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UNITED STATES
NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON NUCLEAR WASTE

In the Matter of:)
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)
14th ACNW Meeting)
Day Three)

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UNITED STATES NUCLEAR REGULATORY COMMISSION'S

ADVISORY COMMITTEE ON NUCLEAR WASTE

October 13, 1989

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UNITED STATES NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON NUCLEAR WASTE

In the Matter of:)
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14th ACNW Meeting)
Day Three)

Friday,
October 13, 1989

Room P-110
7920 Norfolk Avenue
Bethesda, Maryland

The meeting convened, pursuant to notice, at 8:30 a.m.

BEFORE: DADE W. MOELLER
Chairman, ACNW
Professor of Engineering
in Environmental Health
Associate Dean for Continuing Education
School of Public Health
Harvard University
Boston, Massachusetts

ACNW MEMBERS PRESENT:

MARTIN J. STEINDLER
WILLIAM HINZE

ACNW CONSULTANTS PRESENT:

MEL CARTER
GENE VOILAND
DAVID OKRENT

DESIGNATED FEDERAL EMPLOYEE:

SIDNEY PARRY

P R O C E E D I N G S

DR. MOELLER: The meeting will come to order. This is the third and last day of the 14th meeting of the Advisory Committee on Nuclear Waste.

During today's meeting the committee will hear and discuss the following topics. First of all, we will hear presentations from EEI and EPRI, the representatives from those organizations on their perspectives on the high-level waste repository program.

Secondly, we will hear from a representative of EPA, a status report on revisions to the remanded EPA standard, 40 CFR 191, Subpart B.

And then that will take us up to lunch and we will recess for lunch and then return in Executive Session still open to the public to prepare formal reports on the various subjects that the committee has discussed at this meeting.

The meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act and the Government in the Sunshine Act.

Dr. Sidney Parry is the designated federal official for the initial portions of this meeting.

We have received no written statements or requests from members of the public to make oral statements during today's session. If there is someone here, though, that would like to make a statement please let us know and we

will attempt to accommodate you.

A transcript of this morning's meeting is being kept and it is requested that each speaker use one of the microphones, identify himself or herself and speak with sufficient clarity and volume so that he or she can be readily heard.

We will proceed then with the first part of today's agenda and I will call upon Steve Kraft from EEI to lead off.

Steve, it's a pleasure to have you.

MR. KRAFT: Good morning. Thank you. It's a pleasure to be here.

As the chairman indicated, my name is Stephen Kraft, I am the Director of Nuclear Waste and Transportation Activities at the Edison Electric Institute.

My presentation is going to be rather brief because I think that the committee would be well served to spend considerable time on the presentation by EPRI.

By way of introduction, the electric utility industry by way of funding activities at five separate trade associations has been operating a nuclear waste and transportation program for about the last 14 years. Each association, while it may seem somewhat confusing to the outside observer conducts a program that is consistent with its own organic function. For example, EPRI being the

research organization in the industry conducts the high-level waste/low-level waste research that the industry conducts. American Nuclear Energy Council is our governmental affairs arm; they conduct those activities, et cetera, down the line.

Edison Electric Institute has the largest program in existence among the associations. It has the greatest depth of staff. Therefore the industry leadership has placed the main lead function with Edison Electric Institute and we are responsible through our committees and mechanisms for coordinating all the activities of the associations. And we like to think we operate as one industry.

And one of the main reasons that I asked to participate in this session was by words and the fact that I am here to communicate to you that EPRI and EEI work very closely together; and when EPRI represents their program it is not necessarily separate from our program, it is the same industry program.

(Slides being shown.)

MR. KRAFT: Having said that let me launch into some of the items that -- I hope everyone can see that. You have copies in front of you and there are copies in the back for the public.

I'm going to concentrate my remarks for the next few minutes on the repository program only and not all of

the DOE high-level waste program.

Needless to say the industry is extremely concerned about the entire program. But you know a lot of people, myself included among them, are very quick to vilify DOE for a lot of the difficulties that they are facing right now in the high-level waste program and their repository project in specific.

And the Department of Energy deserves a good share of the credit for the difficulties that they are currently facing, but not all of it. You have to be very honest in looking at this program, and before you are quick to condemn the department.

For example, a lot of people now, because of the difficulties DOE is facing, tend to forget some of the progress they have made. I know when the Waste Act passed in 1982 I was one of the skeptics who believed that a sitting president would never authorize the characterization of three sites for the first repository; yet, President Reagan did. It was a year late when he did it, but to me that was the most startling achievement I have ever seen. I sitting president actually named three sites to be characterized for this particular facility in three separate states.

They produced an enormous amount of documentation. And a lot of people like to complain that DOE wasted a lot

of time producing the documentation, but that is simply in response to their interpretation of the requirements of the statutes and the NRC's regulations and they are doing the best job that they know how to do.

Having said all that, I think you have to be honest and say, well, they can do a better job within the repository project that is quite true.

On this chart I have given a list of a number of the key items that we are very concerned about in the repository program and I don't think I want to go into too much detail on either one unless there are questions from the committee, but just to spend a sentence or two on each one.

The industry has been critical of DOE's program structure and management since the onset of the program. The DOE normal way of doing business with a small headquarters activity and a field office distinct from the headquarters and multitude of contractors actually carrying out the effort we believe was not an appropriate organizational structure for the time of time scale and intense activity that would have been required to meet the original schedules in the NWPA.

We always were supportive of the concept of single chain of command straight line management, much the same kind of ideas as Admiral Watkins is now putting in place

throughout the agen , so we are very happy to see that motion.

The program schedule and cost: the schedule is probably the most frustrating aspect to the electric utilities. You get the impression that DOE doesn't really much care about the uncertainty they're causing to the electric utilities in having to plan for the safe and environmentally sound storage of spent fuel on their own sites, not knowing when your spent fuel is going to be picked up by DOE under the contract, you have to make your plans accordingly. And I think every electric utility is now well on the way, if they haven't done so at least once expanding their spent fuel storage capability.

Cost is another area that is of extreme concern to us and we have yet to see a cost estimate from DOE on the cost of the program given the new Amendments Act that passed now almost two years ago.

Their fee adequacy study which was, the law mandates to be issued every single year as to whether the 1 mill per kilowatt hours needs to be increased or not increased. If they issued one today it would be the 1987 fee adequacy report, so we would know whether the fee was adequate in 1987. That's the kind of uncertainty that's in this program now that is quite frustrating to us and to our customers.

Yes, sir.

DR. OKRENT: Do you look at the projected total cost if things go well or they go more slowly or more poorly than well, and in any way examine this and try to judge whether this is reasonable? And let me add a small piece of information to the question.

I read in one of the inside something or in the newspaper this week that there are cost projections of 25 to $50 billion. In 1984 when I was on a Scientific Advisory Board which by statute reviewed the next to the last EPA standard cost was talked about. And the numbers that were given then were 2 billion.

MR. [illegible]: For the total program.

DR. OKRENT: To build the repository. And there was no large sum separately stated as needed to get ready for it. So there was sort of a $2 billion figure.

But what was to me more interesting was when I and others asked the question: would the cost be different if the standard were less stringent? Both EPA, and if I recall correctly, DOE seemed to think the cost would be about the same. And I don't know that the Edison Electric Institute participated; these were open meetings. I don't think we heard very much from industry, although Floyd Collor was a member of this committee and Katlan substituted for him.

Anyway, I must say, at the time I was a skeptic

but I had no basis for questioning it. Now, I don't -- but I see your projected costs which are far beyond the cost of living increase, and I'm wondering whether EEI is looking at the total question of cost in some way.

MR. KRAFT: The short answer to that question is, yes, we look at cost all the time. But a more in-depth answer is, no, we do not conduct our own grassroots roundup cost estimate for the program; that is too massive a job that we simply do not have the resources to do. But we do rely very heavily and study very closely the DOE's cost estimates along with the fee adequacy report every year, they're supposed to issue a total life cycle cost estimate, TLCC.

DR. OKRENT: When you get to regulations and licensing I'll reask the question, because it's -- because I tried to indicate then and trying still to learn whether there is an important relationship between the stringency and the probabilistic standard, and then the NRC follow-on and the cost.

MR. KRAFT: Well, I don't know whether you can show the positive factors from a specific regulatory requirement to a specific programmatic cost. You know, in the reactor business we tried to do that for a long time. And EEI, a number of years ago, attempted to collate industry experience in exactly that area, where NRC

regulations perhaps appeared unreasonable to us and what the increase costs were. And the only evidence we could find were anecdotal. There was a paper written on the subject by Suzanne Phelps, at that time was on the nuclear staff at EEI. And we were not really able to make a direct relationship case there.

But there is no question that NRC regulations which are driven by EPA standards drive the DOE reactions to how they meet those standards. And then, of course, the staff interpretation of those regulations which in many instances is not yet known is going to drive the DOE costs.

We do a yearly review of the DOE repository project. In fact, next week we're having a group of people out to the Yucca Mountain office to conduct that review. And back in -- when there were still three sites to be considered and we were -- our review that year, we were able to identify, although not in very specific terms, that NRC staff requirements -- questions NRC staff was asking of the DOE staff had a direct relationship to DOE proposing research projects at Yucca Mountain or any of the other repository activities.

And in a way you could see a direct relationship from the implementation of the regulations by the NRC staff to a research project. And just while we're on that subject, one of the best things the NRC did, by the way, was

the creation of the FFRDC, your Nuclear Waste Center, because what we noticed and it wasn't a secret to anybody is that, there were contractors who were whispering in the ears of the NRC staff through their contracts saying, well, how should we regulate this facility. NRC staff was making a requirement to the DOE staff. DOE wanted to have a research project to answer the question, and the same contractor popped up and said, gee, I know how to do that. Those are the kinds of things that we were very, very critical of. And I think NRC and DOE began to notice that same problem and NRC took the right action to move that to a separate contractor.

DOE's reaction to NRC's regulations, in our opinion, may be overboard sometimes and maybe they don't have -- maybe they're just not certain enough in their own work and they feel they need to do more and more and more and more, but when you ask them, why is a site characterization plan 6300 pages long and why do you have 12,000 pages of study plans that you have to write, their answers are, we don't want to get anymore objections from the NRC staff.

So there is a relationship, although it's very hard to pinpoint a specific item in a regulation and say, that caused the cost to run up.

DR. CARTER: Could I ask you a couple of questions

and one related to budget, not what the budget may eventually be, I think that's somewhat speculative due to past history but what the budget already -- what monies already have been expended.

Now, you mentioned documentation, for example, and to the best of my knowledge the money expended thus far or approximately on this project is on the order of a couple billion dollars.

MR. KRAFT: A little over 4 billion -- 2 billion.

DR. CARTER: Yes, 2 billion spent. But you don't even have a hole in the ground.

MR. KRAFT: Exactly right.

DR. CARTER: So you talked about documentation, so as far as I can tell, thus far you've got about $2 billion worth of documentation, a few things that go with it. But the question is: how do you feel about that? Is it a reasonable expenditure of $2 billion? Are you dissatisfied with the progress? Are you irritated or happy or what?

MR. KRAFT: All of those.

(Laughter)

MR. KRAFT: Before I answer the question directly let me just preface that by saying that, about a billion and a half was spent on work that Congress subsequently cancelled. And you go back to the political activities between the middle of 1986 when DOE named the three sites to

the end of 1987 when Congress passed the Amendments Act, there were a lot of people involved making it known that they were in favor of cancelling those activities, the industry among them.

So we have to be somewhat less critical about how much money was spent doing what. Having said that one fact, yes, we are very disturbed by the cost. They are the high cost provider, but in our opinion at the moment they are the only possible provider of the service.

The Department of Energy by the nature of the way the government does business is the high cost provider. A fact that I like to quote -- I may be wrong on the dollar value -- but DOE, you know, DOE doesn't do anything by themselves. I mean, DOE staff is not really carrying out this program. They're managing the program. Their contractors carry out the program. They spend $40 million a year before the first contractor works; that's a base cost to have the staff light the lights in the offices, you know, travel expenses, all of that. It's a tremendous amount of money. And then, they first have to start paying the contractor.

In terms of whether all that money went to documentation, not all of it has. There was a lot of site work done at the Hanford site. There has been site work done at the Yucca Mountain site.

However, the documentation is quite expensive. They went through something in the neighborhood of 15 to 20 revisions of things like environmental assessments, which themselves are several phone book size documents. I don't know how many revisions of the site characterization plan they went through. But every one of those is a multi million dollar type of project; the number of people that are put into it.

Right now I don't know what the cost estimate is for their QA program, but they have been building, tearing down and rebuilding QA programs, it seems now, forever; they haven't got there yet. Every time they look into another part of their QA program they find problems, and those cost a great deal of money.

They also have a tendency to redo work that's already been done because in a way you have to be sympathetic to that because the time lags are so long on this project that preliminary designs that were perhaps acceptable to the NRC staff five years ago when they were first done are now unacceptable. Because I think as Part 60 requires the understanding of how we're going to regulate this process evolves over time, and understandings build over time, and NRC staff interpretations of regulations will evolve over time. And so preliminary designs have to get redone.

And that question of rework is just -- that's driving the cost up. We have also noticed in our reviews and have been very critical of, the fact that they seem to be doing work out of sequence that will result in having to rework later. And the answer to that is, well, that's the only way we can meet the 1998 schedule. Well, they've been off that 1998 schedule probably since the day after the Act got passed.

There needs to be some readjustment as to how they're going about scheduling their work and all that. But we have no real hope that the cost is going to be much reduced beyond what the projections already are.

DR. CARTER: Let me ask you two other questions. One related to specific matters, it's your impression of that; and the other related perhaps to what sort of moderation or influence can EEI and the nuclear industry have on not only schedules but budget and so forth. But before I ask you that one, how about a specific case now.

The main thrust of what needs to be done at the moment is site characterization. This is what Congress chartered that should be done.

Now, DOE has got conflicting responsibilities or conflicting directions. One is to go ahead and implement the Nuclear Waste Policy Act and its amendments and so forth.

The other is to abide by all state, local laws, and what not, and this is impossible at the moment in Nevada. They need to get a number of authorizations, permits, approvals, counseling, or whatever from the State of Nevada. Now, this is obviously to a big extent that the entire program of site characterization, except what you can do above ground and some of that even, completed dead in the water. Now this obviously affects the schedule. It obviously affects the cost.

Now, the question is that this impasse has been there for some time. And the question is, it has to be resolved if there is ever to be site characterization at Yucca Mountain.

Now, what's the industry's view on that sort of thing? A very specific case now, it cost money, affects schedule and a number of other things, and yet, it has been allowed I guess to just languish for lack of resolution.

MR. KRAFT: The State of Nevada is the best well funded, most dedicated intervenor we have ever seen. They are well organized. They are well run. And they approach the problem with a religious zeal that is unmatched.

The governor has made his position plain. The latest edict from the governor is that when legislature passed resolutions in January of this year opposing the repository, that constituted the state's veto under the NWPA. On the face, that's a specious legal argument that wouldn't hold up, but he still expresses his view.

We had hoped that under the new administration that Admiral Watkins who has a wonderful reputation of not only as a manager but as a conciliator and negotiator would be able to reach his hand out to the state and say, look, we've got a job to do here; you've got a job to do there, is there some way -- some other way of putting together a program where you can see your way clear to granting us permits and we can begin the work somehow under some condition. And I'm not going to speculate what those conditions are, but there have been a lot of discussions in the department and elsewhere as to, you know, segregate -- separating surface work, down hole work, all these different options.

The governor sees this program in entirely different terms. And the entire state mechanism is simply

refusing to cooperate in any way. It is going to result in a confrontation between the federal government and the State of Nevada and it's going to come sooner or later. And given that it's going to come sooner or later the industry is arguing that it ought to come sooner. I mean, we're wasting a lot of time and money here.

DR. CARTER: Yes, I think that determination could have been made some time ago, not now or not in the future.

MR. KRAFT: We had actually made the determination such as it is quite a while ago. I mean, well over a year ago in time. But new administration, things sort of go into a hiatus during the transition period. And then we waited with great anticipation as to who would be named Secretary of Energy.

And, in fact, in the middle of last year when the department announced that it would -- officially announced it would delay receipt of spent fuel from '98 to 2003, a movement began in the industry to sue DOE for anticipatory breach of the contract. To us, that's the ultimate weapon that we have to seek redress through the courts.

In January of this year we -- the 180 day deadline for filing the lawsuit under that issue -- the cause of action being the issuance of something called the "Annual Capacity Report" last year expired at the end of January. And we have a process in the industry, you know, many, many

member companies that need to be in on the decision, and we were at the point where we were going to make the final decision in January, beginning of January as to whether that lawsuit would be filed. All the papers were prepared and we were ready to go, when President Bush named Admiral Watkins Secretary of Energy.

Just as a matter of interesting history, that occurred the morning of the day that the final Policy Committee would make this decision was meeting. And it happened to be meeting in Arizona two hours -- you know, two hours later in time than here. Had that not been the case we probably would have decided to bring the lawsuit because we wouldn't have known about Admiral Watkins being named. Once Admiral Watkins was named the industry leadership simply said, well, now wait a minute, we owe this guy a chance, he's got a good reputation, he's got the right background and all like that.

The question that has to be asked -- and I think it's the question you're asking, sir, is -- well, okay, how long do you wait? And I think the industry is running out the end of its rope right now and we're waiting to see -- we've been hearing since May that there's an announcement imminent from the department on a rescheduling in actions relative to Nevada; we don't know when that announcement is going to be made. We don't even know what the content of

the announcement would be as hard as we've been trying to find out, as I'm sure everybody has.

So, you know, I can't say that we have a specific hard and fast plan for trying to kick this program off the spot that it's on now. It's unfortunate in the way that the Nuclear Waste Policy Act is written and the way the contracts were written based on that, that the industry is asking its rate payer to pay $500 million a year into this program that is being carried out by bodies and individuals that we have little or no control over. It is not the standard contractual relationship that we have with anybody else that we might hire to do a job.

DR. CARTER: I understand the difficulty with some of the provisions of the law.

But the other question is related to that particular thing as far as the industry and FEI. Do you have any particular mechanisms or specific procedures by which you could either moderate or influence the budget and the schedule?

You know, you can be critical. You can review. You can do a lot of other things. But is there any effective way to put that in the action as far as program and schedule?

MR. KRAFT: The only way that we have to influence the budget is through the congressional appropriations

process, which we've used. Like, you know, Madison Road in Federal's Paper 10, everyone has the opportunity to influence the government and take advantage of it. And while it's not always clear how these things come about, there are provisions in the current Appropriations Act that DOE has to respond to that we're very happy to see there.

The financial process that DOE has in closed to outsiders including ourselves. Great frustrations -- great frustration in OMB. We have been roundly criticized by the budget reviewers at OMB for not getting in there and looking at the DOE costs in advance. Well, we can't; it's illegal for us to do so. It's illegal for us to participate in any of their procurement decisions.

So it is -- there are these barriers that we keep on searching for ways around that are set up either by law, executive order, or simply departmental policy that prevent us from seeing these cost figures at a time when we could be most, we think, most useful to the department in looking at them when they're first -- like, for example, right now they're beginning to work on their FY '91 cost productions; that is a process that we are excluded from.

So we just keep on pushing and see what we can do. It is our ability to have an influence over this program as one of the highest arts of governmental affairs. I mean, it is not real clear how we do this.

DR. STEINDLER: Where would you think you could make significant contributions if you were allowed, for example, to participate in DOE's procurement process? Or why is it that the industry believes they have something to add that is currently not being done by DOE or in the following of the rules that govern the procurement process?

MR. KRAFT: Well, I think one of the best ways to control costs is to have people who have a direct responsibility for collecting the monies and paying the monies, having some say over what those costs are.

We could provide a back pressure, let's call it, on the process in DOE to keep costs down. We've noticed that in many programs, not just the waste program, through many programs that we're interested in at DOE. The RISA program, for example. Where we feel that we can bring something to the table simply because we're there. Simply because we have a different point of view.

More specifically, there are procurements DOE has conducted that, frankly, we would have preferred they never conducted. The Firm Reactor Cast Development program is way bigger than it needs to be. Way more expensive than it needs to be. And they've cut it back significantly due to our agitation, but we were never allowed in that process.

What guarantee do we have that the cost was, in fact, the lowest evaluated cost from our point of view in

terms of the contractors that were hired to do the work. Some contractors are extraordinarily adept at making proposals to the government. And it's not obvious to us that they are necessarily the best contractors suited to do the work; maybe they are. But we're not in that process, so we can't say.

With regard to the overall cost question, I would think it would be a great benefit to the rate payer who ultimately bears the cost of this, that if we could sit in the DOE deliberations now on their FY '91 budget, so when a contractor comes in and says, we think it's time to do X in the program, that someone who really cares about the money to say, no, why do you need to do that; you did that five years ago.

I don't know that those questions are being asked in the way that I would like to see them asked. Maybe they are, but I don't know that they are. And that's really the essence of it.

DR. MOELLER: Gene Voiland.

MR. VOILAND: Is it possible for EPRI to be an intervenor in this process?

MR. KRAFT: Intervenor in what way, Mr. Voiland?

MR. VOILAND. Well, we're talking about ultimately a licensing process here, the facility has to be licensed; DOE has to be licensed. I don't know where that licensing

process starts formally and so on.

But is EPRI denied the right of being an intervenor?

MR. KRAFT: Well, it isn't EPRI, it's EEI.

MR. VOILAND: Or EEI.

MR. KRAFT: Just to keep the initials straight.

MR. VOILAND: Yes.

MR. KRAFT: It may not be terribly important to you all but it's terribly important to us.

(Laughter)

MR. VOILAND: No, I really meant EEI.

MR. KRAFT: Bob Shaw and I regularly have, you know, these sort of conscious raising sessions where we try to make sure we know what side of the fence we're on.

MR. VOILAND: Do you have EEI T-shirts?

MR. KRAFT: We thought about that. I especially like the ones that the FBI has, you know, when they go on a crime that says FBI; I'd like to get one of those.

At any rate, the licensing process officially begins when NRC dockets the application; and that will not happen for some time in the future. The current schedule that's at the end of 1995, but at this point it's anyone's guess when that will happen.

There is going to be a prelicensing procedure that is in the LSS rule that will be something of a docketed kind

of activity with parties and intervenors. To date it has all been a very informal process and we have been a fully participant in that process. And I have to say, I see that Bob Browning is sitting on the side here, Bob and his people have to the fullest extent of the law and NRC regulations and procedures has made sure that as an interested party we have been fully informed and involved in the process.

And I should say that we have had greater -- a greater sense of involvement through the NRC activities than we have through the DOE activities. We have been able through our activities in the QA area moderate some of the dispute between NRC, the state, and DOE on QA questions. For example, we have a very highly proficient QA contractor who helps us out on that.

Having said that let me introduce Chris Hinkel who is sitting in the first row over there, my project manager for high-level waste. Chris participates in a lot of the NRC activities.

As far as the question of intervention itself goes we have had the most -- the most of preliminary discussions with Office of General Counsel in conjunction with some of the LSS negotiations. We were a party on the LSS negotiation and you may recall we were the only party that vetoed the rule.

DR. OKRENT: I'm sorry, the only party?

MR. KRAFT: Who vetoed the rule in the negotiation.

The question came up of standing in the prelicensing process that the LSS rule contemplates. And there is a significant question as to whether the industry will have standing. We believe we do. We believe we can make the case that we have standing. But as I have been told, and I'm not an attorney so forgive me if I don't get this quite right, but I've been told that standing in an NRC proceeding arises from the site. We have no member with a nuclear plant in that state near that site.

So that seems to be a problematic -- a legally problematic thing for us to be a formal intervenor in the licensing process. We think we can get -- we have a way to resolve that issue. There are special exemptions and what have you to be allowed into the process, but it's going to be a lot of years before those issues are addressed.

To the extent that it is still a formal prelicensing process as contemplated by the MOU between DOE and NRC, we are fully and actively involved. And again, I can't say it often enough, we feel very, very fully involved and able to participate through the NRC process.

MR. VOILAND: Do you feel that's a productive activity?

MR. KRAFT: Oh, yes, I do. I'm very impressed

with the people in NMSS, particularly Bob and his staff; I think they do a wonderful job. There are times when, in the course of day-to-day business, you know, you don't particularly like what an agency is doing, of course, but -- I mean, by and large, I think it's a very positive affect on the program.

DR. STEINDLER: Does EEI issue formal reports or written documentation on the concerns that they have with specific aspects of the pursuit of the program as either pushed by or executed by DOE or NRC? You've indicated a number of significant critiques, and I wonder how those critiques are ventilated and made known to whoever?

MR. KRAFT: Yes, sir, we certainly do. In addition to EEI filing comments on just about every document and rulemaking GTP, NRC issues, and similar documents from other agencies and DOE, some of the more memorable ones in the recent past have been our comments on the site characterization plan, draft, and the statutory version. You would expect us to be doing that as normal business. But I think more to your point, we issue a formal report each year on our review of the repository program. We have issued five of them so far; number six will be out some time in the months following next week.

We have in the works a special QA report that we've been preparing that we want to finalize. And during

periods of intense activity on Capitol Hill there is a whole series of testimony. And we use testimony as a way to make our points known, not simply to the congressional committee that's asking but to anyone who feels like they want to know about it.

And in other areas beyond the repository we've got -- that we just recently completed, an extensive study on the MRS that we filed with the MRS Commission.

So, yes, we do have a series of documentation that you could look through.

DR. STEINDLER: Well, for example, you've indicated -- I want to go back to that procurement issues that you feel left out of the examination of the procurement process, do you have a report which summarizes those views and recommendations that you might have for rectifying those problems?

MR. KRAFT: No, sir, not on that particular item.

On the cast procurement, specifically, we did write a fairly lengthy letter to the director of the program simply expressing our views as to what they should be doing in that procurement. But, no, we did not do that because we looked into the DOE procurement regulations and found that it's not so much that the DOE staff is on their own keeping us out, they are -- it is a legitimate legal requirement that we simply couldn't get around; and there was just no

sense pushing it any further.

DR. MOELLER: Excuse me, let me remind the committee that we're halfway through the allotted time for the two initial presentations. And while it's very interesting and beneficial, we'll have to keep that in mind.

MR. VOILAND: Could I ask just one.

DR. MOELLER: Gene.

MR. VOILAND: You mentioned a little earlier that you're publishing an annual report on the waste program, is that available only to your members or is that open?

MR. KRAFT: Oh, no, it's available to the public. Once we send it to DOE it goes into the public files. It is -- I believe we made copies available to NRC staff.

Moving on -- I won't dwell very long, I want to make sure Bob has a sufficient opportunity. Of course, we talked a lot about, just now, our concerns about getting the new site characterization work started. There are two obstacles to that: one is the one we discussed at length, the state permit situation.

The second one is the QA. That's an internal obstacles. You know, if the governor woke up tomorrow and decided that he has changed his mind and said, please come do it, DOE still would not be able to go forward. The latest estimate is 12 to 15 months. So that -- and by the way, that's 12 to 15 months assuming they find no more

problems; that's just knowing what problem they have now.

In the area of regulations and licensing, I don't have very much to say on that because I think Bob will talk very directly about some of those questions in the regulatory area, except just let me generally say that our concern in the regulatory area is how the staff will ultimately interpret the regulations and how then does DOE comply with the regulations. What level of uncertainty is going to be acceptable in the licensing process?

DR. OKRENT: Can I ask a question here?

In what you just said, you did not include a statement that you would reassess the EPA standard which is remanded and is presumably subject to change either small or large.

My recollection of five years back around 1984 when there was a congressionally mandated review of the next to the last EPA standard that there was not very much direct input from the industry into what that standard should be.

My recollection may be wrong, but at least that's the way I recall it, through the committee that was reviewing the standard. Although there was, as I mentioned, Collor, Floyd Collor was a member of this committee and Katlin --

MR. KRAFT: Bob Katlin.

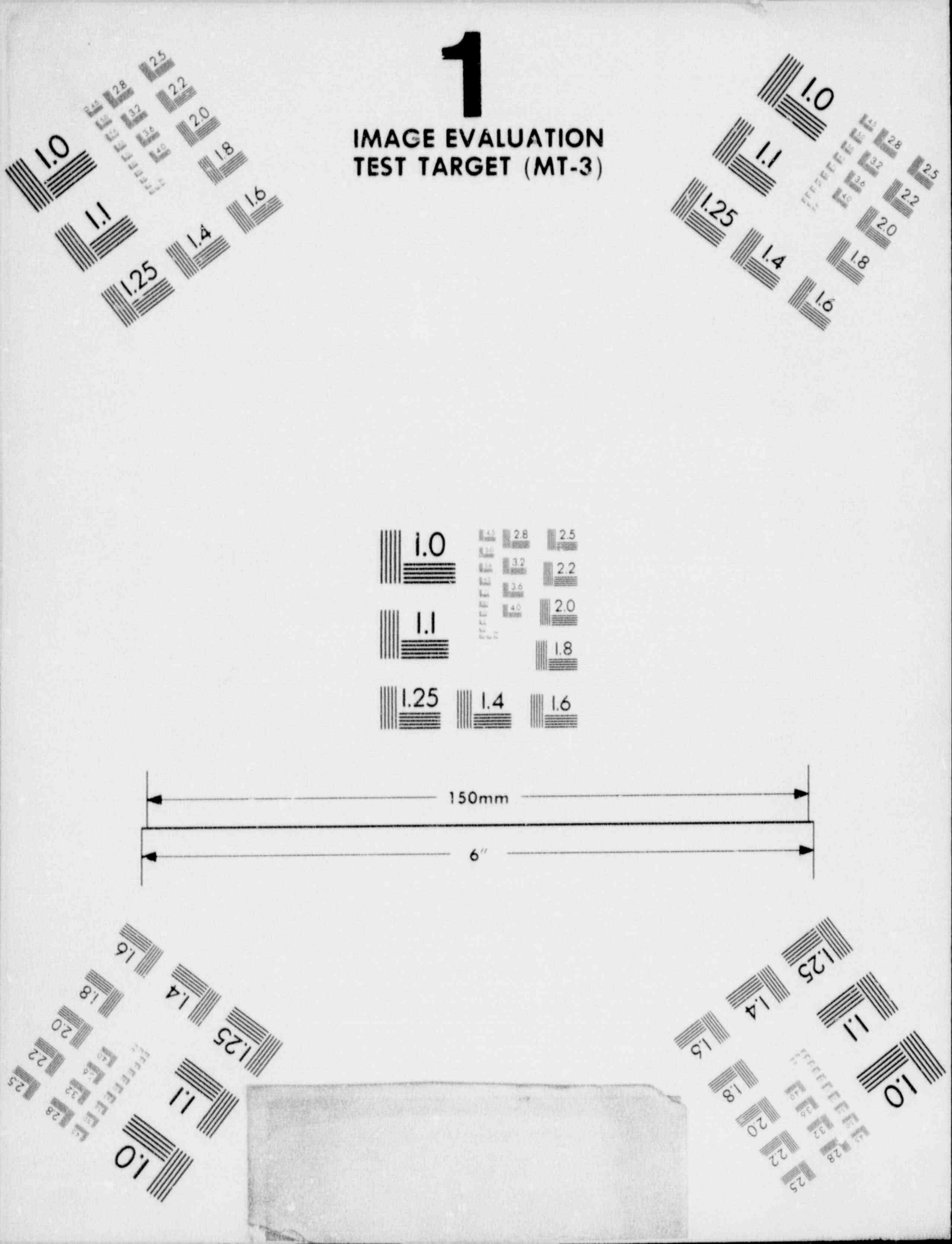
DR. OKRENT: -- assisted on it. And that

committee made a variety of recommendations among others that EPA shouldn't adopt the quantitative standard unless they first had assured themselves that it was indeed practical. Also, that it needed to be -- should be relaxed considerably, it was too stringent, and so forth. But there are a lot of recommendations in there.

I wonder whether the industry now thinks it should play a deeper role in the formulation of what the standard will be or -- because what you just said, we're going to look at what NRC does and implement. I find that curious. It seems to me the basic standard itself should be a primary issue so far as the industry is concerned.

MR. KRAFT: I think the answer to that question is, we have and we will. We were -- my memory is failing me on the 1984 period, I don't really recall what our participation was. Surely we provided formal comments, because we did that as a matter of course. But it's possible that back then a decision was made that because Floyd and Bob were involved that that was industry representation at the time and there was no need for EEI to expend its limited resources in that area.

But once the standard was challenged in court we entered as intervenor defendant along with EPA. We were supremely unsuccessful in convincing EPA how we thought they ought to defend their standard, which we believe led to the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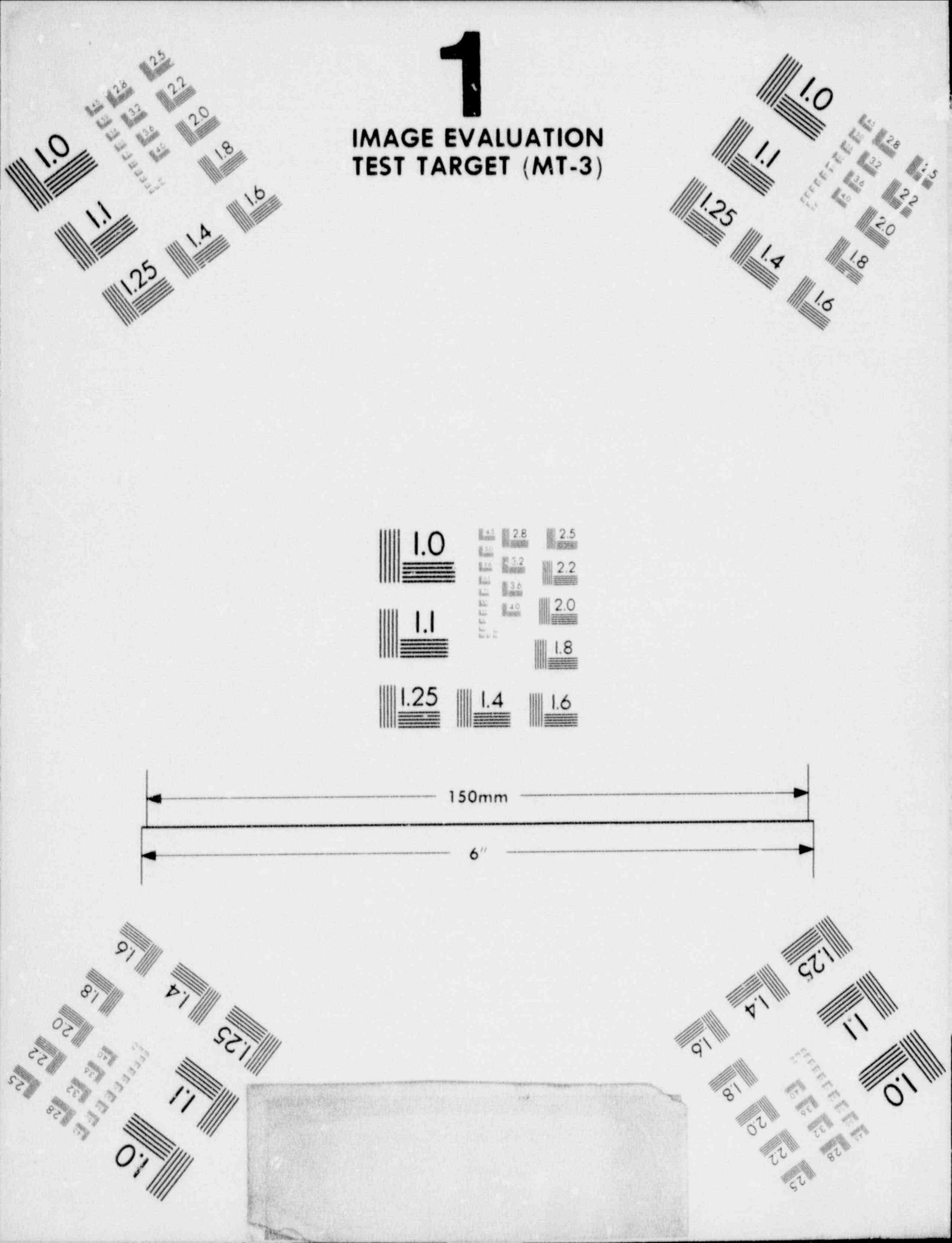
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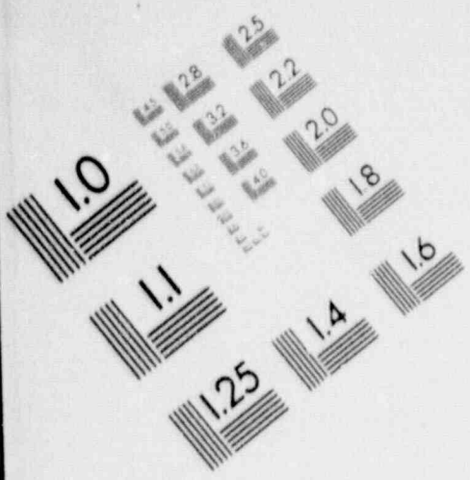

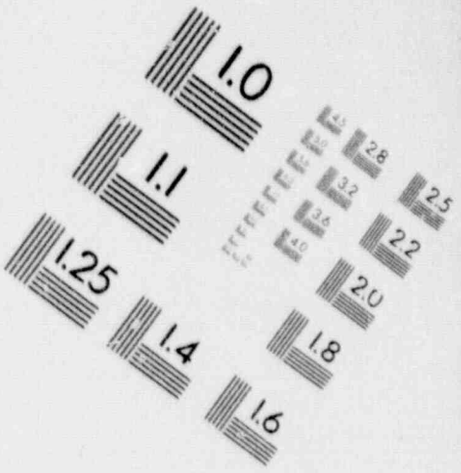

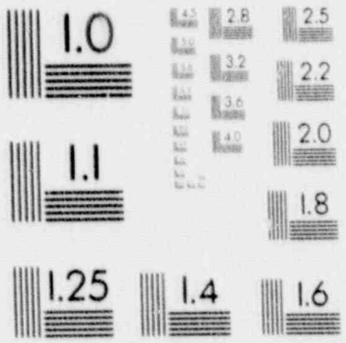

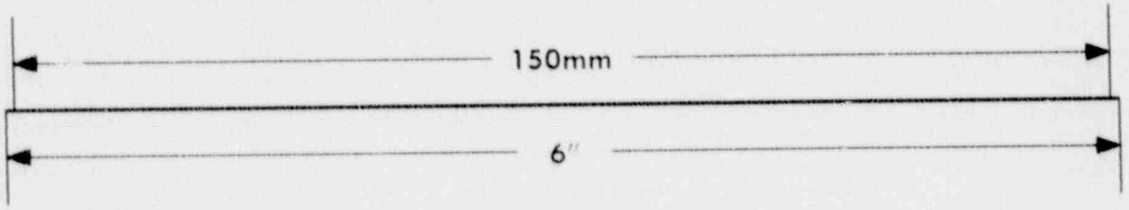

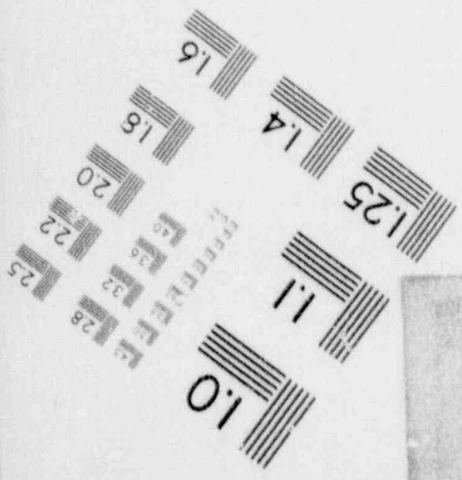

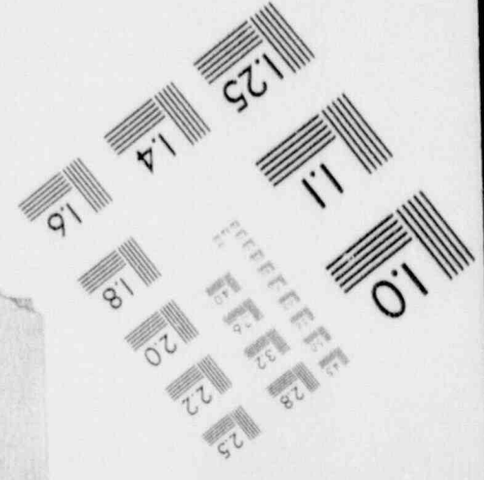

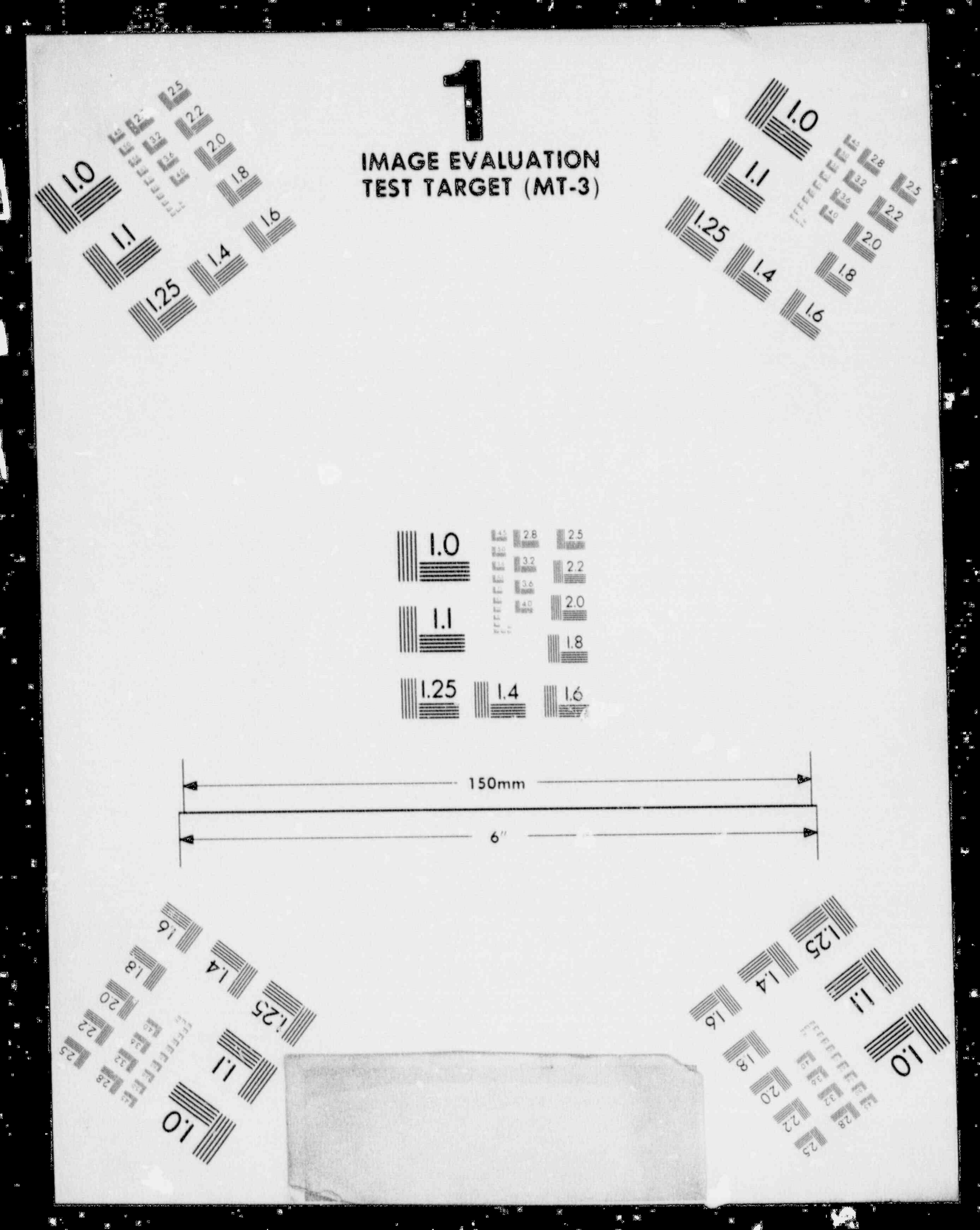
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court's action and has now kicked off their review.

In the interim period we have attempted to learn what EPA is doing. I mean, before now when people -- when their information is available. And again, it's a process in a regulatory agency that is predominately a closed process and they were very happy to talk to us but not terrible interested -- interest is the wrong word -- not terribly able to share with us what they were specifically working on.

Now that this is becoming more of a public part of the process we will be involved. And with the new EPRI high-level waste program there might be an opportunity to put greater resources.

DR. OKRENT: Well, I might say, if I were industry -- this is a gratuitous comment -- I would set up a task force just to review the EPA standard to see what should industry recommend, if anything. And my guess is there could be some strong recommendations.

MR. KRAFT: I think that's an excellent suggestion. We have the mechanism to do that, as you can well imagine.

Moving on, the last issue I wanted to mention which leads into EPRI's presentation is the question of early determination of site suitability or unsuitability. We approach that predominately from a cost standpoint. The

way that DOE has currently structured their site characterization program as we understand it is, they conduct every examination of Yucca Mountain that you can possibly imagine in all, let's generally call them geologic sciences. And at the end of time they look at the data, they reduce it to analyze it; and then they make an ultimate decision as to whether the site is suitable or unsuitable. We think that's not quite the right way to do it. We believe that there can be some studies done looking at the large discriminating factors that would render the site unsuitable.

Now, let's avoid a discussion as to what the definition of suitability is, because I have come to the conclusion that it's largely a state of mind.

In the ultimate, when you receive a license, suitability and licensability are the same. However, prior to that point suitability is really anyone's judgment as to whether knowing the state of knowledge about Yucca Mountain at that time and given that individual's assumptions about how the staff will interpret regulations and how a licensing board will act, whether or not you can get a license. And that varies depending upon who you talk to and your point of view.

It is what allows the NRC and DOE and the National Academy of Sciences and every other body at a national level

to say, they've not seen anything yet to suggest Yucca Mountain is unsuitable; at the same time allowing highly qualified professionals at the State of Nevada to say, based upon what we now know, it is unsuitable. That's what you get into that argument.

Our concept -- and this is what Bob is going to be talking about -- is aimed at encouraging DOE in the strongest possible terms to be looking at those activities first that will serve to remove the preponderance of doubt, reduce the uncertainty in those big areas of concern: vulcanism; groundwater; travel time, you know the list, early. So if they do discover a problem we discover it early before more money is spent.

Now, some of those activities need to be conducted on the surface and some need to be conducted down hole; it's not one or the other, okay.

At this point, gentlemen, rather than go through my second slide which is a somewhat more detail on the suitability/unsuitability question, I think for sake of time, if the Chair agrees, to allow me to turn it over to Bob and allow him to go through his story.

While he is coming up here let me say that we at EEI are very excited about the EPRI program because it has potential for leading DOE into areas that we believe DOE desperately needs to be led.

DR. MOELLER: Mel Carter has a question.

DR. CARTER: One question and perhaps either you or Bob might want to respond to it.

You mentioned the state of mind, and I guess to some extent the way this program is set up, I think, this is DOE's approach with the performance allocation, possibility of flexibility in terms of engineered barriers and so forth. I think the state of mind is that most of the problems that they can envision can be fixed. And I think with that you're going to have this continued impasse or defugality or whatever.

MR. KRAFT: I fully agree and I think we hold the same view that DOE has, that there is enough flexibility in the ability to design around any problems we might discover.

The difficult you have aside from Nevada's point of view which cannot be ignored, you have to sort of, at this point, make guesses as to how the regs will ultimately be interpreted, and not only by the NRC staff but by a licensing board. And that becomes, as you well know, a judicatory legal process, not a scientific determination type process.

So that's why I say that suitability at this point is largely a state of mind; it's how you view -- how those ideas will come out.

Robert.

MR. SHAW: Thank you, Steve.

As we indicated before our attempt this morning is to give you both facets or at least two facets of the industry approach of the whole question of the area of high-level waste.

As Steve indicated, my name is Bob Shaw, I'm the program manager for high-level waste and spent fuel storage at the Electric Power Research Institute. I have been in this role for just five months so the area is quite new to me, although I've been at EPRI since 1975. My experience is in other areas such as water chemistry and low-level waste before this time.

This morning what I would like to do with you is give you some background with respect to the utility attitudes and approaches towards research being conducted by EPRI on high-level waste; to then give you an illustration and maybe even a model and a guide for the direction that we're taking which comes from the Seismicity Owners Group efforts that were put forth by EPRI a couple of years ago. And then take that model and guide and translate it into what we anticipate doing with regard to the high-level waste for the particular research that might be conducted at EPRI.

We do have utility support that indicates more finances will be put into this area than we have done in the past. Our efforts in the past with regard to the high-

level waste repository have primarily been an oversight keep up to date. Most of our efforts have been on spent fuel storage, and there are now two utilities that have onsite storage and together with DOE and the utilities we have had cooperative programs to develop those facilities.

We've also been involved in fuel compaction and other activities that assist the utilities in dealing with the whole issue of spent fuel and what to do with it over the years.

I don't have a copy of a viewgraph of the cover sheet, but let me indicate that there are three names on the cover sheet: mine as the presenter; followed by Bob Williams; and Carl Stepp. The three of us are very actively involved, as you might even term us a committee within EPRI to develop the program that I'm going to discuss here. The other member of my group is Ray Lambert whose main efforts are conducted in the spent fuel storage area.

(Slides being shown.)

MR. SHAW: For some background, we've had some discussions with advisory structures. And here this comprises two elements: one, we have a very formal advisory structure that we have with EPRI where three times a year we meet with utility representatives to discuss our program.

We have asked for additional funding and through the EEI nuclear waste we've had discussions with their

formal advisory structure as well.

And there are a set of recurring themes that arise that I think gives you perspective that's important from the utilities. One question frequently raised is: why pay EPRI to do what we're already paying DOE to do? If they were doing the job, the $500 million that goes from the utilities to DOE would be taken care of. Aren't we just chasing good money after bad.

Secondly, how can EPRI have any influence over this mammoth DOE program.

Third, what deliverables can we expect for the money that the utilities put into the EPRI program. The DOE program is not spending our money effectively. There is a need for technically input from the utility perspective; a real desire to take what Steve has described from a programmatic point of view and extend that to a technical point of view as well.

And finally, a question that's raised is, what can we do that is really useful.

To extend this perspective we would also say that the DOE program as it's formulated is scientifically deep. It does draw on excellent technical specialists. It's, as Steve referenced before, a long-term bottoms up study that culminates many years out in a site performance assessment that determines whether or not this site really can be

licensable.

Our opinion is that at times DOE is much too accepting of regulatory positions and isn't offering the kind of challenges that we feel need to be conducted.

And finally, there is a need for the identification and prioritization of critical issues, and that will be part of the rest of my presentation here.

The basis of our high-level waste plan does emphasize EPRI's technical strengths. We will seek to influence DOE and leverage our relatively small resources. We do look to emulate the recent successes of our Seismicity Owners Group in particular, and we do attempt to address a near-term crucial issue, that is to develop a process for early site suitability assessment.

We've had some discussions recently about the term "suitability" and "licensability," and it's my hope that we won't get into the kind of discussions we had the last couple of days here about terminology. But let me give you some reference that suggests that we see that licensability is a rather undefined term yet. And until the technical positions are developed by the NRC one cannot define what licensability is. And so I think a suitable interim term is suitability that gives some expression from us as to whether the site really can come under 40 CFR 191 and can satisfy those particular provisions.

But without interpretations it's very difficult at this stage to determine whether or not this site is licensable.

As an introduction then, we do see that performance objectives are necessary for the safety and licensing decisions and they center on the two particular aspects of 10 CFR 60 and 40 CFR 191.

And we want to emphasize here that 191 does set permissible exposure in probabilistic terms and establishes probabilistic assessment as the primary basis for licensing. And I'll extend a little more on that as we go through this discussion here.

The probabilistic methodology developments include that there is currently no accepted methodology for high-level waste repository analysis. We believe that early development would be particularly beneficial to: first, focus the site characterization activities.

Secondly, to reach early resolution of the site suitability issues.

And third, to develop an early perspective on the overall performance uncertainties.

DR. OKRENT: Before you remove that, have you looked at the remanded EPA standard and judged that it is a standard that one can work to and provide reasonable assurance of, or whatever is the word, of meeting the

requirements of the standard or is that something that EPRI has not gone into deeply yet?

MR. SHAW: We haven't yet and it's one of the early items on our agenda.

DR. OKRENT: Because as I noted earlier, that question was posed to EPA before they finally adopted it. To my knowledge, they did not themselves show that this was a workable standard. And it would seem to me that if you try to assess, is it workable or where are the sticking points where it might not be workable. This is aside from any site, I mean, as a standard itself, about thinking broadly. That could also provide not only some guidance, but where you wanted to focus attention, but it might even, if you did it soon enough, impact on the next version.

MR. SHAW: I think your earlier suggestion of pulling together a group of experts to look at this, you will find fits very nicely in the program that we've developed here as I go on in my discussion.

We see that the program needs include an early use of performance assessment, with an emphasis on early, to give some focus to the site characterization activities. As a part of that we would see a structured methodology to assess overall repository performance, and prioritize site characterization activities to address issues and to assist this early resolution of site suitability issues.

The regulatory and licensing considerations which I know are well known to you people, but I will review them from our perspective nonetheless, are that we do have a 10,000 year time frame. That there is reliance on both engineered and natural barriers. And we would even take some argument with the limitation on the engineered barriers with regard to the length of time over which they can be considered. We feel that engineered barriers are quite capable of extending well beyond 1,000 years and their influence on the release from the site.

The characteristics of the basin and range are certainly complex. We see there relatively rapid tectonic processes compared to other parts of the country. And that there is potential interaction among the number of processes and mechanisms that occur in that basin and range.

We see as the overall objective for performance assessment that it should be coordinated with and direct the characterization and data collection activities at the site for the program.

There are requirements for performance assessment methodology that really have not been well established. And we see that the direct probabilistic approach does have many advantages.

Taking that approach we see that direct probabilistics can facilitate quantitative statements about

qualitative interpretations. And we're certainly left, when we have to extrapolate out thousands of years with significant qualitative interpretations from experts. We see that these can deal with both data uncertainty and process and model uncertainty. And it's very compatible with the earth science prediction as used for the EPRI Seismicity Owners Group.

And let me take just a moment to pause on this Seismicity Owners Group because I'm going to talk a bit about what they did over the last couple of years in developing a program.

The issue which was raised by NRC a number of years ago was the consideration as to whether considering the earthquakes that occurred historically at Charleston, South Carolina, especially, whether or not the plants on the east coast were suitably protected against such seismic events. And as a result of that EPRI responded mainly through Carl Stepp by putting together a Seismicity Owners Group. So I want to describe a little bit it's activities as a model that we are using for the work that we would conduct on a high-level waste effort.

The program objectives for this Seismicity Owners Group are listed here. They were: to evaluate the specific issue of the 1982 USGS position on the Charleston earthquake.

Secondly, to evaluate the general issue of possible large earthquakes elsewhere in the eastern US.

Third, to provide a comprehensive data base of eastern US seismicity for subsequent use by utilities at the individual plants.

Fourth, to develop a methodology for seismic hazard assessment at eastern US nuclear plant sites that include possibly large earthquakes; to evaluate the potential effect, if any, on plant seismic margins as they existed.

Now, the program efforts that were there were, first of all, to collect and display scientific data. To develop deterministic correlations and models based on fundamental earth science principles. To evaluate these models in a probabilistic context using fundamental earth science principles. And to develop a seismic hazard calculation methodology. To use the deterministic and probabilistic models to evaluate the hazard and its uncertainty at nuclear plant sites.

Now, the methodology on this viewgraph which is not particularly easy to see stresses in time and in technology the different aspects that we proceeded through. We started here with respect to data on its label "WS-1" referring to workshop number 1, defining the data needs that were required for this activity.

And then first, they looked at tectonic processes and crustal stresses and did this through a series of seminars and workshops.

Secondly, tectonic features and seismic sources, again, a series of workshops and seminars.

And finally, to look at seismicity parameters.

So this gives you a picture of the procedure as it evolved. Now, the makeup was that: first, there was developed a methodology development team. This team was to define the particular methodology that was carried out by these groups.

Then there were actually a number six different teams that were formulated as committees. Each of these had a variety of technical experts in them, so that they were reasonably balanced one to another. There was not one on tectonics and one on geomechanics and so on and so forth. Each of them were to have a range of experts separately, independently, but with shared data. Each of these teams then evolved a study that looked at the various aspects of earthquakes in the eastern United States.

And what came from these teams is illustrated here. This particular picture has to do with the Millstone site in Connecticut. And what it shows is that for the six different teams, whose names simply indicate the lead contractor that was involved, six different teams looked at,

in this particular instance, the annual probability of exceedance of 10 Hertz spectral velocity at this particular site.

So this is simply meant to be a graph that is one measure of the intensity that's likely at this particular site. And you can see that there's a range of determinations of these six different groups working with the same data, having interaction amongst themselves, but each one forced to come to some consensus about what is the likelihood of this particular feature.

Now, as I say, this is illustrative and there were other features, of course, of the earthquake properties that were developed by these teams as well.

But out of this comes and expert opinion as to what is the likelihood of these particular occurrences, and it gives you the range. So it does give you an indication of uncertainties along with reasonable values associated with this.

The outputs of this Seismicity Owners Group and the products were the following, I don't think I'll read through these so that we can move along on this, but you can see the various items that came out of this including reports and workshops.

Some of the lessons here I think are particularly poignant. We can to the conclusion that you used teams, not

individual experts.

Secondly, that you define multi science teams and you require consensus within each team.

Third, you use a structured step-wise approach that reaches consensus and approval at intermediate stages.

Fourth, you develop a procedure that is not complaint, but compliant with fundamental earth science principles. And you allow enough time for definitions, differences, objectives to be resolved. In this particular case, enough time amounted to on the order of three years.

Continuing these lessons: six, define an overall scheme but allow separate applications by team.

Seven, promote communications amongst the team to eliminate the lack of information and to give interteam feedback on the draft results. So that we don't come in with products that, well, one team says, hey, you guys completely forgot about one of these aspects.

DR. MOELLER: But when you have communications, though, among the teams, I guess, that has to be limited so they don't direct influence their ultimate conclusions?

MR. SHAW: No. No, I would say that's not the case. You allow unlimited interaction. And just as the group of you here will interact with each other that doesn't necessarily determine that you have unduly influenced each of them. We consider people of the same stature there who

are independent thinkers and therefore will accept in a reasonable fashion objectively the opinions of others.

So we actually promote the interaction to as great a degree as possible, so that no team is missing on any particular point.

We feel these results are highly defendable because, first of all, a wide range of professional expertise was used. Fundamental data are available for review for each and every group. The basis for expert interpretations are documented. Individual assessments are transparent.

And the NRC and reviewers, in this particular case USGS, were involved in the process as observers right from the start. And the effectiveness in dealing with NRC, Carl Stepp particularly feels, was highly dependent upon this interaction with NRC right from the start. So we were very pleased that they were an active participant.

Now, to take that process and go to what we're going to do in high-level waste, what we have in mind right now going back to an earlier viewgraph is to develop a methodology development team which now says, what could we do in the area of high-level waste? How would we look at the various aspects and put together an overview model?

We are in the process right now of pulling together that methodology development team. And towards the

first of the year, if it seems appropriate, we will be formulating the different teams that will look at the various aspects of how you develop an overview model.

We do see this as being done on a probabilistic sense. And we've developed a couple pictures which assist us in looking at this whole process. There are two logic tree diagrams that we've developed that in this one case looks at the groundwater system framework. These are meant to illustrative of the kind of efforts that we would take here. But you could look at alternative or maybe the better word that's been developed here is "various," various models and boundary conditions that are available for groundwater systems. And then you can look at the various scenarios that come from that particular process.

So in a sense this is process and this is events that would describe a series: geochemical; hydrologic; and then you have the class of potentially disruptive processes such as geologic; tectonic; climatological; and cultural.

And then what you end up with on the far side is, of course, a whole chain that come from these various legs to give you analysis cases or what we've described in another similar viewgraph as being scenarios, the various scenarios that come from this.

This is meant to be another logic tree that looks at the overall repository performance starting with the

engineered barrier; consider site intrusions; geomechanical; et cetera. Other processes that lead you to a whole list of scenarios.

And the whole concept would be here that the scenario would both give you a picture of, what does that mean in terms of the distribution of radioactivities in a particular dose. And it also gives you the probability or the statistical reference to how likely that particular scenario is.

And now this evolution can be done, really, in a fairly simplistic manner looking at the overall site; and then can become more sophisticated as you look in more detail at each of these particular logic tree steps.

So to develop a summary then, our perspective is that you need a performance based approach to characterize and license the high-level waste repository. We feel it's important to develop a methodology for early site suitability assessment for the purpose of identifying and prioritizing the crucial issues. And we think -- well, we know that there is a need from the utility perspective that this program would demonstrate an influence on repository progress.

And the other item I would add to that is our emphasis on the probabilistic approaches which we feel are most appropriate right now.

And that completes the formal presentation I have.

DR. MOELLER: Thank you, Bob.

Mel Carter and then Marty Steindler.

DR. CARTER: Bob, I just wondered, I don't believe you mentioned it, but in terms of the program, what sort of resources are going into it at the moment and do you anticipate -- I think you mentioned that you were going to get increased or had requested increased funding for it, so what level are we talking about on an annual basis?

MR. SHAW: Right now we have formally approved $600,000 for this year. We are also in the process of requesting approximately 50 percent more than that. But we are in the process of negotiating as to whether that additional funds will be made available to us.

But if we're successful we'll be on the order of a little less than a million dollars.

DR. MOELLER: Marty.

DR. STEINDLER: I've got a couple of comments and a question.

You indicated early-on that you think the DOE program is too accepting of regulatory positions; that's a view that may not be shared by either NRC or DOE. But I wonder, you know, my comment is, I guess, that negotiation is possible only among parties with approximately equal power. That's not the case if the regulator is dealing with

the regulatee, and so there's a potential problem that I think you oversimplified.

My question is: having gone through this, I think, fairly rigorous exercise, two issues arise. One, who do you think will be the actual user of the output of this program that you folks are embarking on? And how can it be incorporated into this vast DOE exercise that you mentioned?

And two, do you have some insight as to whether or not parts or all of your methodology are now being pursued by DOE, albeit perhaps not as vigorously and as single mindedly as you might?

MR. SHAW: Let me interpret what you said is three questions rather than two, so I'll comment on your first -- comment first with regard to the licensing.

What we see is that DOE is very much similar to some of the very early aspects of licensing nuclear power plant. When, I would say that, nuclear utilities were relatively naive in the licensing process and tends to be more accepting and less challenging.

As the utilities went through the licensing process for many plants and many utilities there was a maturity that developed that I think gave them an appropriate, more appropriate response to NRC, in particular, technical positions and other issues.

We feel -- and there's already activities underway

here to make available some of the licensing experts and others from the utilities to DOE to possibly influence them to allow them to very quickly come up that learning curve as to how to license plants.

I'm sorry, I forgot your first question.

DR. STEINDLER: Well, I was wondering how you were going to get --

MR. SHAW: Yes, how we're going to --

DR. STEINDLER: -- get a customer --

MR. SHAW: -- how we're going to use this program.

We recognize that the resources that the utilities have indicated most likely would be available to us, are not sufficient to carry out a process of this nature for the full scope of all the technologies that really need to be incorporated appropriately.

It's our hope and intention that we will serve more as a catalyst. That we will by example develop a methodology and process that DOE would be excited about and wish to take over themselves. And that we would have effective communication with them right from the start, much as the Seismicity Owners Group did with NRC. That would allow them to conveniently and appropriately incorporate this, if they see it and we see it, as a successful venture.

And so over the long haul it would be our aim that DOE would be excited by this and say, yes, you've got some

great ideas, we want to incorporate it in our program, can we have it; and we would say, yes, it's all yours, we would be pleased to continue to be involved in some consultant capacity. But I think that would be the limit of it.

DR. STEINDLER: And my final question was: do you have any insight as to whether or not DOE is now pursing a methodology in its programs that is similar to yours?

MR. SHAW: I've been working hard on that over the last few months to try and determine the extent to which that is going on. It's has been the challenge at times to try and find out just what DOE is doing. And there's a number of different groups that have at various times claimed to have an overall methodology that is approaching the whole question of performance assessment. None of them seem to take this particular tact.

In my discussions with people thus far who has indicated quite a strong interest in looking at, for example, outside experts who might be pulled together much in the sense that Bruce Marsh suggested here that you would get volcanologists together and have a seminar where you come to some meeting of the minds as to what is the intensity and the likelihood and so on and so forth.

So I think there are certain aspects of such a model that have been developed. What I haven't seen evidence of yet is any real picture of an overview model

that allows them to rather quickly say, what appear to be the crucial issues that we really have to reduce the uncertainty on in order for this site to look like it's licensable.

There are, I think, descriptive terminologies that suggest that this prioritization is being carried out. But nothing that I would call as really a model that can flow and become more sophisticated and advanced and be flexible, so that with time it can be changed and adapted appropriately.

DR. MOELLER: Bill Hinze.

DR. HINZE: One of the concerns that the NRC, the ACNW, and I believe you had is in terms of the integration of all of this data. And certainly, the SOG concept and the diagrams you've shown here are those that lead to integration. It's certainly based heavily upon integration.

My impression is that this integration is going to, a considerable degree, be developed as a result of the study plans and incorporated into the study plans.

What plans do you have in the works to review the study plans? There are some, what, 113 of these study plans or so that are scheduled to be sent to NRC of which they're going to review, Bob, 20 percent or something of that order of magnitude.

Do you have plans to review the study plans at any

depth, Bob?

MR. SHAW: We're seeking that balance right now that says, on one hand we should be reviewing all the things that DOE has done. And on the other hand it says, but wait a minute, but we have a methodology that we're trying to develop which in some sense is independent of the particular approach.

Now, neither of those in isolation I think is appropriate. And so what I see is appropriate is a blending. It's important for us to, I think, select out particular study plans that are appropriate for the overall methodology and to become aware of those.

And so I think a selective process is probably the way in which we will go.

Steve.

MR. KRAFT: Again, trying to keep the initials straight, Bob's Vice President, John Taylor at EPRI, has informed me in no uncertain terms EPRI is not in the business of review and comment on government documents.

So to the extent that Bob's program has to review or would benefit from reviewing selected government documents to perform the very important activity they're doing, they will do that.

But the ongoing review of documentation is our function at EEI. Our plans at the moment are that -- with

regard to study plans is that it is highly dependent on the pace with which DOE produces them. If they all come out at once, which, of course, they will not do, that is a budgetary hit to our ability that's beyond our control -- beyond our capability, I mean to say.

If they come out much more slowly and we can over the years review them, we certainly will. At the moment the plan is to review the ones we believe are important enough and need to be looked at. But I think by the time it's all said and done we'll have reviewed the majority of them.

DR. HINZE: Thank you.

I have a bit of familiarity with the Seismic Owners Group program and one of the very basic elements, and you alluded to that, is the data base. The data base for Yucca Mountain and the several hundred kilometer region around it which many of us feel is very important to the study is a tremendous amount of data to assimilate, to say nothing about getting a hold of it to begin with.

I will look forward to seeing how you will cut to the critical data and obtain that data. I think this is a potential -- a stumbling block, from my own viewpoint. I'm always concerned that one is -- does not have access to all of the data and therefore either results or suspect.

MR. SHAW: I think all of the comments that you just made could have aptly been made at the beginning of the

Seismicity Owners Group activities in a similar fashion. And so I think the parallel there gives us a nice example to follow, because certainly there was extensive data and very difficult to cut through to the cut data that was involved in that process.

DR. HINZE: Well, I was very active in the first data working group; and I don't see that as, really, any parallel and problem to the problem that there is at Yucca Mountain.

And I'm a new boy on the block with this, but I'm still learning about all of the data that are available and that are important to it.

I want to say, and perhaps you can guide me a bit, in terms of -- you have two points: the SOG point and as a model for your analysis of the crucial issues; and the early performance assessment. I really appreciate your comments about early performance assessment and using that as a basis for developing the types of data that one should collect and the completeness of the data and the precision of it and all the rest.

But I guess -- can you help me a bit. I get concerned about performance assessment at an early stage based upon what I consider to be inadequate data, and making decisions resulting or the results of that performance assessment leading to conclusions at an early stage which

are based upon inadequate data that are not properly controlled by sensitivity analysis.

How does one make certain that the performance assessment is used only in a positive way and not in a negative way?

MR. SHAW: Well, I think it's important as to what you mean by the word "conclusions," obviously. And here I think conclusions rests mainly in the area of guidance. To me it's a lot like a research project where you're stumbling into a new area, the first thing you do is a back-of-the-envelope calculations to see what you know and what you don't know. And as a result of that you identify the areas where you need to know more and you delve into those areas. And sometimes you find, oh, this wasn't the area I needed to know more it's over here. And I made a mistake in my back-of-the-envelope calculation; and therefore you need to refine it.

And we see that as a very natural process. A very acceptable methodology into which we would take this as well. And so I would be very hesitant to say that early-on in the stages of using this methodology that we come to conclusions. That we use this for guidance, for direction for saying, where should the emphasis be that it isn't now.

DR. HINZE: As a scientists I think that's absolutely correct. What worries me about it is that these

things tend to fall in the hands of managers, administrators that don't realize the stage. And I'm just voicing a caution here in terms of the way that the results of early performance assessment are handled.

MR. SHAW: I agree. There's a sensitivity that needs to be considered very strongly here and I appreciate your comments.

DR. OKRENT: It wasn't clear to me what you mean by early; is that in two years or four years? These days early might be a term longer than four years as one looks ahead.

MR. SHAW: I don't think before next Monday.

(Laughter)

DR. OKRENT: Well, I'll go along with that.

MR. SHAW: My time frame in terms of, let's say, a first cut is in terms of a year to a year and a half.

DR. OKRENT: I find it hard to believe that you would deal with all of the major processes on this figure one showing scenarios in that time --

MR. SHAW: I think we could agree -- I could state that I can sit down with a group of experts here and in five days deal with all of those issues and come up with a model. And to me it's just a degree of sophistication that you arrive at, the degree of calculational details, degree of uncertainty, and so on.

So to me it's simply a matter of time and as to how deeply you wish to go on any of these issues.

DR. OKRENT: Okay.

MR. SHAW: Excuse me. One more point I would like to make as a part of this: the emphasis here is on developing the methodology. We do not see ourselves doing a performance assessment. We see ourselves developing a methodology and getting into that a little bit to demonstrate how it can be carried out. But we certainly do not have the resources to do it.

So if DOE doesn't get excited about this particular methodology and think it's something they want to do, we would very likely phase out of it.

DR. MOELLER: Gene.

MR. VOILAND: I thought your curves of sensitivity were exceedingly interesting here. It seems to me what you've done is used a delphin analysis using teams rather than individuals. And, of course, that's a process for trying to get the best out of expert opinion.

And despite the fact that you had six different expert teams all using the same data, there's a spread of roughly a factor of 500 in some of these numbers, which simply reflects the fact you're dealing with a difficult problem. You're dealing with uncertainties in models, uncertainties in data, and there probably reflects a degree

of conservatism.

But despite that spread, if you take the worse case it gives you something that you can certainly justify and work on; and then, I presume then, if you find that some of these values are difficult to deal with, then you have to go back to your engineering and try to give you the degree of risk protection by engineering.

So I feel quite -- how many in this particular situation when you went through and tried to determine the number of events to put your effort on, how many came out of that?

MR. SHAW: I wasn't involved and I can't go back and give you that number. If you wish to have it for your own use I can certainly get it through Carl Stepp.

MR. VOILAND: No. No, it's a curiosity question.

MR. SHAW: I don't know the details.

MR. VOILAND: Generally out of the global number of events that you can identify by just sitting down and writing everything down there will only be a few I think.

MR. SHAW: That was certainly one of the problems was to narrow it down on what were the appropriate events that should be included in the data either because of the quality of the data or the time when it was taken or the appropriateness of the data.

And to take your point one step further, you know,

you talk about the range of a factor of 500 in there. And then one could come to the conclusion; is that factor of 500 something that we can live with? Is that acceptable variation? Or is that a set of data that really needs to be narrowed down in order for the license application to be defendable?

MR. VOILAND: You know, if you started off by establishing, first of all, what does it have to be for me to live with it and you found out that was 100 times less conservative than what you found here, you feel quite comfortable and you would go home and sleep well at night.

MR. SHAW: Right. And we're looking forward to all of you people defining for us what we have to be in order to be acceptable.

DR. MOELLER: David.

DR. OKRENT: In case the members of the committee aren't all familiar with the fact, there is another study for the eastern United States done by experts in a different one, the one done by Livermore. The results don't agree exactly. They don't necessarily lie within what you would call the range of uncertainty and so forth.

And there are, let's say, seemingly advantages to doing it by the EPRI method on the one hand, disadvantages, and the same goes for the Livermore approach.

And NUREG-1150 in reporting seismic risk to the

two plans they examined shows not to choose between the EPRI method and the Livermore method; they quoted risk numbers using both of these just to give you at least a current approach used by the reactor branch.

MR. VOILAND: You know, what suggests itself there is that you have essentially six groups here.

DR. OKRENT: I'm telling you there's another study with expert teams organized in another way.

MR. VOILAND: Sure. But you have six analyses here by six teams and you've got a seventh. I guess what suggests itself to be is to ask the question, you know, why -- how do they differ?

DR. OKRENT: I don't know whether it's six against one or six against six. You want to be careful.

MR. VOILAND: No, I'm not saying any one is right. But I'm suggesting that what would be interesting to do is to look at those and see why they differ. What were the basis of the differences among the six teams?

DR. OKRENT: There are reports on that subject.

MR. VOILAND: Good.

DR. OKRENT: But in the end it's related to both technique and the opinions of individual experts.

MR. VOILAND: Right.

MR. SHAW: Certainly, we're not defining our methodology as the methodology. But rather we're saying, we

feel there is a need to have some methodology that leads to an earlier site assessment for suitability and the need to identify the crucial issues. And so it's in that context that we have defined it.

I would like to thank you very much for the invitation for us to come here and give the presentation. We appreciate your time and -- or pleased that you're interested in knowing what the utilities are actively involved in.

DR. MOELLER: Well, thank you, Bob, and I hope that this won't be the last time you will come and discuss this, because it was a very interesting presentation, crystal clear, and we realize, too, that you had to move along rather rapidly, thank you for that.

And thank you, also, to Stephen Kraft of the EEI, of sharing your thoughts with us.

MR. KRAFT: It was a pleasure.

DR. MOELLER: Those also were most interesting and we'll look forward to hearing again from you at a future time.

The committee will take a 15 minute break.

(Whereupon, at 10:10 a.m. a 15 minute break was taken.)

DR. MOELLER: The meeting will resume.

The next item on our agenda is a status report of

recent developments regarding EPA standard, the 40 CFR 191, and our speaker is Dan Egan from EPA.

We welcome you back, Dan, we're looking forward to a discussion of this subject and hearing what you have to say.

(Slides being shown.)

MR. EGAN: Thank you, Dr. Moeller. By my notes it has been a little over a year since I came to brief the ACNW last, and I appreciate the chance to give you both a quick review of what we've done over the past with 40 CFR 191 and then a little forecast as to what our plans are for the development of this rule, hopefully, through completion to promulgation.

As I say, my topic will be both on the history, to some extent, current status and our plans to 40 CFR 191. I thought it was somewhat fitting to give this presentation on Friday the 13th, I hope I may do a little better than the computer virus that we've heard about lately.

Just to cover real quickly the historical perspective, I would like to put this slide up to remind people that we've been at this for quite a while. We actually started this program back in October of '76, a little remembered fact now, as part of President Ford's nuclear power initiative on nuclear waste management.

It took us quite a long time to develop 40 CFR 191

to the point where we wanted to seek public comment on it. We actually appeared in the Federal Register in December of 1982 as part of the precursory to the Nuclear Waste Policy Act which was passed shortly thereafter.

We spent about six months in the public comment and hearing process completing that in June of '83. And during this same year of 1983 we had underway a review by EPA Scientific Advisory Board, which you've heard a good bit about, with that report I think finally published in January of 1984.

Considering both these public comments and the SAB report, again, took a while with the final rule being promulgated in September of 1985. And unfortunately, from my perspective, we were sued shortly thereafter and the rule was subsequently vacated by the First Circuit Court of Appeals in Boston in July of '87. As it turns out, the entire rule was vacated; both subpart A and subpart B, although there were flaws discovered by the court's opinion only in certain isolated sections of the rule.

EPA went back to the court and asked the court to reinstate all the sections of the rule that were not found to be defective, and the court gave us half a loaf. They refused to reinstate any parts of subpart B which were the disposal standards. However, they were willing to reinstate subpart A which deals with waste management and storage.

So the existing situation as we speak today is, there is a 40 CFR 191 but only subpart A is in place, that which deals with waste management and storage. The entirety of the disposal standards remain vacated and remanded to the agency for further review.

Before proceeding, I just want to run very quickly over a little anatomy of the rule as it was promulgated in '85. As I mentioned, there are two subparts and I'll only speak today about subpart B, the standards for disposal which I think are probably by far the most interest to this committee. I'll be glad to answer any questions on subpart A, however, if you have them.

Subpart B consists of many discrete parts. We, first of all, had the numerical containment requirements which are the now well known release limits over 10,000 years; and this is the section of the rule that is probabilistic in nature.

Complementing this in what the agency has always felt was an essential part of that were the qualitative assurance requirements. We then had individual protection requirements, which I'll talk about more in a minute, groundwater protection requirements, and Appendix A which had the release limits for the containment requirements. And what we felt was fairly important in the final rule was a set of guidance for implementation to amplify how EPA felt

the containment requirement should be implemented.

DR. MOELLER: Excuse me, Dan. 191.14 is quality assurance?

MR. EGAN: Qualitative.

DR. MOELLER: Qualitative assurance.

MR. EGAN: [illegible] a distinct difference, they have no direct relationship to quality assurance requirements at all.

DR. MOELLER: Thank you.

MR. EGAN: They are instead qualitative principles that the agency feels are quite important to the act of disposing of these waste.

And let me spend a little more time on the substantive sections of subpart B before I go further.

Again, to amplify, the containment requirements as they were published in 1985 due to limit total releases over a 10,000 year period and to cover both expected and accident releases within a range of probabilities that are defined in that section.

The assurance requirements which we have always felt were an essential second pillar, if you will, to the containment requirements are qualitative principles that complement the containment requirements and establish things, for example, as the agency's policy on a partial limited reliance on institutional controls that we think

should be considered, wind projecting, a performance of repositories over this 10,000 year period. And there are other such qualitative provisions as well.

And in sections to the rule that were added to the final rule that were not in existence for the proposed rule in '82 are individual exposure limitations and protection on concentrations in groundwater that applied to only a 1,000 year period and applied only to what we called undisturbed performance. Specifically, they did not apply to accidental situations.

Now, as I will discuss a little later, this is in fairly sharp contrast to some of the regulatory approaches that are being considered by the Europeans. We are focusing much more on individual exposures for a substantially longer period of time. And some countries are also considering applying those individual exposure limitations to accidental situations. We have felt that is not appropriate and as you will see in a moment that part of the approach we are not planning to reconsider either.

DR. OKRENT: Do you have a definition of --

MR. EGAN: Yes, there is one in the -- both the standard and -- the standard as promulgated and the working draft, which I could read it, if you wanted me to. We felt that was fairly important.

Now, let's talk for a minute about why the court

remanded the standards and there were three principal reasons the First Circuit Court of Appeals felt that we had not done an adequate job in preparing 191.

First of all, they found that the agency had been arbitrary and capricious by being inconsistent with the Safe Drinking Water Act. In particular, the court was not convinced that disposal of the types we were regulating, disposal of high-level waste or transuranic waste in mode geologic repository was not, in fact, something that was covered under underground injection. The court was not convinced that this type of disposal was not underground injection and therefore should not be covered by the underground injection control regulation that the agency has promulgated under the Safe Drinking Water Act.

It is our feeling, which I'll state right away because we want to get it on the table, that EPA feels that disposal in mode geologic repositories does not constitute underground injection. And we are prepared to make an argument in the preamble to the rule that we will come out with stating that that is, in fact, the case. It is a different -- totally different type of disposal, and basically explaining our rationale for not including this type of disposal under the underground injection control programs.

We have similar language in the preamble to our

low-level waste standard which we would like to propose for public comment. However, those have been sitting for some time over at the Office of Management and Budget. But that position has been as part of the low-level waste package coordinated through the agencies, so we don't anticipate any difficulties within the agency.

And we think that we will be able to make a fairly compelling case that despite the court's interpretation that, in fact, we are not dealing with an underground injection problem when we talk about high-level --

DR. MOELLER: Your microphone is almost lost.

MR. EGAN: You said it was Friday the 13th.

There, is that a little better.

DR. MOELLER: Yes, thank you.

MR. EGAN: A second point that the court found was arbitrary and capricious was they felt we had not adequately justified the use of a 1,000 year period in developing the individual protection and groundwater protection requirements. This at the time was based largely on a trade-off of what was reasonably achievable of reasonable cost versus difficulties we saw in extending the period for a longer period of time, for example, 10,000 years which comes to mind as a fairly natural place to possibly extend those standards.

The court found that the arguments we have used in

the preamble to the final rule were not adequate and remanded the rule back for reconsideration of this point as well.

The third reason the court remanded the standards was not a finding of arbitrary and capriciousness, but rather that we had merely not provided adequate notice and comment for the groundwater classification scheme that we had included in the final rule that had not been in the proposed rule. Therefore the court remanded our groundwater protection requirements, not because they found any defect in them per se, but because they found that we had not given the public adequate warning that we were going to proceed with the classification scheme of the type that we promulgated in 1985.

So from the court's point of view we had two points that the court felt we had inadequate policy; and one point where the court felt we had inadequate procedure. So against this basis the agency proceeded to begin a program to redevelop these standards, and hopefully with all due speed repromulgate them.

Now, what I want to spend some time on and most of the morning is to give you, first of all, a flavor of some of the major issues that we plan to consider as we redevelop 191. And in a couple of slides from now I'll contrast those with a set of issues that we don't plan to consider.

Because we don't consider 191 as a regulation that has been sent back completely to the drawing board. In fact, we plan to build very strongly on the existing rule making as few changes as are possible to put forth what we consider to be a responsible regulatory package.

First of all, we will, of course, be considering our consistency with the Safe Drinking Water Act, not from the point of view so much that we think this is underground injection, although we will be explaining our policy in that regard. But looking at the exposure limitations established by the Safe Drinking Water Act which are as the interim drinking water standards establishes as you know are limitation of 4 millirem per year to people who use drinking water, to determine what situations, if any, we should apply that 4 millirem limit to in this regulation. So that will be one major area that we'll be considering in the redevelopment of 191.

Secondly, of course, will be considered the period of which we would extend individual exposure standards. That's an issue we must address by virtue of the court remand. Is 1,000 years adequate? Should it be a longer period of time? There was no reading from the court ruling that a shorter period of time was what the court had in mind; it was fairly clear that the direction the court thought we should be looking is longer and not shorter.

Thirdly, we will, of course, be seeking public comment on the groundwater classification scheme and the groundwater protection requirements which will also have a period of time associated with them.

And these first three bullets on this slide will be the -- those things we must address in redeveloping 191 to satisfy the details of the court remand.

We don't plan to stop there, however, because we think there are a number of other things that have changed that we must consider in redeveloping the rule.

First of all, we feel that what I call rather broadly here, experience with site evaluation needs to be considered. Let me give you a little more detail on what I mean by that.

When we promulgated 191 we were back under environment established by the Nuclear Waste Policy Act where we were considering, you know, five or six sites with a principal of selecting three sites for detailed characterization with those sites to be characterized at some considerable expenditure and then ultimately narrow it down to one.

It was sometime after that that Congress passed the Nuclear Waste Policy Amendments Act, which we all know now, changed that approach to focus strictly on Yucca Mountain. That's an area in which we feel we have to be

sensitive to as we adopt our regulation, particularly as we do performance assessments of the type and scope that we feel are essential for developing our rule.

Secondly, there has been in the transuranic waste arena, of course, a great deal of experience with the construction and evaluation of the WIIP site which is another facility which is covered by 191, although it's not a privy to this committee; it's one that we also have to spend a great deal of attention to and we're evaluating the findings that DOE is making with regard to the projected effectiveness of the WIIP site as well.

And both of these redirections in the national program are things that, as I'll go through the working draft number one, I can show you areas where we're being sensitive to evolutions in the national programs and the sites that are being considered as part of those.

Secondly, under the area of non-court remanded issues we're also being very sensitive as we can to coordinating with our sister agencies in developments and related rules. Specifically I had in mind here, of course, 10 CFR 60 from the NRC and 10 CFR 960 which are the site selection guidelines that DOE promulgated as part of its Nuclear Waste Policy Amendments Act responsibilities.

In both cases we interact with the respected agencies and are continuing to do that to find out what

changes they are making in their rules; what experiences they are having in grappling with the implementation of 191 as both agencies have been doing, and trying to find out where we may be able to make changes in 191 and still preserve the basic environmental protection intent of the rule, but perhaps may facilitate more readily -- more ready implementation of the rule.

Finally and really an upshot of the first point I made here in the italicized lines is, we are also updating the performance assessments that we prepared as part of the 191 package that was promulgated in 1985. And let me explain a little bit of what I mean by that: we are not doing performance assessments of the scope or magnitude that you've heard described about DOE's program. However, we have done for 191 in the past and are attempting to do for the revised 191 relatively quick and dirty performance assessments that give us some flavor of what's reasonably achievable in terms of environmental protection for the primary national program that we're considering.

This is, as it is for most EPA regulations, a primary area of consideration in developing a rule. And we are trying to get a flavor again for Yucca Mountain, for the WIIP site of how their projected performance compares both with the performance assessments we did in 1985 for the suite of sites that was then being considered under the

Nuclear Waste Policy Act. And ultimately just, you know, on their own lights as to what level of protection is available for those sites under different sets of assumptions about engineered barriers, for example, different sets of assumptions about how the sites perform geologically.

We are having some difficulties in getting some closure to using in this area and this has reflected some of the slips we've had in our schedule. And perhaps the next time I come to talk to ACNW I can give you a projection of what we've done in our performance assessment process. I cannot, however, do that now because we don't have any results that are available to discuss with you at this point.

DR. MOELLER: Do you have a methodology for it?

MR. EGAN: We have a methodology, for example, for things like individual protection and concentrations. We've been trying to use the F-TRAN program that was developed for NRC by Sandia National Laboratories. We are finding some difficulties in applying that to the WIIP site which happens to be the particular area we're working on right now. And we're evaluating whether we need to go through a different computer code package, and again, I don't have an answer to that. But that happens to be one of the thickets we are laboring away in right now.

DR. OKRENT: Are changes in climate included in

what you're doing? And also, does that fall into the category "undisturbed?"

MR. EGAN: The changes in climate would fall under the category of "undisturbed" by my personal estimation. Changes in climate are something we're looking at to see whether they need to be considered in terms of our performance assessment, whether there is a serious issue relative to the sites involved. Again, I can't say we're to the point of scenario selection yet because we haven't gotten that far. But it's something -- it's definitely within the scenarios we're looking at in the first screening, whether we keep climate change in under the performance assessment we'll do yet, and how sensitive the performance assessments will be to climate changes, I can't tell you. I would like to be able to, and the next time to speak I may be able to.

DR. OKRENT: And do you think you will be able to predict some changes in climate with some probabilities?

MR. EGAN: We probably would do it with a probabilistic range if there was data available for that.

DR. OKRENT: But that's a big "if."

MR. EGAN: That's a big "if," I agree with you. And also, under what time frames that would be a consideration. I know that we have just gotten in hand two reports from contractors that we have asked to look at

scenarios, both for Yucca Mountain and the WIIP site, and in both of those climate changes one of the scenarios considered. I remember reading one of the reports that there was an assumption made that the infiltration rate at Yucca Mountain would soon to be .5 millimeters for the first 5,000 years and then increased to 7.5 millimeters for the second 5,000 years; a substantial change in climatic conditions.

I don't know yet whether we will actually use that scenario that way. But there are assumptions being built in or being considered in some of the scenario screening that we are going through now that try to grapple with changes in climatic conditions and seeing what the effects would be on the repository.

I need to get the results of those myself to see how it all turns out.

In your package as I discovered this morning you do have a copy of working draft number 1 of our rule. And something I very much like to do in the rulemaking process is make it a very open process. So what working draft 1 is, is literally an internal document at EPA. However, we have distributed it to those interested government agencies and the like, so that as we develop the rule, you know, well before we get into the formal public notice and comment period we do have a device by which we can interact with a

variety of parties just to gather opinions and basically collect more information and more knowledge than we have available just to ourselves within the staff.

So working draft number 1 is the first of the series of working draft that we'll prepare on 191 and circulate from time to time as a device, just to make this a fairly consensual process to the extent that it is at all possible. A perhaps note in the previous rule and the draft of the previous ruling, I got to working draft 23 before we got a proposed rule out. I hope I don't have to go that far this time.

DR. MOELLER: Do the various government agencies, are they pretty good in submitting formal comments?

MR. EGAN: Well, we don't look -- because it's informal process we don't then necessarily look for formal comments.

DR. MOELLER: Formal, okay.

MR. EGAN: What we usually do -- in fact, we're in the process of scheduling them right now for working draft 1 -- we'll hold meetings with NRC, with DOE, for example, staff to solicit comments. We will also have the conference calls, for example, with the involved states: Nevada, New Mexico, and other groups as well, there is no need to go through the whole list.

DR. MOELLER: Okay.

MR. EGAN: But to trade opinions and get information from those groups as well. We try not to make it so much a formal letter writing campaign because that makes more work for everybody. And there is a time for that. You know, when you go through the notice and comment process that's the time for formal positions to be taken.

There are some groups that are better served by writing to us; we are glad to accept written comments, but it is not a procedure we demand of our sister agencies. We are just as happy to sit down in a comment setting and go over that.

Let me go over with you some of the key changes that are in working draft 1, changes from the rule as it was promulgated in '85 and just touch upon a few reasons why we've made some of the changes, give you some background behind some of it. Also, indicate some areas in which I think I may have had a few bad ideas. That happens as part of a working draft process. There's a few of these I already know that I want to change, that the feedback has convinced me that that wasn't quite the right thing to do.

First of all, we have been considering some changes in subpart A, that part of the rule that actually is in effect. In particular, we now plan to implement somewhat belatedly a recommendation that was made to us by EPA's SAB, that we get up to an effective dose equivalent concept in

subpart A. And we're finally breaking the tie to Part 190. We're not going back and revising Part 190, which is a rather old rule at this point. But are finally saying that now we need to put effective dose equivalent as a primary concept in 191.

And we're also considering changing the coverage of 191 somewhat, so that rather than just applying to DOE disposal facilities, it may apply to DOE waste, you know, waste management at DOE facilities that aren't envisioned for disposal, but also do waste management. For example, Hanford, Savannah River, Idaho, the Big Reservation, and seeing whether it wouldn't, in fact, be more practical to have 191 apply there as opposed to in this case the Clean Air Act standards that are being considered under NESHAPS, because those two rules are coordinated in such a way that the Clean Air Act standards do not apply where 191 subpart A applies. There's a coordination between the rules and there are some reasons to consider that it may be more beneficial or more appropriate to apply 191 subpart A rather than NESHAPS.

Secondly, we war also adopting in working draft 1 the agency's groundwater classification strategy that has been under development for a number of years. This is something -- this is what is class 1, 2, and 3 aquifers appear in the working draft 1 definition which are a much

broader classification that we used in the rule promulgated in 1985.

I note that in Dan Fehringer's comments on the rule to the Board he characterized this as the classification scheme as the most -- something like the most unworkable mess imaginable. I'm not sure I disagree with Dan particularly on that, it's not a classification scheme that our office developed. It's one that is coming out of the agency's broader groundwater protection policy where it in itself is not yet a final agency position either; that is still under review. And whatever we do, however, there is a strong likelihood that we're going to try to be consistent with the agency's approach to groundwater classification. So this rule is, to some extent, hostage to the developments under the groundwater -- the broader groundwater policy.

Finally -- not finally, but nextly, if you will, we're -- in the working draft we put a provision in that played with some consideration for undisturbed performance only of a 100,000 year time frame for the containment requirements.

My motivation for this were a couple. First of all, before the Nuclear Waste Policy Amendments Act we did have a device that the 100,000 year time frame was going to be considered. That consideration was going to come from DOE site selection process in narrowing the sites that were

to be considered from three sites to one. Because at our request DOE had included in 10 CFR 960 a provision that called for projections of long-term releases from undisturbed performance to be done over a 100,000 year period as part of the site selection process.

Having such projections done quantitatively and being considered in the site selection process we felt was a fairly qualitative, fairly non-binding, but yet appropriate way to build some consideration of that longer post 10,000 year time frame into the selection of sites and design of repositories. And as a result we then chose not to include, even though we had an EPA SAB recommendation, for example, to consider a longer period of time, we chose not to consider time periods longer than 10,000 years in Part 191.

Yes, sir.

DR. OKRENT: Actually, if I recall the SAB recommendation it was that in the comparison of sites to be done.

MR. EGAN: In site selection process.

DR. OKRENT: And that was the only context there.

MR. EGAN: That's correct; that was the context.

DR. OKRENT: So it was not a suggestion that one looked at 10,000 years in the way the new draft does.

But I can think of two different kinds of points that come out of this bullet. One is in the SAB report

there was a specific recommendation that unless EPA could show that the probabilistic approach was truly workable it would go to some other approach, because the SAB was asked, is this the approach to take. And I must say, I've looked at the -- now that I have finally gotten a copy of the response I think the response is rather too small for the importance of the question. And I haven't heard yet -- I hope we'll hear some time today a serious assessment on your part of the workability, aside from the fact that you're having some studies done which I think doesn't really has what comes up in a real site, as I see it.

But there's a different point: I earlier asked you about, would you include climate and undisturbed -- this is a man-made event. If we think of man-made events in a negative way, and this is what we're doing there, why then don't we think of man-made events in the positive way.

And if you look at the probability that over 10,000 years, in fact, cancer will not be disgorge is, and that radiation will not be disgorge is, in fact, I -- my guess, although I'm not a doctor, is that it will be easier to get a consensus of opinion in the medical world and the molecular biology world and so forth, that long before 10,000 years you will have these things in hand while you're still struggling to figure out what's the likelihood of a volcano or an earthquake or climate change as it were. Yet,

you don't allow for this at all in your standard. And to me it's a philosophical imbalance. And if you're going to go to 100,000 years it just becomes -- both of those problems become worse, trying to prove that you can do something; and also, not allowing for what society is going to do if you just look at the current, what's happened in this century or in the last 50 years, the last 20 years.

So it seems to me that it would be well worthwhile, even though you've been working a long time on this, to rethink what this time period means and whether these release limits that far out are as important as they appear to be if you do a calculation by the current recipe with what we know today about treating cancer.

MR. EGAN: Let me try to respond to at least pieces of that, if I can, as best I can.

First of all, we do plan to do some reconsideration of the time frame, not just for the reason I've already sited, but where I want to finish, the reasons that we're reciting is that, over the summer I had the opportunity to be exposed to some of the thinking of the standard setting that is going on internationally, other countries that are also grappling with the same problem.

I was invited to participate in a workshop that was hosted by the West Germans who want to adopt, I believe, a 10,000 year time frame as we have and we're struggling

mightily, we're trying to justify that short a time period compared with a number of other countries that are, in fact, as the IAEA is, also, is looking at substanti... longer periods of time for standard setting and tryi... get a feeling for, you know, how -- what type of philosophies other countries are struggling with. That is one of the reasons I have been looking at trying to see whether there is a productive, if you will, non-destructive way of looking at a longer time frame as part of 191, given that the previous vehicle that we had under the site selection guidelines that DOE did was largely invalidated by the congressional action in 1987.

There is no longer a comparison of sites that's going to be made. That comparative site selection process no longer is part of the national program.

So the vehicle we had, and we can point to, to say, this is how we mean to consider time frames beyond 10,000 years no longer is available to me.

In hindsight and the way we put 100,000 years in working draft number 1, I am now becoming convinced is not a workable solution to the problem. It was never intended to address a probabilistic approach in any case. I never thought that extending probabilistic calculation over 100,000 years would begin to be workable. And if it has been read that way, that's clearly a miscommunication on my

part. It was intended to apply only to undisturbed performance situations. Even there I'm becoming -- I had some questions as to whether that consideration is something of a quantitative calculation in comparison with quantitative numbers as something that's going to be workable for 100,000 year time frame.

What I'm now considering is whether there's a way to make a qualitative provision in the new assurance requirement, for example, that would somehow capture a requirement to do calculations for a longer period of time without establishing a current numerical test to judge the acceptability of those calculations. to see if we can find a way to build again some adequate consideration of this longer period of time.

I'm also going to be curious to see what the results are in a performance assessment workshops that are now being held. In fact, were held -- being held this week in Paris of international approaches to performance assessment to see how other countries are struggling with this long-term calculational problem as well.

So we are trying to spend a fair amount of attention to assess in response to that SAB recommendation the workability of both the probabilistic approach; and also, the workability of the longer time frames and different approaches toward grappling with that position.

The US finds itself at the moment in a minority position among free world countries in having regulations or developing a regulatory strategy that focuses on so short a time frame, which is to me always a very interesting way to put that question. There are perhaps two or three countries that are looking at 10,000 years; most of the -- the rest of them are still talking about, albeit they are not as far along, odd words again, in the regulatory process as we are. But are talking about much longer time frames and how well they can come up with approaches that we might then reflect in our rule as something that we'll be spending the next several months looking at.

The cancer question I can't really grapple with too well other than I don't think EPA as a policy matter is likely to ever write a regulation that would allow environmental degradation of any kind because a cure of cancer was to be relied upon to be the answer to that environmental degradation. That I suspect is a public policy perspective, probably not a workable solution. We may agree or disagree with that observation, but it's not something that I think we'll be able to get very far with in trying to get a regulation out the door in my agency.

Let me move on then to some more of the points and changes in working draft number 1, and then perhaps we can come back to some of these points in the question -- the

question and answer session at the end of the presentation.

Fourth, a new provision in working draft number 1, again, is an attempt to frame in ALARA type of assurance requirements that was in the proposed rule that we dropped in the final rule. And again, we dropped it for a couple of reasons from proposed to final in the previous rulemaking process.

First of all, we dropped it because again at that comparative site selection provision that was in DOE site selection guidelines. We felt by having DOE commit to that long-term quantitative projection in making comparisons between sites based on that, that would tend to encourage an ALARA provision or ALARA principle in the site selection process, so that it would not longer from that point of view be required for us to have an ALARA provision in our rule.

Secondly, we felt NRC in developing 10 CFR 60 and establishing the engineering control requirements that it had, had established for the purpose of the high-level waste program engineering control requirements that we felt were a pretty good reflection of ALARA. We thought NRC basically did a pretty good job in 10 CFR 60.

So that based on those two principles we decided, all right, we don't think it's essential that we maintain an ALARA provision in the final Part 191.

Again, two factors mitigate against that

philosophy. First of all, again, we've lost the site selection comparison process that we had in 10 CFR 960 by the congressional action in 1987. We no longer have a comparison of sites looking as one site to be better than the other. And not making that the only decision criteria, but at least having it available in the decision process.

Secondly, and something that was always there but we hadn't thought about, evidently not back then, is 10 CFR 60 as good a regulation as we might feel it is doesn't do anything for the WIIP. And the ALARA issue and engineered controls for the WIIP is one that increasingly we're struggling with and the WIIP project is struggling with; and I think there are some very good developments that are underway in that program. But we think the ALARA concept really does have something to offer in regard to the selection of engineered controls, not so much again for the high-level waste program where we think that's been adequately covered by NRC in 10 CFR 60, but in the design of engineered controls for disposal systems that 10 CFR 60 would not apply to.

Therefore we are considering very strongly of reinstating the ALARA principle as an assurance requirement in this rule. And again, be very careful with how we word it so we don't create a regulatory requirement that's unworkable, which one that captures our intent in trying to

encourage rather regardless of what numerical predictions say, reasonable judgment in selecting both sites and engineered controls that will keep releases of radioactivity to reasonably achievable levels. That is, as low as reasonably achievable without, you know, having overly -- the overly restrictive interpretations of ALARA that cartoons of ALARA sometime represent.

ALARA has been a radiation protection provision that has been with us a long time. We occasionally gripe about it but it's one that has been very productive. And we think it's one that perhaps should be maintained in the disposal program as well.

Finally, of course, changes in the working draft, the latter two, there are series of options in the working draft and these primarily refer to those principles that are associated with the court remand. And there are two -- the two dimensional grid I've constructed there really does two things. One, it applies the 4 millirem per year standard in increasingly broader characterizations. At one end it doesn't apply at all, 4 millirems doesn't appear in the standard at all.

At the other end it applies it to people who drink groundwater from any of the three groundwater categories that we consider. Actually that's not true. Through all of the drinkable groundwater categories: categories 1 and

categories 2.

And the other dimension of the grid is to take those same individual protection and groundwater protection requirements and apply them either for 1,000 years or 10,000 years. And with that little two dimensional grid of options what we will then do is, once we get our performance assessments, and here I'm talking only about the undisturbed performance part of the performance assessment. Once I get the undisturbed performance projections available for, again, both Yucca Mountain, the WIIP and some of the old sites that we're still looking at just to give us a comparative tool, we will then try to assess the practicality, both economically and in the regulatory sense of choosing any one of these. I think there are six options in there, it's a two by three grid. And seeing which of these are most practical to implement.

And then, also, probably seeking public comment on some range of those options as well before we make a final selection.

DR. OKRENT: Just a small anecdote: before the SAB review there was no individual protection clause.

MR. EGAN: That's correct.

DR. OKRENT: In fact, I'm probably the one responsible for the recommendation in the subcommittee which said that there should be some such protection for several

hundred years. And it was my own thinking that people are most concerned about their grandchildren and great grandchildren and after a certain window it blurs.

And this then became a recommendation for 500 years when the full committee rounded it out. When EPA got to it, it was 1,000 years. And now you say -- you interpret what the judge says is, why not 10,000 years. And, in fact, the whole process is independent of the original concept of why it was proposed. And it's just -- it makes one wonder are there -- what are the philosophic bases for some of these things? Are there any?

And I find in this case, whatever it is it isn't the one for the original proposal. And had the original suggestion not been made there wouldn't be any possibly. So it's a very curious development, in my own mind.

MR. EGAN: As not the father, but a contributing father I understand your frustration. The SAB recommendation was not the only reason that we adopted this provision.

Again, we also were grappling with the way -- being consistent with what was being done internationally, but doing it in a way that we felt had some chance of being practical. And hence, the inclusion of individual protection requirements that were limited to 1,000 year period, and also, limited only to undisturbed performance.

And that second limitation I continue to find to be a very major one. I somewhat shutter at doing a probabilistic assessment for accidental events of individual exposure in trying to get regulatory closure on that type of process.

But the best -- the only hope I can offer you is that there is no -- do not read the inclusion of a 10,000 year, option year as an indication that the agency is committed to that approach, particularly. We do really -- we had to look very strongly at the practicality of doing an event, an individual exposure rule for that type of time frame; and are fully prepared to be responsive to the answer that it may not be practical. That is indeed one of the conditions we're going to look at very closely and the performance assessments and the process of developing the proposed rule and the evaluating comments we receive on it. So it is not the foregone conclusion that it will extend to 10,000 years.

You are correct in that there was no -- there was a certain amount of discounting philosophy that was implicit in the SAB recommendation that you authored. It is certainly fair to say that the court ruling had no sympathy for that type of philosophy whatsoever.

And that's just kind of an observation on what transpired in the regulatory and legal process that evolved after the SAB report was received by EPA.

Let me go on to my last slide and I think we might have a fairly productive discussion and also I can see a little better when we get the lights back on.

DR. MOELLER: Could you remind me as you change slides, the 4 millirem, was that an effective dose equivalent?

MR. EGAN: It is certainly the way I'm using it in working draft number 1.

DR. MOELLER: Thank you.

MR. EGAN: I would have to go back -- it was not an effective dose equivalent in the initial interim groundwater standards and I don't know -- excuse me, interim drinking water standards, and I don't recall, I believe there is a rulemaking to try to update the drinking water standards to effective dose. I don't recall where that stands in the rulemaking process.

DR. MOELLER: Okay, thank you.

MR. EGAN: When I use it, it's effective dose equivalent.

Let me just touch on real -- not real briefly, I'm going to touch on some of the things we don't plan to consider. As I said before, we're not, you know, taking 191 and throwing it out and starting it over. There's a number of issues that we're satisfied after the process and the court ruling that we don't think require us to go back and

redo.

Number one, we still plan to have release limits. Curies over 10,000 year period, and both of these two points I'll talk about now, as the primary numerical standard. There is no intention to deviate from that basic approach. And there is also no intention -- my third bullet -- to deviate from the approach of having a probabilistic rule and including -- and therefore including accidents -- accidental releases in this release limit over 10,000 year structure.

We are -- and this is where I'll now get back to one of Dr. Okrent's earlier comments -- we are sensitive to the SAB recommendation that we evaluate the workability of the probabilistic standard however we formulate it. And that may be read to mean that the specific numbers that are in the 191 as promulgated could be revised if we find that there is serious impracticalities in implementing them from the experience we see as both NRC and DOE and is the NRC and DOE performance assessments that I will look to primarily for this determination, as to whether it's going to be practical to implement the probabilistic standard as we have defined it.

DR. OKRENT: Have they done a performance assessment that is adequate for what you need? I haven't seen it.

MR. EGAN: I haven't seen it either; and that's

part of the process that we will be interacting with the other agencies on to try to find out. I have interacted some in another arena with the WIIP project. They haven't done it either, but they're embarking on an approach that leads me to believe that they are going to do it. And I don't have to make this final determination, of course, until I promulgate a rule -- and we will talk about that later. But what I will need for a proposed rule is some projection of whether I think an adequate approach in the numerical structure that we've defined is likely to be available when needed. That is, when I promulgate a rule.

And it's also very useful for us at EPA to be going through a performance assessment process, albeit somewhat simplified ourselves, because it makes us get our hands dirty in the same numbers and the same uncertainty and data. And it's not easy to do which is sometimes why we slip some in our schedule when we talk about getting the rule out. But it is part of the process. We think it's very important to putting out a rule that can be practically implemented.

And having said all that, that's as far as I want to go with this at the moment, but I will be glad to come back to that later as needed.

The assurance requirements is a section that the court found no defects in. As mentioned before, I'm

considering adding one or two assurance requirements. However, I'm not considering deleting any. We're not talking about taking any of the ones that were in the final rule before out.

So the existing assurance requirements are an issue that we're not considering changing in any way.

And importantly, as a summary point, the primacy of this couplet of the containment and assurance requirement is the primary regulatory strategy that the agency is pursuing is not going to be changed. In other words, we are not talking about substituting an individual protection requirement, no matter what time frame we use as the primary regulatory structure that we see as applying tc high-level and transuranic waste disposal facilities.

And finally, with respect to individual dose requirements there is no intention to broaden their applicability beyond undisturbed performance. That is, we do not plan for accidental releases to be regulated by individual exposures.

Again, although there are a number of countries that are proceeding along that direction, I wish them well. We have never, in our judgment, seen that as a practical thing to implement. And for the same reason that Dr. Okrent is concerned about implementing that probabilistic structure that we do have already, my own threshold of judgment is to

extent that to an individual exposure approach, I think is clearly unworkable process and does not add, again in my opinion, significant environmental protection over that which we get from the containment assurance requirements already.

With that a summary of those things we don't plan to change. And if there's anything there that people have their heart set on changing, I suppose we can talk.

Finally, the conclusion, this is the current official schedule, if you will, of the 191 development. We're hoping to wrap up our performance assessments, and again, I emphasize the relative simplicity compared to what you've seen from the other agencies, by relatively early next year, February is the target. With the hope of proposing a new rule for public comment in June of 1990.

We would then spend a couple of months doing a public hearing process to August of '90. And then would allow ourselves a year plus a few months to develop a final rule. The target of promulgating a final rule in January of 1992.

Now, I suspect if I come to brief you all on about the same period of time next year I'll probably have a new schedule, is my personal guess, but this is what we're working to now and what we hope to achieve if at all possible.

You will be seeing, I'm sure, working drafts as they filter around and seeing the evolution of a regulatory thinking well before this formal time scale. And that I think becomes one of the benefits of the working draft process, they'll let you get kind of a window into our thinking of how we're developing the rule as we go along.

And with that I appreciate the opportunity to brief you all. I'm perfectly happy to answer any questions I can in the time available.

DR. MOELLER: Thank you.

And we'll open it for questions.

David Okrent.

MR. EGAN: Starting there we may never finish.

DR. OKRENT: No, they're limited.

Again, I'm trying to understand how you interpret "undisturbed." And when I read the definition it says: "Means the predicted behavior of a disposal system including consideration of the uncertainties and particular behavior. If the disposal system is not disrupted by human intrusion or the occurrence of unlikely natural events."

So order of magnitude, what makes something unlikely in your mind -- EPA's mind?

MR. EGAN: I haven't tried to put a quantitative interpretation on that. Let me give you some thoughts totally off the top of my head in which I may --

DR. OKRENT: I did that yesterday, so it's fair enough.

MR. EGAN: I may live to regret them, but what the heck.

For the purposes of undisturbed performance here is certain -- let me make some limiting statements. Certainly anything with the probability of less than one and ten I would consider to be unlikely for that purpose.

DR. OKRENT: We agreed on that one. Interesting.

MR. EGAN: Less than one and two would probably strike me as little bit too restrictive. So something in there would probably be aware -- it would come down, if forced to in numerical.

DR. OKRENT: Then what does "human" -- we talked about climate changes. But if they result from, let's say, the greenhouse effect, is that human -- the same as human intrusion? I'm just trying to understand again what the standard -- what it means.

MR. EGAN: I think what I would probably say is, no, that is not human intrusion. Because that would be something that would be caused by an activity entirely external to the repository and not in the immediate vicinity thereof.

If the greenhouse effect was something tnat people were projecting was likely to occur, kind of an unavoidable

consequence of what man was about, I would say you probably have to consider that as part of undisturbed performance.

DR. OKRENT: And one would have to estimate what man is going to do to try to prevent it.

Can I go on. I realize that I don't understand the philosophic basis for, what I'll call the risk aversion feature in the remanded standard. That is, you asked for that you not exceed by more than one chance in ten the limits in the table. And you not exceed by more than one chance in a thousand, ten times the limits.

MR. EGAN: Right.

DR. OKRENT: And why I say risk aversion is you go by a factor of 100 for a factor of 10. What is it -- were you trying to protect against some kind of situation or what was the reasoning for this? Why the second term? Could you help me a little.

MR. EGAN: Two factors in the thinking. First of all, and this is -- as you were somewhat the father of some of the SAB recommendations, there are some things I was primarily responsible for. I do believe philosophically where it's achievable -- I'll come back to that point in a moment -- in risk aversion and standard setting. I think that there is a real principle in trying to limit larger consequences, perhaps more strongly than smaller consequences in terms of a PC waiting, probability times

consequences.

I think there have been many examples where risk aversion approach has been one -- when it's been tested -- has been one that the public has very strongly asked for, whether it's reasonable or not, given the economics of a situation which is where the second point comes in.

The second point comes, we also, based on the performance assessments again that we did, we looked at what was reasonably achievable. We looked at the CCDFs for the various models that we had put together and found that the numbers that we had at the time, again, for the performance assessments in hand at the time in each case, that when we proposed the rule we had lower probability numbers in the proposed rule and they were 10 to the minus 2 and 10 to the minus 4 respectively.

DR. OKRENT: Yes.

MR. EGAN: And for the final rule, the numbers you quoted, in both cases they reasonably tailored what we thought was reasonably achievable, the CCDF, from the existing performance assessments that were in place.

So for the final rule based on: (a) what appeared to be reasonably achievable from the performance assessments I had in hand at the time; and, (b) believing that there was a reasonable principle at risk aversion as a standard setting philosophy we chose the numbers we chose.

That has an implication for the degree development of the rule. As we go back and again look at the performance assessments those numbers may, in fact, change. They may wind up being risk averse. I suspect they will not be the inverse; I don't think we will ever get to that situation. But the exact level of the two numbers, not so much the one and ten, but the level of the one and 1,000 is something we will be looking at.

DR. OKRENT: If I can make two comments. One, in fact, when the safety goal policy of the Nuclear Regulatory Commission was developed, first, the straw man approach proposed by the ACRS included risk aversion concept, which the Nuclear Regulatory Commission decided not to accept in their safety goal policy; they do not include that.

And they're dealing with events, which in my mind are more likely to arouse risk aversion feelings, let's say, in the public than yours, but that's just a note in history.

I was trying to think what was being accomplished by this current version in the remanded or the new draft, and I asked myself, well, gee, is Dan trying to prevent something really bad by doing this. And I said, what would I do if I were trying to prevent something really bad. And I said, well, rather than set something at ten times, which is still a small effect since, you know, that standard really allows for very nominal effects over 10,000 years, it

may be 1,000 times the limits like you might get from, let's say, a volcano right under the site or something equivalent, whatever, should really have a stringent limit which, in fact, is not quite accomplished by the ten times.

But if one -- do you see where I'm getting at?

MR. EGAN: I see your point.

DR. OKRENT: I'm not urging anything. As I say, the NRC has, in fact, decided not to include that kind of thing in its safety goal policy. When you do the calculation of expected risk there's no risk aversion in it.

One more, when we were talking about in '83 the question of costs came up and I think you gave numbers like 2 billion, is what I remember. And the DOE seemed to think that was okay. And now I read 25 and 50 billion for a repository. I don't know how much of that arises from them trying to meet a stringent standard and how much arises from a complicated site and how much arises from other things.

But it seems to me it's a lot of the nation's money. And maybe you do have to think in terms of what you are accomplishing and what it costs in some way. Let me leave that.

It was raised then and I think -- it seems now the costs have gone up much faster than inflation, let me put it that way.

MR. EGAN: Let me assure you that one of the

standards -- the documents that I have produce both for the proposed rule and the final rule is a loving little thing called a "regulatory impact analysis" that we were required to do by Executive Order, and it is exactly the purpose of that document to address exactly that question of whether the cost implications of the alternatives that we'll look at. And when you see in the working draft that little grid of options there, for example, we will be looking both at the cost implications as well as the practicality implications of those and of any other options we choose to look at.

And when we did the final rule before we struggled to find any impact. We struggled to find an area where we were having an impact based on what we had done. We were able to find some for the individual protection requirement because if you extended it -- in that case if you took that requirement to 10,000 years as opposed to 1,000 years for the Hanford site you were getting into some copper canisters and things like that and you can get a pretty good -- you can get an impact there. Surprisingly it wasn't a huge percentage of the program which surprised me, but it was an absolute dollar value that was fairly substantial.

We do try to find ways to throw --

DR. OKRENT: If you count the money that goes up to getting ready to build the thing as part of the job,

which seems to me has to be. And if one looks now, as I've had the chance of, how much has to be done to get enough information to satisfy -- to provide some assurance concerning a rather remote events for which there is probably only going to be expert opinion plus a limited amount of data, and then there are pressures, but get more data where you can't count, I think one will find rather large costs are posed by stringency.

MR. EGAN: I would be interested to see what we come up with.

DR. OKRENT: I don't know how you estimate them as a consequence --

MR. EGAN: I don't know either, but we will try.

DR. OKRENT: Thank you, Mr. Chairman.

DR. MOELLER: When will that be ready?

MR. EGAN: The regulatory impact analysis will be ready when we propose the rule.

DR. MOELLER: Okay.

Dr. Parry.

MR. EGAN: A draft of it which will then be subject to public comment as the rest of the rule is.

DR. MOELLER: Dr. Parry and then Dr. Carter.

DR. PARRY: Dave, you had mentioned the similar point earlier this morning and as I remembered having, I believe, been there when you raised the question, my

recollection was that no one thought that the added stringency in and of itself would add to the cost of the facility.

But what would result would be perhaps extended periods of time while it went through the licensing process to prove that you met the added stringency; and that was not quantified.

But my impression or recollection was that there was little or no direct added cost that they could ascribe to more stringent.

DR. OKRENT: But that's an incomplete assessment of a tail not only wagging the dog, but he's walking the dog, all the R&D and information you have to develop in that case outweighs the final effort.

DR. MOELLER: Mel Carter.

DR. CARTER: Dan, a couple of things, if I'm right. One, what did the agency base the determination on that you would not consider TRU that had been buried prior to August the 15th of 1985; was that a legal determination or was that based on consideration of relationship to minimal public health problems or just what?

MR. EGAN: Neither. It was primarily determination, again, of looking at the amount of effort we felt would be necessary to address that, because one of the things we felt would be necessary to address that would be,

first of all, examining whatever existing health effects were associated with that waste and examining the alternatives of exhuming it, what that cost. What the environmental effects of that would be. And basically, a very different type of analytical problem than we were embarked on in trying to project the performance of facilities that were not yet built, they were in the process of being built.

And we felt, quite frankly, we didn't have the staff resources to take on that additional work load as part of this rulemaking process.

So the determination was made that, that part of the problem which, first of all, nobody was beating us about the head and ears about to write a standard for.

And secondly, which would require an analytical effort substantially different in nature and I think a fairly substantial scope to examine the range of alternatives that one might look at for those wastes. It was a programmatic decision not to include them under the rule.

DR. CARTER: Another one -- I'm always looking for flexibility in EPA standard, so the requirements, the numeric requirements are contained, of course, in Appendix B, table 1, and to me they're sort of interesting. You've got the numeric requirements in Section A or Subsection A, I

guess. And then Subsection B says, you need not provide -- I'm not quoting directly -- need not provide complete assurance that the above conditions will be met, namely, the numeric values. It only requires reasonable expectation that compliance will be met.

And then, of course, Subsection C to that is between 10 to the fourth and 10 to the fifth years after disposal. Projected release rate should not be much greater than those allowed in A.

That would appear to me that B and C contain a fair amount of flexibility and I just wondered if you would discuss that a little bit for us.

MR. EGAN: Well, it's -- in both cases you actively reflect my intentions, unfortunately for that -- fortunate or unfortunately. The wording that you saw of much greater for 100,000 years that will probably be lost, as I suspect I'm going to be removing that provision from the containment requirement section and repackaging it. And how, I don't know I'm going to repackage it as an assurance requirement.

The use of reasonable expectation was a very intention step on our part. It does not say, for example, reasonable assurance as Subpart A does. And it was a very intentional move to step away from the analytic rigor that reasonable assurance has come to represent in NRC

proceedings in licensing and many types of nuclear facilities.

And to reintroduce a term for which we would hope that somewhat less analytical rigor given the tremendous uncertainties that one faces in doing these performance assessments could be used.

We then talk a little more about what reasonable expect -- do more setting of the analytical framework in the guidance section, Appendix B and now it's Appendix C in the working draft.

But to try to trunk in my comments, there is very much an intent in all of that to try to build in as much reasonable regulatory flexibility as possible; and that is a correct reading of the words.

DR. CARTER: The other question I had related to what used to be at least Appendix C, namely, the guidance for implementation of subpart B. The statement I would like to pick out of there is one that says: "Because the procedures for determining compliance with subpart B have not been formulated and tested yet, this Appendix" and so forth. You also discuss the large amount of uncertainty or substantial amounts of uncertainty in this; and I presume that Appendix C which is not an inherent part of these, although it's to be included.

I guess the analogy would be that this is somewhat

like a reg guide of NRC.

MR. EGAN: Yes. It is the intention and we do mean to have this appendix published in the CFR when the rule is promulgated. It is not as you read from the introduction a binding set of principles.

We find it's being very helpful in tailoring some of the performance activities that have gone on, particularly, for example, in the WIIP process.

We also were considering, based on the experience we're seeing in the other agencies trying to apply performance assessment, we'll probably be making some relatively minor changes in this section to try to reflect some of the difficulties that have gone on in the implementation process to date.

DR. CARTER: Well, my question would be: I presume you and your staff, even though the process has not been put together as far as procedures for determining compliance, but I assume you at least speculated about this.

MR. EGAN: Oh, yes.

DR. CARTER: And I presume you have seen ways that a repository could be in compliance with a subpart B.

MR. EGAN: Certainly. And we interact with both NRC and DOE staff reasonably often on that. We will interact even more frequently as we go through the rulemaking.

DR. CARTER: So you're optimistic about someone needing --

MR. EGAN: Yes, I'm optimistic about that.

I note that NRC Commission doesn't really give much cotton to Appendix C. It was in the Commission comments on Part 191, basically, kind of saying, we don't feel this applies to us. And we kind of say, okay, that's your prerogative. But it is something that's being very heavily used in DOE process on the WIIP, because the WIIP is going through a performance assessment process right now as they build their procedures for performance assessment and stumbling across the types of analytical problems one would expect in that type of process.

And they have been applying this appendix pretty heavily, and we're getting some comment back there that will lead us to make a few changes to it. But the basic inclusion of the appendix will, you know, continue to be part of the working draft.

DR. MOELLER: Gene.

MR. VOILAND: I would like to comment on the ALARA principle, if I will. I think the ALARA principle makes an awful lot of sense for occupational exposures, for example, where the numerical control limits are very high, 5,000 millirem per year.

But when the regulation is pushed down so that the

control limit is a fraction of natural exposure rates, I'm not sure what it means at all. I think 25 millirem per year, if that's the control kind on a limit, is ALARA.

And you also have a provision for an alternate standard which is 100 millirem per year. So under some circumstances you apparently are willing to allow more exposure.

What does ALARA mean in terms of that? Why do you impose ALARA in one and then allow it to rise up?

In this context I'm just not sure that ALARA really has much of a meaning. Also, the cost of improving, the lower the control limit goes up. I think in terms of occupational exposure we try to assess that. In terms of $1,000 per rem, which is reasonably easy to do when you're dealing with large dose rates and so on.

MR. EGAN: One of the -- it makes a number of good points for us to consider. One of the kind of counter-considerations that I would offer is that, when you look at what's going on in the high-level waste repository you are, in fact, talking about the isolation in a relatively small geographic area, of literally millions of curies of that radioactivity.

I mean, we are not talking about a trivial enterprise here, when you actually do this. And I don't know exactly what the analyses will tell me when I finally

see something I believe for Yucca Mountain.

But when we looked at individual exposure analyses for repositories in saturated, you know, below the water table sites, and you looked at individual exposures that could occur once you got, you know, release from engineered controls and flow down to the groundwater system, you were talking about exposures that were in the tens to hundreds of rems per year, not millirems, of people who use that groundwater.

So you were talking about, albeit, hopefully an unlikely situations or very long time. But an unavoidable consequence of isolating a huge amount of radioactivity in a small area to the unfortunate individual who might, either because of an accidental release or because he comes along for a long time frame down the road gets an exposure, he is talking about a pretty substantial exposure.

And it's that type of fairly major environmental impact possibility I emphasize.

MR. VOILAND: But aren't we talking about the undisturbed site, you know, for this; and we're not addressing those kinds of things here. I don't think you ever address accidents in terms of ALARA.

MR. EGAN: I'm not sure that you don't ever address accidents in terms of ALARA when you talk about --

MR. VOILAND: You look at the recovery from

accidents in terms of ALARA.

MR. EGAN: But I don't know exactly how -- whether ALARA is an appropriate application here; we're still looking at it. And I'm still looking at, again, because -- I agree with you that there becomes a standard level of such stringency which is no longer practical to apply to ALARA. That was the nature of my comments about 10 CFR 60 when we looked at the engineered control provisions there; I think they have done an adequate job. They don't need to be anymore stringent than they are now.

MR. VOILAND: I guess that's my reaction, it just doesn't seem applicable to that kind of a situation.

DR. MOELLER: Other questions or comments?

(No response)

DR. MOELLER: I hear none.

Well, let me thank you, Dan, for coming. And you mentioned I'm sure we will interact again and we look forward to keeping up with this as it moves along.

MR. EGAN: Thank you very much.

DR. MOELLER: With that it brings to a close the formal portion of today's meeting. The committee will immediately go into executive session perhaps for a half hour or so and then break for lunch.

We will be working on final drafts of the several letters that we're preparing on the basis of the discussions

that have been held at this meeting.

Let me thank our reporter for being with us, not only today but many days in the past. And we appreciate very much your support and we look forward to seeing you again at some time in the future.

Thank you.

(Whereupon, at 11:45 a.m. the meeting was adjourned.)

CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of: ADVISORY COMMITTEE ON NUCLEAR WASTE

Name: 14th Meeting 3rd Day

Docket Number:

Place: Bethsda, Maryland

Date: October 13, 1989

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken stenographically by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

/s/ Joan Rose

(Signature typed): JOAN ROSE

Official Reporter

Heritage Reporting Corporation

Insert #1

14TH ACNW

THIRD DAY

INTRODUCTORY STATEMENT BY ACNW CHAIRMAN
13TH MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE
OCTOBER 11-13, 1989

THE MEETING WILL NOW COME TO ORDER. THIS IS THE THIRD DAY OF THE 14TH MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE. DURING TODAY'S MEETING THE COMMITTEE WILL HEAR AND DISCUSS THE FOLLOWING TOPICS:

1. EPRI/EEI PERSPECTIVE ON THE HIGH-LEVEL WASTE REPOSITORY PROGRAM
2. STATUS REPORT ON THE REVISION TO THE REMANDED EPA STANDARD 40 CFR 191, SUBPART B
3. PREPARATION OF ACNW LETTERS

THIS MEETING IS BEING CONDUCTED IN ACCORDANCE WITH THE PROVISIONS OF THE FEDERAL ADVISORY COMMITTEE ACT AND THE GOVERNMENT IN THE SUNSHINE ACT.

DR. S.J.S. PARRY IS THE DESIGNATED FEDERAL OFFICIAL FOR THE INITIAL PORTION OF THE MEETING.

WE HAVE RECEIVED NO WRITTEN STATEMENTS OR REQUESTS TO MAKE ORAL STATEMENTS FROM MEMBERS OF THE PUBLIC REGARDING TODAY's SESSIONS.

A TRANSCRIPT OF PORTIONS OF THE MEETING WILL BE KEPT, AND IT IS REQUESTED THAT EACH SPEAKER USE ONE OF THE MICROPHONES, IDENTIFY HIMSELF OR HERSELF, AND SPEAK WITH SUFFICIENT CLARITY AND VOLUME SO THAT HE OR SHE CAN BE READILY HEARD.

WE WILL NOW PROCEED TO FIRST ITEM OF THIS DAY's AGENDA.

Insert #

EEI/UWASTE

Edison Electric Institute

Utility Nuclear Waste & Transportation Program

Repository Program Summary

Presented to

U.S. NRC's ACNW

Steven P. Kraft
Director, Nuclear Waste &
Transportation Program

Repository Program Summary

Utility Industry Repository Program Concerns

- Program Structure and Management
- Program Schedule and Cost
- Start of new site characterization work
- Quality Assurance
- Regulations and Licensing
- Early determination of site suitability/unsuitability

USNRC's ACNW 10/13/89

Repository Program Summary

Evaluating Site Suitability

- Why is site suitability an issue for Yucca Mountain?
- How is site suitability a regulatory issue for Yucca Mountain?
- Key issues in site suitability evaluation
- DOE approach to evaluation
- Proposed industry approach ==> EPRI

USNRC's ACNW 10/13/89

Insert #3

EPRI

EPRI HLW RESEARCH Program

by

Robert A. Shaw

With Assistance From

Robert F. Williams

J. Carl Stepp

For Presentation
To
U.S. NRC Advisory Committee
On
Nuclear Waste

October 13, 1989

Background of EPRI Program

Discussion with utility advisory structure

- Recurring themes
  - Why pay EPRI to do what we're already paying DOE to do?
  - How can EPRI have any influence over this big DOE program?
  - What deliverables can we expect for our money?
  - DOE program is not spending our money effectively
  - There is a need for technical input from the utility perspective.
  - What can we do that is useful?

EPRI Perspective

DOE program is;

- scientifically deep, drawing on excellent technical specialists
- a long term "bottoms-up" study culminating many years out in a site performance assessment
- too accepting of regulatory positions,
- in need of identification and prioritization of crucial issues

Basis of HLW plan

- Emphasize EPRi's technical strengths
  - Influence DOE and leverage our relatively small resources
- Emulate recent successes
  - Seismicity Owners' Group
- Address a near-term crucial issue
  - Develop a process for early site suitability assessment

Introduction-1

- Performance objectives are necessary for safety and licensing decisions
  - NRC regulations 10CFR 60
  - EPA regulations 40 CFR191 - sets permissible exposure in probabilistic terms and establishes probabilistic assessment as primary basis for licensing

Introduction -2

- Probabilistic methodology developments
  - Currently no accepted method for HLW repository
  - Early development would be particularly beneficial
    - - Focus site characterization activity
    - - Reach early resolution of site suitability issues
    - - Early perspective on overall performance uncertainty

Program Needs

- Early use of performance assessment to give focus to the site characterization activities
- Structured methodology to assess overall repository performance
- Prioritize site characterization activities to address issues and to assist early resolution of site suitability issues

Regulatory and Licensing Considerations

- HLW repository objective
  - 10,000 year time frame
  - Reliance on both engineered and natural barriers
- Characteristics of Basin and Range
  - Complexity
  - Relatively rapid tectonic processes
  - Potential interactions

Performance Assessment

- Overall Objective - Performance assessment should be coordinated with and direct the site characterization and data collection activities of the program
- Requirements of a performance assessment methodology
- Direct probabilistic approach has many advantages

Direct Probabilistic Approach

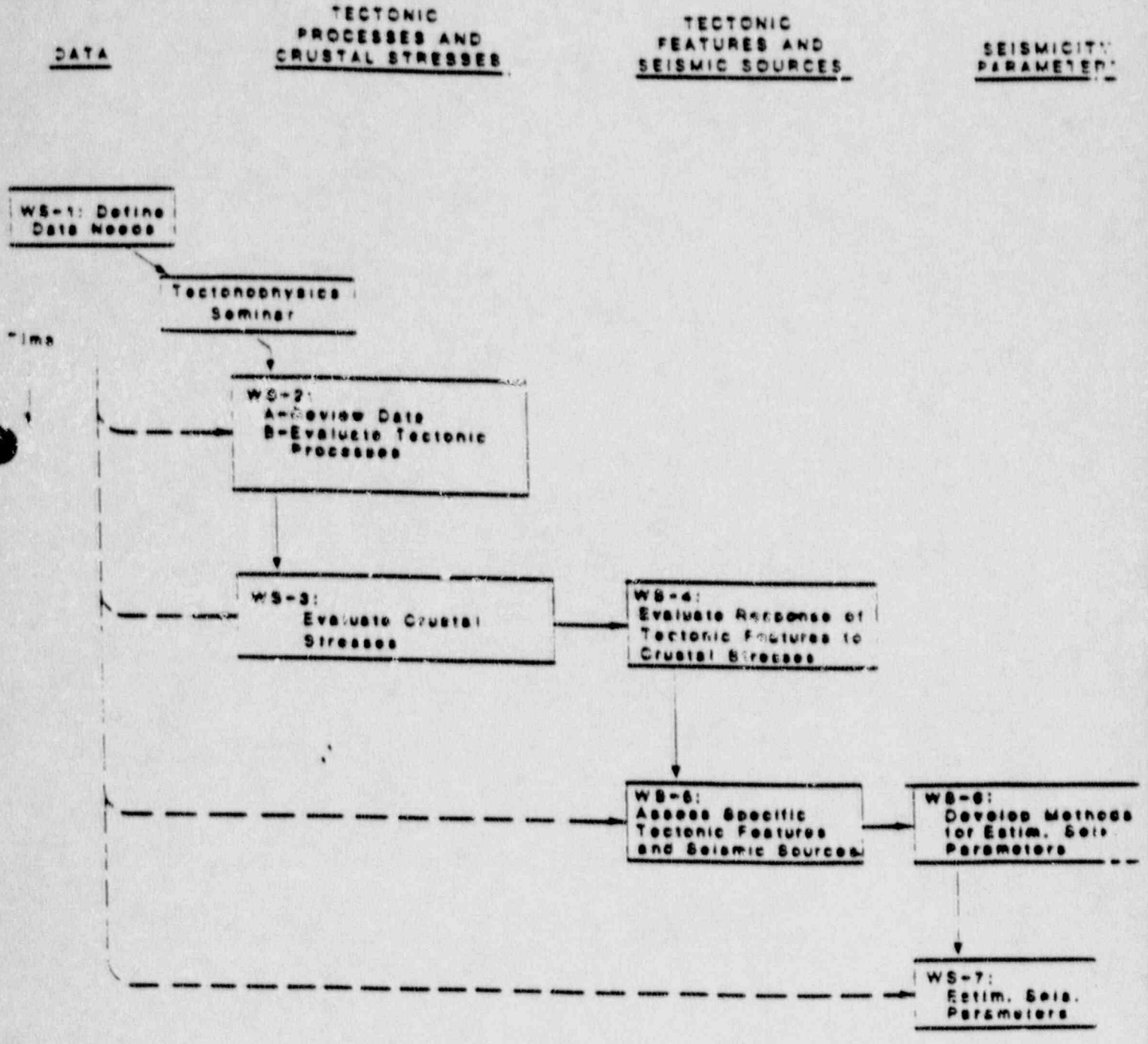
- Facilitates quantitative statements about qualitative interpretations
  - Can deal with both data uncertainty and process and model uncertainty
  - Very compatible with earth science prediction as used for the EPRI Seismicity Owners Group

SOG Program Objectives

1. Evaluate the specific issue of the 1982 U.S.G.S. position on the Charleston earthquake.
2. Evaluate the general issue of possible large earthquakes elsewhere in the eastern U.S.
3. Provide a comprehensive data base of eastern U.S. seismicity, for subsequent use.
4. Develop a methodology for seismic hazard assessment at eastern US nuclear plant sites that includes possible large earthquakes, to evaluate the potential effect, if any, on plant seismic margins.

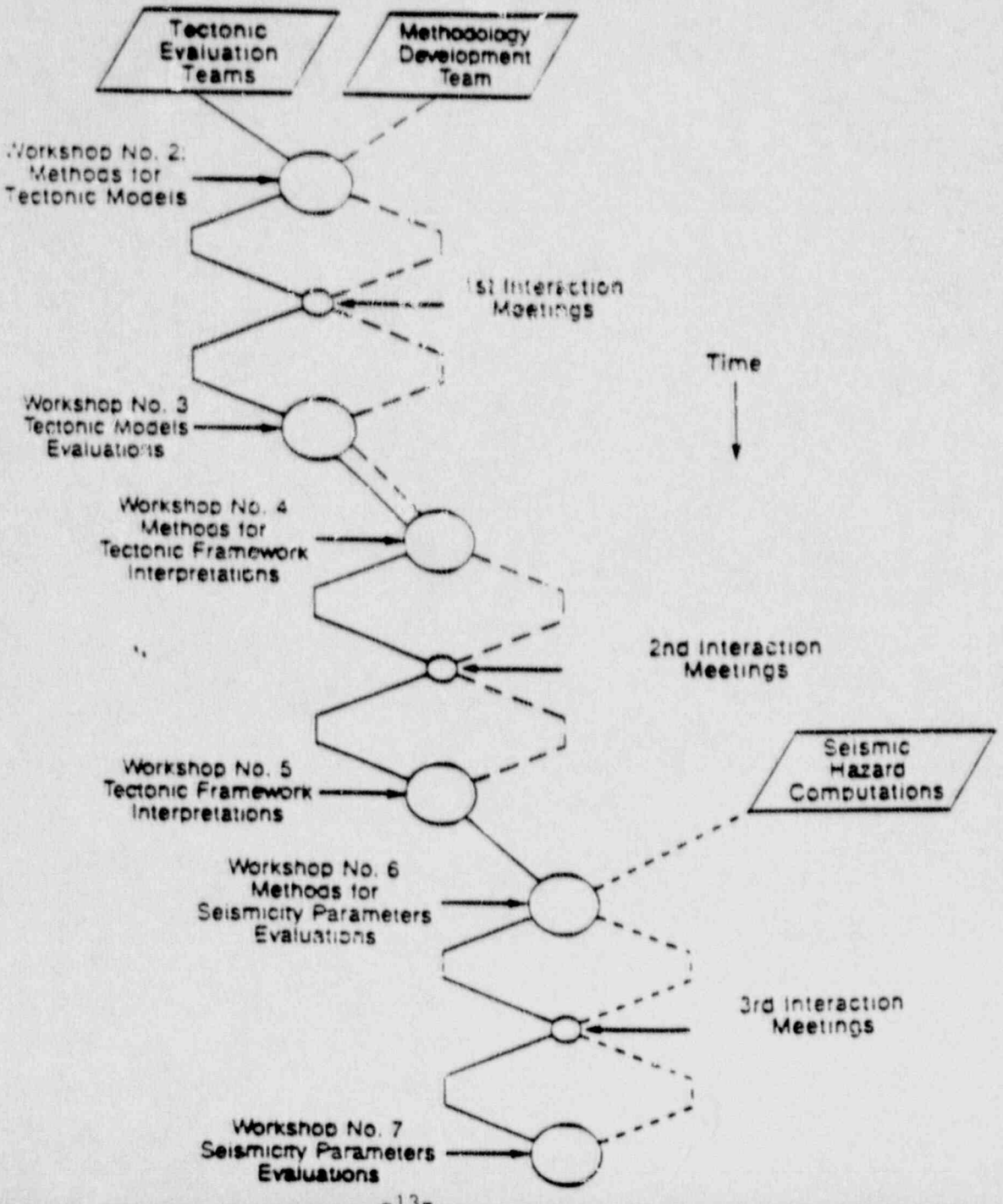
SOG Program Elements

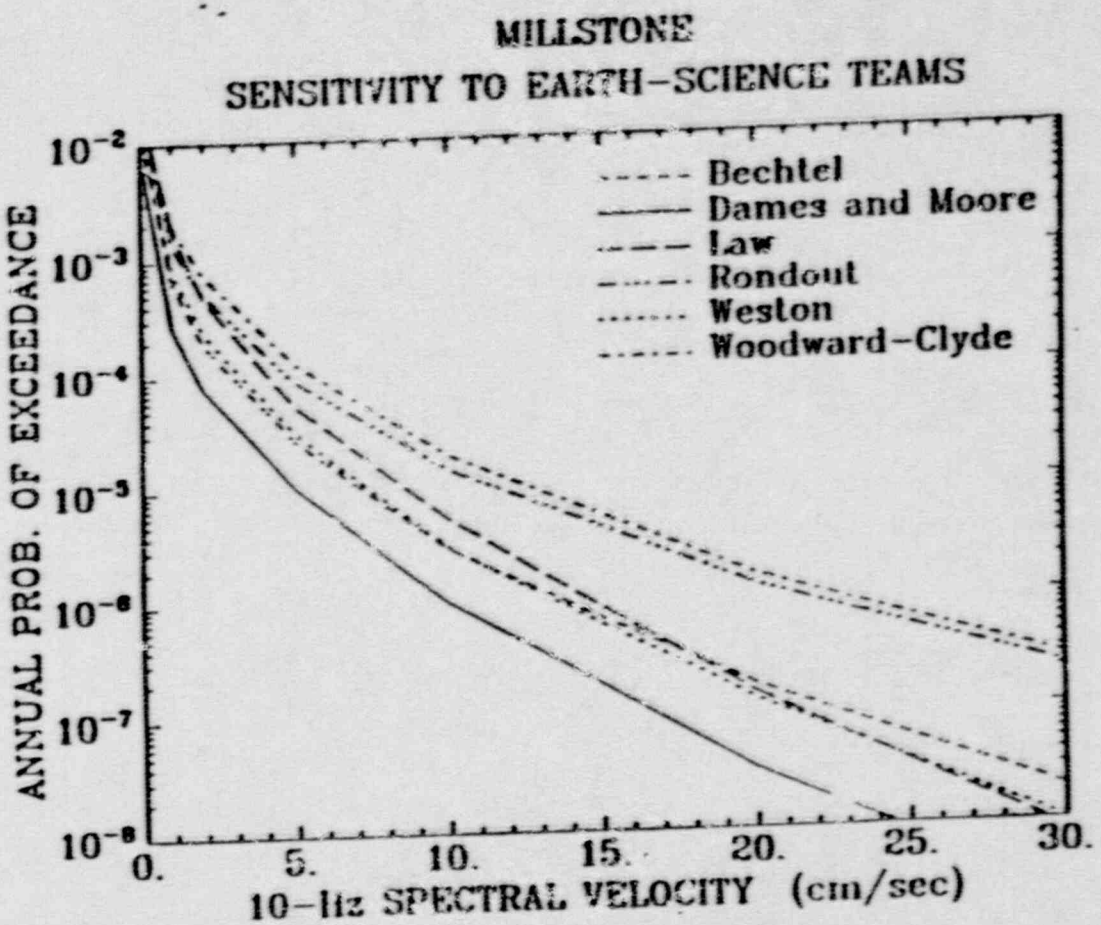
1. Collect and display scientific data
2. Develop deterministic correlations and models, based on fundamental earth science principles
3. Evaluate deterministic models in a probabilistic context, using fundamental earth science principles
4. Develop a seismic hazard calculation methodology to use the deterministic and probabilistic models to evaluate the seismic hazard and its uncertainty at nuclear plant sites.


DATA
TECTONIC PROCESSES AND CRUSTAL STRESSES
TECTONIC FEATURES AND SEISMIC SOURCES
SEISMICITY PARAMETERS
WS-1: Define Data Needs
Tectonophysics Seminar
WS-2:
A-Review Data
B-Evaluate Tectonic Processes
WS-3:
Evaluate Crustal Stresses
WS-4:
Evaluate Response of Tectonic Features to Crustal Stresses
WS-5:
Assess Specific Tectonic Features and Seismic Sources
WS-6:
Develop Methods for Estim. Seis. Parameters
WS-7:
Estim. Seis. Parameters

SEISMICITY OWNERS GROUP

- EARTHQUAKE SOURCE ZONE INTERPRETATIONS




MILLSTONE
SENSITIVITY TO EARTH-SCIENCE TEAMS
Bechtel
Dames and Moore
Law
Rondout
Weston
Woodward-Clyde
ANNUAL PROB. OF EXCEEDANCE
10⁻²
10⁻³
10⁻⁴
10⁻⁵
10⁻⁶
10⁻⁷
10⁻⁸
0.
5.
10.
15.
20.
25.
30.
10-Hz SPECTRAL VELOCITY (cm/sec)

SOG Program Results & Products

1. REPORTS

- Scientific data presentation
- Deterministic models of large eastern US earthquakes
- Probabilistic assessments of possible large earthquakes throughout the eastern US
- Methodology for seismic hazard assessment at eastern US plants
- Quality-assured computer coded for seismic hazard calculations

2. WORKSHOPS

- Presentation of results
- Technology transfer

Lessons From SOG Program On Extracting Subjective Opinion From Experts

1. Use Teams, not individual experts
2. Define Multi-science teams: Require consensus within each team
3. Use structured, step-wise approach that reaches consensus/approval at intermediate stages
4. Develop a procedure that is complaint with fundamental earth science principles
5. Allow enough time for definitions/differences/objectives to be resolved

Lessons From SOG Program On Extracting Subjective Opinion From Experts

Continued

6. Define overall scheme but allow separate applications by each team
7. Promote communications among teams to eliminate lack of information and give interteam feedback on draft results.

SOG PROJECT RESULTS ARE DEFENDABLE BECAUSE:

1. Wide range of professional expertise used
2. Fundamental data are available for review
3. Basis for experi interpretations are documented
4. Individual assessments are transparent.
5. N.R.C. and reviewers (U.S.G.S.) were involved in process, as observers.

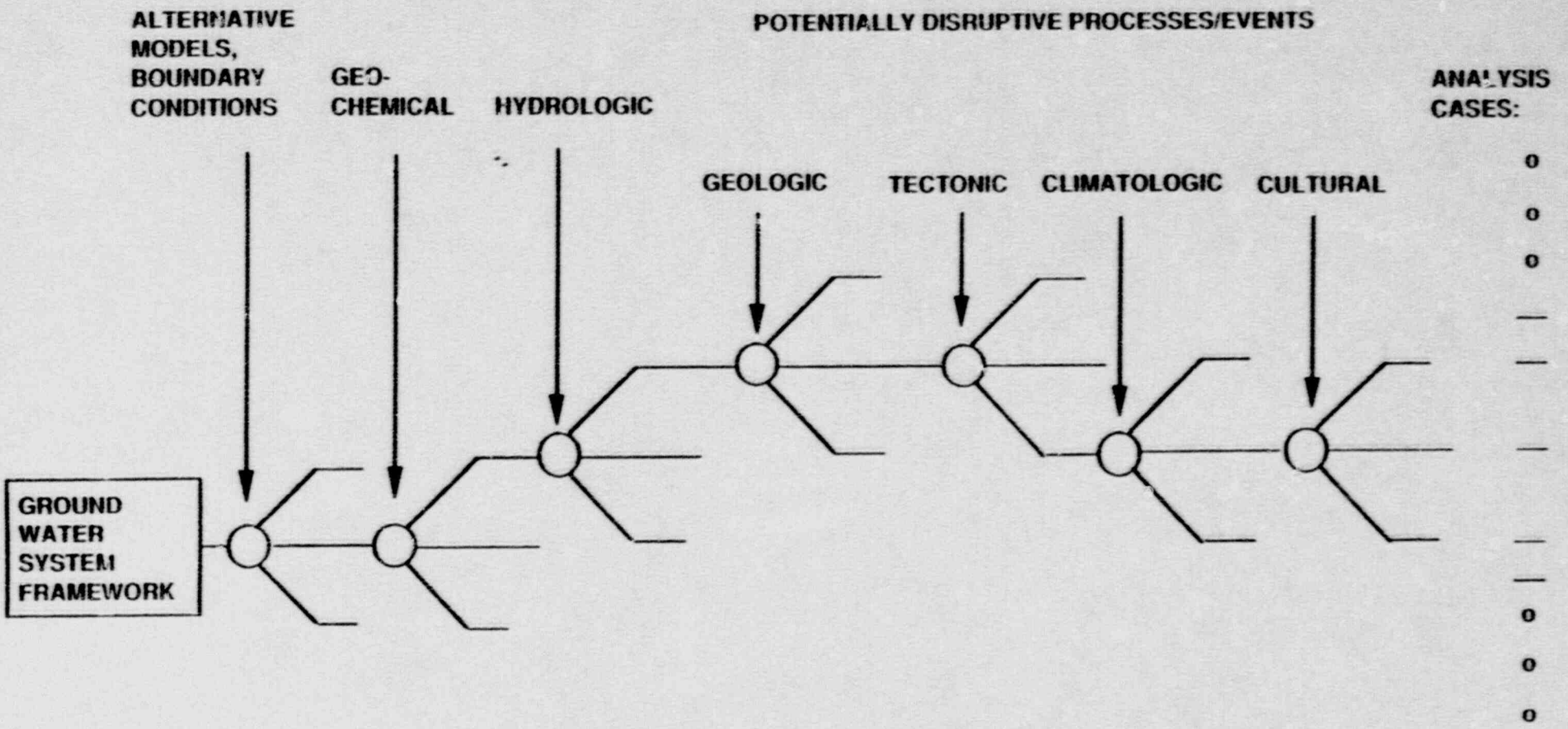


Figure 2. Schematic of logic tree elements for assessing uncertainty due to ground water system models.

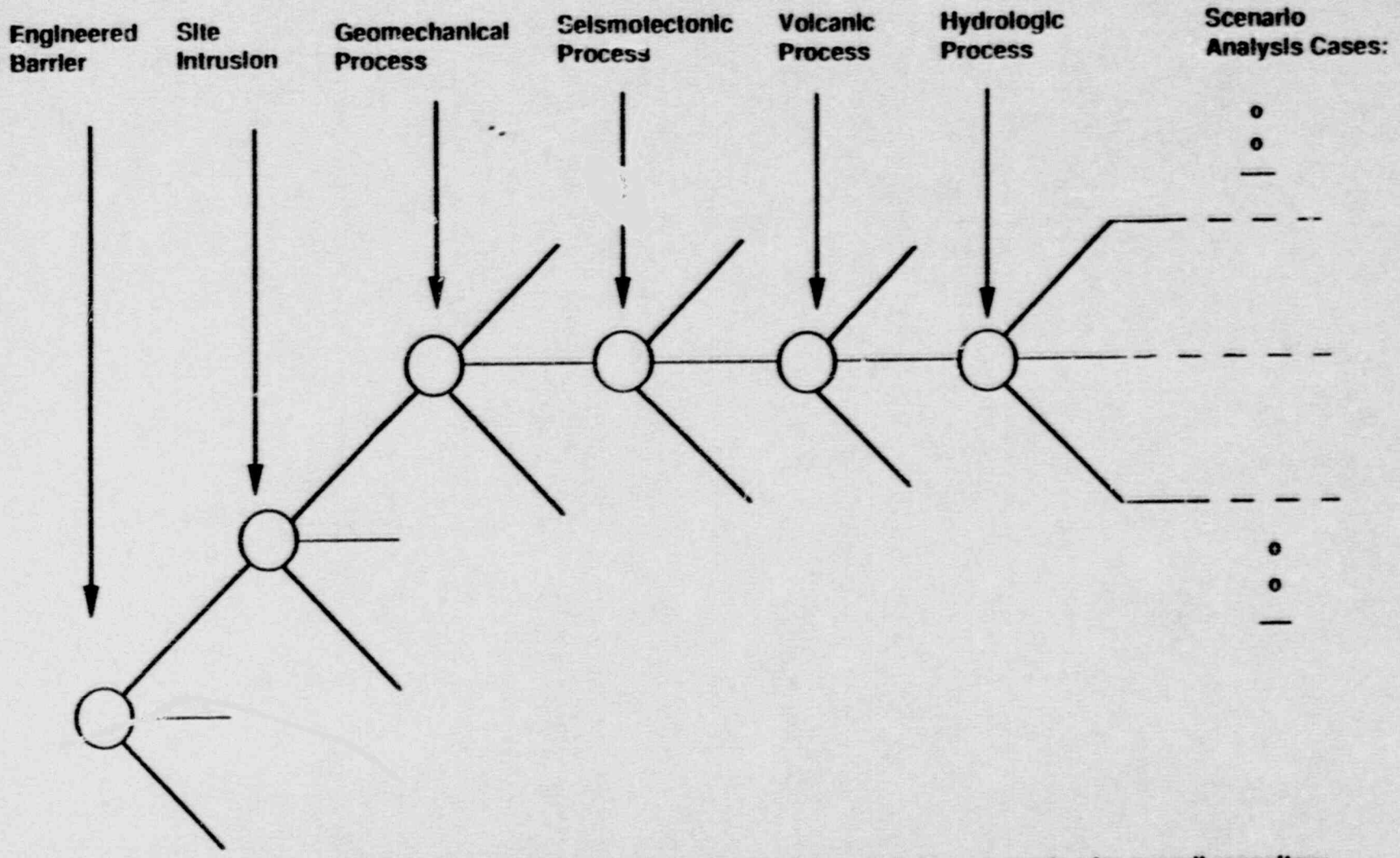


Figure 1. Schematic of major logic tree elements linking scenarios for overall repository performance assessment and uncertainty analysis.

SUMMARY

Need a performance-based approach to characterize and license the HLW repository

Develop a methodology for early site suitability assessment to identify and prioritize crucial issues

Demonstrate influence on repository progress

Insert #4

Status and Plans: 40 CFR 191

Briefing to NRC ACNW
by Dan Egan

Friday, October 13, 1989

HISTORY OF 40 CFR 191

✓ 10/76 - Program Started by President Ford

✓ 12/82 - Rule Proposed for Public Comment

✓ 6/83 - Hearings & Comment Period Over

✓ 1/84 - Publication of EPA SAB Report

✓ 9/85 - Final Rule Promulgated

✓ 7/87 - Rule Vacated & Remanded to EPA

✓ 9/87 - Subpart A Reinstated

Filename: ACNW2

Parts of EPA HLW Standards

- Subpart A - Stds for Management & Storage
- Subpart B - Standards for Disposal
  - 191.13 - Containment Requirements
  - 191.14 - Assurance Requirements
  - 191.15 - Individual Protection Requirements
  - 191.16 - Groundwater Protection Requirements
  - Appendix A - Release Limits for 191.13
  - Appendix B - Guidance for Implementation

Filename: ACNW4

DISPOSAL STANDARDS

(Subpart B)

✓ *Containment Requirements (191.13)*

-- Limit Total Releases Over 10,000 Years

-- Cover Expected & Accidental Releases

✓ *Assurance Requirements (191.14)*

-- Qualitative Principles That Complement Containment Requirements

-- (e.g., Limit Reliance on Institutions)

✓ *Individual & Groundwater Protection (191.15 & 16)*

-- Limit Individual Exposures Over 1,000 Years

-- Apply Only to 'Undisturbed Performance'

Filename: ACNW5

REASONS FOR REMAND

- ✓ Inconsistent with SDWA (4 mrem/year)
- ✓ 1,000 Years Not Supported for 191.15
- ✓ Inadequate Notice for 191.16

Filename: ACNW7

MAJOR ISSUES CONSIDERED

- ✓ Consistency with SDWA and UIC
- ✓ Period for Individual Exposure Standards
- ✓ Groundwater Classification & Protection
- ✓ *Experience with Site Evaluation*
- ✓ *Developments with Related Rules*
- ✓ *Updated Performance Assessments*

Filename: ACNW8

CHANGES in WORKING DRAFT 1

- ✓ Dosimetry & Coverage of Subpart A
- ✓ Agency's Groundwater Classification
- ✓ Some Consideration of 100,000 Years
- ✓ 'ALARA' Assurance Requirement
- ✓ Options for Individuals like SDWA
- ✓ Options for Individuals to 10,000 Years

Filename: ACNW9

ISSUES *NOT* CONSIDERED

- ✓ Release Limits Primary Numerical Standard
- ✓ 10,000 Years as Basic Time Period
- ✓ Inclusion of Accidents & Probabilities
- ✓ Existing Assurance Requirements
- ✓ Primacy of Containment & Assurance Req
- ✓ No Accidents for Individual Dose Reqs

Filename: ACNW10

PLANS FOR 40 CFR 191

✓ 2/90 - Complete New Assessments

✓ 6/90 - Propose Rule for Public Comment

✓ 8/90 - Complete Public Hearings

✓ 1/92 - Promulgate Final Rule

Filename: ACNW11