UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BRIEFING ON DECOUPLING SITING REQUIREMENTS FROM FUTURE DESIGNS AND UPDATE OF SOURCE TERM MATTERS

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PUBLIC MEETING

Nuclear Regulatory Commission
One White Flint North
Rockville, Maryland

Monday, October 15, 1990

The Commission met in open session, pursuant to notice, at 2:00 p.m., Kenneth M. Carr, Chairman, presiding.

COMMISSIONERS PRESENT:

KENNETH M. CARR, Chairman of the Commission
KENNETH C. ROGERS, Commissioner
JAMES R. CURTISS, Commissioner
FORREST J. REMICK, Commissioner

STAFF SEATED AT THE COMMISSION TABLE:

SAMUEL J. CHILK, Secretary

WILLIAM C. PARLER, General Counsel

JAMES TAYLOR, Executive Director for Operations

DR. THOMAS MURLEY, Director, NRR

ERIC BECKJORD, Director, Office of Research

FRANK CONGEL, Director, Division of Rad Protection & Emergency Preparedness

THOMAS KING, Deputy Director, DSIR/RES

P-R-O-C-E-E-D-I-N-G-S

2:00 p.m.

CHAIRMAN CARR: Good afternoon, ladies and gentlemen.

The staff is here today to request the Commission's approval of its plan to implement updated source term knowledge, including rulemaking to decouple reactor siting from plant design.

In July of 1989, the Commission requested the staff to provide a paper discussing the extent to which the currently used source term could be updated or otherwise improved for future light water reactor designs. The currently used source term is derived from technical information document 14844 which was issued in the early 1960s. In SECY-89-341, the staff stated its intention to modify regulatory guidance in such areas as containment, isolation, valve closure time, evaluation of the efficacy of radioactive material cleanup systems, and control room habitability.

Staff also stated its preference to undertake a study to examine the implications of decoupling siting from plant design for future reactors. The Commission agreed with the staff's plans and the staff requirements memorandum in February 1990, but they requested the staff to provide specific information from

such a study. That information included criteria that would be used for siting, if siting were to be decoupled from plant design, benefits and disadvantages of risk-based siting criteria, degree of conservatism exhibited by the options under consideration, applicability to and impact on existing plants, and the pros and cons of equating the low population zone to the emergency planning zone.

Following consideration of this issue after the meeting, the Commission will provide guidance to the staff in a notation vote.

It is my understanding that copies of the staff's slide presentation are available at the door.

Do any of my fellow Commissioners have any comments they wish to make before we begin?

If not, Mr. Taylor, please proceed.

MR. TAYLOR: Good afternoon. With me at the table are Eric Beckjord and Tom King from the Office of Research, on my left Tom Murley and Frank Congel from NRR. I'll ask Eric to begin the formal presentation.

MR. BECKJORD: Good afternoon, Mr. Chairman, Commissioners.

Today we will present to you a very important and complex subject, as the Chairman has said, namely the use of accident source terms in regulations,

particularly with regard to reactor siting and reactor safety design features.

The staff will present its recommendations in response to several Commission staff requirements memos and its plans with regard to updating current practice in this area. At the heart of current practice is a description of the hypothetical accident source term derived from the report which the Chairman already referred to, TID-14844, which is commonly used along with the dose guidelines of Part 100. This report, known as TID, contains a source term that has profoundly influenced both reactor siting and, as well, a number of important reactor design aspects.

We've recognized for some time that the TID source term, while providing a high level of plant mitigation capability, is no longer fully consistent with modern research in reactor accidents. Our objective in recommending that current practice be updated is, first, to address acceptable site parameters directly in the regulations, considering current understanding of plant safety and factors important to risk. Second, to allow the insights of what we currently know about severe accidents to be reflected in and improve the design of future plants. Thirdly, to allow licensees of existing plants to voluntarily apply

updated source term information, where practicable, to existing plants for the purpose of improving design.

I will ask Tom King, who will give the staff presentation on that subject, to proceed.

MR. KING: Thank you, Eric. Good afternoon.

I'm going to discuss the staff study and recommendations on decoupling siting from plant design as contained in our paper, SECY-90-341. On page 2 of the handout is an outline of the briefing. I'm going to quickly go through the background and the description of what is the source term and how it's used in regulations, since these have been discussed in previous meetings, and concentrate on the remainder of the presentation dealing with why I consider it change and what our proposed plan is.

(Slide) Turning to page 3, the present study that was provided to you was initiated by a Commission staff requirements memorandum in July which requested us to evaluate the extent to which current source term would be updated or improved for future LWRs. In the staff's response, we recommended that the staff undertake a short study to examine decoupling siting from reactor design. The Commission endorsed that effort and asked several other questions as part of the staff requirements memorandum that came back.

(Slide) On page 4, just quickly, the three other questions that were asked. The staff was asked to propose changes to regulatory positions where current understanding of source term would permit. It was asked to investigate options for early completion of research activities on the chemical form of iodine, and asked to assess the pros and cons and feasibility of employing a PRA-based mechanistic source term. The staff has responded to these requests and the references to the SECY papers are shown on slide 4.

(Slide) Page 5, also for quick background review, discusses what is the source term. As you recall, in order to evaluate a site and a plant combination, Part 100 requires a release to containment to be postulated. This postulated release is used in the calculation required by Part 100 to determine whether the dose guidelines provided therein are met. This postulated release is known as the source term and it is essentially the timing, form and quantity of fission products available in containment for release to the environment.

But in addition to use in Part 100, it is also used in licensing in other ways. It's used to define radiological and environmental conditions for certain plant systems, for example in equipment

qualification, and it's used to assess the effectiveness of certain plant mitigation features, the major one being the containment.

(Slide) On page 6, where does this source term come from? It's based largely on experimental results in the late 1950s that involved the heating of uranium dioxide pellets and it's documented in TID-14844. It involves -- what is documented in TID-14844 is that the source term to be consider should consist of 100 percent of the noble gases, 50 percent of the iodine and one percent of the solids. These percentages are of the entire core inventory of these materials. The 50 percent iodine number is further reduced to 25 percent by assuming half of that is plated out in containment. The TID itself is referenced in Part 100, but the numbers themselves are not in Part 100.

(Slide) Moving onto slide 7, how is this source term used, first in conjunction with current siting requirements. Part 100 requires that every reactor site define an exclusionary boundary and a low population zone. The exclusionary boundary is one where there are no residents and it's controlled by the applicant. The low population zone, there are residents permitted and basically it should be such that the largest nearest densely populated center is at least

one and one-third times the LPZ outer radius.

Typically, the exclusion area boundaries range from one-fifth to one and a quarter miles, with a typical size being a half a mile. The low population zones range in size from three-quarters of a mile to seven miles, with a typical distance being a three mile radius.

Part 100 requires that doses be calculated at the exclusion ~~ary~~ boundary and low population zone and that the Part 100 dose guidelines be met. It also assumes the existence of a low leakage containment. Or, to put it another way, containment integrity is assumed for the duration of the accident.

(Slide) Turning to page 8, how is the source term and the Part 100 requirements implemented in current siting practice. Currently regulatory guides 1.3 and 1.4 contain the practice for calculating the off-site doses and they're based upon the accident being a large LOCA accident. Specifically what they say is that for the release in the containment you should assume 100 percent of the noble gases, 50 percent of the iodine, of which half is assumed to plate out. They do not assume any solid fission products are available in containment for release. They assume an instantaneous appearance of the source term and the iodine chemistry

is given as largely elemental iodine.

Further in the calculation, a containment is assumed to leak at its maximum leak rate, for BWRs for the duration of the accident, for PWRs after 24 hours the leak rate can be reduced to half of the value in the tech specs.

COMMISSIONER REMICK: Tom, what has experience taught us in that leak rate? I realize we had only one test, TMI, but what has our experience been with leakage tests or inspections and so forth? Is that a real -- our assumption of one percent volume leakage per day -- excuse me, one-tenth of a percent. Excuse me. Has that demonstrated to be a realistic assumption? Have we looked at that?

MR. CONGEL: You can look at that question from two perspectives. In terms of testing to ensure that those standards are met, we have a requirement that those tests be performed to verify the leak rate is within the tech spec limit. There have been some problems in verifying it because the measurement itself is difficult to make.

In terms of the other part of your question, in terms of how it would respond in a real accident situation, no, I can't shed anything. There's been some research results.

COMMISSIONER REMICK: But does the staff still feel that that's a reasonable type of assumption to make or have you addressed it?

MR. CONGEL: A reasonable assumption and --

COMMISSIONER REMICK: Assumption for us to make when you say that minimum leak rate will be maintained, do you still view that as a reasonable assumption from a regulatory perspective?

MR. CONGEL: I would say yes in terms of the tests that are performed to indicate that that capability can be met and that it does provide us with an assurance of a certain level of performance that should be there given an accident. It does have some limitations though.

DOCTOR MURLEY: Commissioner, are you talking about future plants?

COMMISSIONER REMICK: I'm talking in general about is that a reasonable assumption for us to make for the future, no question about it, yes, that the containments -- we can depend on containments to perform that way with no greater leakage, including severe accidents. It's a difficult question, I realize.

CHAIRMAN CARR: I guess we don't have any data to show otherwise.

MR. BECKJORD: My recollection on the data, it's been some time since I've looked at it, but I know that to attempt to show no greater than one-tenth percent leakage per day is right at the ability to measure temperatures. These tests take place over a period of about a week. So, I think the --

COMMISSIONER REMICK: I'm not talking about difficulty of testing. I realize that. What I'm saying, you're talking about moving these requirements and have you thought about whether that type of -- I hesitate to call it requirement. I guess it is a requirement, would continue or would be relaxed or not. Am I too far ahead of myself?

MR. TAYLOR: I think you may be. There is a discussion on revising the valve closure times and so forth, which it will be developed.

DOCTOR MURLEY: But I think I can help a little bit, and that is for future plants we're asking the applicants to look at containment performance under severe accident conditions over a wide -- considering a wide range of phenomena, high temperatures and even molten fuel and that sort of thing. I don't know that we're thinking about relaxing the tenth of a percent, but we're certainly not putting the total off-site calculation based on that kind of consideration. So,

it's going to, in future plants, I believe, take a much reduced role, wouldn't you say, Frank?

MR. CONGEL: I would definitely say yes. I'd rather look at the overall phenomenon and make judgments about the capability other than just what specific parameters. In fact, I think that message should come across in our presentation, that we don't concentrate on individual parameters but a bigger picture view.

COMMISSIONER REMICK: I agree.

DOCTOR MURLEY: Now, part of where we're heading today, you'll see is we're going to have a revised Part 100. But there will also have to be a new rule that discusses containment performance under severe accidents and that's where this will come in. It will be -- I can't tell you how it will turn out, we haven't started to write it, but it won't be as simple as a leakage rate of a tenth of a percent.

COMMISSIONER REMICK: Okay. Thank you.

MR. KING: (Slide) Okay. Completing our current practice on page 9, we do, in evaluating whether the Part 100 dose guidelines are met, give some credit to fission product cleanup systems, although that credit is done in a very conservative way. We do calculate doses using conservative site meteorology, and since

1975 we've used regulatory guide 4.7 to address more directly acceptable site characteristics.

(Slide) Okay. Moving on to page 10, the source term assumptions also affect many plant systems and we've provided a list here of the more major ones that are affected. I'm not going to go through each of these individually, but basically the effect is either covered in regulations or in regulatory guides and it could be the timing or the quantity and form of the fission products that are assumed to be released as part of the source term that could have an effect on these systems.

(Slide) Page 11 is a schematic which you've seen before and just puts in pictorial form the current practice that's used for defining a source term and the release to the environment. I won't dwell on that.

(Slide) Let me get to page 12, which really begins more of the heart of the presentation, which is why consider a change from what we're currently doing. There are several reasons for considering a change. TID-14844 originally did not give credit for the use of fission product cleanup systems. Although we're doing that today, we're doing that in a very conservative way and we had to do that. (Slide) There's a backup viewgraph, if I could have that, that I put on the table

before the meeting that shows its calculation occur from TID-14844 that shows the effect of what the exclusion-ary boundary would be if no credit were given for fission product cleanup systems. It doesn't go out to the size of reactors that are being built or being operated today. If you extrapolated out to a 3800 megawatt thermal reactor, we'd be talking something in the neighborhood of a two mile exclusion-ary boundary. So the staff, given that prescription that was used before, did start to give credit for fission product cleanup systems.

COMMISSIONER REMICK: Tom, I'm not sure I understand what you just told me and what I'm looking at here. You're saying this is without any clean up systems?

MR. KING: Without any cleanup systems.

COMMISSIONER REMICK: And it demonstrates if one went that way exclusion boundaries would be about two miles if we didn't give credit. Is that --

MR. KING: For the larger size reactors, yes.

COMMISSIONER REMICK: Okay.

MR. KING: Another reason we want to consider a change is that other than the population center distance criteria, the one and one-third times

the low population zone, Part 100 contains no other specific site criteria. As I'd mentioned before, the siting is largely governed by regulatory guide 4.7.

Further, Part 100 does not address challenges to containment or assume containment failure. It assumes containment integrity during the duration of the accident. Containment failure is now recognized as one of the primary contributors to risk. We feel that's an area that should be revisited in light of current knowledge of severe accidents and risk to the public.

COMMISSIONER REMICK: I want to make sure I understand here. You're saying Appendix A of Part 100 is not site criteria, it's design criteria? Is that the implication of what you're saying?

MR. KING: Appendix A to Part 100 deals with seismic evaluations.

COMMISSIONER REMICK: Right. And you say that's not a site criteria, it's -- you would call it a design criteria then?

MR. KING: It's really criteria for the investigations that have to be done at the site in terms of the geology.

COMMISSIONER REMICK: Isn't that site related?

MR. KING: Yes, it is site related. I didn't mean to imply that we're --

COMMISSIONER REMICK: Okay.

MR. KING: -- eliminating Appendix A here.

COMMISSIONER REMICK: No, I understand.

MR. KING: But there are some --

COMMISSIONER REMICK: Am I correct you're going to propose that that be put in Part 50 eventually?

MR. KING: Appendix A?

COMMISSIONER REMICK: Appendix A.

MR. KING: We're proposing now or planning to propose that Appendix A be updated based upon current seismic information. Whether that goes into Part 50 or stays in Part 100, I think is something that's to be determined.

COMMISSIONER REMICK: Okay. I guess I'm still having problems with the bullet then. You say other than the population center distance criteria, and Part 100 contains no other site criteria, and you're going to eventually make Part 100 less site criteria, but you're not sure if the seismic aspects are going to go to Part 50 or stay in Part 100. There's an inconsistency. Maybe it's trivial, but I'm trying to get what you're telling me.

MR. KING: Any seismic aspects that deal

with the site would stay in Part 100. I think if there are things in Appendix A now that are more plant design aspects, I think we might consider putting those in Part 50. But at this point, as far as I know, we haven't gone through Appendix A and decided exactly what stays and what goes.

COMMISSIONER REMICK: I'm not sure that bullet is correct as stated then because you're saying that seismic considerations may stay in Part 100, but Part 100 will only address site criteria.

MR. KING: Yes. The idea is that Part 100 only address site criteria.

COMMISSIONER REMICK: All right.

MR. KING: (Slide) Okay. Turning to page 13, our current practice has also resulted in other design features whose performance could be improved or optimized if a more realistic source term were used. For example, main steam isolation valves on BWRs that are now required to close fast, with a more realistic use of the timing of the source term could get some relaxation in that area and hopefully improve reliability.

We also have new designs under review which makes the time -- makes now the time to go ahead and pursue these changes, we feel. That gave the staff some

underlying reason to get started now. Therefore, what we're proposing are changes to current practice for future LWRs that would, we believe, give designers more flexibility to develop designs with safety features that enhance safety by utilizing realistic source term assumptions, more directly address acceptable site parameters and more directly address realistic containment challenges and performance.

(Slide) Page 14, I won't dwell on this but in the past there have been changes made to our siting practice as a result of updated source term information. Specifically, standard review plan sections were changed that dealt with PWR containment sprays and BWR suppression pools in the area of fission product cleanup assumptions that are used with both of those.

(Slide) And on page 15, we currently have two generic issues that are related to source term: control room habitability, which deals with updating the calculational methodology that's used for fission product transport to and in the control room dumping; and BWR leakage control systems, looking at giving credit for fission product holdup and plate out in BWR steam lines and the condenser. Those two issues aren't resolved yet, but currently work is underway on those.

(Slide) To summarize our present practice,

on page 16, for siting we postulate a fission product release into containment. We use applicable site characteristics to calculate whether at the exclusion-ary boundary and the low population zone boundary, whether the Part 100 guidelines are met. We also use the guidance and regulatory guide 4.7 in more directly addressing some of the site characteristics that we feel the site should meet.

For plant design, the source term postulated in TID-14844 is also used and affects the performance and design of plant systems. It shows up elsewhere in the regulations and the regulatory guides. The design and performance of these systems are strongly influenced by source term assumptions.

(Slide) Where are we going? Page 17 is where we're trying to go. What we're trying to do is decouple siting from plant design for future LWRs. What do we mean by decoupling? We mean addressing the site characteristics directly in Part 100 and plant design features directly in Part 50.

The site characteristics, what we plan to do is have a two step change that will get us to where we're trying to go. The interim step we're trying to add, we propose to add site criteria to Part 100. These will be based upon what is currently in regulatory guide

4.7. We also propose as part of that to update the TID-14844 source term assumptions that would be used in the dose calculations required by Part 100.

In the final step, what we're proposing to do is to remove from Part 100 reference to the source term and dose calculations, but retaining the siting criteria that were added in the interim step, and then add to Part 50 requirements that would deal with engineered safety feature design and performance directly. Part 50 though also has references to the TID or would contain references to this updated TID. We continue to retain those in Part 50 because they do affect the design of certain plant systems and features and would continue to do so even under the updated TID.

COMMISSIONER CURTISS: Tom, on this two phase approach that you're taking here, I guess I don't understand why reg. guide 4.7 can't be incorporated in Part 100 and at the same time taking the -- I'll speak into the mike here -- at the same time take the revised updated TID and since 4.7 will be the controlling factor for siting, put the updated TID, which will then become, I take it, just strictly a design standard and put that in Part 50 today. What's the thinking that's gone into recommending that you reserve that step until the second phase?

MR. KING: Okay. That could be done. The reason we proposed the procedure we did was we were trying to get the updated site criteria into Part 100 as soon as possible. To do that, we wanted to minimize any other changes that had to be made to either Part 100 or Part 50. Even though it sounds like taking the TID and the dose calculations in Part 100, it sounds like a cut and paste operation to take them out of there and put them in Part 50, my experience with cut and paste operations is sometimes they turn out to be more than cut and paste operations. To minimize the amount of changes we had to make, we tried to limit it to just the very minimum of changes to get the site requirements --

COMMISSIONER CURTISS: Yes. I take it you could take the 4.7 and plug that in pretty quickly. You could do that, I guess, as long as -- it would take as long as would be required to do notice and conduct rulemaking. If you, in addition, took the Part 100 source term part of that and put it in Part 50, how long would that take to do?

MR. KING: Again, if it turns out to be just a cut and paste operation, it could be done as long as it takes to notice and comment.

COMMISSIONER CURTISS: From a technical

standpoint though, you have all the technical information necessary to do that today?

MR. KING: To transfer the dose requirements?

COMMISSIONER CURTISS: Right, to Part 50.

MR. KING: Into Part 50? Yes. In fact, I don't think -- it's not a technical question.

DOCTOR MURLEY: It's not that simple. Our view is that the Part 50 change is going to become something like a severe accident containment performance rule.

COMMISSIONER CURTISS: I understand that.

DOCTOR MURLEY: That is not a cut and paste operation. That means you've got to look at a broad range of accidents and this time treat them as realistic as you can and decide then what kinds of features need to be dealt with in the containment. It will be some of those 15 or 16 issues that we came to the Commission with in our review of the severe -- of the advanced -- the ABWR, you recall. So, there will be things like the containment -- the area underneath the containment, depressurization issues and things like that looking for future plants. So, it's going to be, in my view at least, a fairly broad based rule. It's going to take quite a while to develop it.

COMMISSIONER CURTISS: I understand that's the objective.

DOCTOR MURLEY: That was the reason for the phase-in, Commissioner.

CHAIRMAN CARR: This is the range in severity accidents that you're going to consider in the TID update?

DOCTOR MURLEY: No, it's --

COMMISSIONER CURTISS: They're prepared to go with the TID update, I take it, today because when you all make the change to Part 100 to incorporate 4.7, you will at that same time have the updated TID to plug into Part 100. My question is since that's going to be a design consideration, since 4.7 will be controlling the siting question, in the interest of doing what I think is the objective here, to focus Part 100 strictly on siting, why not at that time move the source term calculations, the dose calculations from Part 100 to Part 50, recognizing, of course, that your ultimate objective of a phase II rulemaking is the kind of severe accident rulemaking that you have laid out in phase II here?

DOCTOR MURLEY: That's still a two phased process.

COMMISSIONER CURTISS: I understand that.

DOCTOR MURLEY: Okay. We'll have to think about that.

COMMISSIONER CURTISS: I guess my question is is there any strategic advantage to leaving in Part 100, that portion which is going to strictly be applicable to design from here on out, if the objective here is to trim Part 100 down and focus it on siting questions?

DOCTOR MURLEY: Bill, why don't you go ahead and answer.

Bill Russell has some thoughts on it.

MR. RUSSELL: Bill Russell on the staff. From the review standpoint, all of the places in the standard review plan that presently cite Part 100 which we'd be using for design and how we would handle those changes, I think, would be complicating the review process to take that step as compared to the approach that we're proposing now.

MR. TAYLOR: Part of it was to be prepared for the early site application, to get Part 100 squared away. Wasn't that -- and we expect for an early site approval being sponsored by DOE. Part of it was looking at the job to revise the full scope of the regulations to do that. Part of --

COMMISSIONER CURTISS: If I understand what

you're recommending, you've accomplished that by incorporating 4.7 into Part 100. We're prepared at that point, from a siting standpoint, to consider and entertain early site application. My question, I guess, went to what is the advantage, if any, of leaving the source term part of it in Part 100 since it will, from there on out, be a design consideration? Bill's comment about the need to go ahead and make the changes to the SRP that go along with making it a formal part of the design process is something, I guess, I need to reflect about. But maybe that is the answer.

Are there any other advantages or disadvantages of what you're proposing?

MR. PARLER: Mr. Chairman, at one of the earlier meetings on this subject, I referred to the fact that a TID is referred to in the Part 100 in a note which in effect says that it is used for guidance. Of course it's been used over the years for much more than just guidance. This was a, as I recall it, the first fundamental substantive rule that your predecessors adopted in the early '60s. But the TID, since that reference is made, can be updated and revised by the staff without going through a rulemaking proceeding. If the revision process is deferred to the Part 50 rulemaking process, that could at least, as I understand

it now, result in more complexity to that particular rulemaking.

COMMISSIONER CURTISS: Let me ask one other question on this point and then we'll go on.

If you are planning on using the updated TID for the design review of the evolutionary and passive reactors, update the TID, retain it in Part 100 with the idea that you would move it over to Part 50 when you finish evaluating the options for a severe accident rulemaking, Bill's point about the need to update the SRP, how are we approaching that today? How are we approaching design questions without an updated SRP if that's, in fact, the critical path that needs to be addressed? That's the only loop I don't understand.

MR. RUSSELL: That was a subject that we spent the better part of our NRR management retreat on, as to how we're going to consider updating the standard review plans for the various classes of reactors, to ensure that there are not other policy issues which may emerge which we would need to bring to the Commission. It's not clear to me that the updated TID is going to identify more areas than we have already identified. For instance, the leakage control system and the scrubbing, two which were identified, we have already identified in the 16 issues that we brought to the

Commission. We're going to consider those in our reviews. So, I'm not sure what that delta would be.

COMMISSIONER CURTISS: Well, let's go on. Tom, anything else?

DOCTOR MURLEY: Well, there's a lot -- we've been around and around on this, which way to go, and we don't have absolutely clear cut ways to go. This is the staff's recommendation here. But with regard to how we're doing reviews for future plants in a severe accident area, we are departing from the standard review plan greatly, as you know, because it doesn't consider a core damage accident as part of the design basis. What we are proposing, and we're well along the way on, is that we do consider it, it doesn't become a design basis accident like the old large break LOCA. But to a large extent, we are departing from the standard review plan.

So, if I understood your question, we don't have a good answer as to how we're treating it today in the standard review plan. We're kind of finding our way and it emerges in areas like these 15 policy issues that we come to the Commission with. When we get through the first plant, we'll be able to collect it all and then revise the standard review plan.

COMMISSIONER CURTISS: Yes. As I read your

paper, I guess the first question, I didn't see what the logic was behind retaining the source term part of Part 100 and deferring that transfer to Part 50 until the phase II. Bill's answer that you -- it would be preferable to do that in phase II because that would prevent us at the same time to make the changes in the standard review plan. That prompted me to ask if that's the case and if we're using that updated source term in reviewing the reactors today, I gather we're doing it in the absence of any updated SRP, as you say, outside of the scope of the SRP.

So, I guess I come back to my original question and maybe I need to think about this, why not move it to Part 50 today?

DOCTOR MURLEY: I think Bill's answer was logical, but the fact is we haven't really kicked it around a lot. So, I don't have a good answer for it.

COMMISSIONER REMICK: I had a similar question. I understand what Bill's saying, but I'm not sure if that would prevent it. But I had the same question of why not do it at once. Maybe it's not possible, but I think it is --

DOCTOR MURLEY: Well, let us consider it and get back --

CHAIRMAN CARR: I've got a related question.

Your figure 4 on the schedule there shows the completion of the first revision or the interim revisions to Part 100 a year after the start of early site reviews. DOE's got to put a site application in a year before we give them the interim revision -- final revisions of the interim revision to Part 100. So, have they bought in on our schedule? You see what I mean?

MR. KING: Yes. No, the schedule that's shown in Enclosure 4 is the fastest schedule we felt we could get that step one, that interim update to Part 100 completed. Again, that schedule and the plan for that step one was to do the minimum possible. That's why we did not talk about taking the dose requirements out of Part 100 and putting it in Part 50.

CHAIRMAN CARR: And we're still a year behind DOE's site application.

MR. KING: We're still about a year behind.

CHAIRMAN CARR: Okay. Let's go on.

COMMISSIONER REMICK: I had another question. We talk about taking reg. guide 4.7 and putting it into Part 100. But if I look at the reg. guide, it has what I would call a lot of NEPA information. Now, the thing that was not clear from the paper, is there going to be a residual 4.7 that addresses NEPA questions or are those going to be put

in Part 51 or are we putting all those things in Part 100 now because they're site related? There's things like noise and aesthetics and things like that which normally are NEPA-type considerations, I believe.

MR. KING: Yes. Our intent was not to put all of that in Part 100. It was not to put in verbatim everything that's in 4.7 into Part 100. We need to review and see what are the safety parameters, site conditions that need to go into Part 100.

COMMISSIONER REMICK: So, it's only part of reg. guide 4.7 you would put into Part 100?

MR. KING: Yes.

COMMISSIONER REMICK: Okay. I don't believe it's clear from the paper. I certainly didn't get that. But you don't know whether that would be a residual reg. guide 4.7 then or whether that would be incorporated in 51 or you haven't looked at that?

DOCTOR MURLEY: Excuse me. We may have not been clear. The intent, at least in my discussions with all this was that we would mainly take the population density figures from reg. guide 4.7. Were there other aspects?

So, we didn't mean that we would incorporate reg. guide 4.7 into a rule or anything like that.

COMMISSIONER REMICK: Those are the words

we've been using and that's the impression I got, that that's what you were going to do when I read the document. I wasn't sure that that's what you intended.

COMMISSIONER CURTISS: Let me beat this horse one more time. The Chairman's reference to Enclosure 4 has prompted me to ask the following. I take it your critical path here on the phase I rulemaking is going to be the TID update. Take 4.7, here it is, and you can plug it in today. We've had that since what, 1975, and we've been using it. We could almost do it as an interim final rule or an interim effective. But you could it fairly quickly, I take it.

If that's going to be the controlling item for siting, then I have two questions. Number one, if we did that separately, we ought to have that in place prior to DOE's application, shouldn't we? Couldn't we do that fairly quickly?

MR. KING: The reg. guide 4.7 additions?

COMMISSIONER CURTISS: Yes.

MR. KING: Provided we just go back and verbatim include some things from reg. guide 4.7. I think it's more than just the population. 4.7 deals with the exclusion area size. It deals with the LPZ size. It deals with population. It deals with some

other things. It will take some time to develop the rulemaking and recheck and see if those are the right numbers we want to use or we want to modify them in any way.

COMMISSIONER CURTISS: All right. Now, my second question is that if the critical path of the phase I rulemaking is the update of the TID, then I'm still not convinced why you can't -- say once you've done the work, why it is that when you make that change out in whatever the date here is for the phase I rulemaking, why the rulemaking can't consist of a reg. guide 4.7 modification to Part 100 and a TID update which rather than putting it back in Part 100 is plugged into Part 50. And, of course, recognizing that your Part 50 rulemaking will then continue with the phase II part, focusing on the severe accident rule.

Am I missing something there?

MR. CONGEL: Let me just say, my comprehension and understanding of the process is that we have general agreement and understanding that the siting criteria as we understand them at 4.7 can be rather straightforwardly put into a rule form. However, a modified source term is not so readily performed. The reason for it is we are still going through reviews and considerations just for the ABWR review of what that

modified source term should be. We regard some more reviews to be coming in for our considerations where we will be learning more along with the industry.

I, at least from my perspective, am not ready to say that I have a perspective that can be put into a rule form right now. In fact, the reason we wanted to put the siting material into Part 100 right now is so it would leave us more free to consider the engineering aspects of various source terms right now without having the concern over our heads that we would be removing a substantial base associated with siting.

Consequently, when we do eventually come up with another way of judging acceptability of designs, engineering designs, I could conceive of it being done in an environment outside of even a source term existing. But that would be the longest term that I can envision at this point for a source term consideration.

COMMISSIONER CURTISS: Reg. guide 4.7 is going to be the controlling item for siting, first. Secondly, what you said, if I understand it, is that we can do a 4.7 change pretty quickly. We know how it's been done and the pacing item on the phase I rulemaking is the TID update. A 4.7 modification can be done fairly quickly. If that's the case, it's not -- maybe you're telling me we ought to have three

phases. It's not clear to me why the phase I rulemaking needs to be on the critical path for review of the DOE application. Your schedule in Enclosure 4 shows that it is.

MR. KING: Yes. I guess when we put this together, our view is we wanted to do two things to get ready for the DOE application. One was get the reg. guide 4.7 stuff into Part 100. The second was to use an updated TID information in assessing whether the plants meet Part 100, as well as the early site permit would refer to those dose calculations as well. We wanted to make sure the updated source information, source term information was used. So, those two things were put into that step one rulemaking.

COMMISSIONER CURTISS: Why don't you go ahead. I'll come back to this.

COMMISSIONER REMICK: Don't give up.

COMMISSIONER CURTISS: I just need to catch my breath.

CHAIRMAN CARR: We're not getting anywhere.

MR. KING: (Slide) Page 18 is a road map or a flow chart that hopefully pictorially describes what our overall plan is. It shows the two rulemakings, step one and step two, with the update of the TID feeding into the step one rulemaking and being

incorporated in the regulations as part of that step one rulemaking. Then in parallel with that, step two dealing with updating Part 50 and removing the dose calculation requirements from Part 100. I'll talk about each of those three major elements of the plan in a little more detail.

(Slide) We can skip page 19 and just go right to page 20, which talks about the first major element, the TID update. We feel it's important to update the TID for several reasons. One is that it's an interim improvement for Part 100 dose calculations, and is also an improvement for other aspects of plant design that are affected by TID. If you recall, TID not only shows up in Part 100, it shows up four times in Part 50 as well. We also believe that updating the TID is a good way to document the latest understanding of source term which could benefit existing light water reactors.

Work is underway to update the TID. Three major activities, first looking at the timing of release. We provided a paper on the status and impacts of that. We're looking at the composition and magnitude of the release of all the fission products into containment and then we're also doing some detailed look at what the iodine chemical form is.

We plan now to have a draft of the updated TID available in July of 1991 which, according to our proposal, then feeds into the step one rulemaking.

We've had a meeting with ACRS on our plan and they've endorsed the update of the TID. We've had two meetings with EPRI, one on their evolutionary light water reactor proposed source term and one on their passive light water reactor proposed source term. I think we're in general agreement with EPRI in terms of trying to develop an update of this enveloping source term. I think we have some issues to work out in terms of what are the accidents that should be considered in developing a source term. So, we still have some work to do on that.

(Slide) On page 21, just the pictorial of the concept of the revised source term that we have in mind versus the current TID, the current TID is a single value. It's released instantaneously, represented by the horizontal line. What we have in mind is something that would more realistically take into account the timing of the release and where the fission products come from over the period of time that they're being released into containment. It may or may not exceed the current values of TID-14844. That depends on what accidents we assume and other assumptions that we allow

in the calculation of the new TID.

(Slide) Page 22 is our step one decoupling rulemaking which adds site criteria to Part 100 based upon what's currently in reg. guide 4.7, but retains the dose calculation in reference to the source term in Part 100. We would expect that these site criteria that are added to Part 100 would be generally applicable to any type of reactor and our objective in doing this is to complete it, prior to completion, the staff review of the application from DOE for an early site permit.

We would expect as part of that rulemaking only conforming changes to Part 50 would be made to reference the updated TID source term, and we would talk about this step one rulemaking as well as step two rulemaking in an advanced notice of proposed rulemaking we hope to issue in March of '91. The idea of the advanced notice would be to describe our plans and solicit early feedback, both on step one and step two that we could factor into the rulemaking.

CHAIRMAN CARR: But if we're going to complete that prior to the staff review, it seems to me we ought to complete it prior to DOE submitting their application or their application is not going to conform to what we're going to review.

MR. KING: Ideally, having it all done by

the time -- before their application comes in would be the best way to go. In looking at what we had to do and realistically how long it was going to take, it didn't work out. That's why the schedule extends beyond the submittal of the application.

(Slide) Page 23 is the second step of our decoupling rulemaking which involved revising Part 100 to remove reference to the source term and the dose calculations, but it will retain the site criteria that were previously added in step one. The criteria to be added to Part 50 or to be determined at this point could take the form of describing the radiological conditions that need to be considered that affect plant engineered safety features, or they could specify directly engineered safety feature system design criteria and performance. There also may be a reg. guide needed, but the details of how that's going to work out are to be determined at this point.

The objective for the step two rulemaking is to complete it prior to completion of review of a passive light water reactor design. My understanding is the applications for the passive light water reactor designs could come in as early as 1992. Therefore, we felt that it was impractical to complete that step two rulemaking prior to 1992.

(Slide) Regarding existing plants, on page 24, we plan to make the results of the updated TID available to everyone. Existing plants could voluntarily propose to use that information on a case by case basis if they desired to, but we're not going to force them to use it.

COMMISSIONER CURTISS: I'm sorry. I want to go back to your previous chart. You said the objective is to have the phase II complete prior to the completion of the review for a passive LWR design. Does that schedule reflect the fact that the significant policy questions will be addressed in the EPRI requirements document before the actual review of the design? The objective here is to have the phase II done prior to completing the passive design?

MR. KING: Yes. The basis for that is that the information I have is that the passive design applications could come in as early as 1992. I've got the schedule here.

CHAIRMAN CARR: Well, we've agreed not to look at those until we've finished the EPRI design.

MR. KING: (Slide) Okay. Page 25, schedule, I think we've already talked about this. The update of the TID, we're shooting for the draft available in July 1991. The step one rule change,

proposed rule to the Commission in December of 1991 and a final rule to the Commission in February of 1993. And the step two rule change, again complete it prior to completion of the review of the passive LWR designs. But we still have not worked out the specifics of the schedule for that rulemaking.

(Slide) Then, in summary, we recommend that the Commission approve our plans to update TID and initiative rulemaking to decouple siting from plant design.

That completes our presentation.

CHAIRMAN CARR: Commissioner Curtiss?

COMMISSIONER CURTISS: You're going to start with me?

CHAIRMAN CARR: Sure. You'll answer -- you'll get most of mine answered, I think.

COMMISSIONER CURTISS: Let me ask a simple question. If you began today with a rulemaking simply to incorporate reg. guide 4.7 into Part 100 and if you did that with a notice and comment and not an ANPR, how long would it take you to go from start to finish?

MR. KING: And do nothing in terms of TID update as part of that?

COMMISSIONER CURTISS: Correct.

MR. KING: I'd estimate --

MR. TAYLOR: I think this morning to save time, but I think we'd have to get back to you specifically on the schedule.

COMMISSIONER CURTISS: If you pursued that course, would it be more likely that you would have the siting requirements in place prior to when we expect to receive a DOE application for an early site permit?

MR. KING: Off the top of my head, the answer would be yes.

CHAIRMAN CARR: It looks like you're putting in a TID review update into Part 100, then you're going to take it out again in your proposal. You're putting it in, then you're going to take it out. Why not just take it out at the start?

DOCTOR MURLEY: You know, the reason that we got into this situation in the first place came about, you recall, because of our review of the advanced plants. A couple years ago, the EPRI and the applicants were asking us to take credit for things like filter efficiencies and leakage control systems and that sort of thing. I asked the staff why don't we give them credit. Well, it turns out that there's a long history as to why we've -- I think it's discussed adequately in the paper. But the reason we haven't given credit for a lot of these containment dose mitigation features is

to control siting because Part 100 trades off distance versus engineering design features.

Now, we said, "Well, let's change that then," and we looked and we went round and round at various ways to change it and we've come up with this two phase process because design and siting distance are so closely intertwined in Part 100 now. If we add the population criteria from reg. guide 4.7, we still must have the dose mitigation aspects of Part 100 because Part 100 is the only place that lays any dose mitigation requirements on a containment. Part 50 doesn't do it.

We would propose though relaxing somewhat the over conservatisms that we know we have by updating 14844 and also there's other staff practices that we've used over the years that would allow more realism in those calculations. But we feel we still have to have the calculations to be done, but we realize that we don't have, at this stage, enough information to totally revise -- to take it all out and put it in Part 50 and totally revise Part 50.

We could do it in two steps. I mean that's not to say it's impossible, but we'd proposed only revising Part 50 once. I guess we need to go back and rethink as to whether it's better to take the dose

calculation and dose mitigation aspects out of Part 100 altogether, the first phase. My top of the head impression is it's going to be very complicated to do that because there's no logical place in Part 50 to put it.

CHAIRMAN CARR: But the general impression is that's not going to be controlling the siting anyway.

DOCTOR MURLEY: That's right. The way we propose to do it --

CHAIRMAN CARR: So, what difference does it make if you pull it out if it doesn't control the siting?

DOCTOR MURLEY: Because we need to have a mechanism for controlling dose mitigation features of containments. We believe there must still be something in our regulations for that.

CHAIRMAN CARR: But that will be post the siting and the siting is the critical path.

DOCTOR MURLEY: Well, if all you're looking at is the DOE early site review, that's true. But we've got a lot of other reviews going on.

CHAIRMAN CARR: But nobody is going to build a plant until they've got a site.

DOCTOR MURLEY: No, but we've got a hundred and some plants we've already licensed.

CHAIRMAN CARR: But we've agreed you're going to catch them on a case by case basis anyway. So, they're not going to --

DOCTOR MURLEY: But we have to have a basis in the rules for it.

CHAIRMAN CARR: But they're not going to apply until you get something in place. Maybe I'm missing something.

COMMISSIONER CURTISS: Let me take a cut at it and try to address the concerns that you've raised.

Concern number one, amending Part 50 twice versus once.

DOCTOR MURLEY: Yes.

COMMISSIONER CURTISS: It seems to me the tradeoff is amending Part 100 twice versus once. It strikes me as about a wash. Number two, where do you put it in Part 50? I guess from the description here in the SECY paper, you could put it in and label it severe accident approval in your severe accident section because that's what you've pretty much described here.

It does seem to me, getting to the substance of the two approaches, the merits of each approach, that the advantage of maybe what is coming out as a three phase process, the quickest thing that we can do is take reg. guide 4.7 and incorporate that into Part 100.

That, I think, is the principal concern from the standpoint of view of the DOE early site permit process and the application that would be submitted I guess as early as October of 1992.

The dose mitigation features, it seems to me, are going to be addressed, at the earliest, when you complete your TID update. Then the question is, do you put the TID update back into Part 100 or do you put it into Part 50 where you are heading in the direction of, in phase II, a severe accident rule in any event?

I see the advantages of taking it out right at the outset, but I don't see any disadvantages of doing that. Am I missing something?

DOCTOR MURLEY: No. It's a little awkward, Commissioner, because we haven't really thought about the approach here today of taking it out. So, I guess I at least would like a little time to kick it around with the staff. It's not impossible, that's for sure, and maybe we need to evaluate --

COMMISSIONER CURTISS: I'd appreciate your thoughts on what the advantages and disadvantages are of that approach.

DOCTOR MURLEY: Sure.

COMMISSIONER CURTISS: It does seem to me that we avoid the potential that the Part 100 rulemaking

will become the critical path for review of the DOE application. More likely that that's the case if we take 4.7 and put it in Part 100 and limit the change to that. You then have in Part 100 the siting requirements that you need to review the DOE application. The TID update can be done at that same time or shortly after, I guess. If it takes longer, and I take it it will, put those in Part 50 where you're, I think, in phase II heading in the direction of a severe accident rule in Part 50.

MR. TAYLOR: That's going to be difficult to write that.

COMMISSIONER CURTISS: I'd appreciate your thoughts on that as you --

MR. TAYLOR: Maybe what we ought to do is look at that approach and see if we see any disadvantages and go back. I think today we fixed our mind on taking this two step approach. So, we haven't looked at all --

COMMISSIONER CURTISS: My second question is really more -- I guess I'd ask you to speculate. Do you have a feel at this stage for what the options are, what the possible approaches are for that phase II rule, the severe accident part that you've addressed there, how things are shaping up?

DOCTOR MURLEY: Well, insofar as we've kicked it around on the staff, it has to -- I think it will include several of the severe accident issues that were in the 16 issues that we came to the Commission with. So, it will include some of that. It will also have to include some guidance for controlling habitability calculations.

What are some other areas, Frank, that might include?

MR. CONGEL: Overall response given a range of severe accident scenarios, how -- our goal --DOCTOR MURLEY: Excuse me. Equipment qualification is impacted by the source term. So, that will have to be picked up.

COMMISSIONER CURTISS: Okay. On your schedule, I notice that the schedule for that rulemaking goes off the graph here after FY'93. Do you have an estimate at this time or is it just too uncertain to come up with an estimate of timing?

MR. KING: Well, my view is it will probably be done sometime in 1994 for the second step. But beyond that, I haven't --

CHAIRMAN CARR: Will that give the designers enough time to put it in the passive designs?

MR. KING: If we get applications in 1992, the only information I have to look at would be the

proposed rule at that point in time.

COMMISSIONER CURTISS: Okay.

CHAIRMAN CARR: Commissioner Remick?

COMMISSIONER REMICK: When you've all finished with step one and step two, whatever, will you have addressed the SAMDA question in the Limerick decision and such NEPA-related issues? Will those be addressed as part of this process?

DOCTOR MURLEY: Yes, I think we would have to have done that for the severe accident containment design basis rule, the Part 50 rule. We would have to consider alternatives, yes. My guess is that would be the place that we would do it.

MR. TAYLOR: I think that's right.

CHAIRMAN CARR: Let me follow up on that one. How are you going to decide the range in severity of accidents to be considered?

DOCTOR MURLEY: We don't have a -- I don't have a good answer for that. Generally we would expect that they would consider core damage and core melt accidents. One can postulate, of course, extremely serious events like a severe earthquake or something like that, and we haven't decided a cutoff frequency, if that's the question.

CHAIRMAN CARR: I don't know how you're

going to come up with that. I was just curious as to what process you're going to go through before you can say, "Well, we can eliminate this one and we can put this one in."

MR. TAYLOR: I think that's going to be agonizing. We're obviously going to be back with the Commission on that whole subject as to where we are. That's going to be very --

MR. BECKJORD: I think the answer to that involves the risk assessments, like 1150. It's going to be the accidents that are just at or below the 10^{-6}.

DOCTOR MURLEY: Yes. This would be, I think, an ideal case where the safety goal guidance could come in to help us.

CHAIRMAN CARR: Okay. Excuse me.

COMMISSIONER REMICK: No, that's all right.

In the document, you talk about when you develop the design requirements in Part 50, you say that they would be based on best engineering judgment rather than a dose calculation algorithm. Quite often those words, "best engineering," or "most realistic," or "best estimate," get very confused on do we mean best estimate from the standpoint of a statistical or are we talking about best or more realistic calculations from an engineering sense? We throw around those words

sometime, "best estimate," and we do it in an engineering sense and we get hung sometimes because people with statistical background rub our noses in it.

Have you thought about what is meant there by those words in your SECY document?

MR. KING: I think the intent was best estimate in an engineering sense, not in the sense that we analyze design basis accident today with the conservatisms in meteorology and allowable stresses and so forth, that it would be more of a best estimate attempt to define when things fail and when --

COMMISSIONER REMICK: So, it's the best realistic calculation and assumptions? Okay.

Something that I've raised a number of times in the past, in fact something that goes clear back to 1981, when you do look at Part 50, I'm still very much concerned that in Part 50 we have very well hidden requirements for reprocessing plants. Just a week or two ago, I visited Argonne National Lab and had an update on the IFR system and particular from the standpoint of status and projected schedule. It's certainly possible that sometime in the next four or five years, associated with the IFR process, if the advanced liquid metal reactor concept every proceeds, that we're going to be faced with the question on

reprocessing. I've always felt that reprocessing is very, very well hidden in Part 50 and question whether anybody really understands what the requirements are.

Further, it's my understanding that in Part 50 what we do have in there is based on the Purex process. What we might be faced with in the IFR is a completely different process. So, I would urge as we look at Part 50 and using what we did for establishing of Part 72 and perhaps Part 52, consider -- well, you're going to be making changes in Part 50. You have to ask the question do we mean to include reprocessing plants in those changes or not?

As you go through this whole process, I would urge you to think about do we have the resources to look at pulling out of Part 50 a separate part for reprocessing plants. I just have the personal feeling somewhere down the road, maybe not too many years head, we might be faced with that. There's no better time than now to start thinking what are those requirements, if we have the resources, and I realize that's a big question.

There are other ones. The non-power reactor people say, "We'd like to have non-power reactor requirements pulled out of Part 50 so we know what those are." I don't see that perhaps as as immediate a

problem as the question of reprocessing. I realize that's iffy, but there's a chance.

So, I just ask, as you change Part 50 --

COMMISSIONER ROGERS: It might even be more timely for that.

COMMISSIONER REMICK: Well, could be. I shouldn't say it shouldn't be more, it's not as immediate, being a former light power reactor facility licensee.

CHAIRMAN CARR: I would hope it gets addressed in the energy policy.

COMMISSIONER REMICK: No, but -- well, I hope so too, but it's so well hidden in there, I claim, that I'm not sure anybody really knows what those requirements are.

DOCTOR MURLEY: You're right. My book doesn't exactly fall open to the reprocessing part.

COMMISSIONER REMICK: The answer I've always got when I raised this in the past -- and I did it when I was at OPE -- is we don't have an application, so why do it? But, when you don't have an application, that's when you have the time to sit back and ask the questions that should be asked.

CHAIRMAN CARR: We have a plant that's legal. We just don't have an application.

COMMISSIONER REMICK: That's right. That's all I have, Mr. Chairman.

CHAIRMAN CARR: Commissioner Rogers?

COMMISSIONER ROGERS: What is your feeling about the necessity for any deviations from current regulations that may be required by the GE ABWR and the CE System 80+ on the basis of your source term considerations?

DOCTOR MURLEY: We've brought those to the Commission that have come up in our design thus far.

COMMISSIONER ROGERS: Okay.

DOCTOR MURLEY: I don't know of any others. If there are, of course, we'll bring them up. There's some control room, I think, policy issues that are coming, but that's not source term. I don't know of any more.

COMMISSIONER ROGERS: Nothing more.

DOCTOR MURLEY: Right.

COMMISSIONER ROGERS: When do you expect to-- or do you have any feeling about what the results of those INEL calculations on timing releases are going to turn out to be? They're due in the end of the first quarter of '91, are they?

MR. KING: Yes. We hope to get them in the first quarter of '91.

COMMISSIONER ROGERS: Any sense of what those results are yet, or is it still too early?

MR. KING: Right now, it's a little too early. The thing we had done was go back to the FSARs and see what was in there for the various types of plants. A number that seems to represent a ball park number for most of the plants is this 30 seconds before the first pin failure. The INEL calculations, I think it's a little too early at this point -- they're still setting up and debugging and so forth-- to give you anything further than that.

COMMISSIONER ROGERS: I take it, from your last presentation to us, that that would be very helpful if you had even that 30 seconds.

MR. KING: Yes. I think that would be helpful in several areas.

COMMISSIONER ROGERS: Rather than zero time.

Can you say anything about your thoughts on changing the EPZ requirements, not to do it? Is that something you've just pushed back as too difficult to deal with? Is there anything you can say on it?

MR. KING: It was addressed in the paper. There was a specific response to that. We don't recommend that we do that. We keep them separate at this point. I don't know if Frank --

COMMISSIONER ROGERS: Well, just the reasons. Can you say a little bit more about the reasons for that position not to change them?

MR. CONGEL: I can repeat some of the things and perhaps paraphrase the reasoning. When one looks at the spectrum of accidents that could occur in a manner which we presently understand and with folding in the uncertainty in that, you can look at those consequences and by using broad averaging techniques you can see the order of magnitude of ten miles brackets most of the severe type of accidents. That kind of reasoning was applied when the ten mile distance was originally determined. Based on the understanding that I have now or that we have now, even though it may reflect the possibility that those consequences are less likely, they still can't be precluded.

In the meantime, we've had over ten years of working with states and local governments in setting up this ten mile distance and in the vast majority of cases it's worked very well. So, the planning basis we have we feel is, on that basis, conservative. And in the very unlikely event that something perhaps is more serious, we can extend beyond that. I just don't see a good technical basis for making it smaller or even making it larger.

COMMISSIONER ROGERS: Okay. Fine.

COMMISSIONER CURTISS: I guess I had understood that question when it was first asked as not should we reduce the EPZ to the LPZ, but the other way around. Should the LPZ be increased to the size of the EPZ? I read the analysis in the paper and I understand what you're saying, but I guess I thought the question was the other way around. Should the LPZ be increased to the size of the EPZ? Any thoughts on that?

MR. CONGEL: The feeling that I always had and the understanding I always had was that it would come back, that based on a new understanding of the phenomena that we could perhaps make it smaller.

COMMISSIONER CURTISS: Right.

MR. CONGEL: I've always looked at it and analyzed it --

COMMISSIONER REMICK: I think I asked the question, and it was an academic question, what are the advantages and disadvantages of making them the same, and I wasn't thinking about reducing or enlarging, but we have two different definitions here. Is there any advantage of making them one and the same?

Along that line, Mr. Chairman, if I may ask one more question, there was another question that I think the staff missed. I think it was my question and

it's not your fault. I think it's the way I asked it. It was the benefits and disadvantages of risk-based siting criteria, and I probably did use risk-based siting criteria as the words, however, I was thinking of the dose-related siting aspects that are in Part 100 and he was now talking about eventually putting in Part 50. And so, that question was really addressed when we talk about 25 rem, which is a kind of a deterministic -- from a consequence perspective, is there any advantage of looking at the dose from a risk perspective, maybe keeping in one that's deterministic but also maybe one that is risked-based, in other words some kind of a maximum from a maximum consequence standpoint but then something that's risk-based to be maybe consistent with the safety goals?

So, it's not your fault, I think, that you misaddressed the question. It's probably the wording I used. I think it was my question. But it is something, as you think about moving the dose requirements to Part 50, that you might readdress that question. Is there any advantage of those dose limits either putting exclusively on a risk basis or maybe in addition to the other?

DOCTOR MURLEY: To make sure we understand what you have in mind, would it be something like the

EPRI guideline, their severe accident guideline, which is a risk-based guideline?

COMMISSIONER REMICK: When you say "risk-based," I'm not saying it should be the same as --

DOCTOR MURLEY: But, I mean, that form?

COMMISSIONER REMICK: -- 25 rem. Yes, that form. It's basically the safety goal health effects objectives are on a risk-based -- there's a certain risk per year that relates to dose. And, is there any advantage of looking at this requirement we have on a risk-based --

DOCTOR MURLEY: We can look at it.

COMMISSIONER REMICK: And I wouldn't say exclusively, possibly in conjunction with one that is also based on the consequence, just the consequence.

DOCTOR MURLEY: But there, see, you have to make assumptions on what the human error rate is leading up to core damage, and there's no way that you can have much confidence that those assumptions are going to be maintained all through the life of the plant. I mean, you can assume they are, but to me it's very difficult to get away from a deterministic kind of regulation that you can show is always met, whereas if you've got a regulation that's based on how--

COMMISSIONER REMICK: How do you show it's

always met?

DOCTOR MURLEY: Well, you've got equipment in the plant and you put a defined source term in the plant, do a calculation, and you've got certain equipment. Of course, you have to --

COMMISSIONER REMICK: There's a dose-based calculation. Both methods are by calculation.

DOCTOR MURLEY: Yes, but it's not as highly uncertain as the human error rate would be in a probabilistic calculation. Now, this is top-of-the-head answer. I think we owe you, probably, a more thoughtful answer.

COMMISSIONER REMICK: The reason I say I wouldn't make it exclusively is for some of the arguments you're making, and that is the difficulties of making the risk base. But, is there any advantage in trying to tie this to safety goal, which we now have? I just throw it out as a question. You don't have to answer it now. As I say, I know I didn't make the question clear when I first --

MR. TAYLOR: He had already answered it that way.

COMMISSIONER REMICK: Yes, right.

CHAIRMAN CARR: Would you expand on your statement that decoupling would tend to minimize

litigation over severe accidents? I'm not sure that came through to me why.

MR. PARLER: I understand, from a note somebody gave me when a question was asked by Commissioner Remick as to whether or not the SAMDA problem was taken care of, that language was put in by one of the lawyers who is out at the backfitting workshop. So, since I'm responsible, I will speak for him.

His point is that you wouldn't have to defend or litigate the word "credible" that would be contained or is contained in Part 100.11, but you would still need to consider the SAMDA matters in the NEPA review for the Part 50 changes underway.

As Doctor Murley suggested earlier in one of his responses or his response to Commissioner Remick, that could well resolve the problem. So, if anything is resolved in the SAMDA area after Limerick by Part 50 rulemaking or any other way, that would tend to mitigate the litigation. I guess that's what my absent colleague meant.

CHAIRMAN CARR: Well, my feeling is whatever criteria we pick for looking at those accidents, whether it's "credible" or some other word, it would be litigable, you know, when we're getting to the point

where we're trying to decide what to include and what not to include.

MR. TAYLOR: Yes.

COMMISSIONER CURTISS: It's litigable. You're point is it's litigable in the rulemaking proceeding, but not in the individual licensing proceedings? Is that right?

MR. PARLER: That was his point, yes.

COMMISSIONER CURTISS: Okay. I do think you'd be litigating it, but not in a context of a licensing proceeding.

MR. PARLER: The more prescriptive one is in our requirements, the last opportunity you have for litigation. The more general and fuzzy you are, the wider the door is open for litigation. Over the years, the door has been open quite wide in our practice.

DOCTOR MURLEY: Excuse me a second. There is a difference between challengeable in a rulemaking and litigable in individual hearings. That's a good point.

COMMISSIONER CURTISS: I read the point to mean that you would eliminate litigation, but whatever disagreement you might have on where you draw the line -- 10^{6}, 10^{-7}, what have you -- that would be something that could be challenged in the rulemaking

proceeding. Is it arbitrary and capricious? Is there a rational basis for it? But once that's settled, then the point at which you draw the line is not litigable-

MR. PARLER: That's what I was trying to say.

COMMISSIONER CURTISS: -- proceeding. That's the way I understood it.

DOCTOR MURLEY: And that would be a big benefit.

MR. PARLER: That's the place to have those debates, our rulemaking, as we discuss the connection with plant life extension, standardization, repository, et cetera.

CHAIRMAN CARR: Any other questions?

Well, I'd like to thank the staff for the presentation.

I believe that it's time that the Commission undertake revisions to the siting and plant design practices that have been in place since 1962. Although these practices have stood the Commission in good stead over the years, they have led to design features that may not be optimal for the current understanding of radioactive material release and transport phenomena. We should do what we can to ensure that the evolutionary and future plant designs are based on good science and

reflect our best understanding of the phenomenon uncertainties.

I see a forthcoming policy question in the area of what accidents are to be included in the definition of releases into the containment as a replacement for TID-14844. I believe the staff should provide information to the Commission in this area on a regular basis in order to seek policy guidance. Staff should also provide information to the Commission as it evolves its policy on the use of the updated TID-14844 by existing plants.

Any of my fellow Commissioners have any other comments?

If not, we stand adjourned.

Thanks very much.

(Whereupon, at 3:32 p.m., the above-entitled matter was adjourned.)

CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the United States Nuclear Regulatory Commission entitled:

TITLE OF MEETING: BRIEFING ON DECOUPLING SITING REQUIREMENTS FROM FUTURE DESIGNS AND UPDATE OF SOURCE TERM MATTERS

PLACE OF MEETING: ROCKVILLE, MARYLAND

DATE OF MEETING: OCTOBER 15, 1990

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

Carol Lynch

Reporter's name: Peter Lynch

COMMISSION BRIEFING ON SOURCE TERM UPDATE AND DECOUPLING SITING FROM DESIGN

THEMIS SPEIS
THOMAS L. KING
OFFICE OF NUCLEAR REGULATORY RESEARCH
U.S. NUCLEAR REGULATORY COMMISSION

OCTOBER 15, 1990

OUTLINE OF PRESENTATION

- BACKGROUND
- WHAT IS THE SOURCE TERM?
- USE OF SOURCE TERMS IN REGULATION
- WHY CONSIDER A CHANGE?
- PROPOSED PLAN
- IMPACT ON EXISTING PLANTS
- PROPOSED SCHEDULE
- RECOMMENDATIONS

BACKGROUND

o SRM, DATED JULY 31, 1989, REQUESTED THE STAFF PROVIDE A PAPER ON THE EXTENT TO WHICH THE CURRENT SOURCE TERM CAN BE UPDATED OR IMPROVED FOR FUTURE LWRs.

o SECY-89-341, DATED NOVEMBER 6, 1989, RECOMMENDED THAT THE STAFF UNDERTAKE A SHORT STUDY TO EXAMINE DECOUPLING SITING FROM REACTOR DESIGN.

o SRM, DATED FEBRUARY 13, 1990, ENDORSED STAFF RECOMMENDATION TO STUDY DECOUPLING. STUDY PROVIDED IN SECY-90-341.

o IN ADDITION, SRM DATED FEBRUARY 13 DIRECTED THE STAFF TO:

BACKGROUND (CONTINUED)

- PROPOSE CHANGES TO REGULATORY POSITIONS FOR CURRENT AND FUTURE PLANTS WHERE CURRENT UNDERSTANDING OF SOURCE TERM (TIMING OF RELEASE, FP FORM, AND CONTENT) WOULD PERMIT. SECY-90-307 DATED AUGUST 30, 1990 DISCUSSED POTENTIAL CHANGES IN FISSION PRODUCT TIMING.

- INVESTIGATE OPTIONS FOR EARLY COMPLETION OF RESEARCH ACTIVITIES ON CHEMICAL FORM OF IODINE AND OTHER AREAS IN TID-14844. SECY-90-163, DATED MAY 8, 1990, DISCUSSED EXPEDITED RESEARCH.

- SUBMIT A PAPER ON THE PROS, CONS AND FEASIBILITY OF EMPLOYING A PRA-BASED MECHANISTIC SOURCE TERM METHODOLOGY. SECY-90-173, DATED MAY 14, 1990 DISCUSSED THIS TOPIC.

WHAT IS THE SOURCE TERM?

- SOURCE TERM IS THE RELEASE OF FISSION PRODUCTS INTO THE CONTAINMENT AND POTENTIALLY AVAILABLE FOR RELEASE TO THE ENVIRONMENT.

- INCLUDES TIMING, FORM AND QUANTITY OF FISSION PRODUCTS.

- DESIGN BASIS ACCIDENT SOURCE TERMS (TID-14844) USED IN LICENSING IN THREE DISTINCT WAYS:

  - USED IN SITING EVALUATIONS AS REQUIRED BY 10 CFR 100,

  - TO DEFINE RADIOLOGICAL ENVIRONMENT CONDITIONS FOR CERTAIN PLANT SYSTEMS, AND

  - TO ASSESS EFFECTIVENESS OF PLANT MITIGATION FEATURES.

TID-14844 SOURCE TERM

- TID-14844 LARGELY BASED ON EXPERIMENTAL RESULTS OF HEATING UO_2 PELLETS (LATE 1950's).

- RELEASE INTO CONTAINMENT:
  - 100% NOBLE GASES,
  - 50% IODINE, AND
  - 1% OF SOLIDS

USE OF SOURCE TERM IN REGULATION
CURRENT SITING REQUIREMENTS

- SITING REGULATION IS 10 CFR 100.

- PART 100 REQUIRES THAT EVERY REACTOR SITE DEFINE:

  1) AN EXCLUSION AREA- NO RESIDENTS, CONTROLLED BY APPLICANT

  2) LOW POPULATION ZONE (LPZ)
     - "LOW" DENSITY OF RESIDENTS PERMITTED
     - NEAREST DENSELY POPULATED CENTER AT LEAST 1 1/3 TIMES LPZ OUTER RADIUS.

- PART 100 ASSUMES EXISTENCE OF LOW-LEAKAGE CONTAINMENT.

- CALCULATED DOSES AT EAB AND LPZ MUST MEET PART 100 GUIDELINES (25 REM WHOLE BODY AND 300 REM THYROID) FOR 2 HOUR AND 30 DAY PERIODS, RESPECTIVELY.

USE OF SOURCE TERM IN REGULATION
CURRENT SITING PRACTICE

o FISSION PRODUCT RELEASE IS DERIVED FROM TID-14844 (1962), AND PRESENTLY GIVEN IN REG. GUIDES 1.3 AND 1.4

- 100 PERCENT OF NOBLE GASES
- 50 PERCENT OF IODINE (HALF OF THIS IS ASSUMED TO PLATE OUT IN CONTAINMENT)
- NO SOLID FISSION PRODUCTS ASSUMED AVAILABLE FOR RELEASE
- INSTANTANEOUS APPEARANCE
- IODINE CHEMISTRY GIVEN (LARGELY I_2)

o CONTAINMENT IS ASSUMED TO LEAK AT MAXIMUM LEAK RATE ALLOWED IN TECH. SPECS.

USE OF SOURCE TERM IN REGULATION
CURRENT SITING PRACTICE
(CONTINUED)

- **FISSION PRODUCT CLEANUP SYSTEMS (SPRAYS, FILTERS) EVALUATED CONSERVATIVELY.**

- **DOSES CALCULATED USING CONSERVATIVE SITE METEOROLOGY.**

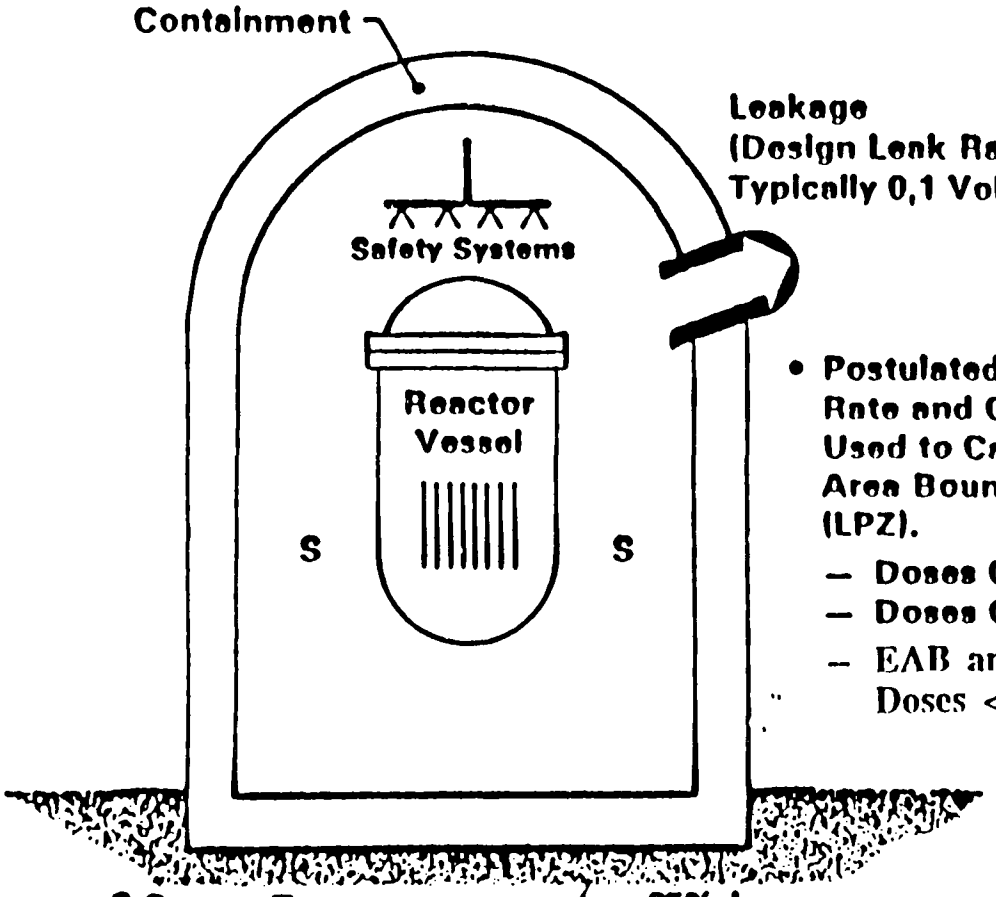
- **GUIDANCE ON EXCLUSION AREA AND LPZ SIZES, AND GUIDANCE ON POPULATION DENSITY NEAR SITE GIVEN IN REGULATORY GUIDE 4.7.**

USE OF SOURCE TERM IN REGULATION
CURRENT PLANT DESIGN ASPECTS

o TID RELEASE ALSO AFFECTS DESIGN OF MANY PLANT SYSTEMS. THESE INCLUDE:

- CONTROL ROOM HABITABILITY
- FISSION PRODUCT CLEANUP SYSTEMS
- EQUIPMENT QUALIFICATION
- POST-ACCIDENT SAMPLING SYSTEMS
- LEAKAGE COLLECTION SYSTEMS (BWRs)
- SHIELDING REQUIREMENTS FOR EMERGENCY RESPONSE FACILITIES
- TIMING OF CONTAINMENT ISOLATION OR PURGE VALVE CLOSURE

TID-14844 SOURCE TERM



- Postulated Release Plus Design Containment Leak Rate and Other Fission Product Cleanup Systems Used to Calculate Doses to Individuals at Exclusion Area Boundary (EAB) and Low Population Zone (LPZ).
  - Doses Calculated Conservatively
  - Doses Compared with Values in 10 CFR 100
  - EAB and LPZ Boundaries Acceptable if Doses < 10 CFR 100 Values

- S-Source Term In Containment (Available for Leakage)
  - 25% I_2
  - 100% Noble Gases
  - Timing and Iodine Chemical Forms Prescribed

WHY CONSIDER A CHANGE?

- TID-14844 DID NOT ORIGINALLY GIVE CREDIT FOR THE USE OF FISSION PRODUCT CLEANUP SYSTEMS.

- AS THE SIZE OF PLANTS INCREASED, HOWEVER, FISSION PRODUCT CLEANUP SYSTEMS (E.G., FILTERS) BECAME A REQUIREMENT TO KEEP EXCLUSION AREAS FROM BECOMING VERY LARGE.

- AS CURRENTLY APPLIED, PART 100 AND ASSOCIATED REGULATORY GUIDES PRIMARILY INFLUENCE PLANT DESIGN AND INFLUENCE SITING TO A MUCH LESSER EXTENT (SITING LARGELY GOVERNED BY REG. GUIDE 4.7).

- OTHER THAN THE POPULATION CENTER DISTANCE CRITERION, PART 100 CONTAINS NO OTHER SITE CRITERIA.

- FURTHER, PART 100 DOES NOT ADDRESS CHALLENGES TO CONTAINMENT OR CONTAINMENT FAILURE (I.E., ASSUMES CONTAINMENT INTEGRITY), WHICH IS NOW RECOGNIZED AS THE PRIMARY CONTRIBUTOR TO OFFSITE RISK.

WHY CONSIDER A CHANGE?
(CONTINUED)

o CURRENT PRACTICE DOESN'T INCLUDE UPDATED UNDERSTANDING OF SOURCE TERM FORM, CONTENT, AND BEHAVIOR AND RESULTS IN DESIGNERS INCLUDING DESIGN FEATURES THAT MAY NOT BE OPTIMIZED TO BE CONSISTENT WITH EXPECTED CONDITIONS.

o NEW DESIGNS UNDER REVIEW.

o THEREFORE, STAFF IS PROPOSING CHANGES TO CURRENT PRACTICE FOR FUTURE LWRs THAT WOULD:

- GIVE DESIGNERS MORE FLEXIBILITY TO DEVELOP DESIGNS WITH SAFETY FEATURES THAT ENHANCE SAFETY BY UTILIZING REALISTIC SOURCE TERM ASSUMPTIONS,

- MORE DIRECTLY ADDRESS ACCEPTABLE SITE PARAMETERS, AND

- MORE DIRECTLY ADDRESS CONTAINMENT CHALLENGES AND PERFORMANCE.

SOURCE TERM CHANGES ALREADY REFLECTED IN REGULATORY GUIDANCE

- STAFF IDENTIFIED (1986) SEVERAL AREAS WHERE IMPROVED SOURCE TERM INFORMATION COULD QUICKLY BE REFLECTED IN REGULATORY GUIDANCE. THESE WERE FOR PWR CONTAINMENT SPRAYS AND BWR SUPPRESSION POOLS.

- STANDARD REVIEW PLAN (SRP) SECTION 6.5.2, COVERING PWR CONTAINMENT SPRAY AS A FISSION PRODUCT CLEANUP SYSTEM, WAS REVISED IN DECEMBER 1988 TO ELIMINATE THE NEED FOR CHEMICAL ADDITIVES DURING THE INJECTION PHASE OF SPRAY (pH CONTROL STILL REQUIRED IN SUMP TO MINIMIZE EVOLUTION OF IODINE FROM SOLUTION).

- NEW SRP SECTION 6.5.5 WAS ISSUED IN DECEMBER 1988 TO ALLOW CREDIT FOR FISSION PRODUCT SCRUBBING BY BWR SUPPRESSION POOLS.

SOURCE TERM CHANGES ALREADY REFLECTED IN REGULATORY GUIDANCE

- **ADDITIONAL SOURCE TERM RELATED WORK UNDERWAY:**
  - **CONTROL ROOM HABITABILITY (GENERIC ISSUE 83)**
  - **BWR LEAKAGE COLLECTION SYSTEMS (GENERIC ISSUE C-8)**

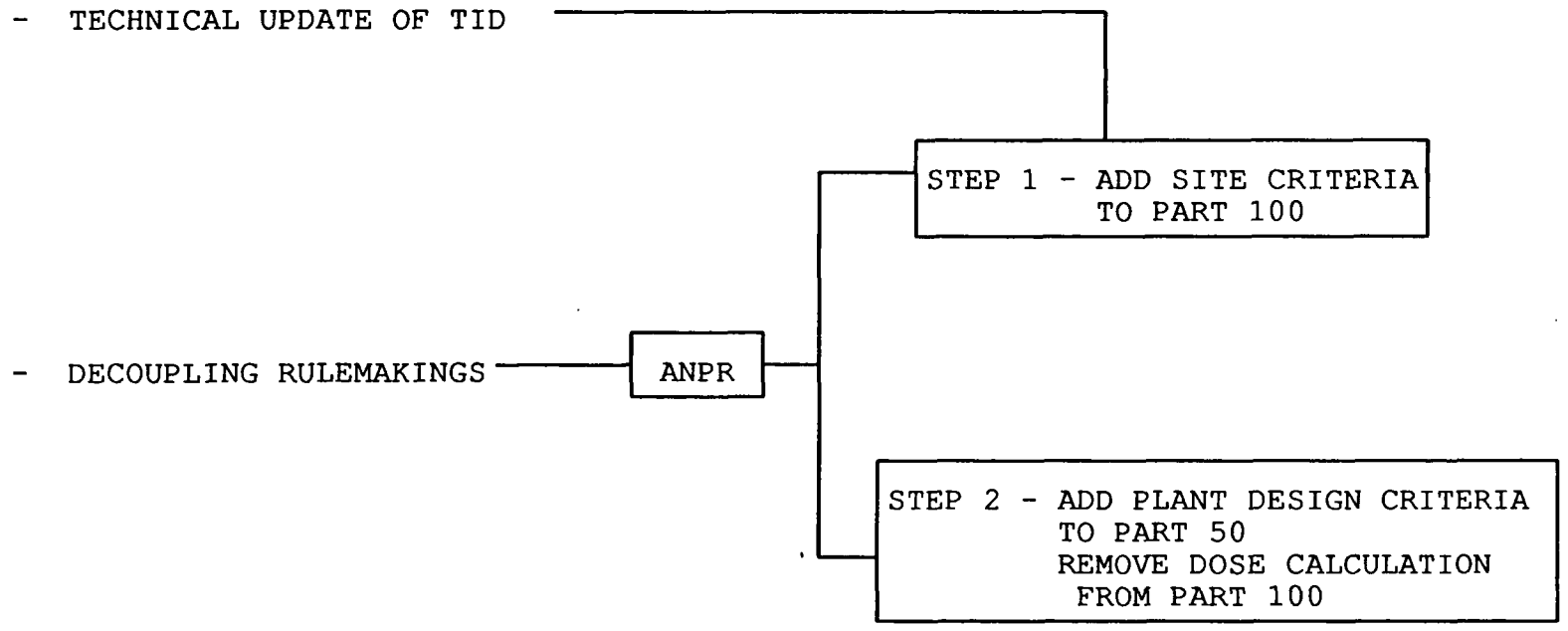
SUMMARY OF PRESENT PRACTICE

- **SITING**
  - TID-14844 FISSION PRODUCT RELEASE POSTULATED
  - USING APPLICABLE SITE CHARACTERISTICS AND PLANT DESIGN FEATURES, DOSES ARE CALCULATED AT EXCLUSION AREA AND LPZ BOUNDARIES AND COMPARED TO VALUES IN PART 100. NEAREST POPULATION CENTER MUST BE AT LEAST 1 AND 1/3 TIMES LPZ OUTER RADIUS.
  - GUIDANCE OF REGULATORY GUIDE 4.7 ALSO USED
- **PLANT DESIGN**
  - TID-14844 FISSION PRODUCT RELEASE POSTULATED
  - PERFORMANCE AND DESIGN REQUIREMENTS OF KEY PLANT SYSTEMS (ISOLATION VALVE CLOSURE, FILTERS/SPRAYS, ETC.) STRONGLY INFLUENCED BY SOURCE TERM ASSUMPTIONS.

PROPOSED PRACTICE

- **SITING**
  - **INTERIM REVISION OF PART 100: SITING CRITERIA TO BE TAKEN FROM R.G. 4.7. DOSE CALCULATIONS RETAINED USING UPDATED TID-14844.**
  - **FINAL REVISION OF PART 100: SITING CRITERIA FROM R.G. 4.7. REMOVE SOURCE TERM AND DOSE CALCULATIONS.**
- **PLANT DESIGN**
  - **INTERIM REVISION OF PART 100: APPLY UPDATED TID-14844.**
  - **FINAL REVISION OF PART 100 AND PART 50: SPECIFY ESF DESIGN AND PERFORMANCE REQ'TS IN PART 50 BASED ON UPDATED RADIOLOGICAL CONDITIONS AND SEVERE ACCIDENT INSIGHTS.**

SUMMARY OF OVERALL PLAN



OVERALL PLAN

- **DEVELOP A TECHNICAL UPDATE OF TID-14844.**

- **DECOUPLING- STEP ONE: ADD SITE CRITERIA TO PART 100.**

- **DECOUPLING- STEP TWO: REMOVE DOSE CALCULATION FROM PART 100 AND REVISE PART 50.**

TID-14844 UPDATE

- WORK UNDERWAY TO UPDATE TECHNICAL BASIS FOR THE SOURCE TERM BASED UPON CURRENT SEVERE ACCIDENT RESEARCH

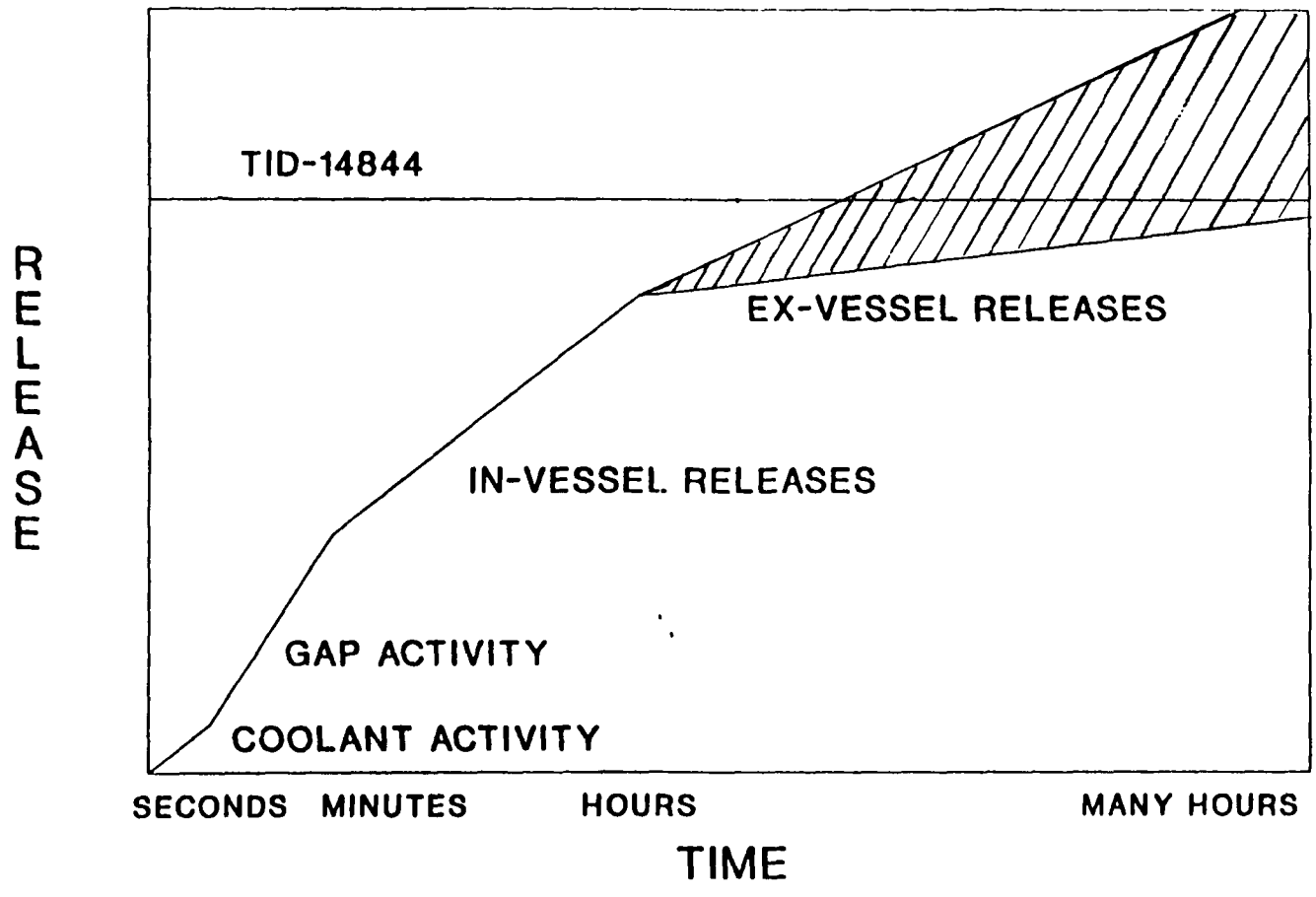
- EFFORT IS EXPECTED TO BE REFLECTED IN CHANGES IN
  - TIMING OF RELEASE (IMPACT AND STATUS GIVEN IN SECY-90-307)
  - COMPOSITION AND MAGNITUDE OF RELEASE INTO CONTAINMENT
  - IODINE CHEMICAL FORM

- DRAFT OF UPDATED TID REPORT SCHEDULED FOR JULY 1991

- INTERACTIONS UNDERWAY WITH ACRS AND EPRI

- A KEY ISSUE TO BE RESOLVED--WHAT IS THE NATURE AND EXTENT OF THE ACCIDENT(S) TO BE FACTORED INTO THE UPDATE OF TID-14844?

CONCEPT OF REVISED SOURCE TERM



DECOUPLING-STEP ONE

o REVISE PART 100 TO ADD SITE CRITERIA (e.g., EXCLUSION AREA, LOW POPULATION ZONE SIZE, ETC.) FROM REGULATORY GUIDE 4.7. RETAIN DOSE CALCULATION AND REFERENCE TO SOURCE TERM, BUT REFERENCE THE SOURCE TERM GIVEN IN UPDATE TO TID-14844 FOR LWRs.

- SITE CRITERIA WOULD BE GENERALLY APPLICABLE TO ANY TYPE OF REACTOR

- TO BE COMPLETED PRIOR TO COMPLETION OF STAFF REVIEW OF DOE EARLY SITE PERMIT APPLICATION

o ONLY CONFORMING CHANGES TO PART 50 TO REFERENCE UPDATED TID SOURCE TERM.

o ADVANCE NOTICE OF PROPOSED RULEMAKING (ANPR) TO BE ISSUED MARCH 1991.

DECOUPLING---STEP TWO

- REVISE PART 100 TO REMOVE REFERENCE TO SOURCE TERM AND DOSE CALCULATIONS, BUT RETAIN SITE CRITERIA PREVIOUSLY ADDED.

- REVISE PART 50 TO ADD GUIDANCE ON LWR PLANT DESIGN:

  a) NATURE OF THE RADIOLOGICAL CONDITIONS (SOURCE TERMS) AFFECTING PLANT ESF SYSTEMS, OR

  b) SPECIFY DIRECTLY ESF SYSTEM CRITERIA AND PERFORMANCE REQUIREMENTS (e.g., CONTAINMENT, SPRAY/FILTER SYSTEM, ETC.)

- ANPR--MARCH 1991

- OBJECTIVE IS TO BE COMPLETE PRIOR TO COMPLETION OF REVIEW FOR A PASSIVE LWR DESIGN

APPLICATION OF UPDATED SOURCE TERM TO EXISTING PLANTS

- STAFF PLANS TO MAKE RESULTS OF UPDATED TID AVAILABLE. EXISTING PLANTS COULD VOLUNTARILY PROPOSE TO USE UPDATED TID ON A CASE-BY-CASE BASIS, IF THEY DESIRE TO.

SCHEDULE

- o UPDATE OF TID-14844:
  - DRAFT AVAILABLE FOR REVIEW AS PART OF PART 100 RULE CHANGE TO ADD SITE CRITERIA--JULY 1991

- o PART 100 RULE CHANGE TO ADD SITE CRITERIA:
  - PROPOSED RULE TO COMMISSION--DECEMBER 1991
  - FINAL RULE TO COMMISSION--FEBRUARY 1993

- o PART 100 AND PART 50 RULE CHANGES TO REMOVE DOSE CALCULATION AND TO ADD PLANT DESIGN CRITERIA TO PART 50
  - PRIOR TO COMPLETION OF REVIEW OF PASSIVE LWR DESIGNS

RECOMMENDATION

THAT THE COMMISSION APPROVE STAFF PLANS TO UPDATE TID-14844 AND TO INITIATE RULEMAKINGS TO DECOUPLE SITING FROM PLANT DESIGN, AS PROPOSED.

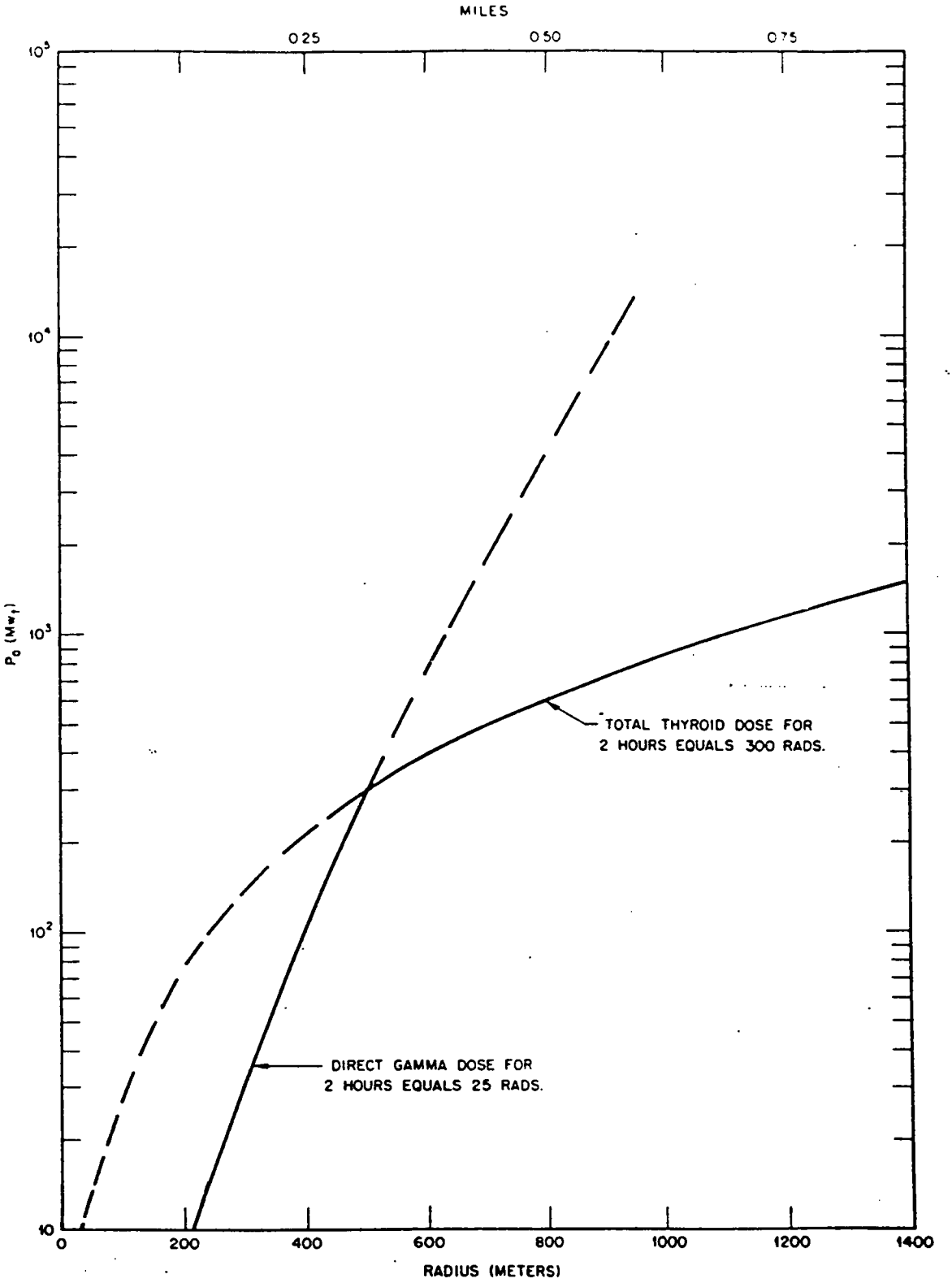


Figure 1. Exclusion Radius Determination.