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Remarks by

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at the

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SAFE MANAGEMENT AND DISPOSAL OF NUCLEAR WASTE
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"SHOULD THE U.S. PROCEED TO CONSIDER LICENSING DEEP GEOLOGICAL DISPOSAL OF HIGH-LEVEL NUCLEAR WASTE?"

Thank you, Mr. Chairman, ladies and gentlemen. It is a pleasure to be here in this historic city of Avignon to address this most timely and important conference on the issue of high-level nuclear waste management and disposal.

The topic of my remarks this afternoon, as the program indicates, is "Should the United States Proceed to Consider Licensing Deep Geological Disposal of High-Level Nuclear Waste?" Implicit in this topic are two subsidiary questions that I believe are important:

> First, is deep geologic disposal the preferred option for how best to isolate high-level radioactive waste for an extended period of time?
>
> And Second, if so, are we in the United States prepared to move forward at this point with the licensing of such a facility?

The first issue is one that I address in some detail in my formal remarks, which are contained in the conference proceedings. There you will find a discussion of the historical background of how we in the United States came to endorse deep geologic disposal as the

preferred option, as well as a more detailed discussion of the basis for our conclusion that until a repository is in operation, we at the Nuclear Regulatory Commission believe that spent fuel can be safely stored at reactor sites for a period up to 100 years.

This afternoon, I would like to focus my remarks on the second question that I have posed: "Are we in the United States prepared to move forward at this point with the licensing of a geologic repository?"

The short answer to that question is no, for reasons that I will discuss in a moment. But before I do so, and in order that you might better appreciate the context in which this question must be addressed, there are several points that I should emphasize about the regulatory process in the United States.

First, the licensing process in the United States consists of a rather less formal, although nevertheless highly structured, "pre-licensing" phase, followed by a much more formal, judicial-like process -- indeed, a process that I believe is unique in its formality, that begins with the formal submission of an application from the Department of Energy to construct a repository, and includes a formal adjudicatory hearing, with full participation by any interested person or party, before the Nuclear Regulatory Commission. The less formal pre-licensing phase, which we are currently in the midst of, entails extensive discussions between the Department of Energy and the Nuclear Regulatory Commission, with the active participation of the State of Nevada, as well as local governments around the Yucca Mountain site, on a wide range of technical and scientific issues.

I should say that, under the current schedule, the Department of Energy is to submit its formal application to construct a repository in approximately 2001 - eight years from now.

The second point that I should emphasize is that in the United States' system, we have essentially two independent safety authorities: the Environmental Protection Agency (EPA), which is responsible for establishing general environmental standards for protecting the public health; and the Nuclear Regulatory Commission (NRC), which is to implement those general EPA standards by establishing more detailed criteria that conform with the EPA standards, and specify how those standards are to be met by the applicant, the Department of Energy.

With those comments by way of introductory background, let me now turn to the central issue that I wish to address; which is to say "Are we in the United States prepared to move forward at this point with the licensing of a geologic repository?"

More specifically, I would put the question as follows: Assuming

successful completion of the pre-licensing phase, which I described earlier, are we in a position today, insofar as our regulatory requirements are concerned, to entertain, and move forward with the formal regulatory review of, an application from the Department of Energy to construct a geologic repository?

Here, I think the answer to the question is quite simply and quite clearly, no, in large part because the regulatory requirements are not clearly defined at this point in time.

Of course, as we know, the Department of Energy will not be in a position to submit an application some time early in the next decade. So, in that respect, this question might be viewed as largely moot at this point.

But on the other hand, it is quite obvious that a clear and coherent set of regulatory requirements is an essential prerequisite to our proceeding with the formal licensing process. Indeed, even before the formal phase, in some respects, it is essential for a well-focused site characterization process for us to have a clear understanding of what the regulatory requirements will be. I must say that, as important as it is to have a well defined set of regulatory requirements, we have not yet reached the point in the United States where we can say that the regulatory requirements governing a deep geologic repository are clearly and firmly established -- and hence are not, for that reason, in a position today to proceed with the formal licensing of a repository. Indeed, I would suggest that the situation is in a considerable state of flux at this point -- in a transitional period, if you will, -- as we in the United States reevaluate many of the fundamental questions involving the regulatory framework. Of particular importance here is the statutorily-mandated review currently underway before our National Academy of Sciences.

Just briefly, Congress last year directed the Environmental Protection Agency to arrange for the National Academy of Sciences to undertake a review of several key policy questions that have arisen as a result of the standards and regulations previously proposed by both EPA and the NRC. Congress asked the Academy to consider three important questions:

1) whether a health-based standard based upon doses to individual members of the public from releases to the accessible environment will provide a reasonable standard for protection of the health and safety of the general public;

2) whether it is reasonable to assume that a system for post-closure oversight of the repository can be developed, based upon active institutional controls, that will prevent an unreasonable risk of breaching the

repository's engineered or geologic barriers or increasing the exposure of individual members of the public to radiation beyond allowable limits; and

3) whether it is possible to make scientifically supportable predictions of the probability that the repository's engineered or geologic barriers will be breached as a result of human intrusion over a period of 10,000 years.

As you will recognize, these questions pose some of the most fundamental issues, insofar as safety requirements for geologic repositories are concerned -- including the question of individual United States population protection, the issue of human intrusion, and the issue of relying on active institutional controls. Beyond these three fundamental questions, however, Congress has addressed what I consider to be an issue of equal, if not greater, importance in the recently enacted legislation.

Up to this point in time, our regulatory standards in the United States have been based upon what we believe to be "reasonably achievable" from a technical standpoint. To put it another way, EPA's standard -- and, for that matter, NRC's implementing criteria as well -- are "technology based" standards, not "health based" standards.

Indeed, this issue is one that NRC has raised on several occasions, emphasizing that much more emphasis should be placed on health-based reasoning, consistent with the recommendations of the International Commission on Radiological Protection (ICRP).

In the legislation enacted by Congress that I referred to earlier, setting up the National Academy of Sciences review process, Congress is quite clear in directing the Environmental Protection Agency to establish "health-based" standards, a move that would bring us more squarely into line with the practice of most other countries, as well as with the recommendations of the ICRP.

It is this Congressional directive, with its emphasis on health-based standards, that I believe could lead to a fundamental reevaluation of the regulatory approach that we have taken in the United States. Several of the key questions in this regard have already been mentioned -- the issue of individual vs. population protection, the issue of human intrusion, and the issue of active institutional controls.

But beyond these three specific issues, the directive to establish health-based standards also brings into play several related and fundamental questions that I believe it would be appropriate for the Academy to consider. In particular, the question of relative or comparable risk -- how we regulate the disposal of high-level radioactive waste compared to how we regulate other long-lived

carcinogenic substances -- is an issue that has been debated in the United States since the early 1980s, and that the Academy, in my judgment, is well-equipped to address. In this regard, the issue of intergenerational equity, raised most prominently by David Okrent at this conference and elsewhere, is a matter that I believe deserves the attention of the Academy as well. Indeed, in this regard, I was pleased to see the Chairman of the Academy's panel, Robert Fri, indicate that the panel's focus would not be strictly limited to the three questions in the Statute, but would include a much broader range of issues.

I should say a few words about the process that the Academy will follow, as I understand it. First, the Academy is to complete its study by the end of 1994, after which the report will be forwarded to EPA for consideration. The first meeting of the panel occurred May 27-29, 1993 in Las Vegas, Nevada and I assume that there will be additional meetings between now and the end of 1994.

Once the Academy's report is complete, it is my hope that this report will, in turn, set in motion a thorough reassessment of the regulatory framework, with a focus on the fundamental policy questions that the Academy has been charged to address, as well as the related questions that I have discussed here today. In this regard, the process that has been established by Congress calls for the EPA to promulgate its standard within one year after receipt of the Academy's report, with the standard promulgated by EPA to be "based upon and consistent with the findings and recommendations of the Academy."

As I have already noted, the legislation requires the EPA to establish health-based standards. Consequently, at a minimum, I would expect that the current standards -- which are technology-based, not health-based, may need to be revised in some significant respects. Indeed, it is apparent at this point that the standard for Carbon-14 will, in my judgment, need to be revised if, as Congress has directed, the EPA establishes a health-based standard. Beyond that, the approach to be taken on issues such as individual vs. population protection, human intrusion, and active institutional controls, will need to await the outcome of the Academy study.

Once the Academy study is complete, and upon repromulgation of the EPA's standard, the NRC is then obligated under the legislation to conform our detailed technical requirements to the EPA standard itself, in a manner consistent with that standard. In this regard, I see several challenges for the NRC.

First, it is essential, in my view, that in setting forth the detailed implementing regulations, we at the NRC establish a set of requirements that have as their objective ensuring compliance with the EPA standard. To put it differently, if DOE complies with

NRC's implementation regulations, they will, as a result, have satisfied EPA's standard. This is not the case today. Indeed, we have two independent regulatory frameworks, where satisfaction of one standard does not mean satisfaction of the other -- and vice versa. Not only do I view that result as somewhat at odds with our basic framework -- where EPA is to set the standard for protection of the general public and the NRC, in turn, is to establish detailed requirements for how to meet that level of protection -- but beyond this, I believe it is possible to establish such a nexus between EPA's standard and NRC's regulation consistent with the defense in-depth principle, as well as in a manner that employs both probabilistic and deterministic methodologies. The establishment of such a unified regulatory framework, with a single clearly defined and transparent health-based safety goal should, in my view, be the objective.

I will say, just briefly, that in addition to the foregoing issues, we have several questions that we at the NRC must address in more detail before we will be prepared to embark upon a formal licensing process. In particular, among the compliance issues that Charles McCombie so ably discussed yesterday, I would note, in particular, that the issue of "reasonable assurance" not absolute certainty -- is an issue that, in my view, requires further attention -- further refinement, if you will, -- so that the parties to our proceeding, as well as the licensing board, have a clear understanding of how uncertainties will be treated and how this concept will be applied in a judicial context.

Beyond that, the use of expert judgment is an issue that I would specifically note, as well, as a critical issue in the licensing context.

CONCLUSION

I would conclude my remarks with three observations:

> First, there is a good deal of pre-licensing interaction currently underway in the United States between the Department of Energy and the Nuclear Regulatory Commission and in this respect, the informal, pre-licensing phase of the process is moving forward.
>
> Second, at this point, however, there are several important regulatory questions currently under discussion and requiring resolution, before we would be in a position to embark upon a formal licensing process. Fortunately, with DOE's application to construct a repository not scheduled to be submitted for several years, we have an opportunity to address these questions in a thorough and careful manner.
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> Third and finally, the ongoing National Academy of Sciences review may well serve as the catalyst for a fundamental examination by the safety authorities in the United States --

the Environmental Protection Agency and the Nuclear Regulatory Commission -- of several key policy issues over the coming years. If this comes to pass, I am confident that we will be in a position to move forward with the formal licensing process when the time comes.

Thank you.