UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Title: PERIODIC BRIEFING BY THE ADVISORY COMMITTEE ON NUCLEAR WASTE

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[PUBLIC MEETING]

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Nuclear Regulatory Commission

One White Flint North

Rockville, Maryland

THURSDAY, OCTOBER 27, 1988

The Commission met in open session, pursuant to notice, at 11: 00 the Honorable LANDO W. ZECH, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

LANDO W. ZECH, Chairman of the Commission

THOMAS M. ROBERTS, Member of the Commission

KENNETH CARR, Member of the Commission

JAMES. R. CURTISS, Member of the Commission

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

J. CHILK

W. PARLER

D. MOELLER

C. SMITH

M. STEINDLER

P R O C E E D I N G S

[11:00 a.m.]

CHAIRMAN ZECH: Good morning, ladies and gentlemen. Today, the Commission is meeting with its Advisory Committee on Nuclear Waste. The Advisory Committee on Nuclear Waste was formally established in June, 1988, to advise the Commission on Nuclear Waste management issues. This is the information briefing this morning.

There are several nuclear waste topics which the Committee would like to discuss today, as noted in the proposed meeting agenda. I would like to welcome Advisory Committee members, and Dr. Smith, I would like to particularly welcome you as the new member, to the Committee, joining Dr. Moeller and Dr. Steindler. We're delighted to have you with the Committee, and we welcome you and all of you this morning.

Do any of my fellow Commissioners have any opening comments they'd like to make before we begin?

[No response.]

If not, Dr. Moeller, you may proceed.

MR. MOELLER: Thank you, Mr. Chairman. We had several items that we would like to discuss or perhaps a better word is to acquaint you with recent actions relative to them. Then we had four items that we would like to discuss more in detail, if that meets with your agreement.

CHAIRMAN ZECH: It sounds fine.

MR. MOELLER: The ones that we would like to brief are our recent visit in August to South Carolina, where we visited, you know, the Barnwell site, and so forth.

Secondly, we'd like to comment on your charge to us to review the programs of the Divisions of Low Level Waste and Decommissioning and the High Level Waste Management Group. We'd like to briefly comment on the decommissioning rule on the environmental monitoring branch technical position, and on the anticipated and unanticipated processes and events that relate to the post-closure conditions at the repository.

The items that we would like to discuss more in depth relate to the high integrity containers, the polyethylene containers; the mixed waste issue; and the solidification of cement-bonded low level waste. Lastly, since I attended, and of course several Commissioners attended last week, the International Symposium on Below Regulatory Concern, we'd like to bring you up to date on our thoughts with respect to that particular subject.

In terms of our visit to South Carolina, there were several items. I've already mentioned -- of course, we'll discuss more in detail, and others on the Committee will handle the high integrity containers and the low level waste solidification. Those were two items we discussed down there, but I would like to delay those for more in-depth discussion.

One of the main things we found in our visit to the

Savannah River Plant, was that they -- and we knew this, and of course, all of us know -- that they are moving ahead to solidify their high level waste there using the Borosilicate process. They brought to our attention, their urgent need, of course, to interact with the NRC staff in terms of making sure that the specifications that they have adopted for these wastes, will produce a product that's compatible with a high level waste repository.

This involves, of course, a number parties. It involves the DOE Defense Group, in that they are the ones that are moving ahead and have the schedule, and are following it. It involves the DOE Office of Civilian Radioactive Waste Management, because they are the ones handling the repository side of it. Then it involves the NRC.

To repeat, they primarily called for interactions, close interactions with the NRC staff, and I'm sure things are moving along well in that. We also visited the Barnwell disposal site, and one of the interesting observations there, was the statements by the group from South Carolina that they feel that they have done their part in terms of handling the nation's low level waste.

As you know, that particular disposal site is scheduled to be closed down. I don't remember whether it's 1992, but somewhere in that vicinity. In conjunction with the shutdown of that side; of course there is the move to establish

the compacts and the multitude -- a dozen or more -- low level waste disposal sites throughout the nation, all of which would be new and would be added to the ones that exist now.

One of the items that came up in our discussions, and we've talked informally with the Division of Low Waste Management and Decommissioning staff here about it. One of the items that came up was whether you could actually have a dozen or more low level waste sites that all would be viable, and that all would be economically justifiable. Would there be enough waste? Anther way of saying it; would there be enough waste to keep that many sites in operation?

Of course, we're primarily interested in protecting the health and safety of the public. That is your charge. That enters also, because if you have an operation that's not really economically viable, then might there be less attention; or if it only operated on weekends or on three days a week or something; there could be concern about the adequacy of the protection of the health and safety of the public.

So we hope to follow that along. Another factor that enters in here is the below regulatory concern policy which you're now having the staff develop and are interacting with the staff on. That presumably, or most hopefully, will further reduce the amount of radioactive waste that has to go to these low level waste sites. Well, that's one more factor then that should be entered into the equation.

We don't have a strong, or any recommendations necessarily at this point on it; but it is a matter that many people are talking about. Could we actually support this many sites? Another item that we talked about in our visit to South Carolina, were the delays at that time in the reviews of topical reports that were being submitted on low level waste matters to the staff. The staff has taken very vigorous action to speed up those reviews, and we simply mention that as one of the items.

The staff is certainly capable to do it, and when we met with Dr. Malcolm Knapp to review the program of the Division of Low Level Waste Management, he emphasized to us that he is giving this attention, and he is hoping to handle it in a more expedited fashion.

The last item we talked about in South Carolina, was the licensing support system, which is, of course, for the high level waste repository. The way in which it came up was that the people from South Carolina in particular, pointed out to us that in their opinion, there was a need for some mechanism for setting up a system for a database for low level waste management.

They just simply brought up the question; could we have something like the licensing support system? I'm not sure it would be -- well, it wouldn't be identical, but it could be something like it. For example, they pointed out; we really

don't have nationwide compilations of how much waste is being generated; where it's coming from; which radionuclides are in it and in what concentrations; and then details of where is it going?

In fact, they jokingly said, does the amount of waste we're disposing of; does that match how much we think is being generated. So, they did call for setting up perhaps some such system, and I'm sure again, the Division of Low Level Waste Management will be looking at that.

The second item in terms of minor discussion or briefing you on them, is with regard to your charge to us to number one, review the programs of the Divisions of High Level and Low Level Waste Management, and decide; do they have enough resources? Are they emphasizing the right things? Are there priorities correct.

Another charge you've given us is to review the research programs associated with low level and high level waste management. Well, as a first cut at our last meeting, we had Dr. Knapp in, and he reviewed the Division of Low Level Waste Program. We found, even though he spent a couple of hours with us, that after we concluded that session, that we really are not in the position to write you any sort of a formal, written comment on these issues -- on his priorities or on his resources, and so forth.

He pointed out to us that he is streamlining his

operation so that he can do the most with the fewest people. We found them to be a very dedicated, hard-working group of people -- very sharp, very much up to date with things. However, we also noticed that he had been reduced in terms of full-time equivalent personnel. He, as a good soldier, has told us, you know, he can do it with what he's got.

We also see down the road, for example, the matter of the new decommissioning rule-making, which has just been issued, and that's going to add a lot of burden to this Division's operations, because I don't remember the number, but it's several thousand licensees who now must develop decommissioning plans, and the paperwork will have to be handled by this Division.

So, we'll try, of course, to keep up with that and do the best we can. I think, as a bottom line, I'm saying to you on behalf of our Committee, that in order to really do as, say, the ACRS does, where it refused the research program, and then comments to you in detail on it; we would have to have a number of meetings, and you know, go into to projects in detail and so forth.

At the moment, we're really not geared up to provide you with what you have requested. We're open obviously to suggestions, and so forth.

CHAIRMAN ZECH: Your Committee is not geared up to do that, or the NRC staff is not geared up to do that?

MR. MOELLER: I think the staff would probably give us what we ask for. They have been most cooperative.

MR. SMITH: I think one of the things that we need to determine is, when you look at the work that's in front of them, you also have to look at how crucial are the deadlines that need to be met, and whether or not in not meeting deadlines by a certain date, you really interfere with some significant programs.

Then, comparing that with the resources that you have -- as Dr. Moeller said, they are well-organized. They're making progress, but they can only move at a certain pace, given the resources they have. That may be acceptable. It may not be acceptable, depending on what other deadlines are out there. That's something we don't know at this point in time.

CHAIRMAN ZECH: All right, thank you very much. We'll be mindful of watching that closely.

MR. MOELLER: Okay, the third item was the decommission rule, which I have just mentioned. Of course, it is final. It has been issued. However, in our meeting, our most recent meeting on that, we reviewed it. Several of us had questions about it. I think in the interim, certainly for me, many of the concerns that I have, have been resolved.

We see it now in a clearer light. That is, the decommission rule had a purpose. It was to assure that anyone using radioactive materials or operating a research reactor,

would have the funds necessary to clean up after they reach the end of their program or their life; clean up the site and restore it to an acceptable condition for public use.

So in that light, it's a very useful and a very important rule. I think though, our position at the moment would be; we would like to see how it works and maybe revisit it in the future. Of course, that, I guess, is a rather obvious response.

I was a little fearful that you, the Commission, might have been placing upon a number of licensees, a tremendous burden of paperwork. I guess to give you one of my personal concerns was; I wondered, if you had a hospital, let's say, using radioactive materials, or an industrial research laboratory using radioactive materials, well, then, you come in and you say, you must be able to clean up this lab upon termination of your use.

MR. MOELLER: Well, as a health physicist, or wearing my health physic's hat, I would have said to myself, well, if your lab is in such a mess that you can't clean it up at the end of your operations, then we should have shut you down quite some time ago.

There's a lot more to it and I think we're understanding it better and all I'm saying at this point is we will keep up. We'll revisit it and see how well it goes.

COMMISSIONER ZECH: Very good.

MR. MOELLER: The fourth item was the environmental monitoring branch technical position. As you know, we wrote you a letter on that and we encouraged the staff to move forward with it because again, with the establishment of all of these new low level waste sites, the states need guidance and we saw this as important, and the staff, indeed, picked it up and they're moving ahead with it.

One of the main items that we asked was, what is the purpose of the branch technical position? Is it to provide policy guidance or detailed technical guidance? I think that's been clarified. I believe it's perhaps predominantly to provide policy guidance with the technical details being in standard review plans and things like this.

Another concept that we wanted to share with the staff and which we have shared with them is that in developing the guidance for environmental monitoring, every effort should be made to develop procedures which detect potential problems, not procedures that simply tell you well, we've got a big problem here. You know, the waste is leaking and it's out into the environment.

There are people, and the staff has people who could adopt as a goal, to develop procedures that anticipate the problems before they actually get too big. So, that's a main item of encouragement we've given to them.

Then, the last point I would make is that this branch

technical position brings to our minds,or to our attention, the need within the NRC staff to coordinate the various efforts they have underway that are related, but at the moment, are not coordinated.

What am I referring to? Well, you have a revision of Title 10 Part 20 underway which sets or will set new release limits for radionuclides into the environment and so forth. It goes into the effective dose concept. It has many new items in it. Yet the branch technical position on environmental monitoring is not up to date with the proposed revision of 10 CFR 20.

The same thing, you have your BRC policy statement underway, or under development. Well, it's to me, of the utmost importance that all of the items that you have that deal with radiation protection, with dose limits, with radionuclide concentration limits, with release limits, with dose limits particularly for the population; that all of these be coordinated.

So, that is one of our recommendations and we'll discuss that with the staff. I may though require that the problem with it is; it requires more than one division to give it attention. It will have to be coordinated across divisions. The problems don't even end there. You have problems with the standards of the U.S. Environmental Protection Agency, their 40 CFR 190 and so forth, still talks in terms of 25 millirem a

year, whole body.

That's fine, but then it talks in terms of 75 millirem to the thyroid which is not comparable to the 25, to the whole body under the new approach.

The last item in terms of briefings, is the anticipated processes and events. There, we really don't have a whole lot to say. We've reviewed it with the staff. We found it confusing.

We believe that work needs to be done. We plan to keep up with it, and we hope that the staff can come back -- next time they come back to us with a proposed statement on this, that it's a lot more clear than it's been in the past.

For example, they talk in terms of anticipated and unanticipated events. The anticipated events are all natural in origin. The unanticipated are natural as well as of human origin, or human-initiated.

One of our consultants -- and we provided a copy of his report to the staff -- one of our consultants said, you know, you're talking about three different types of events. Why don't you say so? He said, you have events that you expect to occur; you have events that possibly could occur, but you don't expect them to occur. Then you have events that are highly improbable, and you seldom, if ever, expect them to occur.

That's not the total answer, but we think it's the

type of thinking that the staff needs to blend into their development of this subject. Now, if you have any questions on any of those items, fine, otherwise, we'll move into the more detailed discussion items.

COMMISSIONER ZECH: I think you can go ahead and move into them.

MR. MOELLER: We can always come back.

COMMISSIONER ZECH: We can always come back later if we feel it's appropriate.

MR. MOELLER: Okay, the first item then, is the high density polyethylene, high-integrity containers and Dr. Steindler will address that.

COMMISSIONER ZECH: Thank you very much. Proceed, Dr. Steindler.

MR. STEINDLER: Thank you. I'm not sure of the extent of the detail that we can properly go into here, but let me simply outline for you what the problem is, what we've done and where we think the status is.

If you recall, the problem with high-density polyethylene is that questions have arisen on its stability in the long-term disposal of low level wastes and specifically, will high-density polyethylene containers -- can they meet the specifications that are required? There are really four different kinds of concerns that deal with largely mechanical and somewhat chemical issues. Will the material buckle? These

are, as you know, fairly large containers.

There's a certain amount of question about whether or not the material will creep as some plastics do under load. There is an issue that's been raised about ductile brittle failure, actual failure of the material. As always, there's the question of how well a plastic such as high-density polyethylene will stand up under radiation.

At the moment, the issue is primarily focused in South Carolina, which is the only burial ground in which that kind of material is used. We have heard several presentations from various people. We heard the staff presentation. We also had Professor Silling from Brown University who is a staff consultant, come and talk to us about his conclusions.

We visited, as Dave mentioned, the South Carolina facilities, Chem Nuclear and also Elan Industries, to see what they had to say about that material. We concluded, and by writing you a letter which in effect said that it would be most useful if the staff were to continue and close out its recommendations or its study of these containers; we added a postscript that we thought that it seemed likely from what we had heard up to that point, that high-density polyethylene containers of the type we're talking about, probably will not satisfy easily the criteria that the Commission has set.

As we understand it at this point, the staff action is likely to come soon as to whether or not they will or will

not allow it. The staff, we understand, are working with the State of South Carolina to see what needs to be done in order to make a smooth transition. There are other options to low level waste containment, rather than the high-density polyethylene HIC's, High-Integrity Containers.

We forsee a fairly early closure of this issue with the staff decision coming out in the not-to-distant future. We think the staff has pursued this issue with suitable dispatch and care, and has taken a fair amount of effort to hear all the sides of the technical arguments that were involved, and whether or not the analyses were correct, and so on and so forth.

I think the staff has done a pretty good job in this area. We should find a satisfactory solution. That's really all I can tell you about the issue here. I can continue on the other issue that I should be covering, or we can move to whatever the agenda requires.

CHAIRMAN ZECH: Dr. Moeller?

MR. MOELLER: Well, why don't you continue. His other topic is the solidification of the cement-based low level wastes.

CHAIRMAN ZECH: Why don't we proceed.

MR. STEINDLER: Let me give you a quick background on that. Low level waste in various forms is occasionally solidified and made into a mass that will meet specifications

by mixture with cement. There are various formulations that people have used. The issue is always the same. That is, to take a material which qualifies as low level waste, which, however, is not particularly solid, and convert it into a solid that meets compression tests and leach tests.

Cement has been used for some time, and it turned out that a TMI container some years ago, was found to have difficulties in maintaining its stability over the long time, and that signalled a reexamination of cement as a method of encapsulating wastes; particularly with ion exchange resins, which are fairly common in the business.

In addition, other things came to the attention of the staff and ourselves, and specifically it turns out that cement is moderately sensitive to some organic contaminants in the material that's being solidified. The presence of organics as well as the presence of some high loading of ion exchange resins, leads to an unstable solid, and occasionally, in fact, leads to surprises; when you note the difference between the cold test -- that is the non-radioactive test that you've done in the laboratory, and the actual field tests that you finally do when you finally get the hot waste in front of you.

The Committee heard several presentations on the issue of cement. We've heard from the Brookhaven folks who are doing research for the staff on this issue, and we heard from the Low Level Waste Branch who are reviewing the topical

reports that have been submitted by vendors on the subject.

Our conclusion and our status on it at the moment is; our conclusion was that the low level waste folks are well aware of the various chemical -- largely chemical problems that have been identified. They are reviewing the topical reports that have been submitted to them at a rate which is considerably greater than it was before. The reorganization and the focus level of the waste group has helped that a great deal.

We do not know right at the moment, what the staff is going to conclude. Our general view is that it looks as though a reduction in the allowed loading, for example of ion exchange resins, from the fairly high value to something lower, may very well solve the difficulties that have been found. On the other hand, the staff is still looking at that, but we would expect in the not-too-distant future, the topical, reports to be reviewed and comments to be made on them.

I think the staff is doing as good a job as they can in this case. I don't know what else I can tell you on that, but I'd be happy to discuss it later.

CHAIRMAN ZECH: No, thank you very much. Let's proceed then.

MR. MOELLER: Well, one of the other items that -- or comments that we had in terms of the low level waste solidification, was whether the Commission should consider some

formal mechanism through which licensees would report such mishaps or problems. We're not implying that any licensee has withheld information. We think they've been forthright in coming forth with the reports. Nonetheless, they're sort of inadvertently reported.

There's no requirement that a failure of the low level waste solidification be reported. To me, it's more important than many LERs that we currently -- that a licensee formally has to submit. We're not sure how that would be done, but it's a suggestion.

MR. STEINDLER: Let me add one other thing.

CHAIRMAN ZECH: Yes.

MR. STEINDLER: We have also looked at, and we're not ready to give you any studied conclusion, but we have looked at the interface between NRR and NMSS. The issue of where does the surveillance of what goes on in the low level waste formulation and disposal take place, and who is responsible for what.

That's an issue which we have begun to look at, and it's part of the problem that Dave alluded to, as to who is supposed to be reporting on issues or incidents that may be worth noting for the rest of the business. We hope in the not-too-distant future to at least clarify that picture, and then let you see where it is that we think some changes might be made, if any.

MR. MOELLER: Okay, the next item is mixed waste, and Dr. Smith will comment on that.

CHAIRMAN ZECH: Thank you very much, Dr. Smith, you may proceed.

MR. SMITH: Thank you. Let me say that in trying to get a handle on mixed waste and the complexity of the issue is almost as difficult as trying to understand what makes a university run.

This is not a real health and safety problem. I think it's a problem, if I can put it in context, of a mountain being created out of molehill, because of a regulatory jurisdictional overlap problem. So, with that little preamble, let me just review a little bit with you.

Mixed waste, if you will, is simply radioactive waste and hazardous waste, and in order to better define that, as you probably know, EPA and NRC got together, and issued jointly a letter which defined mixed wastes. It essentially said that it was radioactive low level waste that had a hazardous component. Here's where we begin to run into problems, because the question is, what's a hazardous waste?

A hazardous waste is basically anything that's listed as hazardous under EPA's RCRA regulations, and they have a whole list of materials, or if it doesn't meet that test as being hazardous, exhibits one or more of certain general characteristics that EPA has set forth, such as reactivity;

such as ignitability, and things of this sort.

Legally, there is not such entity as mixed waste. In other words, it's not acknowledge either in NRC's regulations, nor is it acknowledged in EPA's regulations. The whole issue was brought up when Congress was considering the Low Level Wastes Policy Amendments Act, and I believe that NRC and EPA at that time recommended that the regulation of such types of waste be given to one agency. The Congress chose at that point not to do that, and not to eliminate this jurisdictional overlap.

So, despite the lack of a legal status, EPA has published in the Federal Register, a notice that states that wished to regulate such wastes, must submit a mixed waste program for review. Now, there are only four states that have done that as far as I know -- Washington, South Carolina, North Carolina, and Tennessee.

EPA has also indicated to the states that if the wish, in regulating hazardous wastes, they can exceed the federal requirements. In other words, they can make their own state requirements tougher. To further mix the soup up, EPA has indicated that if a low level waste is, if you will, declared below regulatory concern, then as far as EPA is concerned, it could be disposed of as a hazardous waste.

In fact, the industry, the nuclear industry, is seeking exemptions for several generic waste streams that could

possibly meet this test. Let me try to put this thing in context. You have a situation where EPA carries out its regulatory powers, either as a state in which the EPA offices are doing it, or as an agreement state -- NRC, I'm sorry, either as NRC or an agreement state.

EPA carries out its powers, if you will, by delegating them to a state, or if a state hasn't been given delegation, they themselves would do it -- the Federal Government. Now, you can have any possible combination. A utility could find itself in a situation where in one state, you're dealing with EPA and NRC; in another state, you're dealing with an agreement state, and a delegated state, and some various combination thereof.

Then that causes a problem for the person who has the waste of; how do I go about this? How do I get a license? This confusion has resulted in delays in the states and compacts because it's not clear from people who would build these waste disposal facilities; how do I go about getting a license?

At the present time, if you said, what is the real problem; at the present time, our nuclear facilities are storing hazardous wastes on-site. You see, if there was a site to go to, and they moved it out within 90 days, they would not need a permit from EPA. Since they're storing on-site and it's going to be greater than 90 days, then they have to get a

permit from EPA for the storage of hazardous wastes.

That raises a concern because first of all, it's a very small problem. The amount of mixed waste that's being generated is probably less than one percent of the total volume of low level waste that is put forth by our nuclear power plants.

Secondly, the RCRA law really makes no accommodations for how hazardous it might be -- how much of a risk it might be. It's pretty much all treated the same way. Then you have the whole scenario; what about when we get into the situation of decommissioning? What's the impact there?

Now, there are at the present time no permitted and licensed mixed waste facilities. So, everyone is sitting on this material, if you will.

From the standpoint of the private sector who would seek authorization to operate such a facility, they're not sure; one, whether or not it's worth the investment to try to design a facility that is fully in compliance with RCRA regulations and NRC regulations; and two, if there's enough waste out there to make this a viable project to go into.

To try to take some confusion out of this, NUMARC, which is the Nuclear Management and Resources Council, is conducting a study which will attempt, when it's over, to shed some light on four areas. One, they will attempt to get a better handle on how much of this waste is there. They will

examine the current practices of licensees versus the generation and storage of mixed waste. They are going to establish criteria for technically sound and effective management of mixed wastes. They're going to analyze the overall impact.

Hopefully, when the study is done -- by the way, I should say that there are EPA and NRC people who are on this committee. So, we all hope that when the study will come out in January of '89, it will better characterize the amount of mixed waste that's currently being generated.

Now, I should say that notwithstanding all of the regulatory confusion, at least from the Committee's perspective, as far as we can see, the two agencies are working together very well -- EPA and NRC. In fact, they have already issued three guidance documents and they're working on three others, two of which are supposed to be out this month, and one in June of '89.

You have, I think, received a letter. I'm not sure if you actually met -- I can't remember -- with the American Society of Mechanical Engineers who are concerned about this issue. I think it's fair to say that we would all agree that it would be much nicer if one agency had the clear mandate to regulate on this issue. EPA feels that it's trapped by its law and the way you can interpret the law. NRC, of course, has to deal with the Atomic Energy Act, and so it appears at the

present time that the only thing we can do is try to work together so that since they have to meet the requirements of both agencies, it will be with the minimum of bureaucracy as possible.

In summary, let me say that -- as I said at the beginning -- it's not a major health, safety and environmental problem. It's a problem that's caused by two different agencies of the government having the responsibility to monitor something that has constituents on both sides. There are practical ways to perhaps try to deal with it, if you could get around the legal ramifications.

I think our feeling is that probably the only way that you could do something other than what's being done now, is really to go back to Congress and to seek relief and to have it designated as a one-agency problem. We do have a little concern about what are the implications of this issue for high level waste -- the high level waste repository; spent fuel, transuranic waste.

Depending on how one interprets EPA's responsibilities, we would hate to think of the scenario in which you not only had to be licensed by NRC, but you had to be licensed by EPA and that whole thing. Let me stop there and see if I can attempt to answer any questions. It is a complex mess.

CHAIRMAN ZECH: Thank you very much. Let's proceed,

Dr. Moeller, and we'll come back for questions here when you've finished your presentation.

MR. MOELLER: Okay, thank you. The last item we had was the subject of Below Regulatory Concern. To repeat, I attended the Symposium last week. Also present was, of course, Commissioner Carr and Commissioner Rogers were there for a portion of that meeting. I found it an interesting meeting. I found it very useful. I think the Commission is to be commended on convening and holding such a meeting, because it certainly provided a forum for exchange of thoughts on this important subject.

Having said that, I wanted to just share with you my own thoughts on the matter. Please understand that these are mine. There could be errors and so forth, in my interpretation of certain aspects of the meeting, but as best I could, it's an honest and truthful report.

The fist thing that surprised me at the meeting, was to find that the international community -- mainly meaning the european countries, had come -- well, I shouldn't even say that, because Japan was a member of the group that did it. At the meeting, the first thing that was shown us, was a report by the IAEA and the NEA, the Nuclear Energy Agency, entitled Principles for the Exemption of Radiation Sources and Practices from Regulatory Control.

This is their safety series no. 89, so in essence,

what we had was rather -- I guess I went into the meeting naively. I thought, well, we're all here to share thoughts. Well, they were here to share thoughts, but the thoughts they were to share, represented rather firm positions on the matter. Notwithstanding that, I found their thoughts not that incompatible with what we've been discussing here in the United States.

I might mention too, that in terms of this safety series, there was an EPA representative who was actually a member of the group that prepared it. There was, if I interpret the listings correctly; there was an NRC person who was an observer at the meeting. Having said that, then let me move on.

What was the general consensus at the Symposium in terms of the need for a Below The Regulatory Concern policy? Well, everybody was enthusiastically in support of it. They pointed out that it will promote consistency in regulations. It represents common sense. It will avoid unnecessary expenditure and wastage of funds to control something that doesn't need to be controlled.

They also pointed out that if an agency such as the Nuclear Regulatory Commission would serve as pioneers an move forward in this area, you could provide a very useful education tool by doing this. In other words, it shows people clearly that there are levels of radiation exposure about which we need

not be all that concerned.

Having said that, then moving on to the title, Below Regulatory Concerns, a number of people pointed out that the title is misleading. Perhaps, if you could, you might consider a new title, although someone told, I believe, that Congress had actually written this title down in some type of legislation, and you may have to proceed with it. You do not mean that you are going to ignore this particular source, practice, or device.

What you're saying to the world is, you have carefully reviewed that proposed practice and so forth; you've looked at whether it's justified; you've looked at how carefully the units will be manufactured; how adequate the radiation protection considerations have been applied and so forth. On the basis of a most careful review, you have decided that it can then be released for public use. It can be released into the public domain, whether it's a consumer product; whether it's recycled products from a decommissioned facility; or whether it's even an extremely low level waste stream that you let a nuclear power plant utility discharge into the environment.

Furthermore, you're not going to walk away from it and forget it. Your staff is going to periodically come back an reassess the situation and be sure that things are moving along as you anticipated that they would move along. For all

of those reasons, the terminology, "below regulatory concern," is somewhat a misnomer.

They pointed out in the meeting that we should also keep in mind that exemptions may be only partial exemptions. It's not necessarily that you will exempt it totally or anything like that, and it's important to note that any exemption will, as I have already said, have to be evaluated and justified. They also pointed out and they admitted that they did not have a definition for this term, but they said any device, practice, et cetera, that is exempted, must be quote, "inherently safe," unquote.

They said that for the following reason. They said, in looking at these practices and so forth, you must not only look at them in routine operation, but look at any potential accident that might occur. Otherwise they said that nuclear power plants could be exempted under this proposed policy, if it were not for the potential for an accident.

A normally operating, properly operated nuclear power plant is not going to expose the neighboring population to more than a few millirem, if that, per year. They also pointed out that the followup that I have already mentioned to you, and then they -- I concluded -- this was not something said at the meeting, but I concluded that in terms of the definition of below regulatory concern, what you are actually doing as a Commission, is something along the following lines:

We have the International Commission on Radiological Protection, which has recommended a dose limit, a long-term, long-range dose limit for individual members of the public, of 100 millirem a year. You in your revision of 10 CFR 20, are repeating that. You're saying a hundred millirem a year. Well, what you are deciding here is what portion of that hundred millirem a year dose limit for individual members of the public, can be consumed or taken up by practices which you are going exempt.

For that reason -- I'm jumping ahead little bit -- that tells me that here is one place we disagree with the staff and quite strongly, That is that in terms of talking about exempted practices, the Commission should not, in our opinion, ever talk about a practice that can approach a hundred millirem a year in terms of dose. That is the dose limit for the population for individual members of the public.

If you have a practice that approaches a hundred millirem a year, it must be regulated. There's not question about exempting it. It would have to be regulated. I'm undoubtedly coming on rather strongly here, but I guess that's my intention.

Another point I would stress to you, and another reason supporting my and our argument that you can not approach a hundred millirem with a practice, is that you are not the only actor in this realm. Let me give you some for instance's.

I took time over the last week or so to look up some things.

You have the Food and Drug Administration, through the Center for Devices and Radiological Health, that is also exempting practices, and also contributing their little portion to this hundred millirem a year limit for members of the public. Now, what am I referring to? I'm referring to television sets. They have an electronics group and they have set manufacturing standards for television sets. I don't remember the exact, but it's so many millirem per hour at six feet or some distance from the screen.

Then you have, in addition to television sets -- well, you have millions of television sets, and you have hundreds of thousands of word processors and computers and many of them are in color. It's the color set, of course, that give the dose. But if you take the FDA's exemption, and they allow for the actual dose received by the public -- by individual members of the public is well under one millirem a year. It's much, much less than one millirem.

I don't know whether it's a tenth of a millirem or two tenths, but it's much less. This brings up another item that I want to stress. That is, what is the collective dose associated with all of these television sets and these word processors or computers.

It's in the realm of tens of thousands of person-rem per year -- probably a hundred thousand person-rem per year.

So, we as a Committee believe that we were off base in even talking about a hundred person-rem a year as a collective dose limit. I'll have more about that to say later. Keep in mind that my fundamental point is, there are other actors in this realm. You're not the only one exempting sources.

Let's take another one. I don't know whether you exempted, or the Department of Transportation, but you have your rules for the packaging of radiopharmaceuticals that are shipped on airplanes, okay? An average flight attendant -- the average dose to a flight attendant due to the transport of radioactive materials on airplanes, is three to four millirem a year. The collective dose is 3,000 person-rem per year.

What if we had said a hundred person-rem per shipment of radioactive pharmaceuticals. We couldn't have shipped them. So, we think the hundred person-rem is totally unrealistic; totally out of question. Now, I'm attributing the shipment of radioactive pharmaceuticals to DOT, just for the moment. I don't know if I'm correct.

I've already cited FDA. Let's look at some things you have done -- you or your predecessors. You exempt the use of tritium to give us luminous dials on our wristwatches, and there are millions of watches sold. Well, the average effective dose equivalent to a person wearing a luminous dial tritiated wristwatch is a tenth of a millirem a year and the population dose in the United States -- the current population

does is 1,200 person-rem a year.

Well, you didn't apply any hundred person-rem to that as a limit. Smoke detectors you've heard a lot about. They give about 8 microrem a year per person, but there's 800 person-rem in the U.S. from smoke detectors. I could go on and on, but we had said in one of our letters; it would pay to go back and look at what you've done.

I'm finding now that in hindsight, we were correct. It would pay to go back. In electron tubes, you allow Cobalt-60 and other radionuclides to be used in electron tubes. The average person dealing with those tubes, gets about four tenths of a millirem a year. Again, the collective dose is a thousand person-rem per year.

Let me close out with just one that's always fun for me. You no longer do it, but you earlier authorized the use or uranium to make false teeth shine. You know, a normal tooth is dull, but if you glaze it with uranium, it will shine and people can't tell that you have a bridge or you're wearing a complete set of dentures. The dose to the gums is tremendous, but the effective dose equivalent to an average person who wears those teeth is about seven hundredths -- say 70 microrem a year.

But again the population -- the collective dose is 3,000 person-rem a year. To repeat, the point I'm making is, the collective dose -- I'll talk more about it in a few minutes

-- a hundred person-rem is not what any of us would really want. What did the international community say, and what are we saying? Most everyone said, you must adopt a policy that is flexible. The staff has told us, and let me tell you this, because maybe they would not be eager to do it, but they have the belief that your charge to them was to develop a generic policy statement.

We believe, and I think they would share it with us; we believe that it would be far better at the initial onset to develop a policy statement which could be applied on a case-by-case basis. I don't think we're yet ready to set down generic requirements for these exempted practices. Furthermore, you're not going to have 48 of them coming in over the next year; you're going to have just a few.

The staff can deal with them, I think, one at a time. Now, the international community pretty much said, as a clear practice, we recommend exempting of practices, sources, et cetera that create or yield a few millirem a year to individual members of the public. However, they further went on and said that we would like the combination of all such sources, not to cause a total dose any individual member of the public or more than ten millirem a year.

We said in our latest letter to you, a few tens of millirem, and I still -- one or two times ten -- ten or twenty, in that range. The person-rem I've already mentioned as being

out of the question. Oh, now, in terms of the collective dose, having said to you a hundred person-rem is not too realistic, then what approach could you take?

Well, the international community, even those who participated in the issuance of this IAEA report; we found that there were different ways in which each individual country is interpreting what's in the IAEA report. The recommendations were as follows -- that countries consider a qualitative limit on the collective dose rate, rather than a quantitative limit on the collective dose. The Canadians expressed this very well.

They said, and I'm paraphrasing it, but the way they state it is, steps must be taken to assure that the given practice, source or device does not expose large populations, unquote. They just say, don't let it expose large populations. Another approach that was recommended, and one which seemed quite compatible or agreeable with everyone, was that the licensing agency should simply point out that they will keep careful records -- which you will -- of all practices you exempt, and you'll stay on top of it, and just assure yourself through that mechanism, that no single individual within the public is being impacted by so many practices that he or she will be receiving an excessive dose. That seemed to me to be a very good approach to consider taking.

Also discussed in the meeting was the fact that you

are going to need derived guides. We reemphasize as a committee, that the basic guidance for exemption levels should be a risk no greater than such and such to members of the public. Then you interpret that in terms of a millirem per year. Then you interpret that in terms of how much cobalt-60 can be in a low level waste or how much contamination can be on the surface of something that is released to the public.

So you do those things, and those are what we call derived guides. In addition to setting derived guides, you are going to have to and the staff is going to have to develop models that they will use for estimating the dose to the public because there is no way we are going to measure any of these doses. They will all have to be computer models that predict the dose.

You are also going to have to have a standard set of scenarios that you use to anticipate what happens which goes through the pathway and exposes the public, and then there are going to be uncertainties, of course, in all of this, and one of the major uncertainties is going to be in your ability to measure the concentration of radioactive material in the waste or in this metal to be recycled and so forth.

So they raised those points and not in any way opposed to the practice but simply emphasizing some of the problems that will have to be faced.

In terms of the dose to an individual, there was

considerable discussion on that, and the question was, if you have exempted a practice and you exempted it with the understanding that no individual will receive more than three or four millirem a year, then to what degree are you required or is somebody required to go out and find the single individual who is getting the biggest dose?

The ICRP long ago faced that problem, and it is in the IAEA recommendations, and I think it needs to be in your policy statement. They simply said there is no need and it is impractical to require anyone to identify this single individual. They said that rather than that, pick out a critical population group in which you think this individual and others like him or her is located, and then just assure that the mean dose to that population group is compatible with your exemption level. I thought it was very well stated, and personally I liked it as an approach.

So as a bottom line, and I, of course, have talked for a lengthy period of time, but as a bottom line, we offer the following comments. "Below regulatory concern" is okay as a title as long as everyone understands that that is a misnomer, that it is actually misleading. What you are doing is deciding what dose rate represents an acceptable level for individuals in the general population for you to exempt this practice or let these low level wastes go to a municipal sanitary landfill or let this consumer device be used.

Secondly, the approach has to be flexible, and we are going to have to work with it and learn as we go along. Generically down the road maybe somewhere we can set up a generic rule, but at the moment we believe it has to be done on a case-by-case basis. It would be acceptable, I think, for most groups to exempt individual practices that involved a dose rate of a few millirem a year. For example, EPA has said four millirem a year for low level waste to go to the municipal landfill.

If you have a facility that you know will only expose a very few people -- such as a sanitary landfill, which is not going to expose a million people, just a few thousand, if that, or a few hundred around it -- then you could go higher. But we recommend the total not being more than one or two times the ten millirem a year. There is no way you can talk about -- and I'm coming on forcefully here, but there is no way you can talk about exempting practices that could give a dose up to or approaching 100 millirem a year, for all the reasons I have said.

One thing I have not talked about which we find confusing in the current draft of the policy statement and which has been confusing to us all along is the staff's statements regarding ALARA. They have said at several points -- and I'm paraphrasing it and I'm sure I'm not being fair to them, but in essence they have said if the dose rates from a

given practice are below the exemption level, ALARA will be assumed to have been met. We find that totally confusing.

What we think they are meaning to say is what the IAEA says: Any practice will have to be justified, any practice will be carefully reviewed to be sure that it is inherently safe. If you are selling smoke detectors, you don't want an Americium source that is flaking off and getting into the air and becoming airborne and breathed. You want it properly sealed, et cetera. You will have to assure yourselves that good common sense with regard to sound radiation protection practices have been implemented in this.

So that, to us, does not mean that once it is below the exemption level, ALARA will be assumed to have been met. We think you throw ALARA out. Forget it. Don't even talk about it. Just say you are going to do the things that I have just said.

Then lastly, in terms of a collective dose, don't try for 100 person rem. That is totally really unreasonable or it seems to me to be unreasonable. Go slow. I think what you are going to probably have, and again why it cannot be a generic -- maybe you could still say this generically, but I don't see how. But if you have a source that gives, you know, a tenth of a millirem per year to people who use it, a wrist watch or something like that, there is no need for any collective dose at all, dose limit. It's such an inconsequential dose to any

individual. Forget the collective dose.

Now, if you had a source that gives ten millirem a year and you have exempted it, you do not want that used by 240 million Americans, you want it used by a few dozen or a few hundred people, at the most. So there, initially through just good regulatory practice, you will assure yourselves that it is being handled properly. If in time you find that there is a collective dose limit that works out and sounds reasonable, you might write it down and use it.

Sirs, that is pretty much it.

CHAIRMAN ZECH: Thank you very much, Dr. Moeller, for that very thorough and excellent presentation.

Are there questions from my fellow commissioners? Commissioner Roberts?

COMMISSIONER ROBERTS: No. There are a lot of things to sort out.

CHAIRMAN ZECH: Commissioner Carr?

COMMISSIONER CARR: Yes, I have a few questions.

On Barnwell, I got the impression that the closure of that thing is political, not technical, or they have plenty of room and they can handle a lot more waste than they would like to, really, from a contractor's standpoint.

MR. SMITH: Yes.

MR. MOELLER: Yes, sir.

COMMISSIONER CARR: I certainly agree with you that

we are not going to be able to economically support all the low level waste disposal sites in the country. I don't know how we are going to get out of that problem. My impression is the current ones can handle it for quite a few years.

CHAIRMAN ZECH: Do you agree with that, Dr. Moeller?

MR. MOELLER: That is our understanding. Certainly what Commissioner Carr says is correct. Barnwell has capacity for how many years?

MR. SMITH: I have forgotten.

MR. MOELLER: I have, too.

MR. SMITH: I think their feeling is it becomes political in the sense that you have essentially two sites -- well, there is Nevada, but there is Hanford and Barnwell -- literally taking all of the nation's low level radioactive wastes. From their perception, from the state's perception, it is a matter of equity here.

COMMISSIONER CARR: I don't argue that.

MR. SMITH: We raised the question with them that if some of these other states weren't ready to go with their compacts, North Carolina, for example, what would happen if -- well, they could still handle that.

COMMISSIONER CARR: The TMI container that started the question on solidification of low level waste, are there a lot of examples of this problem or was that an isolated case?

MR. STEINDLER: No, it was not an isolated case.

Subsequently, three or four others came to our attention, and even after that we learned of incidents of that kind that had taken place prior to the TMI incident.

COMMISSIONER CARR: But it is a small percentage of the --

MR. STEINDLER: At the moment it is a small percentage, yes. In part what we don't know is whether it's a visibility problem. The arrival of the decrepitation, if that is the right term, of the cement waste is a relatively slow process, and the time between formation and the time of disposal is relatively small. So it may well be that if we were to exhume the wastes, we may find that there are more incidents than we have seen.

COMMISSIONER CARR: I am trying to figure out if you think we ought to jump on this problem as a problem that we ought to attack immediately or whether what we have got out there is all right and we ought to just make sure we don't put any more out there like that.

MR. STEINDLER: I think the latter would be my personal recommendation. We haven't looked at it from that standpoint, but I think the low level waste folks are treating it as a significant issue and I think they are pursuing it at a pretty good rate.

COMMISSIONER CARR: I understood you to say that there was no place to put mixed waste now. I was under the

impression there is one site that accepts mixed wastes somewhere in the country.

MR. STEINDLER: Not that I know of.

MR. MOELLER: I think we were told there no place.

MR. STEINDLER: That's right.

COMMISSIONER CARR: I read a lot of things and I sometimes remember the wrong ones.

In the EPA/NRC interface, I hear you say they are working well together. The only time I got involved in this, I tried to get them to come together with a standard piece of paper that would both get a permit and a license, which seems simple enough if you just meld all the requirements. That looks like an easy thing to do. That never happened.

MR. SMITH: From what I understand, it gets into the legalities of the situation; that in effect, EPA can't give up jurisdiction, and therefore if it is a hazardous waste, you have got to get a permit from them, and of course if it's radioactive, you have to get a license from NRC.

COMMISSIONER CARR: It seems that a simple application they could submit to both agencies would be able to be written. I don't think they are working as well together as you seem to think they are.

MR. SMITH: I am sure there are some rough edges because it's very hard.

COMMISSIONER CARR: I recognize there are some

technical problems. For instance, one outfit wants a liner, one outfit doesn't want a liner.

MR. SMITH: EPA, as you know, Commissioner, really has very little flexibility because the law itself is very prescriptive. In fact, if you will, the disposal facility is literally designed in the law by Congress, whereas NRC has much more latitude and can, if you will, approach it from a performance-oriented standpoint. So in effect what we end up with is trying to find a design, if you will, which completely satisfies EPA's requirements and at the same time completely satisfies NRC's requirements. That becomes even more difficult when you realize that EPA is talking about a 30-years lifetime and I think ours is 300 years.

COMMISSIONER CARR: I'm not sure it is going to solve the problem to put one outfit in charge unless you solve some of those problems as well.

MR. SMITH: You have got to do more than put one outfit in charge. You have got to amend these laws a little bit so that when we are talking about waste of a certain nature and below a certain level, et cetera, it can be dealt with by one agency.

COMMISSIONER CARR: That is all I have.

CHAIRMAN ZECH: Thank you very much.

Commissioner Curtiss?

COMMISSIONER CURTISS: No, thank you.

CHAIRMAN ZECH: Dr. Moeller, are we monitoring the vitrification of the high level waste at the West Valley facility?

MR. MOELLER: As a committee we are aware of that and it is on our schedule, but we have not yet met on the West Valley matter.

CHAIRMAN ZECH: I hope you will keep it on your schedule. We would like to hear about that when you can.

Let me just make a few brief comments. First of all, this morning's presentation makes it very clear to me that we made the right decision in forming the Advisory Committee on Nuclear Waste. You have brought to the Commission a broad scope of very, very important issues, and I think elevating a number of these highly technical but extremely important issues because they do indeed affect public health and safety, Dr. Moeller, as you have emphasized during your briefing. It certainly shows the value of this committee to this Commission. So I think we did the right thing in that regard, and I commend you and your colleagues for the energy that you have put forward on these many issues to this point.

MR. MOELLER: Thank you.

CHAIRMAN ZECH: Second of all, I really would like to emphasize the number of important issues and subjects you have talked about and touched on this morning. I have tried to keep track of a number of them, and frankly, I have concluded that

it would be useful to the Commission to have the Staff respond to a number of these issues, to all of these issues that you have raised in one way or another. I know we have a number of the Staff here at the meeting this morning, and I would just like the Secretary to make sure that we follow through, if my fellow commissioners agree with me on this matter -- and I hope they do. I see that there are no objections.

I would like to ask the Staff to review the transcript, get back to the Commission with a paper on all of these issues that you have raised, and then the Commission will decide whether it would be important for the Staff to meet with the Commission at a Commission public meeting to respond to a number of these issues.

I think there is great importance to what you brought us this morning, and I don't think we could pretend at this meeting to as a commission cover each of these issues, and I know that is not your intent. I think it would be very helpful for the Commission to have the Staff review these issues.

I know you have emphasized, Dr. Moeller, that you and your colleagues have worked with the Staff very closely on these issues, so I don't think it should be a task the Staff cannot perform, but I think the Commission would be well served by hearing from the Staff on the items that you have raised here this morning.

Mainly I think I would like to commend the committee

for your efforts in the waste issues across the board. We have mostly to date talked on low level wastes, mixed wastes and other issues. We also know that the high level waste issue is extremely important, so we have given you a serious and important task to perform of an advisory nature for the Commission. I think that certainly it shows to me the value of forming this committee and we thank you and we encourage you to continue in your efforts to meet periodically with the Commission, bringing these issues directly to our attention.

I think the Commission will be, again, better informed and better served if the Staff could respond to some of these issues, and then I think it might well be that we would want to have a meeting with the Staff in public session to also make sure that some of these issues are being addressed as aggressively as we can.

Many of the issues, as we all know, have been with us for many years. On the other hand, I am encouraged, frankly, by the international conference, Dr. Moeller, which you attended and described and which several of my colleagues were able to attend, too, at least in part. Those are issues that although with us for a long time, do seem to be coming to the fore. I think that we should make every effort to attempt to solve these issues in a careful and thoughtful manner.

So the thing you have brought forward to us and some of the many things you have discussed -- for example, on the

below-regulatory-concern issue -- are, I think, very valuable and very useful to the Commission.

COMMISSIONER CARR: Can I jump in?

CHAIRMAN ZECH: Please do.

COMMISSIONER CARR: The last time the Staff Requirements Memorandum went out, we gave you the first item of business was to develop procedures for getting timely closure of issues. Have you set that up yet, and if so, can you please apply it to the BRC issue?

MR. MOELLER: We certainly will. They will be proceeding with their revisions in the policy. They will meet with us, and I hope we can --

COMMISSIONER CARR: I was more interested in really whether you have developed the procedures for doing that yet or not.

MR. MOELLER: We have them written down, yes, ways to meet with the Staff and bring things to closure.

CHAIRMAN ZECH: Thank you very much.

Again, I would thank you for a very valuable presentation and ask you to continue working closely with the Staff, and I will look forward to the Staff's response to the many issues that you have raised this morning.

With that, thank you very much for an excellent presentation.

We stand adjourned.

[Whereupon, at 12:25 p.m. the meeting was concluded.]

CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the U.S. Nuclear Regulatory Commission entitled:

TITLE OF MEETING: PERIODIC BRIEFING BY THE ADVISORY COMMITTEE ON NUCLEAR WASTE

PLACE OF MEETING: Washington, D.C.

DATE OF MEETING: THURSDAY, OCTOBER 27, 1988

were transcribed by me. I further certify that said transcription is accurate and complete, to the best of my ability, and that the transcript is a true and accurate record of the foregoing events.

John Ironbridge

Ann Riley & Associates, Ltd.

10/26/88

SCHEDULING NOTES

TITLE: PERIODIC BRIEFING BY THE ADVISORY COMMITTEE ON NUCLEAR WASTE

SCHEDULED: 11:00 A.M., THURSDAY, OCTOBER 27, 1988 (OPEN)

DURATION: APPROX 1 HR

PARTICIPANTS: ACNW 60 MINS

1) INTRODUCTION (DR. DADE W. MOELLER, CHAIRMAN)

   - ANTICIPATED AND UNANTICIPATED PROCESSES AND EVENTS

   - ACNW VISIT TO WASTE PROCESSING FACILITIES IN SOUTH CAROLINA (CHEM NUCLEAR SYSTEMS, INC., BARNWELL PLANT; SAVANNAH RIVER LABORATORY; AND LN TECHNOLOGIES CORP.)

2) REVIEW OF HIGH DENSITY POLYETHYLENE (HDPE) HIGH INTEGRITY CONTAINERS (HICS) (DR. MARTIN J. STEINDLER)

3) STATUS OF MIXED WASTE ISSUE (DR. CLIFFORD V. SMITH, JR.)

4) SOLIDIFICATION OF CEMENT-BONDED LLW (DR. MARTIN J. STEINDLER)

5) DEVELOPMENT OF A BELOW REGULATORY CONCERN COMMISSION POLICY (DR. DADE W. MOELLER)

D. W. Moeller (LET28)
Draft, Oct. 22, 1988

INTERNATIONAL SYMPOSIUM ON BELOW REGULATORY CONCERN
- GENERAL OBSERVATIONS -

1. Although the Symposium was originally conceived as a forum for the exchange of ideas on "Below Regulatory Concern" (BRC) by various agencies within the U. S. as well as representatives from a multitude of foreign countries, it was interesting to find that the European community had held earlier meetings on this subject, had adopted positions with respect to many aspects, and indeed had recently issued a definitive report on the subject (IAEA Safety Series No. 89). So, in some respects, the Symposium served primarily as a forum for the IAEA/NEA group to inform the other participants on the positions that they had adopted and what they therefore recommend for adoption by the rest of the world community.

2. Although (as noted below) there was controversy on many aspects of the subject, there was no disagreement as to whether there was a need for moving forward to adopt a BRC policy at this time. The reasons given included the following:

a. Such a policy would promote consistency in regulations; it also represents common sense.

b. Such a policy will help avoid unnecessary expenditures of resources.

c. It can also serve as a useful educational tool.

As to the need for action now, most participants agreed that the disposal of radioactive wastes, with very low radionuclide concentrations, was the primary driving force. In certain countries, however, another driving force was the desire to release for public use (recycling) certain metals having very low concentrations of radionuclides.

3. As has been pointed out by others, use of the terminology, "Below Regulatory Concern" (BRC), is misleading. In actuality, what is being discussed is the adoption of dose rates to individual members of the public (and perhaps collective dose rates to population groups) that will be considered acceptable for the release of radioactive wastes for disposal in municipal landfills, and for the release of radioactive consumer and recycled products into national and worldwide commerce. Further reasons for using terminology other than BRC is illustrated by the following situations relative to this topic:

a. Exemption of the given practice, source or device will in many cases be approved only on a partial basis.

Few exemptions will be "total." In addition, it is important to note that all practices considered for exemption will first have to be evaluated and justified.

b. One of the requirements for a practice, source or device to be approved is that it be "inherently safe." Otherwise, it would theoretically be possible for nuclear power plants to be exempted!

c. Even after application of a practice has been justified and approval has been granted for its application and/or use, the situation will be reviewed periodically to assure that the original conditions are being met and that the given practice, source or device is still acceptable.

d. In many ways, what is being proposed is to make a decision as to what portion of the dose limit for the public (set at 100 mrem/year in the proposed revisions to 10CFR20) will be allocated to radioactive wastes that are permitted to be disposed of in municipal landfills, and to the release of radioactive consumer and recycled products for public use.

4. Within the international community, there appears to be a "consensus" that a reasonable exemption level (dose rate) for members of the public would be in the range of a few mrem/year. In this regard, it was also clear (for example, as stated in IAEA Safety Series No. 89) that the international community would prefer that the dose rate to members of the public from all exempted practices or products not exceed something in the realm of 10 mrem/year. A key to setting exemption levels is to stress the concept of flexibility. A rigid limit would be difficult to apply at this stage in the process.

a. In this regard, it should be noted that the exemption level for radioactive wastes to be sent to a municipal landfill (where estimates of the total number of people who might be exposed through the operation of a single such facility is relatively small) might range up to as high as 10 mrem/year. EPA, for example, has proposed an exemption level of 4 mrem/year in their discussions on this matter.

b. In contrast, an acceptable exemption level for consumer or recycled products (which might be produced in the millions and used by an equal number of people) might be in the range of only 1 to 2 mrem/year or less.

5. Although the IAEA report recommends a collective dose rate limit of 100 person-rem (1 person-Sievert) per year, it was obvious that there were differences of opinion on this matter. For example:

a. Many Symposium participants recommended use of a "qualitative" (versus "quantitative") limit for the collective dose rate. This was well illustrated by the practice in Canada which is to state that:

> "Steps must be taken to assure that the given practice, source or device does does not expose large populations."

b. Another approach recommended was for the licensing authority to be required to maintain an inventory of all exempted practices, and through careful control of the dose rate they contribute and the population groups that they expose, to assure through this mechanism that no individuals within the exposed populations are being exposed to a sufficient number of practices to cause them to exceed the overall exemption level (dose rate limit).

6. As stated previously, it was the consensus of those attending the meeting that any practice, source or device that is a candidate for exemption must first be evaluated and its use justified. Although this point was not clear, it appeared that some sort of cost-benefit analysis (application of the ALARA criterion) would also need to be applied before a given application was approved. In the course of the discussion on this topic, most Symposium participants made a distinction between dose rates that were considered to be <u>de minimis</u> and those that were eligible to be considered BRC.

a. Although specific "approved" numbers were not provided, on the basis of what was said it would appear that dose rates that would be considered to be <u>de minimis</u> were in the range of 0.1 to 1.0 mrem/year, while those that were considered to be BRC were in the range of 1 to 10 mrem/year.

b. At the same time, it was clear (at least in the international community) that any source, practice or device that had the potential for causing dose rates to individual members of the public that approach 100 mrem/year (the dose rate limit for members of the public) would have to be a candidate for normal regulatory control; it would definitely not be considered eligible for exemption.

7. As implied by the comments expressed above, there was no consensus relative to the need for a limit on collective dose. There were as many advocates for use of a collective dose limit as there were for not using one. A similar situation existed relative to whether such a dose limit, if accepted, should be qualitative or quantitative.

a. One interesting point brought out in the Symposium was that the concept of collective dose was originally developed solely as a means for comparing the societal impacts of several alternative approaches for the control of a given source of exposure. It was not develoed for use in limiting the application of individual sources. Above all, it was never designed as a methodology for predicting the number of "dead bodies" likely to result from a given practice!

b. To avoid the controversy relative to this matter, it would appear that a qualitative approach (similar to that used in Canada) would be appropriate. It would also appear that if collective doses are calculated (for whatever purpose), the data should be presented in a manner so that regulators will be provided with definitive information on the number of people exposed within each dose rate range (and the collective dose contribution from each dose rate range group) and can then use judgment in their interpretation of the resulting potential impacts on the population.

8. Although not emphasized at the Symposium, the exemption level dose rate was based on what was considered to be an acceptable annual risk for individual members of the public to incur as a result of exempted practices. Even after this risk limit has been translated into an acceptable dose rate, however, there will be a need for this dose rate to be further translated into what are called "derived guides."

a. Specific examples of such derived guides would be limits on radionuclide concentrations in, or surface contamination levels on, metals to be recycled. Another would be the concentrations of specific radionuclides permitted in wastes to be released to municipal landfills.

b. Since estimates of the doses resulting from exempted practices will be made using various environmental transport models, there is a need to develop a system for granting approval to such models.

c. Since dose rates to members of the public will also be based on various exposure pathways that are assumed for purposes of dose estimations, there will be a need for licensing agencies to review and approve the related exposure scenarios.

d. Interconnected with all of this will be a need to consider the uncertainties associated with such calculations, and the distributions of doses that are estimated.

9. Also a subject of discussion was the identification of the person to whom the dose rate limit for members of the public should be applied. Because of the difficulty in identifying the maximally exposed individual, the ICRP some years ago recommended use of a "critical group." Such a group was identified as one that was small enough to be relatively homogeneous with respect to age, diet and those aspects of the situation and behavior that affect the doses received. It was designed to include those people who because of their location and/or habits are the most heavily impacted by the given practice. The critical group was estimated to include "a few tens of persons." Following this practice, the regulatory criteria would be assumed to have been met if the mean dose rate to the critical group did not exceed the exemption level.

COMMENTARY

a. There appears to be a need for clarification on the charge that the Commissioners have given to the NRC Staff. Some members of the Staff appear to believe that their charge is primarily to develop a generic approach to the matter of a BRC policy. Since it is anticipated that the number of applications for such exemptions will remain small for the next few years (and since it is clear that experience gained in reviewing the first half dozen or so applications will be valuable), it may be best to initially develop a policy primarily designed for application on a case-by-case basis. On the basis of discussions at the Symposium, it is clear that <u>flexibility</u> is the key. A generic approach might not be practical at this time.

b. An EPA representative stated at the Symposium that the annual risks to individual members of the public, proposed for adoption for exemptions of radiation sources, may prove to be much higher than those currently being used by EPA for the control of toxic chemicals. However, upon closer examination, it was pointed out that the risk limits to which he was referring were for individual toxic chemicals. If the radionuclides anticipated to be present in low level radioactive wastes were treated on an individual basis (rather than considering the waste as a totality), the risk limit per radionuclide would appear to be no higher than that for individual toxic chemicals. Under normal conditions, toxic chemical wastes would be expected to contain a range of chemicals. If this is true, the differences in the risk levels considered acceptable may not be that far apart.

c. On the basis of discussions at the Symposium, it would appear that the approaches being proposed by the NRC Staff with respect to

a dose rate limit (exemption level) for individual members of the public will be acceptable, provided controls are carefully exercised to assure that no members of the public are exposed to an excessive (more than two or three) sources, and that the dose rate from each practice, source or device is limited to a few mrem/year. Problems appear to exist, however, with respect to the following:

(1) The proposal that individual practices having dose rates approaching 100 mrem/yr will be considered for exemption is unacceptable. This should be withdrawn.

(2) Confusion remains on the statements by the Staff concerning the fact that "if dose rates from a given practice are below the exemption level, ALARA will be assumed to have been met." The matter of ALARA and the exemption level need to be clearly separated. All practices should be justified and no practice should be permitted that is not "inherently safe" and that does not clearly exhibit (or demonstrate) good radiation protection practices.

D. W. Moeller (LET28)
Draft, Oct. 22, 1988

INTERNATIONAL SYMPOSIUM ON BELOW REGULATORY CONCERN
- GENERAL OBSERVATIONS -

1. Although the Symposium was originally conceived as a forum for the exchange of ideas on "Below Regulatory Concern" (BRC) by various agencies within the U. S. as well as representatives from a multitude of foreign countries, it was interesting to find that the European community had held earlier meetings on this subject, had adopted positions with respect to many aspects, and indeed had recently issued a definitive report on the subject (IAEA Safety Series No. 89). So, in some respects, the Symposium served primarily as a forum for the IAEA/NEA group to inform the other participants on the positions that they had adopted and what they therefore recommend for adoption by the rest of the world community.

2. Although (as noted below) there was controversy on many aspects of the subject, there was no disagreement as to whether there was a need for moving forward to adopt a BRC policy at this time. The reasons given included the following:

a. Such a policy would promote consistency in regulations; it also represents common sense.

b. Such a policy will help avoid unnecessary expenditures of resources.

c. It can also serve as a useful educational tool.

As to the need for action now, most participants agreed that the disposal of radioactive wastes, with very low radionuclide concentrations, was the primary driving force. In certain countries, however, another driving force was the desire to release for public use (recycling) certain metals having very low concentrations of radionuclides.

3. As has been pointed out by others, use of the terminology, "Below Regulatory Concern" (BRC), is misleading. In actuality, what is being discussed is the adoption of dose rates to individual members of the public (and perhaps collective dose rates to population groups) that will be considered acceptable for the release of radioactive wastes for disposal in municipal landfills, and for the release of radioactive consumer and recycled products into national and worldwide commerce. Further reasons for using terminology other than BRC is illustrated by the following situations relative to this topic:

a. Exemption of the given practice, source or device will in many cases be approved only on a partial basis.

Few exemptions will be "total." In addition, it is important to note that all practices considered for exemption will first have to be evaluated and justified.

b. One of the requirements for a practice, source or device to be approved is that it be "inherently safe." Otherwise, it would theoretically be possible for nuclear power plants to be exempted!

c. Even after application of a practice has been justified and approval has been granted for its application and/or use, the situation will be reviewed periodically to assure that the original conditions are being met and that the given practice, source or device is still acceptable.

d. In many ways, what is being proposed is to make a decision as to what portion of the dose limit for the public (set at 100 mrem/year in the proposed revisions to 10CFR20) will be allocated to radioactive wastes that are permitted to be disposed of in municipal landfills, and to the release of radioactive consumer and recycled products for public use.

4. Within the international community, there appears to be a "consensus" that a reasonable exemption level (dose rate) for members of the public would be in the range of a few mrem/year. In this regard, it was also clear (for example, as stated in IAEA Safety Series No. 89) that the international community would prefer that the dose rate to members of the public from all exempted practices or products not exceed something in the realm of 10 mrem/year. A key to setting exemption levels is to stress the concept of flexibility. A rigid limit would be difficult to apply at this stage in the process.

a. In this regard, it should be noted that the exemption level for radioactive wastes to be sent to a municipal landfill (where estimates of the total number of people who might be exposed through the operation of a single such facility is relatively small) might range up to as high as 10 mrem/year. EPA, for example, has proposed an exemption level of 4 mrem/year in their discussions on this matter.

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5. Although the IAEA report recommends a collective dose rate limit of 100 person-rem (1 person-Sievert) per year, it was obvious that there were differences of opinion on this matter. For example:

a. Many Symposium participants recommended use of a "qualitative" (versus "quantitative") limit for the collective dose rate. This was well illustrated by the practice in Canada which is to state that:

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b. Another approach recommended was for the licensing authority to be required to maintain an inventory of all exempted practices, and through careful control of the dose rate they contribute and the population groups that they expose, to assure through this mechanism that no individuals within the exposed populations are being exposed to a sufficient number of practices to cause them to exceed the overall exemption level (dose rate limit).

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE
WASHINGTON, D.C. 20555

September 16, 1988

The Honorable Lando W. Zech, Jr.
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: SUITABILITY OF HIGH DENSITY POLYETHYLENE HIGH INTEGRITY CONTAINERS

During the fourth meeting of the Advisory Committee on Nuclear Waste, September 13-14, 1988, we met with the Low-Level Waste Management staff and reviewed the status of the staff's investigation into the suitability of high integrity containers (HICs) constructed from high density polyethylene (HDPE) for Class B or Class C low-level waste. This topic was also discussed during other ACNW meetings. The most recent reviews were held during the first meeting of the ACNW on June 28, 1988 and during the field trip to South Carolina, which was held in conjunction with the ACNW's third meeting on August 3-5, 1988. We also had the benefit of the documents referenced.

The Committee heard a well-structured presentation on the technical issues concerning the suitability of HDPE HICs for the disposal of low-level radioactive waste. The focal points of the presentation were the mechanical properties of the present designs and the ability of these designs to meet the NRC requirements for a satisfactory waste container. The staff had obtained expert technical opinion on the pertinent topics and had made effective use of dialogue among knowledgeable parties.

On the basis of the information presented to the Committee, it appears that the present designs of HDPE HICs will have difficulty in meeting the NRC criteria that define their mechanical properties for use as containers for Class B or Class C waste. We are mindful of HDPE's low corrosion rates which, when coupled with other materials that provide the necessary mechanical properties, could result in a container that should be able to satisfy the pertinent NRC criteria. Thus, we have not heard information that would eliminate HDPE from consideration as part of an HIC.

We recommend that the staff bring to closure its study of the HDPE HICs whose designs have been submitted to it for approval. We believe that

staff decisions would then allow the industry to better plan its response and further action, if any.

Sincerely,

Dade W. Moeller

Dade W. Moeller
Chairman

References:

1. Engineering Design and Testing Corporation Report, submitted to NUS July 21, 1986, "An Assessment of Polyethylene as a Material for Use in High Integrity Containers"
2. U.S. Nuclear Regulatory Commission draft report dated April 6, 1987, prepared by J. Pires, Brookhaven National Laboratory, "Review of the High Integrity Cask Structural Evaluation Program"
3. Letter dated February 2, 1988 from David G. Ebenhack, Chem-Nuclear Systems, Inc., to M. Tokar, NMSS, NRC, attaching Chem-Nuclear Systems, Inc. report dated January 29, 1988, "Evaluation of Stress Loadings of CNSI HDPE HICS"
4. Memorandum dated June 15, 1988 from M. Tokar, NMSS, NRC, to S. J. Parry, ACRS, transmitting U.S. Nuclear Regulatory Commission, Division of Low-Level Waste Management and Decommissioning Report dated June 10, 1988, prepared by S. A. Silling, Brown University, "Review of the Structural Designs of Polyethylene High Integrity Containers"

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE
WASHINGTON, D.C. 20555

September 15, 1988

The Honorable Lando W. Zech, Jr.
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED POLICY STATEMENT ON BELOW REGULATORY CONCERN

During the fourth meeting of the Advisory Committee on Nuclear Waste, September 13-14, 1988, we held additional discussions with the NRC staff relative to the development of a Proposed Commission Policy Statement on Exemptions from Regulatory Control for Practices Whose Public Health and Safety Impacts are Below Regulatory Concern (BRC). This topic was previously discussed with the NRC staff during a meeting of the ACRS Subcommittee on Waste Management on May 4, 1988. The ACNW also discussed this topic with the NRC staff during our second meeting, July 21-22, 1988, and reported to you on this subject on August 9, 1988. We also had the benefit of the document referenced.

As a result of these discussions, we offer the following comments:

1. The proposed exemption system is based on the risks associated with the exposures involved, and the system, if modified as suggested here, will be compatible with most relevant regulations and policies of the NRC and other federal agencies, as well as those of international organizations.

2. We urge the adoption of dose rates up to 10 mrem (0.1 mSv) per year to individuals and annual collective doses up to 100 person-rem (1 person-Sv) as acceptable limits arising from a single exempted practice. Please note that this is a different use of the dose limits than is proposed in the draft Policy Statement. Provisions should be made to ensure that individuals within any population group are not exposed to any combination of exempted practices that results in dose rates greater than one to two times the dose rate limit. Experience indicates that such occurrences should be rare.

3. The current draft of the proposed Policy Statement is in need of extensive revision, partly to comply with the recommendations made under item 2, above. Additional items that need to be addressed include:

a. The draft of the proposed Policy Statement should clearly specify 10 mrem (0.1 mSv) per year and 100 person-rem (1 person-Sv) per year as the limits for individual and collective dose rates, respectively. The ancillary use of a 100 person-rem (1 person-Sv) per year limit as a guide to the necessity for ALARA analysis should be removed (see item b, below).

b. There is a need for a much clearer statement relative to the role and application of the principle of "justification" in assessing practices being considered for exemption.

c. Instead of discussing dose rates at which collective dose calculations should be truncated, it would be better to do a complete calculation, and include within the data a tabulation of the number of people within each of several dose rate ranges.

d. The section pertaining to the linear nonthreshold hypothesis needs to be clarified. One approach would be simply to include a brief statement that risk (cancer) estimates should be based on the assumption that the linear nonthreshold hypothesis applies and that this approach will result in conservatism in the resulting estimates.

e. Since its use represents a change in NRC policy, the concept of the Effective Dose Equivalent should be defined within the Policy Statement. In a similar manner, since SI units are in common usage throughout the world, all dose rates and collective doses should be expressed in these units as well as in the conventional units.

4. As the proposed Policy Statement correctly points out, the Agreement States will play an important role in the implementation of the proposed exemptions. For this reason, it is important that the Statement be formally submitted to the Conference of State Radiation Control Program Directors for review and comment.

The resulting document, when properly revised, will represent a pioneering effort in nuclear safety regulation, will help conserve those of our resources that are available for the control of environmental and public health problems, and should receive strong support from the professional radiation protection community. We believe that the proposed Policy Statement, if revised as suggested above, will serve

well as a starting point for the position to be stated at the upcoming international meeting on this subject.

Sincerely,

Dade W. Moeller

Dade W. Moeller
Chairman

Reference:
Memorandum dated September 8, 1988 from Bill M. Morris, Office of Nuclear Regulatory Research, NRC, to R. F. Fraley, Executive Director, ACNW, transmitting Proposed Commission Policy Statement (undated)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE
WASHINGTON, D.C. 20555

August 1, 1988

The Honorable Lando W. Zech, Jr.
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: DRAFT GENERIC TECHNICAL POSITION: GUIDANCE FOR DETERMINATION OF ANTICIPATED PROCESSES AND EVENTS AND UNANTICIPATED PROCESSES AND EVENTS

During the second meeting of the Advisory Committee on Nuclear Waste (ACNW), July 21-22, 1988, the Committee heard a presentation by the staff of the Division of High-Level Waste Management (DHLWM) on the referenced document. The Committee and its attending consultants also focused attention on the possibility of rulemaking on the same subject.

The Committee learned that the time limit for public comments expired more than one month ago. Nevertheless, the staff has received no comments on this Draft Generic Technical Position from any Federal agency, including the Department of Energy, the Environmental Protection Agency, or the U.S. Geological Survey. The Committee is of the strong opinion that the staff, having called for public comment on this important document, should be provided with such substantive comments as these agencies can provide. We note that others, including the State of Nevada, did avail themselves of the opportunity to transmit their views to the DHLWM.

The Committee recommends that you communicate to the heads of these agencies your strong desire that they respond to such requests and that their comments are critical to the enhancement of the licensing process. The ACNW intends to continue to address this topic and will forward to you the result of our review when we have had a more complete set of comments on the subject document.

Sincerely,

Dade W. Moeller

Dade W. Moeller
Chairman

Reference:
Memorandum dated February 22, 1988 from Eileen T. Tana, Office of Nucle Material Safety and Safeguards, to All Interested Parties, transmitting Dra Generic Technical Position: Guidance for Determination of Anticipat Processes and Events and Unanticipated Processes and Events, with Notice Availability (53 FR 6040)