.

MR. MOELLER: As I read your evaluation, you assumed an accident occurred, and then you looked at whether the air system failed subsequent -- yes, subsequent to the accident.

MR. That's correct.

MR. MOELLER: Is that the correct approach?

MR. EMERIT: For this case, that was an appropriate approach, that you would get releases. The maximum amount of release that you could get associated with this issue, the way it was originally presented to us, is extracted from NUREG-0572. That's the way we read this issue.

MR. EBERSOLE: Let me comment about the ventilation aspect of this issue, its effective life, not only the HPCI and RCIC, but other rooms that contain motors of large size or even some consolidated cabinets.

But you don't have to wait for an accident to start asking what the consequences are. All you have to do is fail the ventilation system. When you've failed the ventilation system, accident sequences automatically start; ambient rises. In any of these rooms the equipment have certain ambient limits. In the case of an electric motor it might be quite hot; in the case of consolidated equipment it might be -- you're proceeding toward degradation of the equipment. That leads to loss of is interesting set of equipment which must be placed in motion when you start a plant, and which then, like an airplane that if it sheds its wheels, can never land. It has to have a sustained operation as long as the plant runs, in any mode.

There are about a dozen systems in the plant that must be furnished with sustained ventilation functions. There are numerous ways to find tertiary ways of cooling these areas like dragging fans out of closets, opening doors and so forth, but you have to identify the ways that you are going to find tertiary ways to cool these things. You might well find out on the intake deck that the service water pumps we were talking about a while ago are dependent on fans set in concrete vaults that are plugged into wall outlets. The viability of the pumps is dependent on the viability of the fan, and the fan has been frequently found not to be safety related. So you didn't know, but you were running on an unknown capacity to cool these things by opening doors and so forth if you lost your fans.

A ventilation system failure is, in its own right, an accident, and you don't need any of the probabilities other than its own failure rate.

MR. MINNERS: We may have misperceived the issue. This may be a case in which the definition of the issue affects the prioritization. I think as we saw the issue, it was not keeping equipment cool, which may be an important issue. This issue was limited to radioactive material getting out through the ventilation system.

MR. EBERSOLE: That is the problem, I agree. Again, you have to be careful about what issue you are prioritizing.

MR. EBERSOLE: Mention was made, though, about HPSI and RCIC, which led me to think that it had to be cooled. I want to say immediately that I know of certain rooms that had 2000 horsepower motors in them. Ten percent of that output is 200 kilowatts or thereabouts that is pouring into the room. It will not run long without the ventilation system functioning.

MR. MINNERS: We may have given too much information and misled you.

(Laughter.)

MR. MICHELSON: Let me come to your defense, although I don't think you need that. I had the same problem in looking at this issue. If you go back and look at the documentation which was reported in NUREG-0572, the issue seems -- on page 3-6, it focuses on the failures of equipment designed to monitor. So it's easy enough to believe that that was the issue because it seems like that is the way it was treated.

If you go back, however, to page D-34, although the general description again focuses on monitoring, it begins to bring in a little bit about you have to keep equipment cool and so forth. So I think probably the issue is misunderstood, and that we need a new issue identified which is basically, the environmental control systems throughout the plant which are critical to the operation of many of the safety systems, and if it is redefined that way, then I for one would not have too much of a problem.

I think it's just a misunderstanding, probably.

MR. MOELLER: I agree, it was not focused. We would have environmental control or equipment cooling as a focus, and then I still want to ask, then, where control room habitability is. Would that be a second focus? We would like for you to look at those two items.

MR. MINNERS: Can you be a little more specific? Are you saying those should be identified as generic issues, and go through the process, control room habitability and cooling of equipment? Is that your suggestion?

MR. MOELLER: Stop me if this is the wrong approach, but yes, I'd like to see those identified and evaluated.

MR. MICHELSON: I assume we're going to write some kind of comment letter.

MR. MOELLER: Yes.

MR. MICHELSON: That would be in our comment letter. It seems like it is reasonable to you. Clearly, even control room habitability is a separate issue from equipment cooling, and there are different kinds of problems. Both of them are problems which didn't seem to be treated anywhere on the generic issues list that I can find.

MR. MINNERS: I think I came down here a couple months ago, and somebody asked me if I had all of the generic issues and I said I thought I had all of the generic issues in NRR. I don't think I have all the generic issues; I'm not even sure I have most of the generic issues. I would like to recant.

MR. MOELLER: Dick Foster.

MR. FOSTER: I notice that issue B-36 has got some different kinds of things in it. Can you let me know what the relationship between these is?

MR. MOELLER: Yes, that is a good point, Dick, to bring that up, because it's closely -- B-36 is closely related to the control room habitability. Because when we are talking -- at least, when I am talking about testing these systems, we have in mind what the consultants and architect engineers and so forth have told the subcommittee concerning control rooms and how they are tested, to be sure that the emergency circulating loads will do what they are claimed to be able to do.

MR. AXTMANN: Where is B-36?

MS. TANG: Look on the agenda.

MR. MOELLER: It's on the agenda, the second item on it. Dick had a very good point. Why don't we combine and look at those two in terms of what we're doing. And Ms. Tang has pointed out that B-36 is part of the same general subject, when we're looking at control room habitability. To us, the control infiltration measurements could be combined.

MR. MICHELSON: The comment on B-36 bothered me. When you read the description, it says it is all done with the revision of Reg Guide 1.52 in 78. So I thought that was some other kind of an issue entirely and long ago resolved, but not answering my question of equipment cooling or really our question of control room habitability. It's just some kind of an old issue that was laying around to look at the description. At least it seems it was in that category. All the work was done a long time ago.

MR. WILLIS: I think we have a general problem in a number of these areas in the definition of the problem. We have dealt with B-36 as primarily a matter of handling the air cleaning aspects of filtration. As a consequence, we are in the process of finalizing as to revised reg guides, 1.52 on emergency systems is related to the control room, and 1.140, which is the normal ventilation system. We are not looking at ventilation systems in the broad sense, taking into account air cooling or equipment and that sort of thing. We're simply looking at the air cleaning aspects of it.

MR. MOELLER: Can we get someone to do that? You know, you help us. What would help you most for us to say?

MR. MINNERS: If you think an issue is omitted or incorrectly stated, does not cover all the things you think it should have,those are the kinds of statements we need. It is a judgment betwen making it a bite-sized piece --

MR. MOELLER: Sure. I must say this is an evolving thing. We don't mean to be pulling a fast one on you. It's just that we have finally clarified our own thinking.

Any other comments, then, on issue 1 or B-36 or B-66?

MR. KATHREN: I just have a relatively simple question; it can be answered yes or no.

(Laughter.)

MR. MINNERS: Okay, if we know the answer.

MR. KATHREN: An air monitoring system can fail in an upscale as well as a downscale mode, and if it does, it could create a great deal of havoc in doing things that you might not otherwise want to do, which creates --

MR. GAMMILL: It has happened.

MR. KATHREN: Did you consider the upscale as well as the downscale failure mode?

MR. MINNERS: Probably not.

MR. KATHREN: I asked for a yes or no, and I get a "probably not."

(Laughter.)

MR. WILLIS: Do you want a no? We'll give it to you. We do not have a criterion that addresses or puts a requirement on for an instrument to show an upscale failure. If it has a trip point or an alarm point and you have an upscale failure, you get that, and presumably someone responds. The first response is usually to check and see if the instrument was not working.

MR. MOELLER: And in your evaluation in assigning a priority to these items, please keep in mind -- and I don't mean to be lecturing, but keep in mind the essentialness of the proper performance of people and the proper performance of equipment to the safety of the plant.

Are we ready to go to --

MR. SHAPIRO: I have some problems in your method for assigning a priority to this particular problem. It goes back, I think, to what Bernie Schleien brought up yesterday. And that is you're talking about air cleaning event, letting systems which are absolutely crucial to engineered containment and safeguards in the plant. And in terms of doing everything you can to maintain their integrity -- on the other hand, because of the probability of a major accident, at least one in a million, you have not done all of the consequences by a factor of one million, and you come out with a total -- you go down from five million man rem down to 5 man rem to give you a rather low consequence to the public.

And then you go into costs on the other side, and you come up with a horrendous cost of $429 million, and that's why you say this is too expensive. And nothing is going to happen from this because it's one in a million. It goes against my intuition. This whole thing of reactor safety is because of the enormous amount of radioactivity in the core of a reactor, and somehow or other, that should be factored into this so that you have a continuing effort.

Now, based on your own scheme, there may be some other group in the Commission that does this and maybe that's why it's not in your group. I'd like to know if that is so, who, in fact, does this.

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MR. MINNERS: We have the regulation, and you must realize that the prioritization is done presuming that our current regulations, interpretations through reg guides and SRPs and all of that is implemented. In some cases, that is not true. But we took that as our baseline, that whatever requirement is on the books, that the plants have implemented that. If you had requirements for normal operation, you still have to meet Part 20. For those kinds of situations that is taken care of.

The question that is being addressed here is if you had a coremelt accident, what is the risk to the public? My conclusion is that there is not much risk to the public as far as ventilation systems are concerned.

MR. SHAPIRO: That is because you put in one in a million for the possibility of the accident, isn't it?

MR. MINNERS: The coremelt probability that we used is, in most cases, something like 10 to the -4 to 10 to the -5. Where we thought justified, we had to use higher probabilities. I don't think in any case are we down to 10 to the -6.

This has got a list of probabilities in here which includes containment failures. You have to go through the whole thing. When you add up those sequences, it is more like 10 to the -5 than -- in fact, there is a 10 to the -5 in there. You are misinterpreting by at least a factor of 10, maybe 100.

Your point, I think, is well taken. What we are prioritizing things on is basically coremelt kind of considerations, which is really quite different than I think the Commission in practice did in the past. We were closer to a no-release mode of regulation than to a coremelt regulation.

I think this is a significant change in the philosophy that is being applied. I see people, it would go against their intuition and experience, and that's why when I said when I put the matrix up, that's what you have to agree to. That matrix is not that you are going to control releases under Part 20 nor even some small multiple of that.

It is really talking about coremelt, which is a different kind of thing. People have talked in the past, there has been and there is going to be, continue to be a clash between this new philosophy and the old philosophy. It is a matter of policy. The policy is now out for public comment, and it should be hashed over and decide what we are going to do.

At the moment we are -- we are the forefront of the policy. We have adopted it in this procedure. The Commission has not adopted it for all licensing decisions.

I agree with your comment.

MR. SHAPIRO: The other side of the coin -- I am not quite sure, I am looking at this very fresh and with limited background to it -- but the cost that you assign to it seems to me much, much too high for a lot of the work that could be done in that system.

MR. KATHREN: May I comment on that? I was not going to ask, but I will. It really bothers me that you assign two full-time technicians to keeping this gear operational now. How much do you save there because you don't have 14 percent of your LERs involved with failure of this equipment and how much do you save because when the LER occurs you may be shut down or you may have to do other things?

It seems to me -- I will be direct and blunt and not answer "probably not" -- I will say it seems to me you are really stacking the deck when you figured out the cost in favor of producing a high cost instead of a more realistic estimate of what the actual costs are.

I am sorry to interrupt you, Jack.

MR. MOELLER: Jack Healy has been patiently waiting.

MR. HEALY: I have several questions.

MR. MINNERS: May I come back with a "probably not"?

(Laughter.)

MR. MOELLER: Go ahead.

MR. KATHREN: That's a universal answer.

MR. WILLIS: One, on the cost business, I am painfully aware of this problem because of some of the things that we have just gone through. It is amazing what it does cost to get something done in a power plant. I am thinking particularly of our post-accident sampling system that we have more or less blithely required a few years ago.

I am sure that the idea in mind by the people who made the recommenadtion was to throw something together that would cost you 2 hours' work and a few minutes' thought. It is turning out that the average cost is like $5 million per reactor.

So when we make these cost estimates, we can be wrong in either direction, and it is hard to do.

The other side of the coin is you talked about the LER cost and that sort of thing. As a matter of fact, excluding the LER costs from our calculations biases the costs in a downward direction because we are not in a position of saying, buy from company A instead of company B because they are supposed to be more reliable and you have less LERs.

What we can do is put a requirement on that something function, and that in fact makes for more LERs and it does cost. So admitting it probably biases the costs down.

MR. MINNERS: In terms of cost savings, if you start out with a safety concern basically and then there is -- we consider all of the factors, cost savings are one of the factors we are going to consider, I don't think that the costs of LER processing is that much. Maybe we should have addressed it, but I cannot believe that is going to be much money.

The other question is, if you have to shut down the plant because of the tech specs on the ventilating system, I have looked into that, other people have looked into that, and based on the reports I have seen, unavailability of safety systems in the tech specs is a minor -- an insignificant contributor to the unavailability of the nuclear power plant. It is less than 1 percent contributor.

That is because there are redundant systems, and the tech specs let you run with one system. Unless somebody can give you some information otherwise, that kind of saving is almost nil in these assessments. There is not an economic drive for the utility to have better safety ventilating systems, because it does not affect the plant operation.

MR. KATHREN: You would rather fill out LERs then?

MR. WILLIS: He did not say that people wanted to fill out LERs. That is certainly not the case.

MR. KATHREN: That's his choice. Either the utility has LERs or they operate their system so they don't have it. What I think I am hearing you say is that it is cost effective to continue with the system and to produce more LERs or to continue to produce LERs at the same level. That's what I think I am hearing you say.

MR. MINNERS: I think there is a little different twist to it. I think when you look at these issues and you say, here is a proposed requirement I put on this guide, you have to look at it in two parts: You have to look at what is the potential improvement I can make; it is so bad, if I really were perfect and fixed it, I would reduce the risk this much. You have to start there.

The second question, and a very important question, one to which I am very sensitive, is how much of that potential can I as an NRC regulator gain? I am afraid when I look at a lot of issues, I cannot see how a piece of paper issued by the NRC is going to get anything changed. We are acutely aware of that.

I have insisted that be factored into people's evaluations. This is not to potential, total potential change in risk. This is the effect of change of risk, which is the efficiency of the Commission requirement to get it done. You have got to put that in. There is a big difference between what we require and what we get.

MR. HEALY: I have several questions. In evaluating these issues, do you look at the experience on the failures of equipment, for example, specifically on this one? Did you look at the reports of failures of monitors, reports of failures of ventilation systems, et cetera?

MR. MINNERS: I will have to say probably not, again. We did not go into that depth. We tried to get a quicky number and put in here.

MR. HEALY: Really, you do not take into account the experience. You simply say, well, it a regulation says that you are supposed to do so-and-so, then obviously it is done. One of the issues that may come up is whether the degree of inspection of a system of this nature -- it certainly would seem to me to be a part of it.

MR. MINNERS: I think we make the presumption that the licensee is innocent, he is doing what he is supposed to do, unless we have information that indicates otherwise. If there is a report someplace that we have read that says they guy is not doing it, we won't ignore that. But we tend to make a presumption that regulations and requirements are being directly implemented.

MR. HEALY: Second question --

MR. MINNERS: May I add one more thing? If that is not true, the generic issue place is not the place to treat it. The place to treat it is to call up I&E and say, enforce the regulation.

MR. HEALY: Would you do that?

MR. MINNERS: What else can I say? Sure. But I don't know a particular situation.

MR. HEALY: I am always nervous about failures of exit monitoring equipment, having been involved in one incident in which this occurred. It seems to me that after Three Mile Island, the Commission required two monitoring systems. Did they not? One high level, one low level?

MR. MINNERS: We were just requiring the ability to measure high-level releases. If you could have done it with one, we would have accepted that.

MR. HEALY: By dismissing this issue, which includes the monitoring system, you are saying that the degree of reliability of the exit monitoring now is appropriate without even looking at it.

MR. MINNERS: Without looking at the equipment?

MR. HEALY: No. At the failure reports.

MR. MINNERS: Yes, that is probably true.

MR. HEALY: Is it not possible in these plants that an accident could occur with a sizable release where the only indication would be the exit gas.

MR. MINNERS: Yes.

MR. HEALY: So this is your last safety measure. I would be quite concerned on that. If the response of the plant operator is, that goddamned instrument has gone bad again, somebody is sent up there. He gets up there; he doesn't know whether it has gone bad or not. It is reading high. It seems to me that this is leading you into some potential embarrassment to the Commission.

MR. MINNERS: I think that goes back to what I said before regarding embarrassment to the Commission. I think there is schizophrenia between what the Commission -- I mean by that everybody, not the Commissioners -- say we are going to do. We are going to do PRAs and risk assessents on coremelts, but when events happen, that philosophy does not apply.

I think a test on this is going to be on the steam generator tube rupture process. We prioritized those by this method and came up, forget it. I don't think that the Commission -- once again --

MR. MOELLER: You are getting softer and softer, Warren. Hand him the mike.

MR. MINNERS: I discussed that there is a difference between what we are doing now and what the Commission has done in the past. That is going to be a problem.

MR. WILLIS: May I comment? Let's say an accident with the only indication being effluent monitors, the only thing that comes to mind right off is the failure of a waste gas decay tank. And we do have requirements for effluent monitors along that line, although there is the possibility they will be out of service. But the primary control there is a limitation by tech spec on the inventory of the waste gas decay tank.

Other failures, there might be a dropping fuel element, but there would be other indications there.

MR. HEALY: I am talking about the possibility of blockage of one tube in the center of the reactor.

MR. WILLIS: Blockage -- damage to the core that nothing shows up in your core instrumentation?

MR. HEALY: I know this has happened with one other type of reactor with graphite monitoring and the monitor at the edge of the tube was operating erroneously, so that you were getting a normal reading.

MR. MINNERS: What were the consequences?

MR. HEALY: Then they were not great. However, today you would have one heck of a mess. This happened quite earlier, before the concern of release of radiation to the environment.

MR. MINNERS: I am not trying to sound facetious, but when you say "one heck of a mess" --

MR. HEALY: There was a large amount of noble gas.

MR. MINNERS: If you looked at that in a callus assessment of risk, a puff release of noble gases is not a high-risk event.

MR. HEALY: I assume you will tell that to the operators of Three Mile Island.

Let me put one more thing in here at the moment on the general method you are using. I talked with a fellow from Japan last year, and he declared unqualified, this ICRP method which is essentially what you are doing, would never be accepted in Japan because the costs are being saved by the industry. Risk is being taken by the public.

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MR. WILLIS: Are you implying that the Japanese have safety standards that are way out of line with ours? That's certainly not my experience.

MR. HEALY: I didn't say that. I'm saying that the ICRP system making decisions such as this, which is essentially the system you are using, he stated it would not be used in Japan because the public would not allow it. Because one group is carrying the risk to save money for the industry.

MR. MINNERS: I'd like to go back to your comment on TMI. I think the Commission reactor properly with TMI. I think they put on the hair shirt and said, mea culpa.

My view of TMI is that the Commission did its job, the public was well protected. As you say, it was a heck of a mess as far as the public was concerned. It was real no, never mind. All they got out of it was noble gases. Unfortunately, the perception is the other way and it is an improper perception that risk to the health and safety of the public from TMI was calculated, and it was nothing.

So, why should you -- if that's all that was there as risk to the public, why should you do any -- we don't do that because our criteria includes not only man rem to the public, but we have a limit on core melt frequency. But our system would do something about TMI. If it didn't dirty up the plant and just left a puff of radioactive gas out, without doing the calculation, I think you could see that it probably would come out a low priority. You should recognize that. That is what we're proposing.

MR. EBERSOLE: On the other hand, Warren, if the operators had routinely done -- had turned on the low pressure pumps and started distributing leakage around all over the place, which they were entitled to do, then it would have been another story. It would have leaked. The seals and so forth were not designed to confine the cooling liquid.

MR. MINNERS: That's another thing you have to recognize in accidents. The operators were not stupid.

MR. EBERSOLE: They knew the shortcomings of the systems, evidently.

MR. MINNERS: But once again, the people did not turn on the systems.

MR. EBERSOLE: It was fascinating to find out that they were smart enough not to turn it on, which meant that they must have known that they would not work in the first place.

MR. MINNERS: I think that was common knowledge.

MR. EBERSOLE: But to have the status sitting there with that degree of weakness to me is malpractice.

MR. MINNERS: The problem with the old regulations, we said there would be no release and no activity. That's how we were doing things. There was no release of activity, then there was no need to design the RHR seals for high radiation levels. It led you to a wrong conclusion. The previous regulation had a lot of flaws in it.

MR. EBERSOLE: The release was TID 1844 in the coolant.

MR. MINNERS: I'm saying that the design basis for the RHR seals was that no activity would be released, or very little would be released of the coolant. That was the design basis of the RHR system.

MR. EBERSOLE: The TID release implies that the release is to the coolant and to the containment, and therefore, it goes out into the circulatory systems.

MR. MINNERS: We could argue about TID, Part 100 forever, but it was designed to be a siting regulation and not an equipment design. It has been distorted at times, to use it to design filter systems, pumps and that kind of thing.

When it was put into the regulations, that was not the intent. It was supposed to be a siting criterion. It doesn't work very well except as a siting criterion.

MR. EBERSOLE: You remind me of a remark I heard by an engineer -- to make seals that would withstand a TID dose in the water, he said what do you want to do, make this thing work?

MR. MOELLER: Let's give Bill Gammill a chance to respond to Jack Healy, and as Chairman, I want to start clicking off some of these items.

MR. GAMMILL: Warren responded to the question about the consideration of LERs as a result of instrument malfunctions and so forth. I wanted to make sure that you understand that there are other parts of the organization who are looking into this. My branch, for one thing, we always review LERs of this type. I know that I&E has a group, and certainly it is a serious consideration of the inspectors in the regions when they are reviewing the performance of each of the licensees.

So yes, it gets a lot of attention. And if you see an instrument malfunction, they're going to focus on it.

MR. MINNERS: The prioritization, I have to say again, presumes that the regulations are being implemented properly, that resident inspectors are picking this up and will perform. I don't know how else we can do that without making that presumption.

MR. MICHELSON: I want to ask, I think, a related or direct question. When calculating costs for the purposes of determining cost-benefit ratios, how do you treat the down time that might be involved in getting the change implemented? The cost of the down time.

MR. MINNERS: The hardest part is trying to decide how much additional down time might be required to implement the resolution. And we have selected, as a standardized number to use, 300,000 dollars per day. If the assessor thinks something else is more appropriate for his situation, he certainly can use it if he tells us why.

We picked $300,000 because it is in the mid-range of value, which is referenced I think in the report, which was done by DOE, which went from $100,000 to a million or something.

MR. MICHELSON: Now, to get a little more specific, one always has to keep in mind that you don't shut the reactor down just to make this particular change. There are probably a dozen other things that will happen the same day that were just waiting to be done until it was convenient.

Is it fair to charge the entire cost of the down time to a particular item? Oftentimes, you'll get a distorted answer if you do.

MR. MINNERS: I said the hard part is deciding how many additional days you'll have to shut down to fix this one.

MR. MICHELSON: You do attempt to consider the fact that you would not shut down just to do this job.

MR. MINNERS: Yes. I don't think the Commission would issue any regulation unless it was really a real whiz-banger that would make people shut down immediately to fix.

MR. MICHELSON: Then the cost of shutdown should rarely appear in the cost-benefit calculations.

MR. MINNERS: It rarely does. That's in the minority of issues, I think.

MR. MOELLER: Taking these up, B-67 is next on our list. That is one we have touched upon to some degree. To be honest, what I want to do is make sure we all agree on how we're going to treat B-67. Jack Healy, you mentioned the importance of effluent monitoring systems. We all agree with you. This one, though, Bill Gammill, isn't this more routine release?

MR. GAMMILL: Yes.

MR. MOELLER: It is routine release, and almost all of these monitors are in duplicate, are they not?

MR. WILLIS: The action that's being taken on this thing for normal effluent monitoring is the updating of the radiological tech specs for the operating reactors. We're trying to get something in all of the plants that has tech specs that require monitors on each of the effluent lines.

These instruments are not rated as safety related; therefore, they're not redundant and they are out of service on occasion.

MR. MOELLER: Jack,you are on target. Dick Foster.

MR. FOSTER: I had a little problem with B-67 because the staff writeup on this seemed to be discussing a different subject, and in fact, the -- had a revised title. The one which we started looking at on the agenda was effluent and process monitoring instrumentation. And then the writeup seemed to switch over to waste process control kinds of things.

This confused me. In other words, I have two titles for this, which illustrates the problem. One of them which is written on our list here says, effluent process monitoring instrumentation. I have another one from Bill here relative to generic issue B-67 which reads, "control and monitoring of radioactive materials released in effluents and performance of rad waste systems."

MR. MINNERS: Obviously, two issues. The one we prioritized is written down. Whether there should be another issue or whether we prioritized the wrong issue is something else again. This was really a cleanup of backlog issues that had been on file for a long time.

MR. MOELLER: Warren, what you're saying is that you looked at effluent and process monitoring instruments.

MR. MINNERS: I'm not that familiar with this issue, but yes, I think that is what it says.

MR. FOSTER: In my writeup, it looked like the evaluation was not being made on the instrumentation, but really on the cleanup process.

MR. MINNERS: The paragraph in the middle of the page says, "One subtask of this issue was to develop criteria for the design quality assurance performance of processing effluent radiological monitors."

MR. MOELLER: Bill Gammill, you are the one who sent us a memo, or sent someone a memo. Can you help us? Is it two issues?

MR. GAMMILL: No. B-67 I am relatively sure this is the correct title of that issue -- the subject of my memorandum to --

MR. MOELLER: Control and monitoring of rad materials released in effluents and performance of rad waste systems?

MR. GAMMILL: Yes. What was actually considered in the prioritization I cannot address at this point, whether they considered all aspects. However, we had considered the issue closed or resolved before the prioritization was done.

MR. MOELLER: By considering it resolved, you're saying to us you have tech spec changes underway for all of the operating plants that will solve this matter or resolve it?

MR. GAMMILL: No. What I was saying is we have taken all of the actions described in the enclosure to the memorandum. In many cases, this was a guidance for use.

What Charlie Willis was referring to on the radiological tech specs is a next step here. I don't think it is really related to -- not directly related to the original generic issue, B-67.

MR. MOELLER: Jack Healy, let me ask you, having heard all of that, what is your recommendation? It doesn't sound to me like it is as resolved as I would personally hope.

MR. HEALY: Aren't we talking about two different issues, really here? One is the response of the instrumentation in accidents, and the other one, which was addressed, the normal response to routine effluents. This is what I have gathered.

MR. GAMMILL: I think that is correct. If that's what you are talking about in the accident situation, B-67 did not address that.

MR. MOELLER: Where is the accident situation covered, so that we can pick it up at that point, and we'll let B-67 rest.

MR. WILLIS: III.D.2.1.

MR. MOELLER: Radiological monitoring of effluents. That will take care of it.

MR. WILLIS: That is putting in safety highly reliable tech spec instruments for monitoring effluents in accidents.

MR. MOELLER: Let's pick that up, then, right now.

MR. SHAPIRO: How about II.D.1.2, also. Is that part of it? The radioactive gas management in case you have large releases.

MR. MOELLER: No.

MR. MINNERS: That issue is prioritized all by itself.

MR. SHAPIRO: It has "drop" on it.

MR. GAMMILL: That's correct. That's one -- unless I have a mistake, I think it was one related to a process for control of noble gases following an accident, so that you would have some alternative to eventually releasing into the atmosphere.

MR. MOELLER: I thought it was the waste gas storage tanks. Here it is, a reactor accident could result in the release of noble gases to the containment, and then these are eventually discharged to the environment due to a lack of a noble gas recovery system.

So, Bill, you're absolutely right. It is part of this, and it really is not what we're talking about right now. To get action on these, let's say we agree with B-67 for monitoring of routine releases. We agree no further action.

Let's jump now to III.D.2.1, which is the rad monitoring of effluents. That is under accident conditions, and there, based on the impression I received from the subcommittee, we want to flag that as being of higher importance than currently rated. What is the current rating?

MR. FOSTER: Low.

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MR. MOELLER: What do you want on it? What would you recommend, Jack?

MR. HEALY: Which one are we at?

MR. MOELLER: III.D.2.1. Look on your agenda. That's what I am looking at. The sixth item up from the bottom of the page. It is accidental -- it is monitoring of accidental releases or releases under accident conditions.

MR. EBERSOLE: There was a flap in Chattanooga recently because of a Sequoyah incident. Long ago it was found out that you could not rate diesel horsepower to get raw cooling water to the primary coolant loop. The coolant water has to run at lower pressure than the primary water. When you have a tube failure, if you do not have adequate monitoring, including redundancy or whatever, you eject raw primary PWR coolant to the service water stream on out downstream to the city water uptake.

That recently happened down there. The monitoring system failed, and they did not have a tube failure, so they were pouring primary coolant into the river. PWR primary coolant is pretty dirty stuff. There was a big hue and cry about it.

MR. WILKERS: I am glad you brought that issue up. We prioritized that issue. I thought it was a BWR.

MR. MICHELSON: It was.

MR. EBERSOLE: You are right. Browns Ferry.

MR. MINNERS: That was a generic issue about whether you should have more and better surveillance. We prioritized the first time through, and it came drop, I forget which. And then I heard about that report, and we started to investigate.

That was the first time that I knew that the service water pressure was lower than the primary system pressure. And that was one of the essential elements of the prioritization.

We are redoing that. I think it will still come out low.

MR. EBERSOLE: I would not be surprised.

MR. MOELLER: Jack Healy, it is low priority now. The question is, would we recommend medium or high or reassessment or leave it as it is?

MR. MICHELSON: I have not heard an argument yet for raising it. Did that pass by me?

MR. MOELLER: Jack said not in terms of numbers, you know, value impacts, but in terms of knowing the potential impact on the population, the worst thing you could have is a release during an accident without monitoring capabilities. So he said this is a pretty important thing.

MR. MICHELSON: The basis for believing what is there now is not adequate but is what? This is already redundant and so forth. Just a little higher failure rate, I gather?

MR. MOELLER: It is already redundant?

MR. WILLIS: Generally, these things, the instruments that are there for normal operation releasing at low levels are not redundant.

MR. MOELLER: We are worried about III.D.2.1, which is accidental, accident situations.

MR. WILLIS: The post-TMI accident? In those instances there are some redundant monitors.

MR. EBERSOLE: This is not an accident in this context, to lose a tube.

MR. WILLIS: As far as I know, there is no requirement for redundant monitoring on the service water. Specs do call for a monitor on the service water line, but it need not be redundant.

MR. MOELLER: We cannot seem to get to the bottom of it. What I am hearing, Jack, is that the routine monitors are not in duplicate, and if those routine monitors are supposed to be of sufficient range to give you information during an accident, then we don't have what we want.

MR. HEALY: I think that's right.

MR. MICHELSON: These are not the accident monitors.

MR. EBERSOLE: The crux of the problem is identification of what is an accident. I am talking about accident of a tube failure.

MR. MICHELSON: Tube failure could occur during an accident.

MR. EBERSOLE: I am saying routine shutdown tube failure

MR. MICHELSON: I have not heard arguments that make me change it.

MR. MOELLER: We need answers to a couple of questions, Bill. One is, are the routine monitors expected to perform the accident monitoring, or is there a separate set of monitors in all plants, post-TMI, to handle the monitoring of accidental releases?

MR. WILLIS: The TMI requirements, they do not cover the service water line. There are requirements on what appear to be significant release pathways. I think the concern was more with gaseous releases than liquids.

MR. MOELLER: Right.

MR. HEALY: And are the requirements for duplicate backup on these instruments? In other words, is there redundancy on these instruments?

MR. WILLIS: I think not in every case.

MR. MOELLER: Let's put it this way: The bottom line will be that unless these monitors are in duplicate, we believe this issue needs to be assigned a high priority.

MR. EBERSOLE: Fine.

MR. SHAPIRO. Do they actually have high-level accident monitors post-TMI?

MR. MOELLER: Yes.

MR. WILLIS: Yes, sir.

MR. GAMMILL: From that standpoint there are two. We do have two. We have the normal monitoring system and the accident monitoring system.

MR. SHAPIRO: Real time?

MR. GAMMILL: If you consider that duplication or redundancy, then yes. But they do not both cover the full range.

MR. MOELLER: Then it's not good.

MR. GAMMILL: But if you have an accidental release, you have two systems there that will tell you have an accidental release. One may go off scale, and you do not know how much was released.

MR. MOELLER: That is not acceptable.

MR. HEALY: What is the action of the operator? Is it that the blasted instrument went out again? This is the general reaction. I have seen this time and time again. I do it myself. The instrument isn't working, so forget it.

MR. MOELLER: Let me pick up now on liquid releases. According to B-67, it says, item 3, that the effects -- I am looking at the blue sheets.

MS. TANG: Table 1.

MR. MOELLER: Item 3 says, effects of accidental liquid releases on nearby water supplies. That is covered in B-67.

MR. WILLIS: I have to plead ignorance on that one.

MR. MINNERS: You are talking about the last paragraph on the first page of the issue, "The third subtask of this issue is that worst-case generic analyses were to be performed using SRP sections such-and-such were both BWRs and PWRs located on lakes, rivers, oceans."

MR. MOELLER: All I am saying is does B-67 cover liquid releases in an accident, or does III.D.1 cover it? Because if B-66 covers liquid releases and III.D.2.1 covers airborne, then we need to comment on both items.

MR. MINNERS: B-67 talks about Part 20, so it is not accidents. The III.D.1 is an accident one, I am sure.

MR. MOELLER: Fine. We will stick with it that way. Let's go on to C-17, interim acceptance criteria for solidification agents for radioactive solid wastes. Do we need any discussion of that? What is the ranking of C-17?

MR. MINNERS: Partially resolved. It is a Note 2 item. There is a rule out for consideration.

MR. WILLIS: Part 61, the regulation is now in effect. What is now under consideration are the technical positions that the waste management system had developed from the standpoint of one, anyway. That is a resolved issue.

MR. MOELLER: I don't see that it would demand our comment or attention this morning. Does anyone disagree?

(No response.)

MR. MOELLER: Let's go to III.D.1.2, which is radioactive gas management. We just heard a little bit about that; namely, that it is where you have a release in the containment and you need to vent this release, and you would like to have a noble gas recovery system. Could you tell us, Bill, a little bit more about it?

MR. GAMMILL: Yes, I can tell you what the staff has done on that. About 2 years ago, I would say, on that order anyway, we had a request or a direction from then Chairman Hendrie to follow up on this particular item. He recommended specifically that we consider the use of the process that was developed in Oak Ridge gaseous diffusion plant, and proposed a design which would be portable or mobile and could be transported to the scene of an accident and used to process the containment atmosphere, collect and store indefinitely the noble gases.

He suggested that we consider two different designs: one which would be placed into operation within a matter of 10 days, 2 weeks, in that order; and the other one that could go into operation some 3 or 4 months after the accident, as I recall.

We had a bit of difficulty in defining -- I guess originally we were talking about very early use of the system -- we had difficulty defining an accident scenario where it would be desirable to try to get into a reactor containment, number one. We were looking for a basis for requiring early use of such a system.

We finally ended up with a proposed design that would go into operation approximately 1 month after the accident. We decided that it was not practical to put together a system which would operate much earlier than that.

Preliminary design work was done on it at Oak Ridge. The paper went to the Commission, I would say, approximately a year and a half ago now, I have forgotten exactly, around the first part of '82, I believe. And we have never had any response on that. Apparently, there was very little interest on the part of the Commission in following up because of the expense of the system.

MR. MOELLER: Any comments?

MR. MINNERS: I would like to make a little note on procedures that we are following. The TMI Action Plan has a lot of things in it. EDO wrote a memo that said, if you want to make major changes in it in scope or schedule or you want to drop one of the issues, you are supposed to write a memo to the EDO saying that, which has not been done in all cases.

We are sending this over to the EDO with a recommendation that this thing be considered to be that memo in those cases where issues are designated as resolved or changed in scope or something, and not have to write individual memos for each one of these things.

This issue, if EDO accepts that, that would be having Hammond say, yes, this is resolved, and Bill would have gotten his answer.

MR. MOELLER: I don't see any need for additional discussion on this. Does anyone have other ideas or want to offer specific comments on it?

MR. KATHREN: I would like to ask a question about new plants. I cannot find the sheet here in all this paper, but I wrote my self a note that said, how about new plants. Do they get factored into this sort of thing too?

MR. MINNERS: Yes, they do. When you do a prioritization on these things, a lot of times it ends up that you have to classify plants into different groups because of the risk reduction or the cost is different. So that is what we generally do.

We had an issue which was high priority but only affected new plants. So we reduced it to medium priority because there were unlikely to be any plants in the immediate future. I don't know if we ever went the other way.

MR. MOELLER: Any other questions or comments?

(No response.)

MR. MOELLER: All right, let's look at III.D.1.3, which is ventilation system and radioiodine absorber criteria. What it is is to assure that facilities have adequate filtration of rad materials and acceptable collection efficiencies for iodine during accidents.

It includes revision of Reg Guide 1.52 and 1.140.

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It is a licensing issue as opposed to a generic safety issue.

MR. GAMMILL: As Mr. Willis indicated a while ago, we are in the process of revising Reg Guide 1.140 and 1.52. We are in the process of revising those.

MR. MOELLER: So the work is under way. It will be resolved, in short, or in due time. Okay.

Jack.

MR. HEALY: Could I have a question on that? Does this include looking for stray paths out of the containment, such as being pumped over to the auxiliary building?

MR. MINNERS: You mean this particular issue?

MR. HEALY: No.

MR. MOELLER: Where would that maybe be covered?

MR. WILLIS: It is part of our review process. We do look for those sorts of things.

MR. MOELLER: Fine. Let's go to III.D.1.4, which is, as I gather, having radwaste cleanup features to handle post-accident situations and decontamination.

The committee has written letters in which we called for increased attention, consideration of decontamination as a means of controlling occupational exposures. That would require at least new plants to have the capability to handle the associated waste.

MR. MINNERS: May I make one comment? I rather like this issue because it deals with occupational dose, which I do not think we have considered properly in the past.

MR. MOELLER: Yes.

MR. MINNERS: We may have done the issue wrong, but if our assessment is correct, this says you will incur more occupational dose in implementing the resolution of this issue than you are likely to avert.

So therefore, we say, drop. We could be in error in our assessments. The ratio may be incorrect. I want to draw attention to the logic of the decision process on these.

MR. MOELLER: Do you understand, Jack? He is saying that the decontamination process would involve more occupational dose than it would save than they need to redesign the decontamination system.

MR. HEALY: That really does not sound logical to me. You design a system which is designed to facilitate the handling of the waste at low dose, and you get more dose?

MR. GAMMILL: Let me respond to that. Earlier when Warren made his presentation, he said there are sometimes differing views between staff and his people. Sometimes we work this out, sometimes we don't. I think this is a case where did not get the differences worked out.

I remember commenting on this. But the situation is this: What was intended on that particular item was that suppose you go into the design of new systems -- and I think the group that was prioritizing considered backfitting, which was not the intent -- if you are trying to backfit, then certainly their concerns were valid. But for new systems, no, I don't think that was the case.

The difficulty we ran into, however, is -- in trying to get something under way in this area, I proposed something for the last 2 years in our budget, and both times it was deleted. The reason it was deleted is because in the opinion of management there were not enough new radwaste systems being designed to justify the cost of this work.

I am not sure that that is correct, because of the number of new radwaste storage facilities that are now being designed. Many of those are having radwaste treatment equipment installed in them also. Nevertheless, that was the reason that the bottom line was that we could not justify working on that.

MR. HEALY: This raises a question on the system. This one was ranked low for nuclides because there are not any nuclides coming along. Now, let us theorize that in 5 years from now business picks up, there is a demand for electricity and nuclides do come along. How is this one revived? Is it flagged in any way, such as a little flag that says new plant issues so it can be looked at at the appropriate time?

MR. GAMMILL: No. I think we would depend on the staff remembering that this was a matter of concern that should be taken into consideration at that time.

MR. MINNERS: There are at least one industry group that is trying to identify all of the possible new requirements. They are going through a process of trying to design or at least conceptually design a plant that might be submitted, and maybe that is a mechanism.

Now, unfortunately, I guess you pointed out maybe an errror because they looked at this issue and said, drop. So maybe we need a little caveat here that says: accept with new plants.

MR. MOELLER: Dick Foster.

MR. FOSTER: I did not get around to looking at this ahead of time. So I am probably very confused in what I am hearing. I have the impression that this has to do with cleaning up such things as liquid waste which relates to an accident situation perhaps like TMI and that the action here says since the public dose would be very low in comparison with the occupational dose, that nothing should be done about this.

To me, that says that you are not goina to clean up that effluent by any means. You are going to go ahead and dump it. Let the public dose occur.

It seems to me that at least political considerations would say, whether you like it or not, you are going to clean it up and you are going to get that occupational dose.

MR. MINNERS: That is considered. Accidental occupational dose from an accident is considered in the issue.

MR. FOSTER: Is what you are saying then you are planning that the existing -- the occupational dose associated with existing cleanup systems would be incurred by making them better and saving some of the occupational dose, that that is not necessary?

MR. MINNERS: That is part of it. But the major saving in occupational dose -- it is the other way around. If you implemented backfit of this issue on old plants, you would have to be working with waste processing systems that are not systems, so people that install the revised system would be getting an occupational dose to modify the systems to better treat accident waste. That dose comes out to be higher than the doses that you would save if an accident happens because of the low probability of the accident.

MR. GAMMILL: May I respond to that also in a little different standpoint? This item really resulted from the realization or recognizing that TMI, the existing radwaste facilities were just totally inadequate or practically useless for handling the levels of activity that the experienced following that accident.

That did not mean that they simply had to release those. It meant that they had to design and build a new system to handle it, or systems, before they could proceed.

We felt that with a little planning in advance, such things as leaving room for portable shielding to be moved in or out so that you could go ahead and use it, that sort of thing, so then the existing radwaste systems could be of use following an accident.

MR. MOELLER: When it says "decontamination," Bill, I thought that part applied to decontaminating existing plants, the primary systems, to further control occupational doses. I am wrong? You mean only post-accident decontamination?

MR. GAMMILL: Post-accident decontamination.

MR. MOELLER: Then what would you recommend, Bill? That we simply flag it for reconsideration when new plant applications come in?

MR. GAMMILL: I think that would be appropriate.

MR. MOELLER: Any objection to that?

Dick, I guess I did not see your point. I don't think they are not saying they would clean up what they released to the environment after an accident. They just say they would wait until the accident to build the plant to clean it up.

MR. FOSTER: I understand that [illegible], but I did not understand it before.

MR. MOELLER: Let's try to finish this page. B-65 is spiking, iodine spiking. I don't think we need to talk about it, do we? Can someone just give us a two-or-three-sentence summary of what it is all about?

MR. MINNERS: I can give you a one-sentence summary: we did it wrong, and we are redoing it.

(Laughter.)

MR. MINNERS: We had this classified as a licensing issue.

MR. MOELLER: It is listed here as environmental, inactive.

MR. MINNERS: Okay, I probably got a later update than you even have. It does not make much difference. We think it is a safety issue now. We are going to prioritize it as a generic safety issue. We have not yet done that.

MR. MOELLER: What are you talking about, just when the transient changes the power? You are talking about iodine spiking into the cooling water?

MR. MINNERS: I guess I do not have the details in my mind. Whatever is written down on the paper is what I know about it.

MS. MITCHELL: There are two issues involved. One is the model which the staff uses for design-basis accident evaluation, which industry feels is too conservative. And that would be a licensing improvement part.

However, there is an issue whereby some PWR plants do not have an iodine technical specification, and some BWR plants have high limits in their iodine specifications and are less surveillance. And that is the safety issue.

MR. MOELLER: This is part of the steam generator tube rupture where you were going to limit the iodine in the primary coolant to limit the dose?

MS. MITCHELL: Yes, that's true. The generic recommendation for the steam generator tube rupture accident contains the recommendation that the PWR plants do not have standard tech specs adopted.

MR. MOELLER: We would certainly agree with that.

My main question is how did this slip through the cracks?

MR. MINNERS: It has not slipped through yet.

MR. MOELLER: You caught it. How could it slip as far as it slipped?

MR. MINNERS: Who killed John and who shot John? Those things are too hard to find out, Dr. Moeller.

MR. MOELLER: Let's go on. We have three more on this page.

MR. MINNERS: May I make one comment on what she was talking about, that there might be a change in the accident models. As we went through this thing, I began to see that there were -- there were what I would call opportunities for deratcheting the Commission's regulations. I did not want to classify those as licensing issues, because I think they did directly relate to safety; and yet I did not want to classify them as generic safety issues, because they were not deficiencies but they were useful things to do.

So for lack of a better word, we call them "regulatory impact issues." I think the agency is now mature enough and has a little time that maybe they should search out these places of overconservatism, and if based on this same rating scheme you can save a lot of cost and not change risk much, if any, maybe we should be working on these things on some sort of a priority scale although we have not decided what that priority might be.

So in addition, if people want to identify generic safety issues which are deficiencies, we also are soliciting deratchets.

MR. MOELLER: Okay. The next item is III.D.2.2., radioiodine, C-14, and tritium pathway dose analysis. I find this for consideration because this iodine includes a better definition of the source term during, among other things, an accident; in other words, the chemical behavior of these nuclides within the cooling system and within containment, et cetera. So that to me is a safety issue.

Item 30, III.2.2.

MR. EBERSOLE: Did we jump over the control room infiltration?

MR. MOELLER: Okay. Control room infiltration, B-66 we covered earlier.

MR. EBERSOLE: Let me make an observation. I heard yesterday that this is tested by the process of pressurization of the control and other auxiliary rooms and in determining what the filtration is by exiting, measuring the exit streams, whether you can pressurize with a given cfm.

I am reminded of the barn door swinging only one way, and in the fact that you do not measure infiltration under pressurized conditions, it seems perfectly logical you should measure under exhaustive conditions. There may be dampers and all sorts of minute structures in there that do not operate the same way under positive as they do under the real problem condition, which is negative pressure.

MR. MOELLER: Okay. We noted that comment, and we put that under control room habitability.

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Back on III.D.2, do you see my point? If it includes understanding the source term for an accident, why isn't it given high priority?

MR. MINNERS: I think that is probably a glitch in the system. We do not have a good way of including some of these issues in things that are not generic issues but are being worked on, like a source term. It is being worked on in its own unique way.

MR. MOELLER: So if we look at this exclusive of the source term, then it is not all that big?

MR. MINNERS: Maybe we should have a few words in here that it is being worked on in the source term tests or something like that.

MR. MOELLER: All right, any comment on that?

(No response.)

MR. MOELLER: Let's take up the last two. III.D.2.5 is off-site dose calculational model. My only comment, I could not argue for high regulatory concern on that. My main comment would be what Dick Foster said. It ought to be an evolutionary thing and be able to incorporate new information as it becomes available.

MR. FOSTER: Don't lose your capability just because something important hasn't come along every year. I could see that whole group disappearing, and when something significant does come along, you have nowhere to recreate it.

MR. MOELLER: On the last item, before we break for lunch, rad protection plans are high priority? We can't argue wi h that.

MR. MINNERS: Gee, we got one right.

(Laughter.)

MR. MOELLER: We all have our biases.

MR. KATHREN: Probably not.

(Laughter.)

MR. SHAPIRO: Could they clarify one thing? Going back to III.D.2.1, study the feasibility of requiring development of effective means for monitoring sample noble gases. We said you have already worked on that under TMI. Why is it listed here then? Why does it have a low priority?

MR. MINNERS: Which issue?

MR. SHAPIRO: III.D.2.1(2), page 73.

MR. MINNERS: Let me get there.

MR. SHAPIRO: We said the systems are already in place for real-time monitoring. Is this something else?

MR. MOELLER: Say your point again?

MR. SHAPIRO: We discussed previously the problem of real-time monitoring of gas releases at TMI, and we said that is in place. They have that. But why do we have this particular item and it is given low priority?

MR. MOELLER: If my memory is correct, what we agreed on is that the rad monitoring of effluents -- III.D.2.1 is for effluents associated with an accident -- they said post-TMI they require or they are requiring the nuclear power plant people to install high-range accident monitors. They also have lower-range routine release effluent monitors. They have only one of each.

If you had an accident, the high-range one is out; your low-range just goes off scale. We say that is not adequate. So we have called for an upgrading in the priority. If all of these things upset --

MR. SHAPIRO: This implies that the whole system has to be developed. Am I reading that right?

MR. MINNERS: As I read it, it says, to meet the new criteria you would have to install monitoring systems which are currently beyond the state of the art.

MR. SHAPIRO: That's the point. It is a low-priority item.

MR. MINNERS: That is because we say what we have now is adequate. We don't need state of the art.

MR. SHAPIRO: But what you have is one based on calculation, as I read it, and so forth, isn't it? When I read --

MR. MINNERS: The effluent monitors are radiation detectors at various release points. Because of TMI, we now have monitors on the steam dump valves. We did not have those before. They cannot do a very good job of discriminating what is coming out of there, whether it is iodine or noble gases. They can tell you something is coming out.

I guess what this says is we think that is adequate. You would not have to go to a state-of-the-art device which would tell you how much iodine was coming out and how much noble gases and how much tellurium or whatever.

I am not sure that is the specific case, but that is an example of what we are talking about. This presumes that the TMI requirements and the other requirements on the books have been -- are approved and have been installed on plants, whether that is factually true or not. So this says you already have a whole bunch of accident monitoring instrumentation on the plant, you don't need any more.

MR. SHAPIRO: Are you saying you don't know what you are releasing, though, with the material you have now?

MR. MINNERS: My understanding is -- I am far from an expert in this area -- the steam dump valves, they just have a monitor. It cannot tell you -- all it can read is gamma, so it cannot tell you what is going out there, whether it is iodine or radioactive gases. It does not have a spectrum analyzer on it or any other -- some other device to monitor it.

In fact, that was the reason that people did not put on one for years. They said if you can't tell what is coming out, then you should not have it. But the view prevailed that maybe you don't know what is coming out, but it would be nice to know what is coming out.

MR. SHAPIRO: There may be an inflated cost on developing that. That might be why there is a low priority. Your formula should be looked at to see if it is something -- you should be able to tell the public how many curies of stuff are released. That is my feeling.

It should not have to be done by all of the analyses we had to do for TMI. That was a very circuitous route to find out what was released at TMI.

MR. MINNERS: I don't know how to answer your question. I would like to have it given to me, and we will try to deal with it. Especially, I think some of the consultants probably have better ideas on costs of equipment, and some specific comments on cost would be useful. That it is too high or too low is not helpful. If we could have your estimate of what you think it is, we could deal with that better.

I tell you, it will be a continuing battle. I will take this out to industry and get the exact opposite answer. So I will average the two comments and do what I want.

(Laughter.)

MR. MOELLER: Jack Healy. I was going to comment. I think, Jack, you were saying there are such instruments available on the market today.

MR. MOELLER: Yes.

MR. SHAPIRO: I don't know if there are today, but I have the impression before that we have said that we knew -- we were able to monitor what was released, and now you are telling me all you can monitor is the gamma measurement. I do not think you can get away with that.

I think we have a lot of uncertainties at TMI, not knowing what was released and a lot of concern. We were discussing that with the Rogovin Commission that we know what was coming out of that plant.

MR. EBERSOLE: I always come back to the same thing. I don't see any escape from having airborne sampling equipment that cannot only tell you what is coming out but where it is going, and one should have light planes ready equipped so you can go across two, three, four, five hundred miles and put in motion a quantitative survey that would say what is going out and where it is going. I don't see anything exotic about that.

MR. MINNERS: When you put numbers to that, you get very small risk reductions. What you are saying is that you want to make people feel better. That could be a policy decision of the Commission, and I guess I would fight to take that out of the safety issue list and put it into the licensing issue list and say, hey, you guys want to have more assurance that we are not radiating, so we will put more monitors out there. But there is no real risk, and we are not going to admit to that.

MR. EBERSOLE: Where does the part of it come out, though, Warren, where you say, ah hah, if I know this, I don't need to have a general evacuation where I am going to kill 200 people in traffic jams.

MR. MINNERS: That is a kind of artifact of our methodology here. Evacuation does not reduce the man-rem very much at all here. If you want to consider evacuation, you have to do it outside of our particular standardized approach.

MR. SHAPIRO: If it is not in your formula, we have to put it someplace. That's the only comment I am making.

MR. MOELLER: Carl, and then we are going to lunch.

MR. MICHELSON: I have a difficulty sometimes understanding what we mean by "monitoring" and "sampling." Keeping in mind the example of Browns Ferry, the RHR leaking tubes, that is continuously monitored, so-called, with a gamma monitor which sits on the outside of a pipe. But with water flowing at 8,000 gallons a minute, you do not see much unless you have what I call a gross release through tubing. You do not see these releases.

So what did we mean by "monitoring"? In some way, you have to take literally a continuous sample out of that flow stream and go through some very sensitive equipment looking for whatever you really want to look at. Is that what you are referring to here? You want to monitor? The same problem on steam releases through atmospheric relief valves, you cannot monitor that except with a gross gamma monitor. You really want to know what is in it, that is a sophisticated and expensive setup.

MR. SHAPIRO: We designed something to look at the primary coolant. We calculated the specific activity.

MR. MICHELSON: Primary coolant is not a problem. There is plenty of activity to look at.

MR. MOELLER: He means for an accident --

MR. MICHELSON: Gross gamma for an accident is fine. You want to say, I want to know how many isotopes of this and that.

MR. MOELLER: He would get spectral data.

MR. MICHELSON: It is a tough problem. It is very fancy when you are talking about the kinds of steam flow rates you are talking about on relief valves. It is not like pulling a sample out of a reactor coolant. It is just passing by. You have one chance at it if you are trying to sample. You have to pull a sidestream.

What they do in the case at Browns Ferry is they pull a sample. That is what happened. It took them 8 hours to find out what was in it because it takes that long to pull a sample out, take it to the laboratory and put it in the kind of equipment it takes to monitor this and make a determination of what is in it. This on a continuous basis is not cheap.

MR. SHAPIRO: If I am living near a reactor as a citizen now, I would want to know what is coming out that. If there is a possibility of 10 milion curies coming out of that reactor, I want to know.

MR. MICHELSON: You would pick that up with a gross gamma.

MR. SHAPIRO: I want to know how many curies there are, and they could not tell me at TMI until they spent months on the thing.

MR. MOELLER: There are monitors for airborne releases in an accident that would give you spectral data.

MR. MICHELSON: Out of a steam line.

MR. MOELLER: No. Out into the air.

MR. MICHELSON: Not in the steam line.

MR. MOELLER: I would agree there you would have problems. Of course, it took a little while, but we routinely develop samples at environmental levels and identify specifically what is there. It takes a while to count it.

MR. MICHELSON: They do it with the water systems, but they have to pull a batch sample. We are talking, I think, continuous monitoring here, and yet we want to know what is in that sample continuously. With the flow rate you are talking about, the dilution of the sample, it is a pretty nice setup.

MR. SHAPIRO: It is probably zenon 133. Maybe a dose measurement would do it. You do not have to go through a whole spectral analysis.

MR. MICHELSON: That is what prompted my question: what kind of sample are you talking about?

MR. KATHREN: And the high-energy protons associated with the noble gases, that is a clean part of the spectrum. You are up above all of the garbage that will interfere with that, and you can pretty well get an accurate estimate of what is in the stream based on the noble gas content.

MR. MICHELSON: The first thing you have to know is what the stream flow rate is in order to convert this into some kind of a dose. We do not have means of measuring the flow rate out of the relief valve line, for example. We don't know how many cubic feet per second flow in that line. You don't know this. You cannot calculate dose.

MR. MOELLER: We are talking about two different places. Carl is right. His monitoring situation would be difficult, no question about it.

All right, let's break for an hour for lunch.

(Whereupon, at 12:40 p.m., the Subcommittee was recessed, to reconvene at 1:40 p.m. this same day.)

#15 arl

AFTERNOON SESSION

(1:40 p.m.)

MR. MOELLER: The meeting will come to order.

We had, when we recessed for lunch, five generic issues, so five items left.

What I want to do is take up the first of those five and then we will jump to the afternoon schedule, and then pick up the last four later.

The first one is A-15, which is the primary coolant system decontamination and steam generator chemical cleaning. And why don't we look at the details on that one? And here they are.

It says to develop radiological and administrative control criteria for use as guidelines, as Staff review of decontamination operations.

I sort of felt, with Bob Alexander here, that it would have highlighted decontamination in terms of occupational dose control. But they don't seem to highlight that very much. It says this whole thing has been resolved which, if I understand it, is a little bit surprising.

Could we have some comment on it? To me, primary system decontamination is something we are not doing. The committee has been wanting to see more effort on it.

MR. WITT: I am with the Chemical Engineering Branch.

We have had technical assistance by Battelle Northwest, and we have a document, a NUREG CR 2963 which we have in draft now, and it is going around for comment by the Staff, planning guidance for nuclear power plant decontamination.

We feel that this document should close this issue.

MR. MOELLER: In other words, that report tells, has recommendations and guidelines. Could you give us the bottom line on what it recommends?

MR. WITT: The topics that are covered here are -- let me first say, the intent of this document is to encourage decontamination, to safe manrem exposure.

The purpose is also to dispell some of the fears that some industry has from addressing decontamination, a regulatory process which started in '76 and they still have not decontaminated yet. They may decontaminate next year. That's the latest I hear on that.

The topics that we cover are the benefit-cost analysis, regulatory compliance and this. We say that most decontaminations can be done under 50.59. This is because they will not involve any technical specification changes or any unreviewed safety items.

MR. MOELLER: So, licensewise, it is pretty straightforward for them?

MR. WITT: That's right. Just this past week we had Millstone 2 come in. They are going to do a decontamination of the steam generator channel heads in preparation for a resleeving operation. They are going to use a new process which the Staff has not seen, and they just came in for an information meeting where they addressed all the things that we were interested in: corrosion, manrem exposure, and contingency items.

So, right at that meeting we could say you could continue on under 50.59.

I might mention that job is going to save 1000 manrem.

MR. MOELLER: What is the cost-benefit?

MR. WITT: We did not look at it from cost-benefit, but they surely did. Their decontamination is going to cost over $1 million, so it is over $1000 per manrem. We questioned them on that. We said if you can increase the state time, you're going to save a lot more than $1000 per manrem with all of the training. It costs more because it is the first time of doing it with this process.

This process is a joint Combustion Engineering-KWU process which is potassium magnate peroxide. The same process will be used on a test up in Sweden on the Gustav Reactor

Plant.

MR. MOELLER: I think you said it is on one part of the system.

MR. WITT: Yes.

MR. MOELLER: Does it involve the fuel?

MR. WITT: They put nozzle dams in the reactor coolant piping. The decontamination solution is just circulating from one channel head to the other. They also allow it to rise up into the tubes to reduce the shine from the tubes. They expect decontamination of three to five thousand manrem exposure.

MR. MOELLER: I am pleased to hear that.

MR. EBERSOLE: I want to mention this issue. I don't know where it stands in the regulatory context, but some years ago when the system started to be turned down to simple redundant trains, let's say, for vortex and RHR functions, there had been as many as four pumps which you had to sustain post-accident pumping and cooling. There appeared on the scene regulatory minimums, and this raised the question of what is the meaning of the single failure criteria that was originally invoked on scram, the philosophy where the event under consideration was over in less than a second.

Now it had a time sense, and one argued, why enter an accident, a serious accident, and initially why enter it with only one pumping system, or start with two and then one fails? Am I going to sit there for the next three months and run on one train, or shall I make design provisions, including decontamination, to go in and segment the systems and fix the one that quit? It was a judgmental decision where I used to work that the alternative was to fix it so you could go in and recover a failed train in the most drastic, dirty circumstances.

I don't know what the general practice is, but I think the matter of decontamination gets into this very heavily. There were decontamination provisions put in and means to get the seals and the channels out without taking the whole thing apart. There were shield walls put in and a variety of features to attempt to isolate the presumed disabled train and restore service for the long haul.

Now, I will lay the groundwork for that and let you pick it up.

MR. MOELLER: Could the Staff, anyone here on the Staff, help us with that?

MR. MINNERS: I don't think that issue was addressed beyond the action plan item that -- I forget what it was. The sense of it was to let people get into areas that -- primarily for sampling during high activity, and there was some review of pump seals and things like that.

That is about all I can bring back to my memory as to how that much of the subject was addressed. That certainly is not a design requirement in the sense that you are talking about, Mr. Ebersole.

MR. MOELLER: What can we do, Jesse?

MR. EBERSOLE: I'm talking about plants I was involved in designing, not in a general context. The issue came up at the GE standard plant last week and there was a bigger session about whether this ought to be a design basis or not. In my own view, I think it at least ought to be analyzed carefully. I do not think that single failure criterion will stand, not with the prevalence of common mode failures.

MR. MINNERS: I would like to make one comment on that, Jesse:

The single failure criteria is applied to the safety system which is designated to take care of that sequence;in every accident that we have had, safety systems have not been used. There were normal operations during Browns Ferry and TMI. We used those systems so we never had -- and the probability studies consider that, but the design basis does not. So when you say you are down to a single failure, you really are not, because you still can go back to the steam generator.

MR. EBERSOLE: You can't with a boiler in a containment primary system.

MR. MINNERS: Maybe the letdown cooling system or something like that might be enough. That ought to take care of the heat. I cannot give you a technical answer on a BWR right here. I am saying there are normal operating systems that are available which, when you talk about single failure analysis, you infer only safety systems, but even if all the safety systems fail, there are usually operating systems that can serve to function.

MR. EBERSOLE: In the depressurized BWRs, the heat is removed by transport. That requires a continuity of operation of RHR pumps.

MR. MINNERS: In the BWR --

MR. EBERSOLE: PWR.

MR. MINNERS: You can do natural circulation through the steam generators.

MR. EBERSOLE: It does no good at all. You are talking about using them as heat exchangers.

MR. MINNERS: Yes.

MR. EBERSOLE: There are alternate courses, I agree.

MR. MINNERS: I think your statement about single failure is correct, but it has to be qualified.

MR. EBERSOLE: I agree.

MR. SHAPIRO: The last time we mentioned it, there was a possibility of using a submarine, nuclear submarine working in decontamination. Has that information ever gotten into this program experience?

MR. WITT: I am not aware of it. I think the processes that are being used right now are the London Nuclear Process which has been used probably in at least eight plants in the United States, mostly BWRs. Their clean-up systems, and also their recirculation systems. It has been used recently on steam generator channel heads.

There is also the Lomi system, which is a British system that has been used on a Surry steam generator up in Battelle. They all seem to work fine.

The KWU system sounds promising, too.

I think the emphasis is on low concentration decontaminating solutions because of radioactive waste. This reduces the volume considerably and I don't think this is so of the Navy system.

MR. MOELLER: Dick Foster?

MR. FOSTER: Do I recall correctly that DOE was about to get into this decontamination in a big way, quite recently? If so, do you know what the present status of their effort is?

MR. MOELLER: Dresden, with DOE.

MR. WITT: They put some money in the Dresden operation. DOE is also funding some of Millstone-2 operations.

MR. FOSTER: I think I had something in mind of more of a generic nature. We had a presentation last fall.

MR. MOELLER: We had Dr. Malinzion address the DOE plan for control of occupational exposures, among other things, under the Congressional mandate.

MR. FOSTER: That is the one I am thinking of, which focused almost entirely on the decontamination aspect. I wondered if that is going --

MR. MOELLER: It is moving forward. I have not talked to them for a few months. It is moving forward.

MR. WITT: Isn't that decontamination as a precursor of decommissioning? Is it from that aspect, or an operating plant?

MR. MOELLER: They were looking for control of occupational exposures. This was part of just their overall program that they are developing in response to the Congressional mandate.

MS. TANG: It is the Dose Reduction Working Group. Public Law what -- it has some number.

MR. FOSTER: That's what I meant.

MR. MOELLER: We will follow up and find out on that.

MR. EBERSOLE: Let me go back to what Warren said.

Warren, back in those years, everybody was all heated up about the big LOCA. Hypothetically all you could do was flood the reactor vessel and the water went out on the floor. There was no way of -- they were still doing heat transport through the exchangers. You say that is not the case?

MR. MINNERS: Under the rules of the game we played back then, we had safety grade equipment and that was all.

MR. EBERSOLE: To a greater or less degree, it ought to be looked at. I cannot help but be suspicious of simple redundance with inability to repair.

MR. WITT: You would help me get resources if you'd write that down.

MR. MOELLER: Let's move on, then.

MR. WITT: One last thing. I have this draft. We are still redoing it, just for your information.

MR. MOELLER: This is your analysis of this particular item?

MR. WITT: This closes out this item.

MR. MOELLER: Thank you.

Continuing on with the schedule, what we wanted to do was to pick up with the afternoon items so that the people who present those can finish them up as soon as possible and place them behind schedule as little as possible.

The first speaker this afternoon is Dr. Larry Cohen, and he will be talking on Item III.D.2.6, "Independent Radiological Measurements."

Larry, do you want to speak from up front, then, or sit at the table? Whichever you prefer.

end 15

MR. COHEN: I will sit at the table.

MR. MOELLER: It would help us if you would cover the item briefly on where you stand.

MR. COHEN: Okay. This item, independent radiological measurements, was a self-initiating program that we started in the Office of Inspection & Enforcement. Historically it goes back to the early '70s as a pilot program, where some regions performed some independent measurements, including the measurement of effluents. Region I, in King of Prussia, had a vehicle which was in operation at the time of Three Mile Island, and we realized at that time that -- how useful having this kind of capability was to assess the radiological hazard at Three Mile Island.

Other measurements were performed in the plant by our inspectors, and we made a concerted effort to define the kind of independent measurements we would like to incorporate in our inspection program. In December of 1979, a draft report was prepared called the Independent Measurements Task Force Report which was unpublished and has been unpublished. This was the basis for deciding what equipment would be purchased and what programs would be continued.

The task force was made up of headquarters, which was myself as the chairman, and representatives of the five regions in the radiological area, and also in the safeguards area. It was our belief that independent measurements give you a direct evidence of a licensee's capability which, in conjunction with the traditional methods of paper review and documentation that one would get a better handle on the capability of the licensee to make measurements.

The areas covered included effluent measurements, environmental measurements, external and internal exposure, transportation packaging, medical and safeguards.

The report defines the measurements that the task force recommended to be performed and gave which facilities these measurements should be made at. For example, nuclear power plants, field facilities, byproduct, et cetera, and how often the measurements should be done; the size of the sample, where appropriate; and what equipment was required to make the measurements, to fulfill this measurement capability.

This document listed the equipment that each region should have to perform these measurements, and this has been used as a basis for obtaining the equipment. The largest and main item was the purchase and equipment of the mobile laboratories for each of the regions.

As I mentioned, Region I had a vehicle which turned out to be very useful in Region I and in the ensuing years all regions have been equipped with at least one mobile laboratory.

I believe Region II and perhaps Region I has a second vehicle for safeguards use. The vehicles contain a gamma spectroscopy system with a uranium detector. All regions will have a second unit in their regional office. Other equipment includes survey equipment to handle gamma, beta and some neutron measurements.

And for emergency use, we also include the air samplers and air measuring devices.

So at the present time all regions are fully equipped and operational. They all have the same equipment. We wanted a standardized program, in case of a problem, an inspector from one region, say Region I, could go to Region V or Region III, and be able to operate the program.

We have routinely, like once a year, accounted for a meeting where all of the inspectors operating vehicles sit together, talk about common problems, and computer codes to improve their capability, and make sure that they all are standard in the type of background information for the computer, the isotopes, the abundance, all of the other factors needed to make the measurements. The program, the inspection program from the health physics area, is presently being revised. They are right in the middle of it and we are incorporating independent measurements in various areas. We -- of course, this report was written in '79, and we look at it with our resources that we have available now, and the equipment that is available now. That is basically where we stand right at this moment.

MR. AXTMANN: Could you give us a feel for how extensive your inspection of a plant would be?

MR. COHEN: We try on an annual basis to take our van to the power plant, for example, and there we split effluent samples. It may be a charcoal cartridge, a gas sample, a particulate filter, and a liquid radwaste sample. If the plant is down or there is not enough activity, we have spike samples, simulated samples for them to count. This gives us a feel for how well they can do.

MR. MOELLER: You have not only independent capability, but you split samples to check the accuracy, theirs vs. yours.

MR. COHEN: Right.

MR. AXTMANN: Is that during downtime?

MR. COHEN: We usually do it when it is operating. We try to do an unannounced inspection. We go in when there is activity. During the pre-op we do an extensive review, not only of the -- the counting is only part of it. The capability of the plant, the training, all aspects, making sure their chemistry -- that they have the capability to make accurate measurements.

To support this program, we have a contract with the DOE lab in Idaho Falls, their Radiological Environmental Sciences Lab, and their -- the real chemistry, as they say, the difficult samples they receive, and they do the strontiums and whatever nuclides need to be done. They also support us in other types of samples found in decommissioning sites; whatever needs to be done. They say the difficult samples.

MR. KATHREN: Have you given any thought to becoming -- excuse the term -- an NRC standards lab, with linkage to MBS, which I think has provision now to create these satellite or secondary labs? You know what I am making reference to.

MR. COHEN: Yes. Again in part of this program we have with the RESL Laboratories, we signed a contract with MBS, and they provide 13 unknown samples to RESL of gamma, beta, alpha, mixed gamma, and this is what we call traceability program with RESL, to ensure that RESL is QMBS. This is --

MR. AXTMANN: What is it?

MR. COHEN: Radiological and Environmental Sciences Laboratory, located --

MR. AXTMANN: Where is it located?

MR. COHEN: Idaho Falls. They provide or assist the regions in standards preparation to calibrate the laboratories, the regional laboratories, and also we have a round-robin interlaboratory program where RESL prepares and sends out samples of unknown activity of charcoal filters and gas samples and particulates to check on our regional capability and ensure that we have the right answers.

This is part of a QA program that we have.

MR. MOELLER: And this is considered, of course, to be a resolved issue, because Larry has the program going and everything is working.

Do we have other questions or comments?

(No response.)

Everybody would favor this and we endorse it.

MR. AXTMANN: We applaud it.

MR. MOELLER: One member applauds it. That should make your weekend.

Thank you.

We will move on, then, to the next item, which is Health Physics Improvements, and for that we have Bob Alexander of the Research Staff. And, Bob, we were pleased, of course, this morning in reviewing the generic safety issues that the radiation protection program is listed as high priority.

MR. ALEXANDER: That's out of date.

(Laughter.)

At least occupational radiation protection is being very deliberately deemphasized.

I am happy to meet with my health physics friends and other friends with the subcommittee today.

I have four items in the TMI action plan to bring you up to date on, and one of those in the respirator area is really two different tasks. I will bring you up to date on both of those.

Shall I proceed, Dade?

MR. MOELLER: Yes, go right ahead.

MR. ALEXANDER: The dosimetry process accreditation program is one we have been working on for some time, and it is going to take a little while longer. With the Commission willing, I think we will have it in place. There are three basic areas:

First, the performance standard, which was difficult to get into place, but it has been approved by ANSI last September. And, as you may know, we went through a very extensive testing of this standard. We had three voluntary testing groups with the processors around the country, and after these pilot studies, the standard was adjusted. We feel very certain that we have a good standard to work to, one that is not too stringent and one that is not too lenient, that will work.

And then the accreditation of the dosimetry processors will be by -- will be through MBS NVLAP program, and to bring you up to date on how they are doing, the negotiations with the successful bidder for the testing laboratories are very near completion. They expect to get everyone's signature on the dotted line some time next week. The selection of the NVLAP inspectors is near completion. They had about 40 applicants, and they expected to select 10 inspectors. The very critical guidance document that processor will get from NVLAP to see what the rules are and what he has to do to get in and remain certified in dosimetry is very near completion. According to the contract, the testing laboratory will have six months to get everything in order so that they can start.

So I think we will be able to start with -- they will be able to start the test run and inspection program in about seven months. That brings us to the third element on the accreditation program, and that is the NRC regulation.

Many people feel that this program will fail unless it is mandatory. The NRC regulation would require NRC licensees to use NVLAP accredited processors. The proposed rule was submitted to the Commission on February 14th of this year. So far we only have one vote out of the five. It was positive. But we have to get two more positive votes before we can publish this as a proposed rule.

MR. MOELLER: I hope that the Committee's response was in the proper format. The Committee had no questions whatsoever about this, and we did send forward a letter saying we endorsed it. I hope that will help.

MR. ALEXANDER: I hope so.

MR. AXTMANN: When did we do that?

MR. MOELLER: A couple of months ago. I brought it to the Committee and the Full Committee asked me was it a matter that was subject to controversy, and I assured them that, no, it was not; that all good people were for this. And so they wrote it -- just wrote "favorable" without any discussion on it.

MR. AXTMANN: NVLAP must have been spelled out in that letter. What is NVLAP?

MR. ALEXANDER: National Voluntary Laboratory Accreditation Program.

MR. AXTMANN: Funded by?

MR. ALEXANDER: It is part of the National Bureau of Standards, Department of Commerce. It is supposed to be a self-supporting program.

Does anybody have any questions on the dosimetry? We can go on to the next one.

MR. MOELLER: It says you need an applaud. I will applaud that one.

MR. ALEXANDER: The dosimetry program, or going on to the next one?

(Laughter.)

MR. KATHREN: Both.

MR. MOELLER: Yes, both.

MR. ALEXANDER: The audible alarm dosimeter problem, as far as we are concerned on the NRC Staff, has been closed, finalized. The use of these devices at the time of the accident was controversial because under certain conditions they did not work, and they left a worker carrying one with a false sense of security. It could be dangerous. And I think during the prior years that our regulation on the use of the audible alarm dosimeters was not consistent.

MR. MOELLER: When you said "in the accident," are you saying that generically, or did you imply that at TMI they were using these and they did not work?

MR. ALEXANDER: That was a generic statement. I don't know whether they had any others at TMI or not. We asked for an ANSI standard to be performed. I think it was a health physics society standards committee that was put together, and they prepared a standard N13.27-1981, which gives tests that should be passed by an acceptable dosimeter.

Then we had the commercially available devices tested over a period of three years. Those test results are given in -- this work was done at PNL. The test results are given in these three documents that are listed on the viewgraph.

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You can tell which dosimeters pass the test. The manufacturers' names are not given. They are coded. But PNL put the weight and dimensions of the dosimeter by the code name so that you can readily tell which ones passed the test. I think this has been useful to our licensee.

Then we were ready to publish Reg Guide 8.28 on audible alarm dosimeters. We published it last August or August '81. And just to highlight what it says, the use of these devices is recommended but only specified conditions. It is stated that the devices to be used should meet the performance specifications given in ANSI standards. And the test results, as I mentioned, are available in the NUREG reports.

These devices should not be used if they do not pass the performance specs where the alarm would be too inaudible, where the alarm would be too loud, where the device could be soaked with water. We found none of them worked if they got wet. Or devices could be affected by airborne chemicals.

MR. MOELLER: What sort of chemicals would affect it?

MR. ALEXANDER: Any kind of growth, even sodium chloride C vapor.

MR. MOELLER: Over what period of time?

MR. ALEXANDER: Any kind of growth, even sodium chloride C vapor.

MR. MOELLER: Over what period of time?

MR. ALEXANDER: Pretty fast. They went out pretty fast, short periods.

MR. MOELLER: Any questions on this item?

MR. AXTMANN: Are these little deeds like a pocket dosimeter?

MR. ALEXANDER: They are little larger because they have to accommodate a dectector, a battery, an amplifier, and a speaker. So they are somewhat larger than the type of dosimeter you are talking about. Sometimes they are worn on a belt instead of in the pocket.

MR. AXTMANN: A little pocket, radio-size?

MR. ALEXANDER: That's right.

MR. MOELLER: But the potentiality for avoiding overexposures is tremendous. It is a sound step fo:ward.

MR. ALEXANDER: Yes. We are glad to have that one put to rest.

The next project that we worked on in the TMI list was performance testing of health physics survey instruments. Poor performance of health physics survey instruments was identified at Battelle in a longer-than-5-year acceptance testing program.

There is a letter attached to the viewgraph from Jack Selby at PNL, in which he provided me with the detail of this acceptance test program. So you can pursue those if you want to see what they found.

But to make it very short, there were high failure rates. We decided that we wanted to work towards some kind of a program which would upgrade the performance of the survey instruments. At first we thought regulatory programs would do the trick. In other words, we would get a certification testing program set up and then require that our licensees use certified survey instruments.

I don't think that that is going to happen right now. The position, or the consensus of the NRC staff is that such a program really is not needed and it might be considered overkill. Of course, there are other ways to use the standard, and that is what we are searching for now.

The performance standard is being developed right on time. A copy of the draft has been available for almost a year, and the testing of survey instruments at PNL against this draft standard has begun.

This testing program is jointly funded by the Department of Energy and the NRC. It is a rather expensive program. Some of the instruments have had to be purchased for the purpose of this test program, but most of them have been loaned by manufacturers or by other DOE laboratories. So we have not had to buy very many.

The testing program has just started, and at this point in time I do not have any results. We tried to get some results out of Swent yesterday. He is not giving any results yet.

MR. MOELLER: How would that be used then?

MR. ALEXANDER: To adjust the standard either more strict or more lenient, as it would turn out. It was needed.

There is something you might want to scan attached here. Just back of this letter is a list of the items that are being tested and the items that are covered in the instrument performance standard.

MR. HEALY: Aren't these measuring instruments certified in any way?

MR. ALEXANDER: No.

MR. EBERSOLE: I am talking about typical aircraft instruments, like altimeters?

MR. ALEXANDER: There is no program.

MR. EBERSOLE: So when you get an instrument reading, you really don't know whether it is any good or not.

MR. ALEXANDER: You are raising one of the fellows' questions about this whole thing. I think the main reason the NRC staff consensus that a regulatory certification program is not needed, the NRC obviously should not be in the business of making sure that instrument manufacturers make instruments that don't break down. There is a type of instrument inadequacy that is safety related and a type that isn't. If an instrument just stops working or does not turn on when you turn it on, then there is really no safety problem with that instrument, because it won't be used to establish working times for the worker.

There is another type of problem with these instruments where the instrument does not tell you the truth. And of course, that is the kind we are after. We are going to have to distinguish very carefully, I think, between those two types to get support for any kind of a program from the NRC staff.

There are a lot of questions. We don't know whether we should go for type testing, where the design would be approved or certified -- that is the way we do it with respirators -- and then depend onquality assurance programs to assure that the items being sold were like the ones that passed the test.

Another way is to do it like they do with the absolute filters and test every one of them, which is reasonable really. There are not that many that are made and sold.

Right now, we just don't know exactly how we are going to handle it. We are looking into the possibility of secondary standards laboratory, secondary calibration laboratories, where calibration of instruments can be traceable to the National Bureau of Standards, which we normally don't have now. It may be that the required testing can be done in connection with those laboratories at some time in the future.

Are there any questions on that program? Any advice?

MR. SHAPIRO: I think you should be as easy as possible on the instruments. I am all for your film badge criteria. I think you did a great job of getting feedback. It was difficult at first in terms of people who do not have to measure the whole gamut.

I thought you showed a lot of good judgment on survey instruments. In most cases they just are contamination monitors and don't need the rigor that you might need for medical monitoring and things like that.

MR. ALEXANDER: I think we are going to have a different approach that more closely fits the particular need we have there in those instruments. There are some areas to worry about, though. Particularly in the case of neutron instruments, we would be off by large factors.

The last thing I will report on is our work in the respirator area. There has been a demand for some time for radioiodine air purifying respirators. I think the main problem with respirators and radioiodine has been there has not -- we have not known enough about it to trust any of the carcoaled cartridges that are available. We have not known how long they would work or how well they would work or anything about them, anything else about them.

So people, to protect themselves from radio airborne iodine, have used air supply respirators for long-term work, whereas for the little air containers that they carry on their backs, it would not provide long enough wo king time.

These hoses that drag around are cumbersome and actually increase the dose to external radiation. So it was recognized that it would be wonderful to have radioiodine air purifying respirator that we could trust and that could be tested by NIOSH and certified. We made a contract with LANL to develop two things: test criterion that could be used by NIOSH for these respirators; and second, a test method and the equivalent to test these respirators with so that these devices could be certified by NIOSH.

This project is 99 percent complete. The test criteria have been developed. They are given -- the draft report is ready -- they are given for testing at two humidities, two temperatures, testing with cyclic breathing first in simulator, testing for service life, which of course is very critical. You have to know how soon the radioiodine might break through the cartridge and get into the lines of the wearer.

And the conditions of testing the service life have been given. And a challenge vapor has been selected. It turned out to be stable methyl iodide. We were all grateful that this could be done with a stable radionuclide. They are not used to using radioactive materials at all at Morgantown, where NIOSH does this testing.

It turned out that the best sorbant is TEDA impregnated charcoal. It stands for some enormously long chemical that I did not memorize just for the benefit of this presentation.

MR. AXTMANN: Let's c ess.

MR. MOELLER: Bob can tell you. Bob, this is your chance to shine.

MR. AXTMANN: Tridiethyl ANSI.

MR. ALEXANDER: The test equipment has been put together. It amounts to a miniaturized dual gas chromatagraph and electron capture detector. And it has been delivered to NIOSH and the people there have been trained how to use it.

The only thing that is still to be done before these things can start being used and people taking credit for them in their health physics program is to add a cyclic flow pump, just passing the vapor through. This test does not work for some of the charcoals that might come in to be tested. It has to be done cyclically with a breath simulator. So that pump has to be added to the equipment, and that would be ready to go.

We expect very rapid implementation. Some of the cartridges that are commercially available now are known to meet the test criteria. So this will just be a regualtory matter. We will have to get into Part 20, the protection factor that can be used against radioiodine.

You will notice that all of these projects have been handled very well and are coming to a successful conclusion.

MR. HEALY: Does that mean you're fired, Bob?

MR. ALEXANDER: Yes, I am afraid so.

(Laughter.)

MR. MOELLER: I think this is an impressive list of accomplishments. It's very good.

MR. ALEXANDER: Our boss indicates we have done a very good job over the last 10 years and that he wishes us luck in finding something else to do.

The emergency respirator manual was born of the -- that idea was born in the TMI accident. They had a great deal of trouble about respirators immediately following that accident. Some of the problems they had were with the types. They did not have the right types of respirators available in the quantities tney needed. By types, tnat means mostly they just had the types that only last for 30 minutes, and the tasks were almost always much longer than 30 minutes.

The respirators were improperly stored for emergency conditions. They were not protected properly from contamination accessibility. It had not been thought out in advance. The compressed air supply was inadequate to maintenance facilities that they had in order to keep recycling these things and keep them going were inadequate.

The quantitative fit testing they were set up to do in terms of equipment available and operators to operate these quantitative fit testings was inadequate. They did not have enough people trained to actually just conduct the respirator program. And in many cases, they found inadequatd training of users.

So we felt that the way to handle this would be to do a good job of studying out what these power reactors ought to do in order to be ready in that area.

They have a very excellent respirator laboratory and staff at LANL, which we have supported since 1968. And we asked them to do the study and prepare a manual on respiratory protection in emergency situations.

What I have done for you to give you some idea

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of what is in this manual is to list the chapter titles. And we have a draft of it now. It is being massaged, and we hope to have it ready by July 1.

MR. EBERSOLE: How do you handle the matter of the fellows with long whiskers putting on face masks?

MR. ALEXANDER: In Part 20 it is stated that you cannot use our protection factor if facial hair interferes.

MR. EBERSOLE: They are supposed to be there to use the equipment you provide for them. I never could put together how they could do so, if they get in a radiological emergency, or if they get in any kind of emergency that requires the use of these masks.

MR. ALEXANDER: You understand how the protection factors are used?

MR. EBERSOLE: Not in the context you are talking about.

MR. ALEXANDER: We published protection factors for each type of respirator. If they measure the intake that a person would have had, they measure the concentration in air, they see how long he stays in that concentration. If you calculate the intake, you can divide that by the protection factor.

MR. EBERSOLE: It would cut the exposure time down.

MR. ALEXANDER: Runs from five, for simple devices, to 10,000 for a very complex device.

MR. MOELLER: And they estimate the dose, including this factor?

MR. KATHREN: I was going to comment that at some sites, some places, so-called emergency workers are certainly people who routinely wear respirators and are not permitted to have facial hair other than mustaches, or they may be required to wear a type of face mask respirator hood that -- where the facial hair will not interfere with the --

MR. ALEXANDER: Yes.

MR. KATHREN: And then there is always the fitting program that supposedly assures that an individual -- it is part of a much larger picture.

MR. ALEXANDER: That concludes my presentation. If there are any questions, I will be happy to answer questions.

MR. KATHREN: Bob, you twice alluded to something -- more than an allusion, maybe it is an illusion -- about the program being deemphasized?

MR. ALEXANDER: I wish it were an illusion, yes. Our management feels -- has been told over the last 10 years, we have done a very good job in the area of worker protection and they consider that that job has just about been done.

MR. KATHREN: No more worker protection is needed? That is not what they are saying?

MR. ALEXANDER: It is a deemphasis. My staff, four people have left, and they will not be replaced. And our research budget, which has been running about 2-1/2 million per year has been drastically reduced for fiscal year '85, perhaps even wiped out completely.

MR. MOELLER: This would be very unfortunate, if that is permitted to occur. What can this subcommittee and what can the Committee do to correct this? We are going to be reviewing the reactor safety research budget and we can sure scream loud there. But this is just something that we must not permit to be accomplished.

MR. ALEXANDER: The Office of Research, starting in 1985, -- we now may find out that it is also true in '84 later -- but definitely in 1985 the budget has been rather drastically cut. Mr. Minogue's budget has been drastically cut and he has had to cut many programs, and one of the criteria that he is using in deciding which ones to cut is risk, and the programs that he does not think will contribute very dramatically to reduction in risk are not very likely to get funded. And he feels -- he told us that in the occupational areas, as I indicated, that we are in pretty good shape.

MR. MOELLER: Is he aware of potential reductions in allowable occupational dose limits which could have people screaming as to why wasn't Bob Alexander ready for this, or why doesn't he have the budget to carry out the necessary work to help the utilities meet these new or reduced --

MR. ALEXANDER: I cannot speak for him. He has always kept up to date in this area very, very well for an office director. For someone at that level, he is very informed about occupational radiation protection. So I would bet you that he did, he is aware of that. The man may have no choice; I don't know.

MR. MOELLER: It is like the Committee said on several other occasions: if there is a cut to be made, we can certainly suggest other areas where it could be more -- it would be better applied.

MR. ALEXANDER: We have the data for the collective dose at the nuclear power plants in 1982. Have those been given to you at this meeting?

MR. MOELLER: No.

MR. ALEXANDER: You would be interested in that.

MR. MOELLER: We would.

MR. ALEXANDER: Right after the TMI accident we had a 35 percent increase in collective dose, external dose, at nuclear power plants. We thought that after two years after, '80 and '81, that that dose would go back down. It rose to about 54,000 manrems. I think it was less than 40,000 in 1979. We had thought that after all of the backfitting and everything that arose because of TMI, that it would go back down.

MR.MOELLER: The 54 was in '81?

MR. ALEXANDER: I think we had about 53 in '80 and 54 in '81.

MR. MOELLER: Okay.

MR. ALEXANDER: The data for '82 shows 52,000 in '82.

MR. MOELLER: So it is holding steady. Certainly it is not decreasing.

MR. ALEXANDER: No, at least not -- that is almost within the measurement.

MR. MOELLER: Yes.

MR. MINNERS: If I were reading that 52 manrem a year --

MR. MOELLER: It only has a probability of one.

MR. MINNERS: We would multiply by that.

MR. MOELLER: That's interesting. That is a good constructive comment. In other words, the cost, what sort of a cost, economic cost, would you place on this, then?

MR. MINNERS: I guess the usual numbers. $1000 per manrem. Just give me 1 percent.

MR. MOELLER: He said risk. Didn't you tell us you were basing it on risk?

MR. ALEXANDER: Yes.

MR. MOELLER: We will look into it. We will certainly be working on some words.

MR. ALEXANDER: Perhaps I can furnish you with a set of viewgraphs which give a thumbnail sketch of each project that we wanted to fund in fiscal year '85. We will only be able to fund a small fraction and possibly none.

MR. HEALEY: When you say it is being cut down, would you give us some idea of the percentages? Is it 100 percent?

MR. ALEXANDER: I can give you the numbers, Jack. The amount requested for occupational radiation protection research for fiscal year '85 was $2.6 million. The maximum that will be allowed is $810,000, and over $500,000 of that depends on additional justifications that must be submitted. So we may get as little as $200,000 out of $2.6 million. That is a cut.

MR. MOELLER: That is helpful.

And now R. C. Tang tells me we will be reviewing, of course, what the '85-'86 --

MS. TANG: FY '85-'86 within a month.

MR. MOELLER: The Committee will be writing a report at the June meeting and I am glad we had you down here today.

MR. AXTMANN: What are the major programs that would not be funded if that happened?

MR. ALEXANDER: Perhaps I can think of a few of them, to give you an idea of the sort of thing we are talking about.

We have a project called a Dose Reduction Project at a nuclear power plant which is a contract we have with Brookhaven National Laboratory, and it is broken down into several tasks, all of which are directed toward reducing occupational dose.

Another one was -- another one that was cut out was an effort to get task-specific dose data which no one has, and there are several reasons why we feel like we are never going to be able to do the job we want to do if we don't have all these data. Every time somebody has tried to get such data, it just turned out to be a monumental task. The data exists on work permits, they are scattered everywhere. It just cannot be done. The only way to get it is to set up a computer program and do it on a prospective basis so that five years from now we will have the data and we will want it just as much then, or more, than we would want it now.

We want to set up a certification or an accreditation program for bioassay laboratories similar to the one we have for dosimeters, dosimetry processors.

MR. KATHREN: Would that include whole body count?

MR. ALEXANDER: Yes. The standard for that one is also being tested at Battelle now, as you know. We are pretty far along on that. We would have to have money to give NVLAP to get that started, about $250,000. That is another project.

We want -- my office found out that the studies they did, field studies they did about the protection factors that I talked about a moment ago, that we are using in Part 20 which are determined in the laboratory under laboratory conditions at Los Alamos, are in many cases too large. If you go out into the field and instrument a guy and put him to work, you will not get as good of a protection factor as you get in that laboratory with a guy doing exercises. So we want to do a jointly-funded program with OSHA to do field testing on those protection factors.

I could go on and on. We have about 20 projects of things like that.

MR. MOELLER: Will we receive a list of these, or will they be in the --

MR. ALEXANDER: I don't think so. I will send you a set of the viewgraphs that I put together for the '85 programs.

MR. MOELLER: Please do that, and we will have a chance then to go over this.

MR. ALEXANDER: We are being attacked from another direction, also. Has anybody talked to you about the review that Congressman Bouchard has asked DOE to do of the NRC research program? Do you know about that?

MR. MOELLER: Not as it applies to this, no.

MR. ALEXANDER: That request was made. DOE is in the process of conducting this review of the NRC research program. My program was one of those reviewed. I did not come out very well on that review, and their report, unless we can get them to change it, they are recommending -- they are recommending a budget cut. Their problem does not -- the report is a little hard to get to what they are really after. What they seem to be saying is that a lot of these things that I have asked for money to do are good -- things that should be done.

As a matter of fact, they have a priority list that shows that most of them are things that should be done, but they should not be funded by the NRC.

I think there is a big difference of opinion in this review group which is people taken from national laboratories and industry under Dr. Millunzi's leadership. I think there is a difference in their view on the agency's mission in this area of research and ours. I think that is what is at the bottom of this.

MR. HEALEY: Are there any radiation protection people on that committee?

MR. ALEXANDER: Yes. I know Andy Farrow from Westinghouse is a health physics type. I think one other of them is at least a member of the Health Physics Society. I complained that they should have included Valerio on any other review of the health physics programs.

MR. KATHREN: The only name you mentioned is the chap from Westinghouse, and that is not DOE.

MR. ALEXANDER: I said they had industry heavily represented in this group. There were about 10 people.

MR. SHAPIRO: That would be nice, if we can see a copy of the report, if it is possible.

MR. ALEXANDER: I can't, Jack, but if you would contact Dr. Millunzi, I am sure -- we are in the review process right now.

MR. MOELLER: We have met in line with our Committee responsibilities, we have met with Dr. Millunzi. We had only heard reports up to the time of what needs to be done. We have not reached the point of assigning it to specific agencies to do, or industrial groups, as to how to do it. Maybe it is time that we heard another report from them. We will make a note of it.

MR. HEALEY: Was there a recommendation that this work should not be done, or that NRC should not fund it?

MR. ALEXANDER: You would have to characterize the report as saying that nearly all of the work should be done, but it should be done by someone other than the NRC.

MR. HEALEY: By whom?

MR. ALEXANDER: INPO, EPRI, Health Physics Society.

MR. KATHREN: The Health Physics Society doesn't do research. INPO and EPRI may have somewhat different missions.

MR. ALEXANDER: DOE is included in that, so they say it should be done by DOE.

MR. SHAPIRO: Naturally.

MR. KATHREN: That's what I was waiting to hear you say.

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MR. ALEXANDER: This may be a healthy thing. I can see some good coming out of this. Perhaps it is time to explain to people why I have been spending some of this money instead of -- the answer in general is very simple and straightforward. How on earth am I going to get other people to pay for those projects?

MR. HEALY: The general philosophy in management is if you can't get somebody to pay for them, maybe they are not needed, Bob. I hate to tell you, but this is a managerial philosophy.

MR. ALEXANDER: Sure. And it is certainly an industrial philosophy that has to be confronted. The industry's criteria might be different than ours. They probably feel, well, if we can meet your standard, if we can comply with your standards, then that is good enough and you ought to leave us alone. So that the neutron instruments are off by a factor of 4, who cares if we are less than a factor of 4 underneath your limits anyhow? We are not going to spend any money on this, and we want you to leave us alone.

We don't think along those terms. We feel like if we are going to require these measurements, that they ought to be done with a reasonable standard, to a reasonable standard of excellence, and we feel like doses ought to be minimized to levels that are as low as reasonably achievable, not just levels that are below the limits.

MR. MOELLER: That is very helpful. And certainly, it is not always the message that we want to hear. But we appreciate being kept up to date.

Thank you for that presentation.

We will move on then to the next item, which is a discussion of III.D -- III.5, which is radiation worker exposure, by Diane Flack, again of the research program within NRC.

MS. FLACK: I have prepared quite a package of handouts. I could only carry five copies from Silver Spring. I have a list of the five handouts within that package. If people are interested in certain ones, I am sure in time we will have them Xeroxed for you. Meanwhile, if you would share the five copies, I would appreciate it.

MR. MOELLER: Ms. Tang is going to give out the summary from the top. If you want them, we will give them to you.

MS. FLACK: I appreciated his plea for research funds. We are undergoing quite a process right now.

MR. KATHREN: Is your office being eliminated also?

MS. FLACK: I am Diane Flack, Office of Health Effects. I work for Dr. William Mills.

You asked if our budget was cut. We survived the first round of the cutting very well. Mr. Minogue heartily supported all of our projects. However, yesterday they came out with an EPO markup of the projects, and we could be in a similar boat to Bob Alexander's project. It is very questionable right now, thorugh no fault of Mr. Minogue, as he has been given another drastic cut in budget and it has to come from somewhere.

I was asked today to talk about III.D.3.5, but I feel that really there are four different efforts that we are following up in connection with III.D.3.5, so I would like to go through all four of them.

Our four driving forces behind the worker registry, as I will call it, are an April 1, 1979, memorandum from former HEW Secretary Joseph Califano to former NRC Chairman Joseph Hendrie, asking for establishment, urgent establishment of a registry of all persons at the Three Mile Island site. I will go into each one of these in detail a little bit later.

The second driving force was when Congress recognized the need for a radiation worker registry through inclusion of the Moffett amendment in NRC's FY '81 authorization bill. This bill was not passed, so the Moffett amendment obviously was not passed.

However, it did tell us that Congress is interested in information on radiation worker exposures.

The third driving force is the TMI Action Plan that you have all been looking at today which directs the NRC staff to both improve and expand the data base on industry employees.

The fourth driving force -- and I feel really it is probably the most important -- is there is an overall recognized need by both federal regulatory agencies, health statistics groups, industry, et cetera, for a more adequate data base on occupational radiation exposure.

Now, let me take these one at a time and tell you what has been done in regard to the four different driving forces, as I will refer to them.

In the first very large package there is a historical background. If you can just flip over a few pages, 2, 3, 4, 5, you will see the driving force behind this. It was an official memorandum from Secretary Joseph Califano to the Chairman of the Nuclear Regulatory Commission requesting that we establish on an urgent basis a registry for all persons on the Three Mile Island site.

They felt that a complete record of who had been where on the site might prove essential to the proper follow-up of health effects. This effort was to be coordinated with NIOSH. And over a period of about a year and a half to 2 years there were numerous meetings, many of which are referred to in this document, between NRC staff Met Ed, GPU, NIOSH, Region I people, et cetera, as to how to go about this.

I won't go into all of the details of the meetings, but if you are interested in the historical background, it is there for your use.

For the past several years, however, the effort has primarily been concentrated in two areas. I received monthly summary dose reports on occupational exposures to the TMI work force. These reports are separate from those currently received by Barbara Brooks.

And the second area is a series of phone calls and meetings with the radiological protection group of Met Ed concerning the medical records, the security records, the personnel records, and the dosimetry records.

We have looked over these four different types of records. We have made recommendations about additional data that they could collect, should collect. We have looked at how these four different types of records could be linked, if necessary.

The TMI staff has been extremely receptive to most of our comments. And I would say that the only reason why they have not done some of the major recommendations is because of financial problems.

Particular examples, there would be complete medical physicals on absolutely everybody coming in on site. They do a lot of them on their own employees, but they do not do them on contractor employees, for example.

Concerning the first item I mentioned, the dose reports, they are in your package listed as, I hope, as page 3. Mine is not labeled. My secretary labeled them.

Does everybody have a copy of this? The first couple of pages here is information on a group that I decided merited special consideration. These are the people who are on the entry teams going into containment.

I felt that because of the potential for significant radiation exposure, I would like to keep track of these people. And so I got an agreement from Jim Hildebrand to not send me information on individuals but an overall look at the exposures received by the people going into containment.

You can see over the last couple of years that the number of people going into containmen thas significantly increased. I do not have any information past December typed on the sheet, but I have it behind here if you are interested.

The number of personnel entering the last 4 months have been approximately the same as the number of personnel that entered in October through December.

MR. FOSTER: Can you tell us again what exhibits you are referring to?

MS. FLACK: I think I asked to have it labeled "Handout 3."

MR. MOELLER: We have Handout 3. It does not summarize that.

MS. FLACK: I am sorry. It is 2.

MR. MOELLER: And what page?

MS. FLACK: The very first page.

MR. SHAPIRO: It is called "TMI Reactor Building."

MR. MOELLER: Yes.

MS. FLACK: The first two pages, I will repeat a little bit, are the groups of individuals that go into containment to either make measurements prior to the decontamination efforts or have gone in to assist in the decontamination efforts the last few months.

The highest individual exposure you can see occurred in August 1982. This is still the case. There has not been an exposure as high as this in 1983. So .81 rems is still the highest individual exposure received.

MR. MOELLER: You list for August of '81, .83.

MS. FLACK: You are correct. .83, right.

MR. MOELLER: August is a bad month.

MS. FLACK: Right. If you flip to the third page, this is the 1979 summary report. This was the year that the accident occurred at TMI. This information was put together after all of the dosimetry records were reviewed. If you have seen previous reports that were issued in '79 and '80, they are probably wrong.

They contacted over 2,400 individuals to find out exactly where the people were during the time of the accident to make sure that their badges had not been exposed or they were sitting in racks, et cetera. And this is the final result that was sent in to the NRC.

You can see that even though the accident might have been significant in a lot of people's minds, the exposures were kept, I feel, quite low. The rest of the package is a group of reports on 1980 through 1982. I will just flip through '80. The same thing will apply for the next 2 years.

For each year, I have given you a summary report of the different individuals receiving exposures in the different categories. This sheet is TLD data, by the way; it is not marked on there.

Following that, for each year you should have a monthly report. This is also TLD data. That is mentioned on there.

And then the next three pages for each year, when it starts to talk about man-rems by work and job function, this is self-reading dosimetry data. And these three pages are what Bob Alexander's group are interested in, in particular.

After I received these reports and compiled them, I sent the information to Bob Alexander's occupational readiation protection group, Region I, and down to the Three Mile Island Follow-up Research Subcommittee, which is part of the Interagency Radiation Research Committee. That subcommittee is under Dr. Nygaard. And they reviewed these.

MR. MOELLER: You have to help me a little. You have then gone back and tried to carefully record what doses these more than 2,000 people have received. Is someone else then going to follow them for cancers or something?

MS. FLACK: No. At this time, the NRC has no information on individuals. What I do is when I talk to Jim Hildebrand up there, I continually quiz him on the location of the information. We have no desire to collect it. We just want to make sure it is not discarded.

So although they have talked about a worker registry, the NRC does not want to have that information. We want to make sure that it is put in a form that, if warranted in the future, it would be available.

We are not just interested in whether it is in the computer or microfilm or whatever, but also the linkage between the records is very important. We have encouraged them, for example, to put social security numbers on everything.

MR. EBERSOLE: Do you include the medical exposures?

MS. FLACK: They ask a person about their medical exposure when they come on site. That is noted on the form. That is all I know. I have just seen blank forms. I obviously cannot be privy to that kind of information on individuals.

To get back to the front page again, this group that I was particularly concerned about, not only is this information in those individual's personal files but Met Ed is keeping a list of all of the persons entering containment in their dosimetry office.

This is duplicative to the individual person's information. They set out to do whole-body counts and urinalysis on everybody, but when the numbers got very large, they have started to do the extensive testing only on the person that has the highest MPC hours. So they have had to drastically cut back because of the number of people.

MR. KATHREN: Did I hear you right?

MS. FLACK: I cannot say if it is wrong. I tried to call Jim Hildebrand to see what the exact program was this morning, and I did not get that. I know that he told me for a while there, though, that it was the person. But whether it is really the person or just a couple of people with the highest right now, I can't tell you.

There are over 200 people some months. I find it hard to believe they would just do it on one.

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They have drastically tried to improve the recordkeeping systems up there, and he said that they are operating in a claims-prevention mode. They are trying very hard to keep good records.

So this is the first front that we have been working on. Any questions about that?

MR. MOELLER: Questions at all?

MS. FLACK: As I said, it is referred to as the TMI Registry. But NRC is not personally taking hold of it.

MR. MOELLER: You gave us the driving forces that caused you to want to do this. Have you now talked in recent months to any epidemiologists to just have them glance at this and tell you whether it would be of any use whatsoever?

MS. FLACK: The congressionally mandated feasibility study that was done by NRC/EPA looked into the question, and, no, they cannot look at just the individuals on the TMI site because there are too few and the exposures are too low.

MR. MOELLER: I guess it is nice to have this if you combine it with all occupational exposures at all other operating nuclear plants. Still, you might get negative data.

MR. HEALY: A related question would be as to whether you would have any professional epidemiologists who are actively working in the field as to what data requirements they would need.

MS. FLACK: In fact, there was an epidemiologist working with me on this project for the first couple of years, who is now at DOE. But we worked together.

MR. HEALY: Did he have experience in the field, actively worked in epidemiological studies?

MS. FLACK: Yes. We also sent out a questionnaire that I will show you in a few minutes to epidemiologists at Mt. Sinai getting professional help on what we needed to get collected.

MR. MOELLER: With respect to that, back to Jesse's question, what did the epidemiologists say about not having medical exposure data? I guess your answer was you don't know?

MS. FLACK: Ideally, you would want to have hte medical data.

MR. MOELLER: Do you have smoking information?

MS. FLACK: That was strongly requested. Smoking, alcohol consumption, yes. They have started to ask a lot more questions. Every time I talk to them -- Peggy Hagevelt is in charge of the medical program up there -- every time I talk to her, she is collecting a little more.

Of course, as I said earlier, the ideal situation would be to have a corporate physician there and do physicals on everybody and spend hours. But you cannot do that when you have a lot of contractor employees coming in.

MR. KATHREN: What about other hazards prominent in the news; specifically, asbestos?

MS. FLACK: That was one area we were concerned about, not just asbestos, but in one of earlier trips up there we asked them about their industrial hygiene program. It was minimal, admittedly. But then over the years, they have hired --

MR. KATHREN: Nonexistent.

MS. FLACK: I hate to say nonexistent. To me that is zero. I think there was some information, but really minimal. They did hire an industrial hygienist up there, and he was supposed to develop a program. And I don't have real current information on what is happening.

To be honest with you, I have been on a task force for 5 months, and just tackled this yesterday. So I am a little bit out of touch.

MR. MOELLER: Your comment, Warren, raises questions. For my reading pleasure, I go through LERs.

(Laughter.)

We are all so hepped on radiation exposure, and yet over the last 2 or 3 months there have been three or four cases of technicians falling into empty spent fuel pools or falling -- one fellow fell into a reactor pressure vessel, empty, you know. If the water were there, I guess he would have been okay.

I guess these people are all dead. There are accidents occurring out there that appear to me to be far more serious sometimes.

MR. HEALY: That statement is heretical coming from a health physicist.

MS. FLACK: Any further questions?

(No response.)

MS. FLACK: Then we will go on to the second one.

(Slide.)

MS. FLACK: The second one was when we realized that Congress had recognized the need for radiation worker registry through inclusion of the amendment to our authorization bill. The Moffett amendment authorized the NRC to conduct a study for the purpose of submitting to the Congress recommendations for developing statistically valid data on the long-term health effects of employment in a nuclear power industry.

The report we were to have transmitted was to have contained the following recommendations: We were to indicate the types of medical history information and radiation exposure histories for employees. We were to indicate the additional information needed to relate the medical histories to the histories of radiation exposures and to assess the health effects of employment in the nuclear power industry.

We were to have recommended whether the NRC or another federal agency should be required to develop the needed data on such health effects. In the timetable was to have been 6 months.

(Laughter.)

So this bill fortunately was not passed, because it is very difficult to get all of this information together. As soon as we heard that we might have to provide such information, I worked with my co-worker, who was an epidemiologist, and we drew up a questionnaire to start out. And that should be Handout 3 now.

Now, the questionnaire was designed to determine the type, quality, quantity, and accessibility of data on radiation exposure, job history, medical history, and personal identifiers that were currently available for nuclear power plant workers;

Secondly, determine the additional information which would be needed to link these data and to assess the health effects of employment in nuclear power plants;

Third, to develop a proposed format for data to be collected and maintained by utilities and for recommend action, if any, regarding the development of a nuclear power plant registry.

Now, this questionnaire was, as I say, drawn up in response to the Moffett amendment that we thought might be passed. We were going to look at four different categories of workers listed on page 1, I hope, of -- permanent workers, utility employees, contractor employees, and transient workers.

Now, this is as good a subdivision as we can come up with. I know it is even hard to define the word "transient worker" in many groups. But these are all four categories.

If you look down the page a little bit, we were going to look at four types of records on these individuals: exposure; personnel; security; and medical. This first page, by putting the items on the left-hand side of the column and the records across, was designed to tell us how these records could be linked.

For example, if item 4 social security number was checked all the way across the page, we knew that this information could be linked. This is a draft. I asked to have "Draft" stamped on it. I hope that it is.

It has never gone through any NRC management. It was strictly a staff effort. And it was sent out to a group of consultants to evaluate the questions, and secondly, to a group to verify that this data was not previously collected. It would have saved us a lot of work in answering this.

MR. KATHREN: What is the status of it now? I notice the date is about 2 years ago.

MS. FLACK: The status is nothing. It was stopped at this point. The bill was not passed. We got as far as pretesting it at Calvert Cliffs, and we were surprised to find that it was much easier to fill out than we had expected. The information was available.

Right after that time we lost our epidemiologist to DOE, and I got detailed to other higher-priority work. That was the end of this. I am not saying it is dead forever. I would like to know what kind of information is really out there, and there is always the chance that we will be asked again.

But currently, until we have more staff and more money, it is going to have to be. Ideally, it would be nice to contract something like this out, but our funds are such that it would have to be staff work, and we just do not have the people right now.

Are there any questions on our second item?

The third one is the one that I was actually to be here for today, and I hope you will see how I cannot separate them, The TMI Action Plans. The TMI Action Plans, our item was radiation exposure data worker base. For item

1, we were to improve and expand the data base on industry employees to facilitate possible future epidemiological studies on worker health.

Between Bob and I, we have talked to many, many people about worker registries and the information that is needed. We talked to people -- this is before he went to DOE -- at DOE we talked to industry, AIF, EPRI, took a good look at what records Barbara Brooks has, and initiated the questionnaire.

This item is ongoing. I think it would be totally wrong to say that we should not continue to try to improve and expand the data base on industry employees, not necessarily in the form of a registry, but just overall improvement of the data.

The second one was: investigate means of obtaining employee health data by nonlegislative means. In connection with this, not only did we talk to the previously named groups, but we talked with some people who are connected with the health registries in Great Britain and in Canada.

Fortunately for them and fortunately for us, they have different systems. Canada, for example, has a very nice system where all of the dosimeters are essentially sent to one centralized place for processing. So they have all of the nice lifetime occupational exposure histories at their fingertips. They have another group called Statistics Canada, which gets all of the information on mortality.

Just a good example: One day we went to Eldorado Nuclear. Eldorado Nuclear is able, for example, to access the exposure information at one point from the Federal Radiation Protection Bureau, get good lifetime occupational exposure histories on, say, 30 people they are interested in. And then they are able to go to Statistics Canada and have the people checked to see if that person is indeed alive or deceased.

They are devising a very, very nice elaborate system to make sure that indeed the person that was exposed is the person who is dead. They are not just relying on, say, the same -- we have social security numbers. They have insurance ID numbers up there. It is not just the one correlation.

MR. HEALY: I would like to comment that the fact is in this country there is no such system. The biggest part of an epidemiological study is indeed tracing down these people. Even social security you cannot trust completely, because your returns are frequently maybe 70 percent. You have to trace down the rest of them that are dead by hard, brute force.

In talking to all of these people, they all recognized the need, but they could not offer a lot in the way of help except sympathy.

I have listed this task as being complete. I do not see that there is really any nonlegislative means that we have to require obtaining employee health data after talking to these groups.

MR. KATHREN: May I ask you to define these matters, "nonlegislative"?

MS. FLACK: Other than putting them in our regulations. You can always make suggestions. I have tried very hard, whether I am down at AIF or with somebody up at Met Ed, to encourage people to collect the data. I will not stop doing that.

MR. KATHREN: Why don't you make it a license condition? That is not nonlegislative.

MR. HEALY: What good will this data do you after you get it?

MS. FLACK: What good will it do?

MR. HEALY: Yes.

MS. FLACK: I have a whole list I will show you in just a few moments.

MR. HEALY: When you actually start to study these people, you are not going to do an instant study, because you have no controls. You are going to do a mortality study. There the question is, is the person alive or dead? If he is dead, you get the birth certificate -- the death certificate, pardon me -- if possible, and you have enough money, you can check this hospital records. You can check this with hospital records. I am not sure that a great deal of health records other than perhaps a smoking history or exposure to other agents would be of a great deal of use to you.

MS. FLACK: There is not any way we can even get that.

MR. HEALY: Smoking, in particular, is vital.

MS. FLACK: That's right.

The third item under this was to include as part of the overall rewrite of 10 CFR Part 20 consideration of a requirement for licensees to collect worker medical data. The task force looked into this and agreed not to require collection of worker medical data.

MR. MOELLER: By "medical data," you mean diseases that they may have had or their medical X-rays or both?

MS. FLACK: I would say both. I was not on the task force at that time. But I would say that any kind of medical information is private. We would have great difficulty obtaining it.

MR. MOELLER: And you say the task group decided not to do this?

MS. FLACK: Before Part 20 was really put together, they had all of the separate groups of people to look into different areas.

MR. MOELLER: These were NRC people?

MS. FLACK: I think they were all NRC, but I cannot vouch for that. I was not associated with the task at that time.

MR. EBERSOLE: If you have a percentage of the people who have had heavy fluoroscopy, you will never know that, will you?

MS. FLACK: Not unless the licensee asks for that. I mentioned the people at TMI mentioned they do ask. That would have to be volunteered information.

MR. EBERSOLE: They may or may not tell. It may not work if they told.

MS. FLACK: Absolutely.

MR. KATHREN: I want to explore just a little bit with you the possibility of having done this through the ANSI mechanism.

MR. MOELLER: You mean having it issued as an ANSI standard and then having the NRC endorse it?

MR. KATHREN: Yes, that is one mechanism.

MR. MINNERS: I think that would come under legislative. If we endorse it, it is practically required. That is the usual meaning of the word "endorse."

MS. FLACK: It is a good suggestion. I have not considered that.

MR. KATHREN: I am just curious as to why, and I probably am reflecting the opinions of one here, I am curious as to why it seems to be so difficult to do something in this country when admittedly smaller countries -- Britain, Canada -- by your own statement today, France and Japan have programs in, and maybe the answer is we just don't want to do it.

MS. FLACK: Canada had a very good start by their central dosimetry process. They have centralized health records, as I mentioned. When I talked to Sarah Darby from Great Britain who works on the radiation dosimetry registry -- whatever you want to call it -- under NRPV, she is having the same problems.

I decided that when I first heard about her program, I thought it sounded very, very good, and then when she came over here and we got to talk with her, she is going to what to amounts to licensees and asking permission to contact people working for them, so she has to go through two different authorizations to get information, and at either point they can say no.

So even though the British are saying there is a good registry over there, it is certainly a lot better than ours, but it is still subject to voluntary participation by an individual.

MR. KATHREN: How about France and Japan?

MS. FLACK: I don't know about France, but I know in Japan we thought that it sounded very good. They have the little passports which you have seen.

MR. KATHREN: Right.

MS. FLACK: It is all power plants. I might be wrong, but I think it is just power plants. And they take their little passports from one to another. The people in Part 20 looked into the passport idea before I worked with them, and that was rejected also.

MR. KATHREN: What about France?

MS. FLACK: I don't know that much about France.

MR. KATHREN: Russia?

MS. FLACK: Can you tell me something about France? Is there a good program there that would warrant getting some information on?

MR. KATHREN: They think they have a good program.

MR. MINNERS: In everything.

MR. KATHREN: I'm not that familiar with it, but they use a method similar to that of Japan, and from what I have been told, it is extremely effective, in that they have a system which at any time can enable them to select any worker -- this is what I have been told, I am not saying it is in fact the way it works -- that will enable them to select any worker and to follow through that worker's history of employment at various radiation work, and I assume you can do a prospective one as well, or a present-day one; I don't know. I think it merits some examination.

MS. FLACK: Good suggestion. Thank you.

I would like to get into the final part, and it is an overall recognized need for an overall radiation base on workers.

(Slide.)

I have gone through some recommendations in UNSCEAR, some recommendations I picked up along the road from the British people, and these are some of the needs that I can see that we really have to have a more adequate data base. This is one of your handouts.

MR. EBERSOLE: You can read the first sentence two ways, exposure and the licensed facilities or the exposure of workers who work in the facilities. I don't know which it means. Does it mean the exposure that they got while they were working in those facilities, or the total exposures?

MS. FLACK: A prime concern to us is NRC license facilities. As a regulator, that has to be our prime concern. I think a lot of these would be solved if they could just get a good occupational exposure history. It would be fantastic to have the medical information and everything to go with that, but we have to start somewhere. I think rather than setting up a centralized registry, in quotes, where everything is neatly packaged, that is very idealistic, we just need good occupational exposure histories on people.

These, as I said, are a lot of the needs that we feel we have to meet.

For example, No. 13. If you ever had to respond to a Congressional inquiry, 13, 14 together. Let's put them. I had to do this one time. We got a question, how would it impact the NRC licensees if the compensation level were set at X? There is no data on that. I found it very embarrassing to have to admit that.

What we ended up doing was going through Barbara Brooks' information that she receives on termination reports and getting some cursory data on that, just on the basis of the termination reports. We picked out a number out of a hat, I think it was 10 rems or something, just to see how many people were above that. It is very difficult. We just do not have adequate data on the people employed.

This next item is totally independent of everything I have done with the registry, but I am going to mention it because I think it ties in, and that is the 10 CFR Part 20 revision. I brought along for your information draft copies, and I want to stress draft copies only, of the recordkeeping and reporting requirement sections in our proposed revision to 10 CFR Part 20.

There is a substantial change in there which will undoubtedly impact all licensees, but to summarize it, we are proposing to require annual reports on all individuals for whom monitoring is required. This would be annual information. I repeat, it would be -- it would replace the current termination reports and it would also replace the annual statistical summaries that we get.

Those statistical summaries look just about like the summaries I handed out on TMI. They have a number of individuals in each exposure category for the year.

In order to get this information, the licensee has to have the records on the individuals to add up to get that data, so it is collected.

In order to do this, we are proposing a new form which, during the review process, is called Form X.

It is at the back of your package.

There will be a spot in there for the entry of more than one individual, his Social Security number, date of birth, periods of exposure, and summation of the dose equivalent, annual and special plant exposures.

We feel this is a big step forward in collecting what we feel is absolutely essential data on our work force. But I want to repeat, this was developed entirely separate from my efforts with the registry. It is only recently that I have been working with the Part 20 group. I think it is a very, very important improvement in our regulations.

I don't know whether I stressed enough that this would be a requirement -- required for all licensees. Currently we only receive the termination reports and the annual statistical summaries from certain categories of licensees. So, on some licensees we have essentially no information submitted.

I would like to conclude this last section on needs with mentioning some other groups that have also seen a need for additional data. One was the Congressionally-mandated study which I referred to a little bit earlier in response to a question from Dade. The NRC and EPA jointly had a study to submit a report to the Congress on the feasibility of options for federal epidemiological research on the health effects of low level ionizing radiation.

One of the conclusions that came out of this report in the Interagency Scientific Review Group overseeing the study concluded that a nationwide registry of radiation workers, in particular those employed at nuclear power plants, would provide the most practical means in the future for studying low level ionizing radiation health effects.

Now the only thing I find wrong with this is that we have many more needs other than epidemiology, and I don't want to allude to the fact that we are collecting the additional data in Part 20 for epidemiological purposes. It is really more for regulatory purposes that we need it, to see if our ALARA programs, radiation protection programs of licensees, et cetera, are indeed adequate.

Even UNSCEAR, I notice, in their recent volume mentioned that such additional information would be very useful to compare risks from radiation with nonradiation risks in the same or other occupations. Such information would provide useful data to control dose accumulation patterns of individuals.

Thirdly, there is recent effort on the part of Edison Electric Institute I just read about. They have established a task force to recommend the specific organizational structures and funding mechanisms necessary for the nuclear industry to establish an industrywide recordkeeping system for storing and transmitting data on transient nuclear workers.

Their initial emphasis will be on worker security clearances and radiation exposure histories. Along this line, if you have not seen it, it is worth getting a copy. It is a good report. The AIF funded a study on the recordkeeping system for in-processing of transient workers.

Now this study was concentrated on transient workers, as you all know. You lose maybe two or three days when you start work at a facility undergoing their training program and having security checks and everything. It is extremely costly to the industry.

So they look into the feasibility of standardizing and having a centralized recordkeeping system. The biggest problem that they seem to come up with was a lack of standardization. How do you get a facility that has a very good training program and a facility -- now let's go the opposite way -- how do you get -- yes, how do you get a facility that has a very good training program to accept the word of another facility that might have just an adequate training program as saying that person has been trained adequately?

There are a lot of things. I think -- is it INPO that is looking into standardization of training programs, et cetera?

Another group, American Nuclear Insurers, came out and they are recommending better data collection for defending claims arising out of alleged bodily injury or property damage attributed to low level radiation and routine radioactive releases.

And finally, but not least, the EPA draft proposed revision for EPA guidance for federal agencies on occupational radiation exposures -- I repeat, this is a draft. I do not know if anybody has seen it this week, but -- "agencies are encouraged to maintain a cumulative record of lifetime dose equivalent for each individual. As a result of occupational exposure for doses due to internal radioactivity, the permitted dose equivalent and if it exceeds the numerical value in any year, the radionuclides should be assessed and reported to the extent practicable."

I feel like what we are doing in the NRC is certainly consistent with what all the other groups are either proposing to do or are in the process of doing.

MR. MOELLER: Any further questions for Ms. Flack?

(No response.)

All right, thank you.

MR. HEALEY: I do have a comment. It is all very well and good to establish registries, make sure data are kept, and so on. But in my opinion, the NRC does have a responsibility to see at some point that epidemiology studies are started. These are working under NRC standards, and I realize this may not be very good to pick up in a year of tight budgets, but I really think the NRC has the responsibility to do studies to see that their standards have not produced undue alarm.

It has now been about 20 years since Dresden started up. Dresden was the first commercial power plant. I don't know how long we'll wait until we start these studies, but I would suggest that 20 years is not a very reasonable time.

I would point out that DOE has accepted this responsibility of epidemiological studies on the workers.

MS. FLACK: There is a study just starting like that. It is a joint EPRI-DOE study. They have asked for permission and have received permission to access NRC records in Oak Ridge. Shirley Fry is in charge of this. I met with her a couple of weeks ago. So it is being done. This is only a feasibility study to see if it can be done, and Shirley met with us one day, and Barbara Brooks also, and really hoped that we could solve a lot of the problems that you run into initially.

The first problem -- Shirley is an epidemiologist -- she found working with just termination reports just will not do it.

MR. HEALEY: No.

MS. FLACK: She was totally frustrated.

MR. HEALEY: Absolutely not.

The way we go about it is to go -- first we get permission from the facility. We go in and we photograph all of the dosimetry records on microfilm, and then the medical records, or information such as smoking and so on. And these data are all taken back, coded, put into a computer, and the study is done.

Of course, one problem, what is your control? My only comment is that I think the NRC sometime has to recognize its responsibility that they did put in the standards to which these people are working and, very frankly, we have no studies except for the Mancuso study where people are being exposed to low level radiation. We have no direct proof that our standards are adequate.

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And the NRC has to take a look at this.

MS. FLACK: One of my needs in there was to evaluate the radiation detection standards.

MR. MOELLER: Thank you very much.

MS. FLACK: You are welcome.

MR. MOELLER: We have one item left, and then we have items to review. And let's take a 10-minute break.

(Recess.)

MR. MOELLER: Tne meeting will resume.

The last item on our agenda is the Item II.H.3, and that is on how to evaluate the feedback information obtained from TMI-2, and that will be presented by Ron Foulds of the Research Branch.

MR. FOULDS: Thank you.

I am going to be here.

I presume you are comfortable with the format of just sitting down and going through this.

MR. MOELLER: Right.

MR. FOULDS: I have seen someone else do that, and it is easier than my maybe asking you to look at a projected viewgraph.

I have handed out some things to be looked through here. You said, incidentally, that we were going to talk about II.H.3, and my understanding is we were going to talk about II.H.2.

MR.MOELLER: All right.

MR. FOULDS: Maybe there is no difference.

MS. TANG: They have been combined.

MR.MOELLER: If there is an error, it is mine.

MR. FOULDS: I think there is a difference, but maybe there is none for today.

My name is Ron Foulds. I think you know that. I am from Research at NRC.

The points I would like to make in particular are that we are in the middle or in the midst of a fairly long-range program on gathering information from TMI-2 and examining what is within the reactor containment and, in particular, the most interesting issue at the moment, I believe, is the examination of the reactor core and fuel materials themselves.

In regard to that, the first visual that I have here shows a current defueling schedule. It indicates that in 1983, not far from now, there would be a head lift operation of the reactor vessel, after which time we would hope we would be able to see what really is in there.

I think you all are fairly well aware of and are probably somewhat familiar with the in-core TV examinations that have been made, and you probably all have seen them, or at least tapes of them. And that shows the lack of material about five feet down into what should be the core in the center area. And so when we lift the head, you know, we hope we will see more directly what is there.

The head lift is shown on this schedule as being about July. I think it may be later than that due to some concern that you have read about in the newspaper lately about a polar crane and some people raising issues up at the island.

Following the head lift would be a plenum lift along about the third quarter of '84, and that would allow us to begin, or would allow GPU's recovery contractor to begin defueling about the first part of 1985.

Prior to that time, we will have learned a lot, however, about what is in the core.

In fact, not shown on this schedule is the intent of getting what we call grab samples before the head is lifted. In fact, there in the next month or so, we expect to be putting a tool down inside through the reactor vessel through the same areas that the tool was placed for the core -- for the TV exam, and take -- first of all, take some samples from the top of the plenum, because of what was shown for high radiation field in that area several months back. And we can see whether, in fact, there is concern about high radiation in that area.

This is something that the recovery team is interested in doing and, of course, this would be of interest to us in the NRC, too. What sort of debris is there.

And then further on, there will be an examination of the loose debris that is down at the bottom of that five-foot pit that is in the top of the core.

As you are aware, there are probably 14 inches or so thick loose debris down in that area, and we intend that there would be about a 15 x 15 millimeter sample, sampling device, that would reach down and withdraw the sample from the top of that debris bed and hopefully several positions down through the stratum.

Those samples would be examined, hopefully, to provide us information that would fit into the severe fuel damage program and the source term work that is being done by the end of this year. That is the first opportunity for something real, I think, from within the core, from within the reactor vessel being able to impact the data that we have, that inputs to the severe core and source term activity.

Going back to the schedule here, the fuel shipments are expected to start in the first quarter of 1985, and from that we would expect to be able to do detailed examinations, plans for which we have been developing and you can see some of on the next page.

Here it shows materials and components to be examined. I have already mentioned grab samples. It is the first bullet.

And then the next bullet indicates that we would look at full-standing fuel assemblies.

We will also look at fuel assembly stubs, what is below that five-foot area, the fuel pellets and rods themselves, poison pellets and rods, the spacer grids and fittings and the hardware, the debris bed and so on.

And then, of course, we would also look at the reactor internals, that is lead screws, plenum samples and so on.

The reason we look at those in particular is to see what sort of fission products are plated out on what sorts of materials.

Let me just say that the principal thing we want to do here is to find out where do the fission products go, where do they go from the core and what is still in the core, and what is still attached, glued on somehow, if you will, to inside of the plenum and under the head of the reactor vessel, wherever it is.

And so we want to examine, to find out how did the accident progress. I'm not telling you anything new, I believe; but in short, that characterizes what we want to do.

MR. MICHELSON: On this slide you talk about full standing fuel assemblies. Does that mean complete?

MR. FOULDS: Yes.

MR. MICHELSON: Were there some complete ones at the periphery?

MR. FOULDS: Yes, there is distinct evidence that there are complete assemblies at the periphery. How many and how complete remains to be determined. There are plans to take sort of a topographic measurement at some later stage where we will put down like an ultrasonic sounding device and actually map what that core cavity is like.

And then in doing that, we will see how big is it, and then hopefully we will be able to determine just from that standpoint what might be left standing.

MR. EBERSOLE: It is my understanding that there is a pool of water inside the containment.

MR. FOULDS: Yes.

MR. EBERSOLE: I do not see anything on here-- I have been wondering for a long time, when are we going to get some information on the concentration of radionuclides in the water as a part of this transportable problem? And then when are you going to pump it out? How are you going to put it in the sides, or are you at all? I don't see this at the front end of the sides. I would think that would be early on. Are you going to flood it with fresh water?

MR. FOULDS: Let me answer some of those. I'm not qualifed to go into very much detail. What you are asking in particular is the plans of the recovery contractor, which I think is being selected along about now.

The sump water that you speak of has been pumped out and analyses are being made of what was in the sump water.

In fact, if you will turn to the next page, that is part of another one of a number of tasks identified. I just touched on the core recovery and core examination task because I think it is the most interesting at the moment. If I can go back to a little history a little bit here.

After the accident in 1979, along about summer of '79, the then-chairman of the NRC wrote to DOE, suggesting that we cooperate in a program of examining the reactor. And shortly after that, there were a number of working groups formed to decide what sort of data do we really want to get out of the reactor core, the reactor vessel, out of containment, the aux building and so on.

Those tasks kind of agglomerated around the several items that you see here, the first one being instrumentation and electrical equipment survivability. The second one, radiation and environment. And I believe you heard some about some of that this morning.

The third one is radioactive waste handling.

Fourth, physical plant examination. Most of that fourth one has been done in terms of what was there at the time.

The fifth one is for data integration, and that is -- you can pretty well establish as to how that is to be done. DOE is handling that task primarily by their technical integration office at the island.

The sixth one is mechanical and structural components.

And the seventh, reactor core and fuel.

Now, the letter that I mentioned, that was sent from the NRC to DOE, suggested that there be some collaboration. It was determined later on in a Memorandum of Understanding among DOE and NRC that there would be a four-party group set up to examine this, what became known as the GEND group, which in fact is identified on these couple of pages that you may have seen before in the task action plan.

But that is just a designator for NRC and DOE and GPU, of course, because they had the plant, and EPRI.

EPRI also has a significant role in this. They are doing part of the task II.0 items here. They are also doing all of the task VI.0 items on primary system pressure boundary characterization and mechanical components, the reactor vessel and so on.

DOE is funding the balance of most of the rest of this work. NRC's role is primarily one of providing technical expertise in the development of plans with the various working groups that were originally conceived and developed, and then with the technical evaluation groups which have been reformulated after the initial plans were made, NRC in fact has representatives on these various groups. And NRC, therefore, interprets the NRC interests and guidelines and provides also specific technical expertise for the various groups that in fact break down in accordance with this list of tasks.

So in going on, briefly, the next couple of pages indicate the kinds of reports that come out of this GEND organization. The Technical Information Office, TIO, at the island is responsible for putting together data that is developed by the various subcontractors that are designated to pursue the data-gathering. And so we have what we call GEND reports. And GEND information reports.

And there is just a couple of lists here to show you the kinds of things that are available, and you may already, in fact, know a lot about that. You might be on distribution for it. In fact, if you are not and you want to be, I could do my best to see that you individually could get on the list, if you would like.

In fact, I brought with me an example of some of those things. The GEND reports look like this:

Here is one entitled "Preliminary Radioiodine Source Term and Inventory Assessment for TMI-2."

This is dated March 1983, so that is not on this list that you had.

Here is another one entitled "Quick Look Inspection, Report on the Insertion of A Camera Into the TMI-2 Reactor Vessel Through a Lead Screw Opening, Volume 1." This is also March of '83.

end 22

You see, these are called GEND reports. They provide an annual report. Here they have not quite gotten out to 1982, but here is the 1981 annual report.

MR. EBERSOLE: Did you say they have measured the activity of the coolant?

MR. FOULDS: Yes.

MR. EBERSOLE: Has the activity been --

MR. FOULDS: You said "coolant"?

MR. EBERSOLE: The water.

MR. FOULDS: I was thinking of the sump water.

MR. EBERSOLE: I am talking about the sump water.

MR. FOULDS: They have done both.

MR. EBERSOLE: I was pretty much interested in the fact that the operating crew was either smart of something, so that they did not elect to cool the reactor by the normal psot-accident cooling methods, being fearful that they would get in trouble by letting all that hot water get out to the auxiliary portion of the plant.

So they had conveniently an alternate method of cooling, which was to boil it off through the secondary. That was a very handy thing that they might not have in another instance.

This raises a question. As of this moment, suppose that we have another TMI case but this time we must cool it with the RHR pumps and exchangers. Will the seals loft? These sorts of questions I think need to be raised a lot more importantly than seismic supports which shut down plants.

Do we have a LOCA-mitigating systems which don't work at our plants today? Can we find the answer to that by looking at the concentration of activity in the TMI-2 coolant as of now?

MR. FOULDS: I think the implications of your question certainly bear some study. I can't answer that kind of question. I could say that the data is there if one were to examine the potential for radiation dose on that type of thing. And I believe that on that basis, if you were to ask a question about what sort of dose should these pieces of equipment be expected to survive and operate under --

MR. EBERSOLE: That is the kind of question you have to ask.

MR. FOULDS: I would guess we could get somewhere.

MR. EBERSOLE: Most of them are rubber or rubber-like materials, overhangs.

MR. MICHELSON: Before you go on, TMI, of course, is a very prime example of some good experience with degraded cores. It is our only good example, I think, so far. Does the ACRS routinely receive these reports, put in our library at all?

MR. MOELLER: I have never seen a GEND report.

MR. MICHELSON: Would it be well at least to get them in our library? And if not, I would like to request them personally if they aren't at least going to be in the library where I can peruse them from time to time.

MR. FOULDS: I will make a note of that.

MR. MICHELSON: Send a copy to ACRS so that I can pull them off the shelf. I would assume that means backfitting.

MR. FOULDS: Sure.

Going on with the reports, I mentioned several of these GEND reports. This is also a format for a GEND. This is an information report. It has a different cover. This in fact happens to be the task one for the U.S. Department of Energy TMI-2 programs. I just happened to pick it at random. It is an October '82 report.

MR. MICHELSON: Did you say what "GEND" stands for?

MR. FOULDS: Yes. That is the G for GPU, the N for NRC, the E for EPRI,and the D for the Department of Enegy.

There is a rather informal sort of report that is put out several times a year by the technical information and examination program people that i[illegible] more of a PR-style thing. It is called "Update." It is a thinner thing. Like I say, it is more of a PR-type of item. But that is also provided.

EPRI puts out reports. As I mentioned earlier, they are very much involved in this. The NSAC group puts out reports on it, and under one format, I guess -- I did not bring one of those -- and their normal EPRI reporting format, there is in fact a report published in February of this year called "Joint TMI-2 Information and Examination Program," the EPR participation and support. That one gives a fair amount of detail on what they are doing and how they are proceeding.

At the ANS winter meeting in 1982, last November, there was a special session provided by the TMI-2 personnel. That is the TMI-2 TIO and associated GEND personnel. And the results of that were bound into a volume. This contains a fair amount of data and summaries of data.

I don't know that there are a lot of copies of this available, but if you are interested, I am sure one can be reproduced. This is called "TMI-2 Special Sessions 1982 ANS Winter Meeting," in Washington, D.C. There must be several dozen papers in here providing data.

Going on, you asked how long this would take. I can stop nearly any time. But going on with this, the next page indicates some of those things in a little more detail that we are looking at. I mentioned instrumentation of electrical. That is the first task. That includes analysis of selected cables and connectors and penetrations for survivability and also, of course, equipment. I do not see that on the list here.

MR. MICHELSON: Let me stop you for a moment on the instrumentation. From what I have seen from time to time about what happened, what appears to have happened within the core from a visual inspection, it is apparent that the thermocouples are no longer where we thought they were. And yet tgey are reading very well.

So one wonders during the accident if they were where we thought they were and why they were reading well or what they were even reading.

Is there going to be some kind of a study of this whole question of what thermocouples read when cores start to degrade?

MR. FOULDS: Definitely. As long as you say that you have a junction, you would expect that the thermocouple would read well. The junction, of course, could change its own location by -- you know, if it happens to be here and it melts down to here, there is still a junction.

MR. MICHELSON: Therefore, there is some doubt about the thermal history of the core during the degradation process and therefore maybe it is not what we thought it was at all.

MR. FOULDS: True.

MR. MICHELSON: You are going to study all of that?

MR. FOULDS: That is being done.

MR. EBERSOLE: Moving junction.

MR. MICHELSON: Is there a a report out on that question or will there be one shortly?

MR. FOULDS: I am sure there will be one. I am not sure where it stands.

MR. MICHELSON: Will it be one of these GEND-type reports?

MR. FOULDS: Yes.

MR. MICHELSON: I will watch them.

MR. FOULDS: There have been reports in the SPNDs on the same type of basis.

MR. MOELLER: While we are asking questions, this has a high priority. And certainly, I would agree with that. I guess the point I am not quite sure about, this seems to me to be purely a research operation. You know, you are gathering data, and we are feeding back what we can learn from TMI.

Then where does it fit as a regulatory matter? I find myself a little confused.

MR. FOULDS: I think the regulatory people left. If I can answer that, though, these things feed in to the regulatory data base. In so doing, it therefore becomes part of the regulatory concern. It was Reg, in fact, or NRR who identified this as a high-priority item.

I would certainly concur with that. And in fact, a few pages further on down here, I think I got a page that indicates where some of this goes into the system.

If you look down -- I am sorry, the pages are not numbered, but it is another five or six pages down. It says, "Application of results." You can see that we would expect the results for the core exam in fact to provide information for source term analysis for improvements in reliability of reactor and systems design, operation and maintenance on accident propagation and mitigation analyses for degraded core analyses and associated rulemakings.

MR. MOELLER: The rulemakings would certainly be regulatory.

MR. FOULDS: And improvements to various other regulatory requirement criteria.

What I had here -- let's look at the next page. Correction: I skipped radiation and environment. That is Task 2 of the seven tasks that are listed. Some of that I believe was covered this morning.

If you look at the next page, what I have here is an overview schedule of what they anticipate for getting tne fuel out of the reactor vessel and for doing some of the inspections.

We are stretching from fiscal '83 through fiscal '88 on this schedule, beginning with closed-circuit IV inspectins that are indicated here, and core debris sampling that I told you about a moment ago, and the core topography that I told you about.

And we would expect not to get much out of the core after the head is lifted until they get the plenum out, of course. That is -- there is a bit more involved in getting the plenum out, because they have to take it out wet and move it over to a section that has to be prepared for -- in any event. That is a lengthy process and will be about another year.

So as a consequence, from the other schedule I showed you, we expect the fuel will start coming out early in '85, and then at that point we can start doing some significant examinationof the fuel itself.

As the fuel comes out, they expect to do more cold topographic type examination to see whether things are in fact standing up. You asked about intact assemblies, will they be intact or will they maybe fall in? What will we do about it? Once we get the fuel out, then the examinations can begin in earnest off site.

On the fuel assemblies and individual components and so on, the NRC decided to tell DOE and these working groups what the NRC position was, what was important to get out of the core examination, being concerned that the cost of core examination looked like it was very great.

But from our standpoint, we felt that we ought to identify those things that we see as the maximum necessary information to the NRC. So the next three pages identify that; in particular, in three areas: one for source term program support, one for core dammage assessment, and the other we have kind of indicated as in the lowest priority what we would call Chapter 15 information, in other words, clad ballooning and so on, as being done or as has been done for the normal fuel examination post-radiation work.

Without going thorugh and reading all of this, you can see we are talking about determining the inventory of fission products in the core and measuring physical and chemical forms of materials that are present.

Under core damage assessment, we are concerned in particular to develop what is the core coolability as the accident progressed. I already talked a a bit about the application of the results, which is the next page.

After we met out in Idaho a month or so ago to crystallize the focus of the core examination work that I indicated to you a moment ago that we are kind of in the midst of this, we focused what the core examination work should be and the working group or task planning group came up with the following set of priorities that we should or would likely pursue.

And there is an estimate of a cost being prepared on that now by DOE's contractor. And we have five areas rather than the three that I indicated that NRC was interested in. This is the combined group of DOE, NRC, EPRI, and various interested contractors and laboratory personnel. That is DOE laboratory personnel.

We have identified as critical priority looking at damaged fuel assemblies, loose debris specimens, the crust debris that is -- evidently, there is a possibility that under the loose debris there may be crust formed. And of course, the general condition of the reactor vessel in the core.

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And then with very high priority we look at the control rod lead screws for not only what might be deposited out on them but what metallurgically does this show the temperatures had been in the core during the accident? The same for split tube sections. If you understand split tubes, those are the guide tubes in the upper assembly that drive the control rods.

Of course, fuel stub assemblies down from within the core. I will not bother to read over the rest of this. It is there for your examination.

Sort of summarizing, for the core examination the major safety issues then are identified as fission product release and transport deposition and then core coolability. This is order of priority. Core coolability and understanding the damage processes of the core and the internals and containment integrity. That is confirming hydrogen production and assessing other threats to containment recriticality.

And then last in the priority order is Chapter 15 style information. That is fuel cladding behavior during LOCA and so on. Those are all of the visuals that I had prepared for this. I would be happy to answer any more questions that you may have.

MR. EBERSOLE: I do not see enough about survivability of these pumps that I just got through talking about. It would be an immediate question.

MR. FOULDS: That is an immediate question. It is not one that I have focused on yet at this point, but it is being given significant focus by EPRI. And if you were to refer to the work that they are doing, in fact, back to those lists of items, those seven items, item 6 or task 6, the mechanical components and so on, that is the area that EPRI is looking into in great detail.

MR. MICHELSON: Are they looking into the problem, the problem of plugging the cyclone separator on the pump? Are they looking into radiation damage to the seals?

MR. FOULDS: I believe the answer is yes to both of those.

MR. MICHELSON: That was oneof the major concerns during and after the accident, whether fine material had gotten into the water so that it would be circulated through the clones and possibly through the seals.

MR. FOULDS: It is necessary to look at not only the mechanical effects but the radiation damage.

MR. EBERSOLE: That creates a path to the outside world.

MR. FOULDS: Absolutely.

MR. MICHELSON: Plus the loss of the pumps.

MR. MOELLER: Other comments or questions on this?

(No response.)

MR. MOELLER: Thank you. I think it is a relatively easy topic to discuss in the context that we are doing so today because we were looking primarily to see what priorities had been assigned and whether we disagree. There is certainly no disagreement here.

MR. FOULDS: Thank you very much.

MR. MOELLER: Thank you for coming down and spending the afternoon with us.

MR. MICHELSON: Before you leave, the EPRI document you are referring to on the work, do we have a copy of that?

MS. TANG: The problem with our library is after a certain amount of time they will discard it. It would be better if you requested it.

MR. MICHELSON: I don't have a microfiche reader.

MS. TANG: That's the problem with the library here.

MR. MICHELSON: Will you send me a copy when you get it?

MS. TANG: Yes.

MR. MOELLER: What we have left are the four remaining items at the top of the page 3 of our agenda. I would like to go over those rather rapidly. One is II.A.1.

And let's look at it and see what it entails and see if we have any questions.

Siting policy reformulation. And it has a medium-priority ranking. And their main reason for that is that there are no new plants being proposed, and so they don't see an immediate need to move ahead with the revisions of the siting policy or hte proposed siting rule.

MR. HEALY: When a new plant is proposed, how much time will it have to change the rule?

MR. MOELLER: Not much. However, they do have -- I would tend to agree with this assignment. And let me say why. There are existing siting guides. They could obviously be approved. However, they are probably adequate to meet the need until such time as we could revise them. So for that reason I wouldn't argue with it, again, in terms of priorities.

MR. MICHELSON: I would agree with your comment, providing that "medium" was interpreted to mean that they were not going to spend any time on it now but sometime in the future. "Medium" means various things in here. Generally, I think it means they are not going to do it today although they may be starting on it tomorrow.

I for one do not see any reason to work on this one when I think there are many more urgent issues that they don't seem to be giving a higher than medium rating to. I would say just with the stipulation that "medium" to us means that it will not start until such time as there is a reasonable basis to believe they will need it. And that basis does not exist today.

MR. MOELLER: Let's move to the next one on our list, which is B-1; that is, environmental technical specifications. I presume it is in Table 2. And I presume again that there is no problem here. It is to develop standardized environmental technical specifications and backfit of the existing facilities to these standards, environmental technical specs on a case-by-case basis.

MR. MICHELSON: I thought on that issue there was some sort of an NRR controversy. I would comment that we cannot judge it if they have not resolved themselves what they want to do.

MR. MOELLER: All right. NRC needs to resolve the controversy.

MR. MICHELSON: Then it may or may not change the situation. Right now it is hard to comment.

MR. MOELLER: I don't really understand the controversy.

MR. MICHELSON: It is between the environmental ENgineering Branch and the Licensing Branch.

MR. MOELLER: Carl, what were you suggesting that we do? We will say we will withhold comment until the controversy is resolved?

MR. MICHELSON: Yes. And at least point out that we are aware that a controversy exists. We do not, to my knowledge, know the details of the controversy, but therefore have no comment at this time on it.

MR. EBERSOLE: I have a problem. There is a very substantial effort on environmental qualification.

MR. MOELLER: But that is not this.

MR. EBERSOLE: One could imply by what you just said is to standardize environmental terminology for this purpose.

MR. MOELLER: No. This is for outdoors environment technical specifications in terms of releases from the plant or in terms of natural phenomenon. It is not what you are thinking.

MR. EBERSOLE: The other is are very active --

MR. MICHELSON: It is beginning to get confusing. This is not necessarily the best terminology, but what we are talking about is essential equipment, environmental control. That is the subject you are referring to, I believe.

MR. EBERSOLE: No.

MR. MICHELSON: Not here.

MR. EBERSOLE: There is a large effort in establishing environmental technical specifications and qualifications for the operation of people and equipment.

MR. MOELLER: That is not this.

MR. EBERSOLE: It is the terminology.

MR. MOELLER: All right, we can comment on the confusion in terminology with what truly would be safety issues.

MR. MICHELSON: Then I think when you recognize that a special equipment needs a special kind of environmental control, you have to go back to the tech specs and see if such control is described in the tech specs. To some extent, I think you will find it is simply not there. I could easily have read this that tech specs on environmental control.

MR. MOELLER: Dick Foster.

MR. FOSTER: Yes. I think this is one that we do not want to have them walk away from without a hard look at what they could do to minimize the requirements on the utilities. I know on some of these environmental tech specs which were invoked with the thought that the information would do somebody some good sometime in making an evaluation. It has turned out all we're doing is filling up file cabinets with it.

So my plea is not for more tech specs but for trying to minimize costs to the operators by getting rid of a lot of data collection that is not needed.

MR. EBERSOLE: Would this include the number of degrees' rise in a river?

MR. MOELLER: Yes.

MR. EBERSOLE: The passage of water --

MR. MOELLER: I would think so.

MR. FOSTER: Sampling of fish.

MR. MOELLER: Right. Endangered species and historical sites.

MR. EBERSOLE: Clouds from condenser towers.

MR. MOELLER: That is sufficient for us.

The next item is C-16. Now, this one I will need to look on. But it seems to me to be important. Particularly, it is called "Assessment of Agriculture Land in Relation to Siting." It could be important in terms of societal resources. And the committee is interested in that.

My blue sheets jump from 15 to 17.

MR. MICHELSON: It is on page 93 of this one.

MR. MOELLER: Recent licensing cases have questioned the adequacy of the staff's resource evaluative methods with respect to large land areas. Energy production facilities can be consumers of large land areas. Okay. It is -- in a sense, it is a loss of a resource due to the construction of the plant. You replaced good agricultural land. It is not the loss of resource due to an accident.

MR. MICHELSON: Right. So I wonder why it is even on here or why we should comment on it. It is strictly a nonsafety issue.

MR. MOELLER: Right.

MR. KATHREN: It is listed as environmental.

MR. MICHELSON: That does not mean we should comment on it. This is a nonsafety issue. They just normally deal with purely economic issues, which this appears to be.

MR. MOELLER: We will pass on it.

And that gets us to the one we have been looking for, III.D.2.3, the liquid pathway radiological control.

END T.24

MS. TANG: Table 1, item 31.

MR. MOELLER: Yes, item 31. It is to improve public radiation protection during and following an accident by improving the control of rad materials released into the liquid pathway. It can be accomplished by various interdictive measures.

To me, those need some work. We don't know about -- we can talk about interdictive measures for groundwater contamination and so forth, and they say a possible resolution has been identified. I don't know.

Dick, this is your area. Do you believe all of that?

MR. FOSTER: I don't know what hte resolution is here.

MR. MOELLER: It says PNL investigation showed that resolution is already being implemented.

MR. FOSTER: I have not been to PNL for 2-1/2 years. I would defer to --

MR. MOELLER: They have probably moved forward since you left.

MR. FOSTER: I would hope so.

MR. MOELLER: Ron, can you help us with information?

MR. KATHREN: I don't know anything about this. It says "individual evaluations of reactors as to liquid pathway radiological control."

MR. MOELLER: It may be referring to the liquid pathway generic study. That certainly did not show me a whole lot about interdiction, what to do to stop it.

MR. FOSTER: This could include such things as ability to shut down pumps to public water supplies and things of this sort. I am not familiar with any PLN document that goes into that.

MR. MOELLER: You would have thought they would have cited on.

MR. HEALY: Even if it is available, what criteria are they using for this, for this individual evaluation? What types of things should they be looking for?

MR. EBERSOLE: I could not help but relate it to accidents beyond the design basis.

MR. MOELLER: It is beyond the design basis. It almost has to be. You could have liquid dumping. In the liquid pathway generic study it was absolutley melt-through down into the groundwater.

MR. HEALY: Would this include release to the atmosphere and later cleanup? That is why it has never been resolved? If you do contaminate an area, how are you going to clean it up. Are you going to hose it down? Nonsense. You are not going to hose it down.

MR. MOELLER: You have been asking. That's what we have put under what you call the loss of a major societal resource. We have asked them to be looking at this. I will simply ask some questions on this.

MR. EBERSOLE: It seems to me it always gets down to the characteristics of the strength of the basemat and the design of the reactor structure under the reactor.

MR. MICHELSON: They may viewed this one as another question on the Browns Ferry incident. The heat exchangers leaked to the surface water, which was a liquid pathway to the environment.

MR. EBERSOLE: That is the mild end of the spectrum.

MR. MICHELSON: But during an accident the same thing would have been much less mild.

MR. EBERSOLE: Yes, if we had had a reactor coolant pump.

MR. MICHELSON: It is designed and is supposed to operate under post-accident conditions. This sounds like some good work, but I think I would ask them what they are doing in the case of Browns Ferry.

MR. EBERSOLE: It floats back to the issue about maintaining.

MS. TANG: There are four subtasks.

MR. MOELLER: RC has located the subtasks. Number one, develop procedures to discriminate between sites and plants -- not between sites and plants but between sites or between plants.

MS. TANG: They say "Resolved."

MR. MOELLER: But that doesn't tell you anything.

MS. TANG: I know. This is all the information we have.

MR. MOELLER: No, it says one thing is to establish feasible methods of pathway interdiction. You know, that's not so.

MS. TANG: That is resolved, as noted here.

MR. MOELLER: It is resolved, but it is not resolved. We will ask some questions on it.

MR. FOSTER: You might include in your questions the barging of a decommissioned reactor from Shippingport down the Ohio and Mississippi Rivers.

MR. HEALY: which I hope will sink in the deep ocean.

(Laughter.)

MR. MOELLER: With that, I think we have finished the formal portion of our meeting, much behind schedule, but nonetheless we did get through everything. And I certainly believe on today's review we have reached definitive positions on each item, which is what we wanted to do.

And so everyone will understand, we will simply summarize these in a memo which goes to the full committee and then incorporate it into a total report that goes to the NRC staff.

Are there any other comments or questions?

MR. HEALY: You mean on these items or in general?

MR. MOELLER: Either one.

MR. HEALY: This procedure we had described to us today was really quite interesting. But it is a complete change in the philosophy applied to the review of these items. Now, it may be right. I don't know. I am going to have to think about it.

But it does bring up some very interesting things. One, we had a discussion yesterday of the emergency considerations, and we heard one claim that, yes, you have to include probabilities in your emergency. Another one, now we have to take it as though the accident had a probability of one.

Now, I note on many of the summary items reviewed today they have to do wtih emergencies and control of emergencies, and they were calculated using these probabilities.

I would suggest that one should be somewhat consistent in the use of this, either use it don't use it.

Right?

MR. MOELLER: Yes. But I think this is a very important change in what I have seen in the past. I think the ACRS may wish to take specific cognizance of the details of this procedure.

Okay. In the formulation they say they are going to include the probabilities. You are not saying that they are inconsistent in applying the formula, they are inconsistent in using the formula today versus what was done in the past.

MR. HEALY: That is correct. It is a change. It is in direct response, I might add, apparently to the -- what do they call them from the Commissioners, the safety standards, the safety goals. Yet everything I have read on the safety goals has said that these will not be used in a probabilistic analysis of plants.

Now, isn't this a use of the probabilistic analysis? I am confused. I am not objecting to it. Let me say that. I am simply saying it is a change. I think you would be well advised to have the entire ACRS review this, this method, and be able to give their comments.

MR. EBERSOLE: They are using PRA all the time, but they use it in little discrete passages and they justify that without much discussion.

MR. MOELLER: Jack has said it exaxctly right.

The safety goals say these are trial goals that are to be evaluated on a several-year basis, be it PRAs not to be used, and yet we are using it. Yes, it could be confusing.

MR. HEALY: I am not saying it is wrong. As a matter of fact, it has some good things about it.

MR. MOELLER: Any other comments?

MR. SHAPIRO: The whole method can be fudged and manipulated. When you look at the cost and the risk. I still think intuitively when you are looking at something as catastrophic as a severe radiation release, 10 to the -5th instead of whatever you said was on it because -- is that the way you are designing --

MR. EBERSOLE: The proper use is to digitize a finding where there was an improper deterministic decision made and go back and put it in the context of PRA and justify an ill-made deterministic earlier decision. I think that's wrong.

MR. MOELLER: Right. It is an attempt to set up a formula so that you don't have -- and I say this in a kind way so you don't have to think, and we do have to think.

Dick?

MR. FOSTER: I will have to say that I was highly disturbed when I heard the presentation on safety issues and how they were being prioritized by this particular formuula. I had the feeling that now the only thing which it is going to really have a high enough priority to have a good funding background and therefore go forward is one which scores sufficiently high on their formula in which the -- let's say, perhaps, even new engineers just coming in are going to be making the choices of the parameters which are going to be selectd for going into this formula.

I have a very uncomfortable feeling that the ACRS as an organization could make its recommendations as it wished in the past, but that these would then be handed to some staff member who would run it through the formula, and if the end result did not come out right, then it was going to be discarded just like some suggestion from a member of the general public.

I hope I am wrong about this whole thing. The impression that I got was that now nothing is important unless it happens to come out with a good score on a formula which may have completely the wrong criteria grabbed by someone who does not understand the problem and plugged into the formula.

MR. MOELLER: I think they need to carefully stress that this should be one more tool in their total reservoir that is available to them to help make decisions.

MR. HEALY: They are not doing that, though. Incidentally, one possible control is to have every one of these things analyzed in detail by a second person outside that group.

MR. KATHREN: I am not sure they apply their own criteria consistently within that method. That was a little disturbing to me.

MR. MOELLER: Jack's point is excellent. Have each one done by a peer group or by a second group independently and just see if they are anywhere near the same answer. It would be very interesting.

Okay, those are good points.

MR. EBERSOLE: One too that always impacts is that is a direct conflict with the ALARA principle where an improvement in the context of doing it if is reasonable and practical should transcend some numerical approach to it.

MR. KATHREN: Except if you divide the S value, you take the reciprocal of the S value, you have the dollars per man-rem.

MR. EBERSOLE: In certain cases where you are aiming for the ALARA goal, you don't use that.

MR. HEALY: This is the way SERP now actually uses ALARA.

MR. EBERSOLE: We had a bunch of Frenchmen over here a couple or 3 weeks ago. They told us, in essence, that in certain areas they refuse to use anything but the ALARA approach without --

MR. HEALY: I don't disagree. I am simply saying that one prestigious body has recommended that this be the way you apply it.

MR. EBERSOLE: I can understand its usefulness.

MR. FOSTER: One more comment on that. That is, carried a very short step further on the use of that formula, I think you could end up by discarding plant features and equipment which you have already decided that you are going to install because they no longer are cost effective.

MR. HEALY: It is generally agreed that most of the features on a nuclear plant as far as safety -- I say most -- many are not cost effective when applied to a test like this.

MR. EBERSOLE: The large LOCA mitigation would be in that class.

MR. HEALY: Sure.

MR. MOELLER: I think we have covered it pretty well. I believe we can wrap up the formal meeting.

Let me thank our recorder, Ms. Whitlock, for her patience and time with us.

And with those remarks then -- let me also thank the speakers and the committee members and consultants who have stuck with us. And with those words, I will wrap up the meeting.

(Whereupon, at 5:00 p.m., the Subcommittee was adjourned.)

* * *

CERTIFICATE OF PROCEEDINGS

This is to certify that the attached proceedings before the NRC COMMISSION

In the matter of: ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
SUBCOMMITTEE ON REACTOR RADIOLOGICAL

Date of Proceeding: FRIDAY, 29, 1983

Place of Proceeding: Washington, D.C.

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

Barbara Whitlock

Official Reporter - Typed

Barbara Whitlock

Official Reporter - Signature

ACRS PRESENTATION ON

NRC'S WORKER REGISTRY TASK

APRIL 29, 1983

DIANE S. FLACK
HEALTH EFFECTS BRANCH
OFFICE OF NUCLEAR REGULATORY RESEARCH

HANDOUT	ITEM
1	HISTORICAL BACKGROUND OF TMI WORKER REGISTRY
2	SUMMARY REPORTS OF TMI OCCUPATIONAL EXTERNAL RADIATION EXPOSURE
3	QUESTIONNAIRE TO EVALUATE EXISTING RECORDS OF NUCLEAR POWER PLANT WORKERS
4	RECOGNIZED NEEDS FOR ADDITIONAL DATA COLLECTION
5	PROPOSED DATA COLLECTION IN REVISION OF 10 CFR PART 20

FOUR ACTIONS BEHIND WORKER REGISTRY EFFORTS

--4/1/79 MEMORANDUM FROM FORMER HEW SECRETARY JOSEPH CALIFANO TO FORMER NRC CHAIRMAN JOSEPH HENDRIE ASKING FOR ESTABLISHMENT OF A REGISTRY OF PERSONS AT THREE MILE ISLAND.

--CONGRESS RECOGNIZED THE NEED FOR A RADIATION WORKER REGISTRY THROUGH INCLUSION OF THE MOFFETT AMENDMENT IN H.R. 6628, NRC FY 1981 AUTHORIZATION.

--TMI ACTION PLAN DIRECTS NRC STAFF TO IMPROVE AND EXPAND THE DATA BASE ON INDUSTRY EMPLOYEES.

--FEDERAL REGULATORY AGENCIES, HEALTH STATISTICS GROUPS, INDUSTRY, ETC. RECOGNIZE THE NEED FOR A MORE ADEQUATE DATA BASE ON OCCUPATIONAL RADIATION EXPOSURE.

PRIORITIZATION OF GENERIC SAFETY ISSUES

RCE 4/27/83

PROGRAM FOR MANAGEMENT OF GENERIC ISSUES

1. IDENTIFICATION
2. PRIORITIZATION
3. ALLOCATION OF NRC RESOURCES
4. RESOLUTION
5. REVIEW AND APPROVAL
6. IMPLEMENTATION

RCE 4/27/83

PROCESS

1. IDENTIFY ALL ISSUES
   - SOURCES - NRR, ACRS, AEOD, OIE
2. ASSIGN ISSUES
   - SPEB
   - CONTRACTOR ASSISTANCE FROM PNL (NUREG/CR-2800)
3. DEFINE ISSUES BY CONSULTING WITH LEAD NRC OFFICE/DIVISION/BRANCH
4. PRIORITIZE SAFETY ISSUES USING DEFINED METHOD
5. IDENTIFY NON-SAFETY ISSUES FOR SEPARATE PRIORITIZATION
   - LICENSING IMPROVEMENT
   - ENVIRONMENTAL
6. CIRCULATE PRODUCT FOR PEER-REVIEW
7. ACRS REVIEW
8. SCHEDULE RESOLUTION OF HIGH PRIORITY ISSUES IDENTIFIED BY PROCESS
9. PUBLIC COMMENT

RCE 4/27/83

SAFETY PRIORITY SCORE (S)

$$S = \frac{\Delta R}{C}$$

WHERE ΔR = CHANGE IN RISK
C = COST

$$\Delta R = \Delta(FD)(L)(N)$$

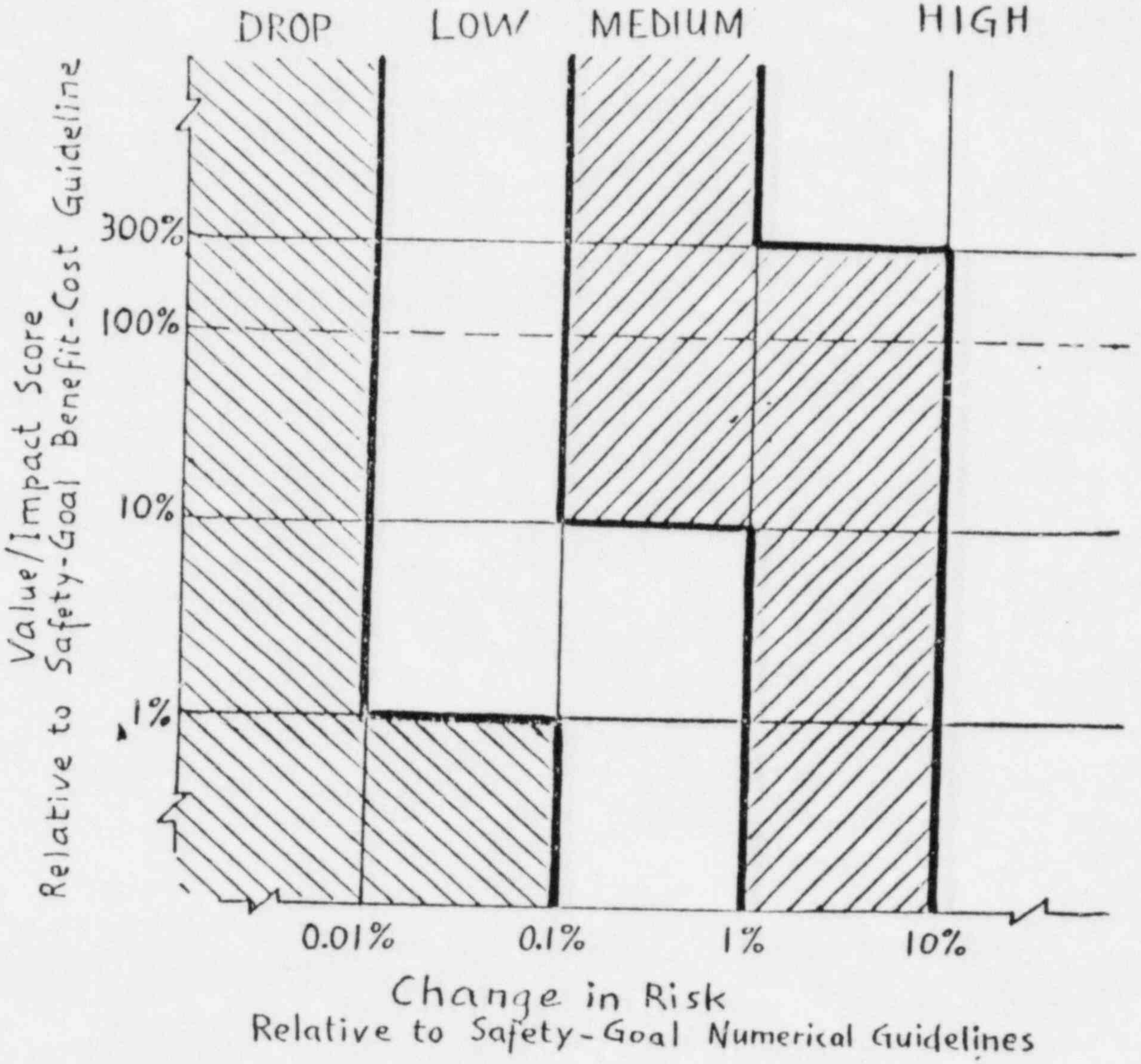
WHERE F = FREQUENCY
D = DOSE
L = REMAINING LIFE
N = NUMBER OF REACTORS

$$C = C_I N + C_R$$

WHERE C_I = INDUSTRY COST (IMPLEMENTATION, OPERATION & MAINTENANCE, ETC.)
N = NUMBER OF REACTORS
C_R = NRC COST

RCE 4/27/83

POTENTIAL GENERIC ISSUES
SAFETY PRIORITY RANKING CRITERIA



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12/3/82

OTHER CONSIDERATIONS

1. UNCERTAINTIES
2. OCCUPATIONAL DOSE
3. AVERTED PLANT DAMAGE
4. DEFENSE-IN-DEPTH
5. PUBLIC/CONGRESS/COMMISSION CONCERN
6. TECHNICAL CONTROVERSY
7. EFFECT OF DELAY
8. NEAR RESOLUTION

RCE 4/27/83

SAFETY PRIORITY RANKINGS OF GENERIC ISSUES

1. NEARLY RESOLVED (NOTE 1 & NOTE 2) } SCHEDULE RESOLUTION

   HIGH PRIORITY }

2. MEDIUM PRIORITY - SCHEDULE FOR FUTURE YEARS

3. LOW PRIORITY } NO FURTHER WORK

   DROP }

RCE 4/27/83

SCHEDULE FOR PRIORITIZATION OF GENERIC ISSUES

1. TMI ACTION PLAN ITEM IV.E.2 (5/80)
2. SECY-81-513 (8/81)
3. ACRS LETTER ACCEPTING STAFF'S LIST (3/17/81)
4. ACRS BRIEFING ON SECY-81-513 (12/81)
5. PRELIMINARY REPORT (3/26/82)
6. COMMISSION BRIEFING (4/13/82)
7. COMPLETE NRR ISSUES, DRAFT NUREG-0933 (9/30/82)
8. FEDERAL REGISTER NOTICE FOR PUBLIC COMMENT (12/15/82)
9. MEET WITH ACRS (1/7/83)
10. COMPLETE NON-NRR TMI ACTION PLAN ITEMS (3/4/83)
11. SUBMIT REPORT TO THE EDO (5/2/83)
12. CRGR BRIEFING (5/11/83)
13. COMMISSION BRIEFING (TBA)
14. PUBLISH NUREG-0933
15. CONTINUING EVENTS
    (a) MEETINGS WITH ACRS SUBCOMMITTEES
    (b) PRIORITIZATION OF NEW GENERIC ISSUES

RCE/4-27-83

TENTATIVE AGENDA
ACRS REACTOR RADIOLOGICAL EFFECTS SUBCOMMITTEE MEETING
APRIL 28-30, 1983
ROOM 1046, 1717 H ST. NW, WASHINGTON, D C.

April 28, 1983, (Thursday)

Time	Time	Speaker/Organization
8:30 a.m.	Opening remarks	D. Moeller, Chairman
8:45 a.m.	NRC Staff Presentation on Control Room Habitability	T. Quay, et. al (NRC/AEB)
10:45 a.m.	****** BREAK ******	
11:00 a.m.	Evaluation of HEPA Filters	T. Allan (Flander Filters, Inc.)
12:30 p.m.	****** LUNCH ******	
1:30 p.m.	NRC Staff's Draft Position on Thyroid Blocking for Potential Reactor Accidents	R. Bernero (NRC/DRA)
2:00 p.m.	A. NCRP Comments on the NRC Staff's Draft Positon on Potassium Iodide (KI)	E. Saenger (NCRP)
	B. NCRP Task Group on Thyroid Cancer Risk	
3:00 p.m.	Recommendations on the Use of KI as a Thyroid Blocking Agent In a Radiation Accident - An FDA Update	B. Shleien (FDA)
3:45 p.m.	****** BREAK ******	
4:00 p.m.	DOE Plans for Decommissioning Shippingport Atomic Power Station	E. Delaney (DOE)
5:00 p.m.	****** ADJOURN ******	

April 29, 1983 (Friday)

8:30 A.M.	Chairman's Remarks	D. Moeller
8:45 A.M.	Prioritization Process for Generic Safety Issues - Methodology	W. Minners (NRC/SPEB)
9:00 A.M.	Discussion of Generic Safety Issues: (in approximate order of discussion)	W. Minners et al.

Issue 1
Failures in Air Monitoring, Air Cleaning, and Ventilating Systems

B-36
Develop Design, Testing, and Maintenance Criteria for Atmosphere Cleanup System, etc.

B-67
Effluent and Process Monitoring Instrumentation

C-17
Interim Acceptance Criteria for Solidification Agents for Radioactive Solid Wastes

III.D.1.2
Radioactive Gas Management

III.D.1.3
Ventilation System & Radioiodine Adsorber Criteria

III.D.1.4
Radwaste System Design Features to Aid in Accident Recovery and Decontamination

III.D.2.1
Radiological Monitoring of Effluents

B-65
Iodine Spiking

B-66
Control Room Infiltration Measurements

III.D.2.2
Radioiodine, Carbon-14, and Tritium Pathway Dose Analysis

III.D.2.5
Offsite Dose Calculational Model

III.D.3.1
Radiation Protection Plans (RPP)

April 29, 1983 (Continued)

	A-15 Primary Coolant System Decontamination and Steam Generator Chemical Cleaning	
	II.A.1 Siting Policy Reformulation	
	B-1 Environmental Technical Specifications	
	C-16 Assessment of Agricultural Land in Relation to Power Plant Siting and Cooling System Selection	
	III.D.2.3 Liquid Pathway Radiological Control	
12:00 Noon	* * * LUNCH * * *	
	Continued Discussion of Generic Safety Issues:	
1:00 P.M.	III.D.2.6 Independent Radiological Measurements	L. Cohen (NRC/IE)
1:20 P.M.	III.D.3.2 Health Physics Improvements	R. Alexander (NRC/RES)
2:00 P.M.	III.D.3.5 Radiation Worker Exposure	D. Flack (NRC/RES)
2:30 P.M.	II.H.3 (tent.) Evaluate and Feed Back Information Obtained from TMI-2	R. Foulds (NRC/RES)
3:00 P.M.	Subcommittee Discussion and Preparation of Comments	
6:00 P.M.	* * * ADJOURN * * *	

No Meeting on Saturday, April 30, 1983

GENERIC ISSUE MANAGEMENT CONTROL SYSTEM-ACTIVE

Issue Number	Issue Type	Schedule	Office/Div/Br	Task Manager	Tac No
III.D.2.5	Safety/	Green	NRR/DSI/RAB	Tin Mo	40062

Title ---------------- Offsite Dose Calculation Manual

Work Authorization --- NRR FY-83 Operating Plan

Contract Title ------- Assessment of Environmental Releases of Radionuclides

Contractor Name/
FIN No. ------------ Oak Ridge National Laboratory (ORNL)/B-0766

Work Scope ----------- To prepare a definitive and authoritative document on the assessment of environmental releases of radionuclides from nuclear facilities in both normal operation and as a result of accidents.

Affected Documents --- None.

Status --------------- The "camera-ready" copy of the final document was received from the contractor on 03/31/83. Following final proofreading and some last minute changes, the manual will be sent to the printer.

Problem/Resolution --- None

Technical Resolution -

Milestones	Original	Current	Actual
Initiate Work - Contract Issued to ORNL	-	-	08/81
Draft Report Delivered to NRC from ORNL	-	-	09/82
Camera-ready Copy of Final Report from ORNL	-	-	03/83
Printed Manual Issued to Licensees and Applicants for Use	08/83	-	-

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Issue Number	Issue Type	Schedule	Office/Div./Br	Task Manager	Tac No.
III.D.3.1	Safety/ High	Green	NRR/DSI/RAB IE/DSRS/RASB RES/DFO/OPBR	R. J. Serbu	42926

Title ---------------- Radiation Protection Plans

Work Authorization --- NRR FY-83 Operating Plan (Part C to Appendix F).

Contract Title ------- None.

Contractor Name/ FIN No. ------------ None.

Work Scope ----------- Finalize a "Letter of Agreement" which outlines the relationship between INPO and the NRC during the period when INPO will actively assist licensees in implementing ALARA-integrated radiation protection programs. Develop an auditing method whereby the NRC can assess INPO/industry progress and success in achieving ALARA integrated radiation protection programs.

Affected Documents --- Directly Related Documents

1. "Letter of Agreement" with INPO.

2. NUREG-0761 - revised into regulatory guide format as R.G. 8.XX.

3. R.G. 8.XX - revise and hold for issue pending success of INPO/Industry.

4. Action Plan/Assessment Method - developed to evaluate INPO/ industry progress and success in implementing ALARA integrated radiation protection programs.

Status --------------- A change to 10 CFR Part 20 (and later 10 CFR 50.54) has been developed and proposed by RES to require power reactor licensees to develop and maintain ALARA integrated radiation protection programs and to maintain a description of these programs. The staff guidance for these programs has been developed as NUREG-0761, and revised to Regulatory Guide 8.XX following incorporation of public comment. In recent staff and CRGR actions the concept of an INPO directed effort to develop these programs over a two year period, in lieu of new regulations and requirements, has been proposed. To this end, the staff has written a letter of agreement outlining an NRC/INPO relationship during the proposed two-year INPO effort. The staff is also developing criteria to evaluate the progress and success of such an INPO/Industry effort.

If the staff evaluations find the INPO/industry effort successful, the issue will be considered to be resolved. If the evaluation finds INPO/Industry efforts not to be successful, the staff will resume efforts to promptly issue R.G. 8.XX and pursue rulemaking.

Problem/Resolution --- None.

Technical Resolution - Milestones are as follows:

Milestones	Original	Current	Actual
Draft Proposed Revised NRC/INPO Coordination Plan distributed for review and comment by OIE, RES, and Director, DSI.	-	-	01/19/83
Draft Plan to INPO Staff for review and comment.	-	-	01/26/83
Staff Recommendation to EDO to transmit proposed Coordination Plan to INPO (Follow-up to INPO (Wilkinson) letter dated August 26, 1982).	-	-	02/25/83
Coordination Plan signed and in effect.	-	-	03/03/83
Draft auditable criteria for ALARA/radiation protection evaluation of INPO Program, including ALARA checklists and evaluation criteria, distribute to IE, RES, and Regions for comment.	04/83	-	-
Revise evaluation criteria.	06/83	-	-
Complete a topical/functional comparison of INPO objectives, criteria and guidelines against NRC criteria.	06/83	-	-

Milestones	Original	Current	Actual
Establish agreement with IE on implemnentation of evaluation criteria in regional inspections.	06/83	-	-
Establish ALARA checklist parameter, SALP/inspection findings, etc., tracking system.	07/83	-	-
Establish schedule of NRC accompanied INPO Appraisals.	09/83	-	-
Draft criteria for determination of acceptability/unacceptability of INPO/Industry success.	10/83	-	-
Establish milestone for criteria approved process.	10/83	-	-
Finalize criteria for determination of acceptability/unacceptability of INPO/Industry success.	12/83	-	-
INPO/industry success evaluated.	07/83-03/85	-	-
Radiation Protection Plan RG either issued or withdrawn.	03/85	-	-
Technical Resolution Complete (Implementation recommendations or close-out documentation).	03/85	-	-

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Medium

Generic Issue II.A.1 - Siting Policy Reformulation

Background

In this TMI Action Plan item, the staff was to establish numerical values for safety-related criteria used to evaluate proposed sites for nuclear power stations, recommend the adoption of these criteria in a Proposed Rule on Siting, and prepare an environmental assessment or environmental impact statement for the revised rule to meet NEPA requirements. NRR (DE/SAB) was charged with the responsibility for developing the technical bases for, and the numerical values of the criteria; RES was responsible for developing the proposed rule and conducting the environmental evaluation.

Work Scope

For the purpose of revising the Commission Rule on Siting, develop technical basis for, and numerical values of (1) criteria for population density, distribution (including population centers) and exclusion distance, considering consequences of all classes of accidents and emergency response preparedness and capability; and (2) standoff distances from off site man-related hazards. In addition, meet, to the extent possible in the rule, the objectives expressed in the remaining recommendations of the Report of the Siting Policy Task Force (NUREG-0625) except for Recommendations 4 and 9.

Status

The nearly completed NRR/DE effort on development of technical bases and numerical criteria for a revised siting rule was suspended in FY 82 in response to the Chairman's desire to resolve safety goal and source term issues prior to proceeding with siting policy development. Based on planning guidance contained in the USNRC Policy and Planning Guidance, 1983, (NUREG-0885, Issue 2), reactiva- of the effort can be anticipated in FY 85, with re-evaluation based on the source term and requirements of the safety goal, and any required reformulation, completed in FY 86. The contractual effort would consist primarily of probabilistic risk assessments and severe accident consequence analyses needed to evaluate the validity of the previously developed criteria in light of source term revisions and safety goal requirements.

Resource Requirements

FY 84	FY 85	FY 86
.1 PSY $0	.2 PSY $100K	.1 PSY $50K

Issue Number	Issue Type	Schedule	Office/Div/Br	Task Manager	Tac No
III.D.2.3 (1 thru 4)	Safety/ Note 2	Green	NRR/DE/HGEB	R. Codell	None

Title ---------------- Liquid Pathway Radiological Control (NRR)

Work Authorization --- NRR Operating Plan. (Appendix F, Part B)

Contract Title ------- Review Liquid Pathway Analysis for Iodine PT Safety Study

Contractor Name/ FIN No. ------------ PNL/B-2511

Work Scope ----------- Improve public radiation protection in the event of a nuclear power plant accident by improving the control of dissolved radionuclide released to the liquid pathway as a result of groundwater contamination, by assessing the fate of radionuclide both with and without pathway interdiction. Also consider the relative importance of airborne contamination of the liquid pathway.

Affected Documents --- (1) Criteria/guidelines on Liquid Pathways (previously a Branch Technical Position)

(2) Update Environmental Standard Review Plans

(3) Issue 2 NUREGS on groundwater mitigation

Status --------------- Liquid pathway analyses have been completed for Zion, Indian Point and about 20 near term OL's and operating plants. Technical Assistance and research contract are resolving problems of groundwater mitigation. Draft Branch Technical Position completed.

Problem/Resolution --- As of April 19, 1983, no staff resources have been devoted to complete a comprehensive Branch Technical Position. Liquid pathway computer program has been received from ORNL, and is being implemented by HES as time allows. We must devote manpower to wrap up this problem.

Technical Resolution -

Milestones	Original	Current	Actual
Indian Point Licensee requested to study Liquid Pathway at plant.	-	-	6/80
Staff begins review and independent study of Indian Point liquid pathway.	-	-	5/80 thru 3/82

Milestones	Original	Current	Actual
Zion liquid pathway analysis completed.	-	-	8/81
Draft of Branch Technical Position on Liquid Pathway Analysis.	-	-	12/81
Indian Point Probabilistic Safety Study Issued, Containing study requested by staff (Chapter 6.7).	-	-	02/82
Fermi 2 FES supplement published has first staff analysis of airborne liquid pathway.	-	-	03/82
Staff requests technical assistance from PNL on Indian Point groundwater modeling.	-	-	04/82
Research issues contract with PNL to extend ANL technical assistance work on groundwater mitigation methods (B2454).	-	-	05/82
Technical Assistance draft report from ANL on Slurry Wall Barriers.	-	-	05/82
PNL issues draft report on Indian Point groundwater modeling.	-	-	07/82
Technical Assistance draft report from ANL on other Groundwater Interdiction Methods completed.	-	-	09/82
Staff completes written testimony on Indian Point liquid pathway.	-	-	01/83
ASLB hearing on Byron Nuclear Plant	04/83	-	-
Prepare User Need letter asking for Airborne Liquid Pathway Research.	06/83	-	-
Staff installs Liquid Pathways computer code acquired from ORNL for use in liquid pathway reviews.	06/83	-	-
Publish ANL Mitigation Reports as NUREGs.	07/83	-	-

Milestones	Original	Current	Actual
About 20 near term OL's and OP completed in which liquid pathway issues were treated. (Results of these analyses are provided to AEB for use in the Environmental Statement section on accident effects.) No sites more than 1 order of magnitude worse than those considered in NUREG-0440 were discovered.	Continuing effort	-	-
Document in a NUREG, airborne liquid pathway analyses performed for Indian Point.	12/83	-	-
Develop a new Environmental SRP for use in Class 9 Liquid Pathway evaluations. Since these ESRP's would not impose any additional burden on licensees but rather document current staff practice in implementing the interim Commission policy on Class 9 accidents (F.R. Vol. 45, No. 116, pp. 40101-40104) we would not plan for a formal CRGR review.	03/84	-	-

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Issue Number	Issue Type	Schedule	Office/Div/Br	Task Manager	TAC No
II.H.2	Safety/ Note 1	Green	RES/DAE/FSRB	None	None

Title ---------------- Obtain Technical Data on the Conditions Inside the TMI-2 Containment Structure

Work Authorization --- TMI Task Action Plan
LRRP, Budget Authorization Documentation

Contract Title ------- None

Contractor Name/
FIN No. ------------ None

Work Scope ----------- NRC is cooperating with DOE and industry on development of plans and guidance for implementation of research and data gathering programs within the TMI-2 containment. These programs concentrate on retrieving data which characterize the progression of the accident and the resulting radiological source term for this case. The programs address the examination of the reactor internals (especially the reactor core and fuel), the primary system piping and vessel, the dose reduction effort during decontamination, and various mechanical, electrical and instrumentation equipment. NRC primarily provides technical expertise in the program formulation and implementation, the programs are generally carried out with funds from DOE and others.

Affected Documents --- Occasionally update protions of the NUREG-0900 Severe Accident Research Plan (Jan. 83).

Provide supplementary data to NUREG-0772, Technical Bases for Estimating Fission Product Behavior During LWR Accidents.

Status --------------- Several dozen information reports have been issued by EG&G Idaho for DOE as a series of GEND reports numbered GEND-001, et. seq. (GEND indicated: General Public Utilities, Electric Power Research Institute, Nuclear Regulatory Commission, and Department of Energy - who are cooperating in a number of technical working groups to manage the planning.) Current efforts are concentrating on final plans for TMI-2 core examination both on-site and off-site. NRC will conduct a series of off-site examinations of selected core materials at a national laboratory.

Problem Resolution --- Lack of full funding support for projected operations in the utility's recovery cleanup program delay the availability of data. An industry supported technical advisory group is assisting the utility in the engineering projects required, to speed the cleanup effort. Shortages of funding in DOE and NRC hold down the amount of data that can be retrieved and examined. Both DOE and NRC are investigating possible financial support from industry and international interests.

Technical Resolution -

Milestones	Original	Current	Actual
Final Core examination plan	04/83	-	-
Head Removal	07/83	-	-
Task Plan for DOE Sponsored TMI-2 Programs	10/83	-	-
Post Head Removal Core Sampling	06/84	-	-

III.A.1.3

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Number	Issue Type	Schedule	Office/Div/Br	Task Manager	Tac No
III.A.1.3(2)	Safety/	Green	IE .	F. G. Pagano	None

Title ---------------- Maintain Supplies & Thyroid-Blocking Agent

Work Authorization --- TMI Task Action Plan

Contract Title ------- None

Contractor Name/ FIN No. ------------ None

Work Scope ----------- Maintain Supplies & Thyroid-Blocking Agent (Potassium Iodide)

The Department of Health and Human Services (DHHS) will develop recommendations for the use of stable iodine for thyroid-blocking to determine what amount of the drug provides an effective dose for thyroid-blocking, the chemical form which the drug should be administered, the medical risk in administering the drug to large numbers of people without medical risk of administering the drug. The NRC will examine various accident scenarios and compare the results of using potassium iodide (KI). FEMA and NRC will develop a position with regard to the use of KI for thyroidal blocking by the general public.

Affected Documents --- None

Status --------------- The DHHS has completed its work and has recommended the administration of a dose of 130 milligrams of KI per day for adults and children older than one year of age as a safe and effective thyroidal blocking technique. In addition it has stated that the risk of the radiation dose to the thyroid exceeds the medical risk of administering the drug without medical supervision at a thyroid dose of 25 rem. Sandia Laboratories completed the cost-benefit study which showed that the use of KI is not cost beneficial. NRC and FEMA have recommended the use of KI for emergency workers, both onsite and offsite as well as for institutionalized personnel within the 10 mile EPZ who would be difficult to evacuate. This recommendation was published in November 1980. A draft federal position on the use of KI by the general public was developed in July 1982, but the NRC staff did not agree with it and is performing another study on the cost-benefit of its use. When their study is completed, the Commission will recommend a course of action to FEMA on the public use of KI.

Problem/Resolution --- None

Technical Resolution -

Milestones	Original	Current	Actual
Completed Study	-	-	01/83
Submit Study to CRGR and EDO for approval	-	-	01/31/83
Submit to ACRS	-	-	02/01/83
NCRP Review completed	05/83	-	-
Provide additional Milestones necessary to complete issue based on Commission Recommendations	06/83	-	-

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TMI-2 INFORMATION AND EXAMINATION PROGRAM

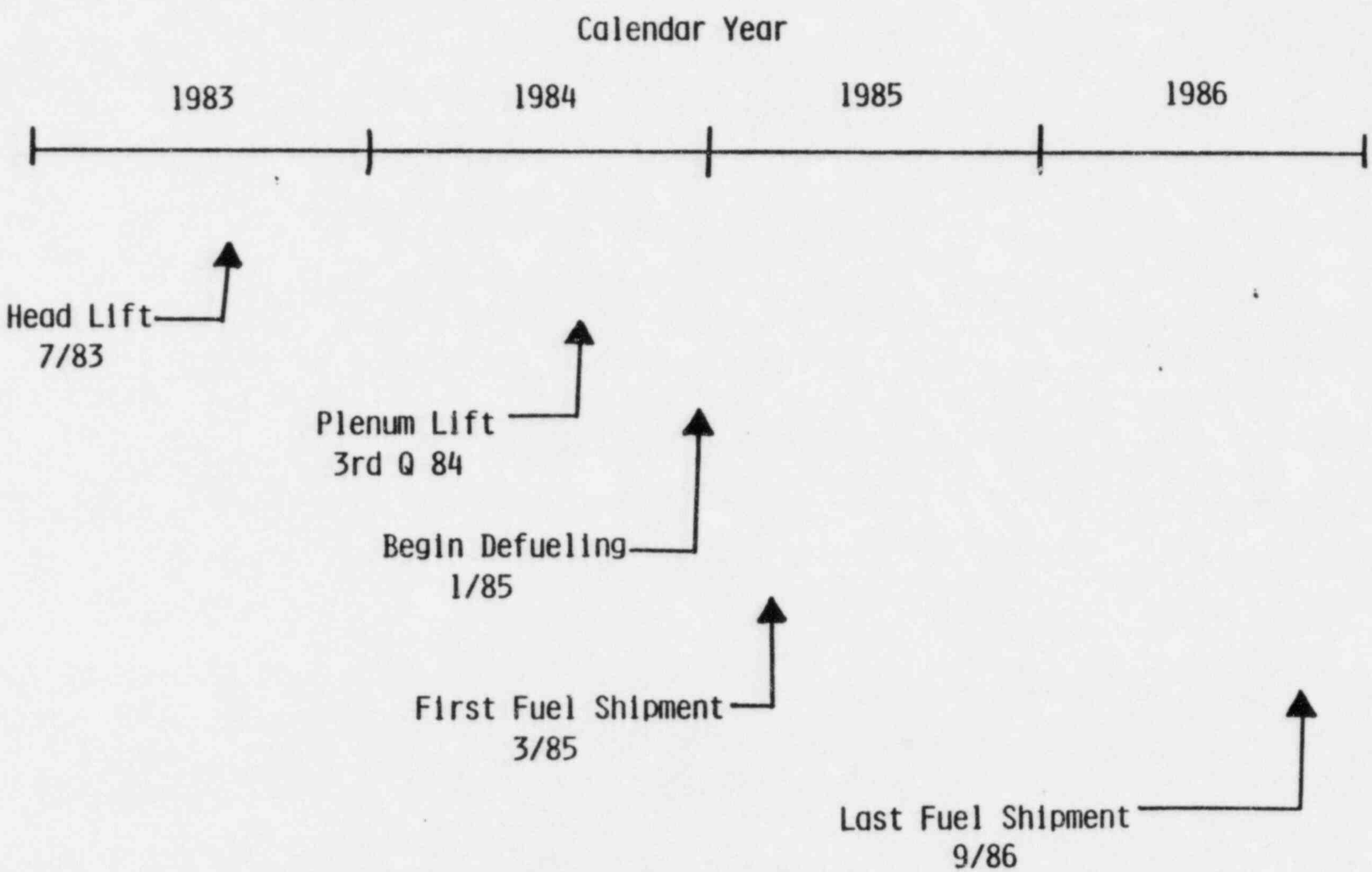
TMI-2 TASK ACTION PLAN
ISSUE II.H.2

R. B. FOULDS

PRESENTATION FOR ACRS

APRIL 29, 1983

CURRENT DEFUELING SCHEDULE



COMPONENTS/MATERIALS TO BE EXAMINED

- IN-SITU

  GRAB SAMPLES, VISUAL, RADIATION, TOPOGRAPHIC

- OFF-SITE CORE COMPONENTS/MATERIALS*
  - FULL STANDING FUEL ASSEMBLIES
  - FUEL ASSEMBLY STUBS
  - FUEL PELLETS AND RODS
  - POISON PELLETS AND RODS
  - ASSEMBLY SPACERS
  - END FITTINGS AND HARDWARE
  - DEBRIS BED
  - ETC.

- REACTOR INTERNAL COMPONENTS
  - LEAD SCREWS
  - PLENUM SAMPLES
  - HEAD SAMPLES
  - IN CORE INSTRUMENTATION (TCs, SPNDs)
  - OTHER INTERNALS SAMPLES (e.g., INSTRUMENT TUBE PENETRATIONS)

TMI-2 INFORMATION AND EXAMINATION
PROGRAM PRINCIPAL TASKS

1.0 Instrumentation and Electrical Equipment Suvivability

2.0 Radiation and Environment

- 2.1 Fission Product Transport, Deposition and Environmental Description
- 2.2 Decontamination/Radiation Dose Reduction Technology
- 2.3 Early Containment Penetration and Monitoring

3.0 Radioactive Waste Handling

4.0 Physical Plant Examination

5.0 Data Integration

- 5.1 Establish Data Bank
- 5.2 Establish Technical Integrator
- 5.3 Archive Sample Repository

6.0 Mechanical and Structural Components

- 6.1 Primary System Pressure Boundary Characterization
- 6.2 Mechanical Components

7.0 Reactor Core and Fuel

- 7.1 Criticality Control Study
- 7.2 Core Damage Assessment and Removal
- 7.3 Packaging, Shiping, Disposal of Fuel
- 7.4 Fuel Experiments and Examination

	Report Title
GEND 002	Facility Decontamination Technology Workshop
GEND 003	TI&EP Technical Integration Office Annual Report
GEND 004	Interim Status Report of the TMI Personnel Dosimetry Project
GEND 005	Characterization of TMI Unit 2 RB Atmosphere Prior to the Purge
GEND 007	Three Mile Island Unit 2 Core Status Summary: A Basis for Tool Development for Reactor Disassembly and Defueling
GEND 008	The Citizens Radiation Monitoring Program for the TMI Area
GEND 009	Measurements of ^{129}I and Radioactive Particulate Concentrations in the TMI-2 Containment Atmosphere During and After the Venting
GEND 010 Vol. I	In-Vessel Inspection Before Head Removal: TMI II Phase I (Conceptual Development)
GEND 010 Vol. II	In-Vessel Inspection Before Head Removal: TMI II Phase II (Tooling & Systems Design)
GEND 011	Canister Design Considerations for Packaging of Three Mile Island Unit 2 Damaged Fuel and Debris
GEND 013	TMI-2 Reactor Building Purge—Kr-85 Venting
GEND 014	Examination Results of the Three Mile Island Radiation Detector HP-R-211
GEND 016	Accountability Study for TMI-2 Fuel
GEND 017	Response of the SPND Measurement System to Temperature During the Three Mile Island Unit 2 Accident
GEND 018	Nondestructive Techniques for Assaying Fuel Debris in Piping at Three Mile Island Unit 2

	Report Title
GEND INF-001	Quick Look Report Entry 1 Three Mile Island Unit 2
GEND INF-002	Quick Look Report Entry 2 Three Mile Island Unit 2
GEND INF-003	Quick Look Report Entry 3 Three Mile Island Unit 2
GEND INF-004	Quick Look Report Entry 4 Three Mile Island Unit 2
GEND INF-005	Quick Look Report Entry 5 Three Mile Island Unit 2
GEND INF-006	Quick Look Report Entry 6 Three Mile Island Unit 2
GEND INF-007	Quick Look Report Entry 7 Three Mile Island Unit 2
GEND INF-008	Quick Look Report on HP-RT-0211 Multivalued Behavior
GEND INF 10	HP-RT-211 Cable Analysis
GEND INF 011	First Results on TMI-2 Sump Sample Analysis—Entry 10
GEND INF 015	Preliminary Characterization of EPICOR II Prefilter 16 Liner
GEND INF 017	Field Measurements and Interpretations of TMI-2 Instrumentation:
Vol. I	CF-1-PT3
Vol. II	CF-1-PT4

DATA ACQUISITION PROGRAM - OFF-SITE

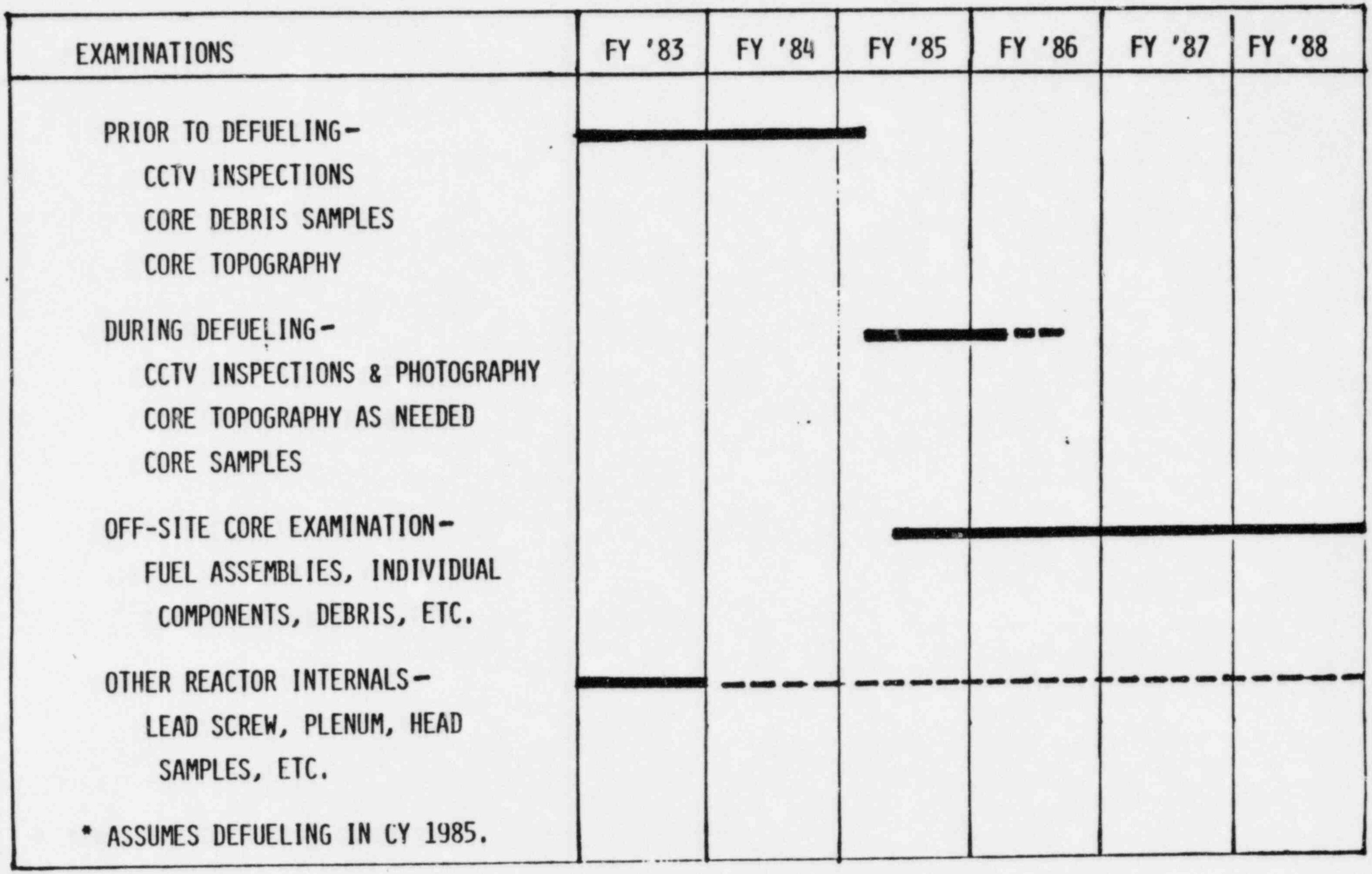
INSTRUMENTATION AND ELECTRICAL

- ANALYSES OF SELECTED CABLES, CONNECTORS AND PENETRATIONS FOR SURVIVABILITY.
- FAILURE MODE AND EFFECTS ANALYSES OF SELECTED CLASS 1E EQUIPMENT.

RADIATION AND ENVIRONMENT

- IN-CONTAINMENT AND PRIMARY SYSTEM SAMPLE ANALYSES WITH RESPECT TO FISSION PRODUCT IDENTIFICATION AND LOCATION, ACCIDENT DIAGNOSIS AND RETENTION MECHANISMS.
- APPLYING TMI RESULTS TO SOURCE TERM CODE VERIFICATION, SIMILAR TO NRC-DOE COOPERATION IN HYDROGEN BURN AREA.

PRESENT PROGRAM - OVERVIEW SCHEDULE*



I. SOURCE TERM PROGRAM SUPPORT

A. DETERMINE THE INVENTORY OF FISSION PRODUCTS IN CORE, UPPER AND LOWER PLENUM, HEAD REGION, AND PRIMARY SYSTEM PIPING TO DO A MASS BALANCE AND DEDUCE THE INVENTORY AVAILABLE FOR RELEASE TO THE ENVIRONMENT.

B. MEASURE PHYSICAL AND CHEMICAL FORMS OF FISSION PRODUCT SPECIES TO UNDERSTAND FISSION PRODUCT BEHAVIOR.

II. CORE DAMAGE ASSESSMENT

A. DESCRIBE THE CONFIGURATION OF THE CORE TO DETERMINE FLOW CHARACTERISTICS AND COOLING MECHANISMS.

B. PERFORM MASS BALANCE ON OXIDIZED MATERIALS TO DETERMINE AMOUNT OF HYDROGEN PRODUCED.

C. MAP MAXIMUM TEMPERATURES IN CORE, UPPER PLENUM, AND OTHER REGIONS OF PRIMARY SYSTEM TO DETERMINE PROXIMITY TO MELTING POINTS.

D. DETERMINE LOCATION AND FORM OF POISON MATERIALS TO EVALUATE POTENTIAL FOR RECRITICALITY, STRUCTURAL CHANGES, BLOCKAGES AND CONTRIBUTION TO AEROSOLS.

E. DESCRIBE CONDITION OF CORE INSTRUMENTS AND DETERMINE SIGNIFICANCE OF THEIR READINGS DURING THE COURSE OF THE ACCIDENT.

III. CHAPTER-15 INFORMATION

A. MEASURE CLADDING STRAIN AND FLOW AREA REDUCTION TO COMPARE WITH CURRENT LICENSING METHODS.

TMI-2 CORE EXAMINATION
MAJOR NUCLEAR SAFETY ISSUES

- FISSION PRODUCT RELEASE, TRANSPORT, AND DEPOSITION
- CORE COOLABILITY/UNDERSTANDING DAMAGE PROCESSES OF CORE AND INTERNALS
- CONTAINMENT INTEGRITY/CONFIRMING H_2 PRODUCTION; ASSESSING OTHER THREATS TO CONTAINMENT
- RECRITICALLITY/SEGREGATION OF FUEL AND CONTROL MATERIALS
- FUEL CLADDING BEHAVIOR DURING LOCA

APPLICATION OF RESULTS

- SOURCE TERM ANALYSIS
- IMPROVEMENTS IN RELIABILITY OF REACTOR AND SYSTEMS DESIGN, OPERATION, AND MAINTENANCE.
- ACCIDENT PROPAGATION AND MITIGATION ANALYSES
- DEGRADED CORE ANALYSES AND RULEMAKING
- IMPROVEMENTS TO OTHER REGULATORY REQUIREMENTS AND CRITERIA

TMI-2 CORE EXAMINATION RECOMMENDED PRIORITIES

CRITICAL	VERY HIGH	HIGH
DAMAGED FUEL ASSEMBLIES	CONTROL ROD LEADSCREWS	CONTROL ROD GUIDE TUBE ASSEMBLIES
LOOSE DEBRIS SPECIMENS	SPLIT TUBE SECTIONS	CONTROL ROD SPIDERS
CRUST DEBRIS SPECIMENS	FUEL STUB ASSEMBLIES	FUEL ASSEMBLY END FITTINGS
GENERAL CONDITION OF THE REACTOR VESSEL AND CORE		INTACT FUEL ASSEMBLIES
		FILTER DEBRIS
		DEBRIS FROM REACTOR COOLANT SYSTEM

TMI-2 CORE EXAMINATION RECOMMENDED PRIORITIES

MODERATE	LOW
UPPER LEAD SCRFW GUIDE SLEEVES	PLENUM COVER DEBRIS
RADIATION MAPPING OF PLENUM	PLENUM COVER SPECIMENS
LOOSE DEBRIS FROM LOWER VESSEL	
CORE FORMER WALL	