UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
***
MEETING WITH ADVISORY COMMITTEE
ON REACTOR SAFEGUARDS (ACRS)
***
PUBLIC MEETING
***

Nuclear Regulatory Commission
One White Flint North, Room 1F-16
11555 Rockville Pike
Rockville, Maryland

Thursday, April 2, 1998

The Commission met in open session, pursuant to notice, at 1:08 p.m., the Honorable SHIRLEY A. JACKSON, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:
SHIRLEY A. JACKSON, Chairman of the Commission
NILS J. DIAZ, Member of the Commission
EDWARD McGAFFIGAN, JR., Member of the Commission
GRETA J. DICUS, Member of the Commission

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:
DR. ROBERT L. SEALE, Chairman, ACRS
DR. DANA POWERS, Vice-Chairman, ACRS
DR. GRAHAM B. WALLIS, Member, ACRS
DR. GEORGE APOSTOLAKIS, Member, ACRS
MR. JOHN BARTON, Member, ACRS
DR. THOMAS S. KRESS, Member, ACRS
DR. MARIO H. FONTANA, Member, ACRS

P R O C E E D I N G S

[1:08 p.m.]

CHAIRMAN JACKSON: Good afternoon, ladies and gentlemen. It's a pleasure to meet again with Dr. Seale and the members of the NRC Advisory Committee on Reactor Safeguards, who plan to discuss a number of topics of interest to the Commission at today's session.

But first, I would like to welcome, if he is here, Dr. Graham B. Wallis to the Commission's Advisory Committee on Reactor Safeguards. We're pleased to have you on board.

The Commission is fortunate to be able to draw upon views and experiences of this selected group of experts as we try to solve and address various technical concerns in licensing and regulation.

During today's briefing, the Commission -- I'm sorry -- the Committee will discuss the following topics.

First, improvements to the Senior Management Meeting process; next proposed revisions to 10 CFR 50.59 and related issues; third, risk-informed and performance-based regulation, including the use of PRA in the regulatory decision-making process; fourth, status of the AP600 review; fifth, shut-down and low-power operations; sixth, NRC safety research programs; seventh, license renewal; and eighth, fire protection rule-making.

Commissioner McGaffigan has already made note of

the fact that our two Commission meetings this afternoon have been scheduled for three hours but probably each involve about five hours.

So, Dr. Seale, my colleagues and I welcome you to this meeting and anticipate another candid and informative session with the Committee, and I understand that copies of the briefing material are available at the entrances to the room.

Unless anyone has any opening comments, I think we had better proceed.

DR. SEALE: Very good.

Well, good afternoon, Chairman Jackson, Commissioner Dicus, Commissioner Diaz, and Commissioner McGaffigan.

As always, the ACRS is pleased to have the opportunity to meet with the Commission and exchange information and for us to provide our views on items of interest to you.

We have a very ambitious agenda today and would not be offended if most or all of the discussion time were consumed in the first four items or so, because --

CHAIRMAN JACKSON: It may come to that.

DR. SEALE: It may come to that. And as the last four items are all work in progress and the view-graphs summarize these items fairly succinctly, I don't think

there's a lot of pressure to necessarily pound the program into the time.

Occasionally -- or additionally, I'd like to mention that we have submitted copies of the ACRS operating plan, and this contains planned activities, priorities, and metrics for assessing ACRS performance. Any comments you may have on that plan we would very much appreciate. We expect to update it quarterly -- that is, July being our first update.

I think we'll get right into the program, and John Barton, Plant Operations Subcommittee Chairman, will begin with a discussion of the ACRS deliberations on the Senior Management Meeting process.

John?

MR. BARTON: Thank you, Dr. Seale.

ACRS has been actively involved in the review of the proposed improvements to the SMM process. In March 1997, the Committee reviewed the prepared Arthur Anderson report and, since then, has had several meetings with the staff and prepared two reports to the Commission.

In the September report to the Commission -- some highlights of that report,

The Committee supported the goal of codifying the SMM information-gathering and review process. However, the basis for the top-level criteria contained in the template

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was not clear to the Committee.

Furthermore, the process by which the template led to formation -- formulation of decisions also was not apparent to the Committee.

The Committee preferred to see a top-down structure that starts with a point of decision, identified the objectives of the decision, and then proceeded to define the informational needs to support the decisions.

In a memorandum subsequent to the Committee report -- it was a memo from the ACRS Executive Director -- forwarded comments from an ACRS member, Dr. Apostolakis, which laid out for the staff an approach to the top-down decision-making approach.

Also, another item in the September report, we talked about the assurance of the needs of the new performance standards to be objective and reduce reliance on event-driven assessments, and we made the point that, although progress had been made improving information basis of the senior management process, considerable work remained in areas such as developing tools for assessing management and organizational effectiveness and testing their implementation before being included in the SMM process.

Also, in our September report, with regards to staff's integrated review of the assessment process, we noted the staff had not defined requirements, preferably

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quantitative requirements, for an adequate program to assess license performance.

It was not apparent to the Committee at that time how well-designed recommendations could be formulated without explicit definition of the requirements for an assessment program that met the agency's needs.

It was also not clear how preferred opinions -- options could be selected absent these requirements, and we recommend the NRC staff develop these requirements for an adequate licensing performance assessment program.

Subsequent to that report, we had additional meetings with the staff and issued a second report on the subject in March of this year, and in that report, we reviewed the draft Commission paper.

We looked at the overall objectives. We felt that they were not sufficiently specific to allow evaluation of the proposed assessment process. We recommended at that time the development of specific objectives and performance measures that could be applied directly to the process.

The assessment decision model, logic model, we felt should show how the selected decision options noted in the draft paper would utilize the performance measures.

CHAIRMAN JACKSON: Dr. Barton, I think Commissioner Dicus has a question.

COMMISSIONER DICUS: Yes. About the objectives

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and the performance measures, could you be a little more specific on what sort of measures you think would be useful to provide the clarity?

MR. BARTON: George?

Dr. Apostolakis led this thought, and I'd like him to expand on that.

DR. APOSTOLAKIS: Well, the overall objective of a

process like the Senior Management Meeting is usually something that is general, noble, but not operational. So, as I recall, it says something to the effect that we want to make sure that the plants are safe.

Now, that doesn't mean anything. You have to tell me what safe means.

For example, if you want this to be risk-informed, would you like to prevent the occurrence of initiating events?

Now, that's something specific, that's something I understand, and that certain contributes to safety.

Would you like to make sure that the safety functions have a certain reliability? Again, that's operational.

Now, operational -- well, maybe that's an exaggeration, but -- so, the second level, the second tier would be objectives of this type that elaborate on the top level.

Then you might ask yourself, well, what does it mean to assure the safety function, reliability? You go down one further level.

Now you become more specific. Maybe you will say I don't want such-and-such an event to happen, and you may have to go down two or three or four levels until you reach a point where you say, well, now, this I can measure, this I can track, and then you have this hierarchy construction that shows the rest of us why you selected certain things to monitor and why you left certain other things out.

Right now, we have the top objective, and then we jump way down to the six categories, what is called a template, and the connection is not clear. I mean it's not that there is no logic. I'm sure there is some logic someplace, but it's not evident from reading the document why, for example, I have to worry about human error, I mean besides the general feeling that human error is important.

So, that was really the idea of requiring that.

COMMISSIONER DICUS: Okay. Thank you.

MR. BARTON: Also in our March report we made the comment and recommendation regarding that the staff should work through at least one example that uses the actual inspection reports and demonstrate the implementation of the new assessment decision logic.

We wanted to be sure that the new engineered

approach, taken to an actual case and worked through, would lead you to the same decision that was arrived without this approach. It was kind of a test of the new approach.

CHAIRMAN JACKSON: Now, my understanding is that there has been some piloting of the process since the time you had the discussions with the staff. Do you have any updated commentary?

MR. BARTON: No, we do not, not at this time. We know that they were going to try that process, but we haven't had feedback as to how well that process worked.

We also recommended at that time that the categories in the proposed templates -- the six categories of the template be evaluated and see if they were at the appropriate level and whether there was any unnecessary overlap.

We recommended the assessment process contain provisions to ensure consistent results are obtained among the regions. The new process really drives back to the regions most of the work; decision-making is done at the

region level.

We wanted to assure that there would be consistency, that in the new process would be enough built into it that we could assure consistency among the regions without having to rely on headquarters people down at the regions looking for the consistency.

The process itself should have built in reasonable assurance of consistency among the regions. That was a concern we had, and we didn't see how -- weren't sure how that was in the model.

CHAIRMAN JACKSON: Commissioner Dicus.

COMMISSIONER DICUS: I want to dwell a little bit just briefly on the consistency issue, because I think it is a problem.

Are you talking about consistency of implementation of the process, or is there a greater problem or another problem with regard to the consistency of plant performance from a regional or a national basis?

MR. BARTON: We were concerned with consistency in the process. You know, no process is perfect. That's probably the reason we're changing the current process, to improve it, make it more scrutable, more objective.

We wanted to ensure that, in designing that new process, that the same performance indicators that you were measuring in one region, you measured in another region and gave you the same result. That's what we were looking at.

We also made a recommendation that the measured -- plant performance be measured at a more global level.

We had some discussions with industry at one of the Committee meetings, and we felt that the input to the new process that the staff was proposing was set a real low

compliance enforcement level and saw some opportunity in what the industry was proposing as performance indicators that maybe the staff and industry might get together and raise the performance indicators and the input into the process.

CHAIRMAN JACKSON: Have you had discussions among yourselves about the connectivity between the suggested performance indicators from the industry to the kinds of issues that Dr. Apostolakis raised?

I mean is there a migratory path? Are those -- have you looked at whether those would be the appropriate performance indicators to achieve what he wants? Have you agreed as a committee that you agree with what was in its memo?

MR. BARTON: We have discussed this amongst ourselves, and I think there is an agreement that -- based on what Dr. Apostolakis mentioned before and where the industry was coming from, I believe there's agreement in the Committee -- if I'm not right in that, please, any member speak up -- that there should be more attention paid at the higher level.

Anybody want to comment on it?

DR. APOSTOLAKIS: I don't believe, Chairman Jackson, that, as a Committee, we looked at that specific aspect of the NEI presentation, but that should be

relatively easy to check, because it's higher level, higher level requirements.

But that is an issue that will keep coming back. Where do you set the performance measures? We had a

presentation this morning on the new performance-based initiative. Where do you do that? Do you use risk information? Do you use something else?

Because ideally -- not ideally -- you would like them to be as high as possible where the highest level is, of course, the QHOs. Practically, you can't do that.

So, where is the optimum so that we will satisfy that third feature, I believe, of performance-based regulation, namely giving flexibility to the licensees. The lower you go, the less flexibility they will have.

CHAIRMAN JACKSON: Right. But I'm really actually turning back on you something that you said the staff needs to ensure, and that has to do with consistency.

If you're going to talk, on the one hand, about the need to agree on performance indicators starting with some that may have already been developed by the industry or somewhere else and if you're going to make that recommendation, then there has to be a connectivity between that recommendation at whatever level these performance indicators would come in, with a judgement as to (a) is that the right level, (b) if it is, you know, what the connection

has to be to what the staff would, quote/unquote, actually measure or look at, because in the end, it doesn't do -- you have recommendations that go like this or like this, but at any rate, you have to ensure that, if you're going to make the recommendations on the one hand, in one area, that they are consistent with the recommendations you make in the other.

DR. SEALE: If I may make a comment, it strikes me that, realistically, what you have to do is to erect this connective tissue between -- or lines between the low level and the high level indicators, and once you've done that, then the kind of gradation that occurs is deciding how you tune to get blips on your radar screen.

One of the things you have to have is a scheme or a system that gives you data that tells you what's going on in the plant.

CHAIRMAN JACKSON: Well, I think that's where we all want to get, obviously, and the issue is that, if you're starting at the -- if you want a hierarchical scheme, right, you have to have the connectivity all the way down.

However, what I'm saying is something slightly different. I'm saying that, if you're talking about imposing a set of performance indicators, that you've got have a fundamental decision made as to whether they are the right performance indicators for regulatory agency.

DR. SEALE: Yes.

CHAIRMAN JACKSON: Okay. And then you're dealing with in the context of this hierarchical or connected approach.

Yes, Commissioner Diaz.

COMMISSIONER DIAZ: If I might build up on that, I think, essentially, what we should be asking, also, is is there a process of convergence between the different opinions and if that convergence is naturally happening or does it need to be a function, you know, that will make it happen?

DR. POWERS: It strikes me that you need to be careful not to misinterpret what the Committee was saying when it made its recommendations.

It was saying that we feel there should be a hierarchical structure, and in that hierarchical structure,

you will arrive at high-level performance indicators, higher level than perhaps what the staff is proposing, like what the industry was saying.

We did not espouse the industry's indicators per se but, rather, suggested that, when they created this structure, they would encounter these higher level and those might be better to use than the lower-level indicators.

I don't think the Committee was saying adopt these that the industry has proposed.

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DR. SEALE: No, we did not come to that conclusion.

DR. POWERS: Rather, these industry proposed indicators looked to be higher and you will arrive at them in the course of your hierarchy.

CHAIRMAN JACKSON: But I would also argue that, from an implementation point of view, you've got to ask who uses what when, and I assume this is implicit in what Dr. Apostolakis is talking about, because you can talk about having your higher-level indicators, but the issue is who's making use of them and to what end?

Are they being used as a consistency check? Are they being used in decision-making? Are they best used at a very high senior management level? That may be different than what the guy does in the field, and so, we have to be very clear in that.

DR. POWERS: In a moment or two, Mr. Barton, we'll get to the issue of requirements -- agency requirements for the assessment process, and that will come up in spades.

CHAIRMAN JACKSON: All right. Well, then I better let Mr. Barton proceed, then.

DR. APOSTOLAKIS: A forcing function in the form of a delta function will be very welcome, by the way.

CHAIRMAN JACKSON: A delta function -- a forcing function to you or a forcing function to the staff? Let's

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be clear on who we're forcing to do what.

COMMISSIONER DIAZ: If I may amend the record, the Chairman who uses what when, also for what, and that goes back to your performance measures.

DR. KRESS: That would call for different sets of performance measures, one for the inspector and another one for the senior management and even a different one for you guys.

CHAIRMAN JACKSON: Let Mr. Barton continue.

MR. BARTON: Dana, in our September report -- I mentioned earlier -- this was a comment that we had made. We had noted that we had not -- staff had not yet defined the requirements for the program to assess licensee performance. Would you like to expand on that? It was also in our September report.

DR. POWERS: Staff is now attempting to develop an integrated assessment program, and what we saw was what I would characterize as an assumed solution to that assessment, to integrate together assessment that currently takes place in three different areas into a single assessment.

I call it assumed, because there did not appear to us to have been an attempt to define what the agency needs for its own purposes as an assessment of plant performance, what are the requirements that you had.

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Then, once you had those requirements, one could

presumably define a number of strategies for obtaining those assessments and compare them on the basis of some ranking system, some preferred alternatives, preferences that you had, how you would compare various strategies, all of which met the requirements the agency had but some of which may be preferred because they're less costly, less manpower-intensive, more transparent to the public.

We had not seen that kind of structure in developing this integrated assessment and found it very difficult, then, to look at this integrated assessment and say does it, in fact, meet all the agency needs, as you said, from the front line inspector, the eyes and the ears of the agencies at the plant itself, to the top level sitting at this table.

You need to have an assessment that meets all those needs. It's difficult to judge if we don't know what all those needs are.

COMMISSIONER McGAFFIGAN: My concern comes at it from a slightly different direction.

The staff is going to talk to us -- I don't want to spend a lot of time on this, but they're going to talk to us in an hour-and-a-half about this stuff, and they have a slide of boundary conditions, which boundary conditions are sort of like requirements, and I'm not sure I agree with all

of them. I probably don't. And I've heard additional requirements coming from you all this morning that aren't among their boundary conditions, that this should be risk-informed. That's not something that they're aspiring to at the moment. They do aspire to line up better with enforcement, which I'm hearing some criticism of and I have concerns.

But I think there's a real danger in over-constraining this problem so that there is zero solutions. In fact, it may already been well past that point, and when you try to design a single process to meet, you know, a multiplicity of requirements and the requirements keep growing, you know, if we aren't at the point where there's zero solution, we'll certainly get there rapidly.

DR. POWERS: The one thing you have to have in any kind of design-making is to have an agreed-upon set of requirements, and I forgot to say agreed.

COMMISSIONER McGAFFIGAN: Agreed-upon, right.

DR. POWERS: That's an essential step, and it is not beyond the bounds of credulity to say that I can create enough requirements that there is no solution, and then you have to have an agreement upon reduction in those requirements.

I think it is better to do that, to follow that

tact, than to have a set of requirements created after you have assumed the solution, and I think that's all we were trying to communicate.

COMMISSIONER McGAFFIGAN: You think the staff has this rock, as some people call it, and has the following characteristics which they then say are the boundary conditions for the rock.

DR. POWERS: I think there is a strong component of that. I think that they, indeed, did see criticism of having three or four, depending on how you count them, different approaches to doing plant assessments, and they said my requirement for this is to have one, and they took that.

CHAIRMAN JACKSON: I'm not here to be the defender of the staff, but in fact, I think we all have to take ownership, because I think, in fact, the staff was trying to be responsive to what it thought it was hearing from the Commission.

DR. POWERS: I have no doubt.

CHAIRMAN JACKSON: So, that defined at least part of the rock.

DR. POWERS: I have no doubt that's true. You have an excellent staff that's very responsive, and in this particular case, you have a particularly ambitious fellow leading this product that's anxious to produce a product

that everybody likes.

I mean he really is trying very hard, and we're simply trying to hone his strategy a little bit here in our comments.

COMMISSIONER McGAFFIGAN: He may have produced something that nobody likes.

DR. POWERS: And he won't be the first.

COMMISSIONER McGAFFIGAN: Right.

CHAIRMAN JACKSON: Well, the real question I really have in terms of an over-arching way, since I think this is the last view-graph on this subject -- it's a question but embodied in it is a comment, and that is how much did you treat this as a work in progress and an opportunity to help shape where it's going as opposed to assuming that it is the product that needs to be accepted or rejected?

DR. POWERS: I think we recognized exactly that it was very much a work in progress. That's how it was presented to us, if I can characterize it.

DR. FONTANA: Yes.

MR. BARTON: Yes. And tried to help the staff develop the process as they went along.

COMMISSIONER McGAFFIGAN: Can I ask one other question? One item you slipped over on the previous view-graph was perform additional research prior to use of

economic indicators. I don't know whether that is a kind way of putting this off to the third millennium or later.

Is there any prospect that we're going to be able to come up with something that's useful in economic indicators if we throw research dollars at it, or is that something that we should just --

MR. BARTON: I'm not sure we were talking about throwing a lot of research dollars at it. I think we were coming at it from the perspective of can you really gain -- what can you really gain from some of the economic indicators?

There's changes in how plants spend money that go on for years before you see some performance changes.

So, I think what we're really saying is be careful how you use economic indicators. It may be a data point, but we're not sure at this point that it should be a decision point. I think that's where we are on the economic indicators.

DR. SEALE: But it's certainly an input to the product, and so, you should keep track of the economic activity supporting the plant.

CHAIRMAN JACKSON: That's interesting. I mean the comments that the two of you have made actually have raised a point of another clarification that perhaps needs to be in

the process and that is making distinctions between what is

input and knowing how that input is to be used versus the decision point.

DR. SEALE: Yes.

CHAIRMAN JACKSON: Okay.

DR. SEALE: Well, you're back in the barrel again, John, along with Tom on proposed revision to 50.59.

CHAIRMAN JACKSON: Proposed.

DR. SEALE: Proposed. We try to be careful with some of these words.

CHAIRMAN JACKSON: Okay.

MR. BARTON: Again, just some background.

We provided the reports in April, October, and December on the proposed 50.59 process change.

The first slide, which is the April report -- I won't go a lot into that. That's kind of -- it's history. We proposed something and it went out for public comment.

So, skipping ahead till our October report, we proposed that the NRC should issue revision 1 to Generic Letter 91-18. We felt that it did clarify the applicability of 50.59 evaluations to address the degraded and non-conforming conditions. Also, it addressed completeness and some inconsistency.

Also in that report, we recommended that there be work continued to continue to develop the plan for a 50.59 process that's consistent with the risk-informed

performance-based regulation.

This is where Dr. Kress was driving the Committee to focus on the risk-informed piece of the regulation.

Tom, would you like to expand on that?

DR. KRESS: Certainly.

I guess it would be easier to tell you what we didn't mean by that bullet rather than what we did mean.

We did not mean that the 50.59 process ought to be done by means of a PRA looking at delta-CDF and delta-LERF like the Reg. Guide 1.174, and in fact, we don't think that's even possible.

The consistency part meant that any changes that are proposed that have a direction of risk increase, even though it's small or minimal, should not be inconsistent with the values that are in here. They should be very small.

CHAIRMAN JACKSON: But to the extent that there could be a direct comparison or could be cast --

DR. KRESS: If they could be.

Now, the other part of this is we take those levels of risk change or outside the purview of PRA, that PRA is just not good enough to quantify at those levels, so that the challenge is going to be, for the staff, to quantify both this word "minimal" or "small," as well as to develop ways at which one could -- criteria or attributes

that one could use for a licensee to be guided on what qualifies for that kind of change.

Now, that's going to be a real challenge, and my personal view is that you don't set up a set of criteria that says, if the change meets these criteria, that it qualifies. I think that's almost an infinite set.

I think what you do is set up criteria that, if the change meets these things, then it does not qualify, and clearly, one of these would be, if it's a decrease in risk, it automatically qualifies.

But some of the other things for increases in risk are going to be much more difficult to come by, and they are performance in nature because we have already said you can't quantify them with a PRA, so you have to use intuition, judgement, and I think there would be things like do they impact defense-in-depth, is the change on some system or component that's safety-important or safety-related.

I don't claim to know what these rules ought to be, but I think that's where the challenge lies, and that's, I think, how you make it risk-informed and consistent. That was the intent of that bullet.

CHAIRMAN JACKSON: Can you look at it in terms of how it might affect design basis or FSAR accident frequency?

DR. KRESS: Yes, I think that would be one of the criteria, if it affects the design basis.

Another one would be, if you can -- if it's obvious that you can use a PRA to quantify the change in risk, then I don't think it's 50.59. I think that automatically puts it in 1.174.

COMMISSIONER McGAFFIGAN: Can I ask a question?

CHAIRMAN JACKSON: Please.

COMMISSIONER McGAFFIGAN: The staff has shown you a view-graph that isn't quite the one that's in Reg. Guide 1.174 at the moment where 10 to the minus 7 core damage frequency is described as negligible in terms of risk-informed regulations, and presumably, things are going to get handled very rapidly if somebody can convince the staff that they're in that range, and there was at one point a claim that 10 to the minus 7 was the limit of resolution of PRA technology, and then that was clarified to say no, there are lower levels of resolution that you all can deal with, as low as 10 to the 10th, 10 minus 10, 10 minus 12.

DR. KRESS: I think the Committee disagrees.

COMMISSIONER McGAFFIGAN: Disagrees with that. Okay.

That gets us maybe back to where we originally were. If it's 10 to the minus 7 or below in core damage frequency, is that a -- I know you're going to talk about severe accident space versus design basis accident space, but if it's that level, should it be a 50.59 issue or should

it be an issue that comes to the Commission staff for review and approval?

DR. KRESS: I think the feeling of the Committee was we're not quite certain yet what that level ought to be, because we're talking about cumulative risk over -- there may be hundreds or even thousands at a given plant.

COMMISSIONER McGAFFIGAN: Right.

DR. KRESS: So, we're not quite sure that 10 to the minus 7 is the correct level, but assuming there is some level down there that's about there or even lower, we just do not think that there is a good way to quantify that, and you'll have to come up with a set of rules that you feel qualifies a change to be in that level even though you can't quantify it, and that's going to be a real challenge. That's where we think the challenge is going to be.

CHAIRMAN JACKSON: But don't you think a point that one has to keep in mind -- and that's the difference between the intended use of the reg guide and the Standard Review Plan, is that, in fact, the kinds of changes -- let's leave aside the issue of whether you can put the kinds of changes to the plant that would occur under 50.59 into this

space, but those levels are determined within a context that, by definition, the staff is going to be reviewing those, whereas 50.59 is meant to be a screening rule that relates to screening in terms of things that can happen

without coming to the staff, coming to NRC, so that one has to keep in mind, if you're talking about numbers, that the one has a set of numbers that's being used together with other things but being used in the context of changes to the licensing basis that, by definition, are being reviewed by the staff.

The other is a screening set of criteria, and that's a very different kind of thing.

DR. KRESS: Yes, I think that captures the essence of it.

CHAIRMAN JACKSON: Let me just follow on for a minute. If one wanted to do to risk-informed -- and I think that's what you're really talking about, as opposed to having performance-based per se approaches -- is it possible to do something within design basis accident space, where one can talk about a comparable kind of thing, like design basis accident, frequency of probability in a quantifiable way.

DR. KRESS: We have not discussed that, but I personally don't think so. In fact, I don't think there is a good connection now between risk and design basis space. There is a connection. I don't think we have it well quantified or well thought out.

CHAIRMAN JACKSON: Well, let's talk about it for a second, because I'm trying to understand something. Isn't

what you would call a design basis accident something that, at least for certain things, really what would be an initiator in a PRA calculation?

DR. KRESS: Yes. It's generally an initiator, and then there's stylized --

CHAIRMAN JACKSON: -- stylized sequences that would lead to having you determine whether Part 100 limits would be exceeded, right?

DR. KRESS: Yes.

CHAIRMAN JACKSON: So, is there a possibility of starting with a design basis accident, as laid out within --

DR. KRESS: Well, certainly, because those were selected --

CHAIRMAN JACKSON: Right. And then taking those and going through -- is it possible to arrive at, going through a sequence of things that could lead you to exceed Part 100, if you then were able to assign the same kinds of probabilities --

DR. KRESS: You certainly could do it that way --

CHAIRMAN JACKSON: -- and then arrive at some probability of exceeding Part 100?

DR. KRESS: I think you could certainly do it that way. I would not recommend that.

CHAIRMAN JACKSON: Okay.

DR. KRESS: Because I don't think that's true in

risk-informed.

CHAIRMAN JACKSON: Purity of risk-informed means tied to severe accident analyses, but risk-informed, in many people's mind, has come to mean tied to severe accident consequences.

One could argue that you could have a risk-informed process that examines the probabilities of

some other consequence, of coming to some other consequence.
DR. KRESS: Oh, certainly.
CHAIRMAN JACKSON: And in that sense, I disagree with your statement that you can risk-inform an analysis to a different consequence.
DR. FONTANA: I can understand what you're saying.
I think, in the best of all worlds, there would be a seamless spectrum from a severe accident all the way down to --
CHAIRMAN JACKSON: Absolutely.
DR. FONTANA: -- and design basis would be a set in those accidents. So, one ought to be able to do a risk analysis with the lowest spectrum of accidents.
CHAIRMAN JACKSON: Right.
DR. FONTANA: We're not there yet.
CHAIRMAN JACKSON: Well, all I'm saying is that my understanding is that, essentially, what you would call a design basis accident, in many ways, is an initiator when

you do your typical PRA calculation, and so, you could have a way, it strikes me, if it is an initiator, to put it into the kind of methodology that 1.174 envisions, and you come out with an answer, which in that case would be expressed in terms of something like a core damage frequency or large early release frequency, and that's one part of a screen if there were some level set.
DR. KRESS: You could certainly put that on the initiating frequency itself.
CHAIRMAN JACKSON: Right, exactly.
DR. KRESS: But once again, you're going to have a great deal of difficult quantifying these types of changes that will propagate through and end up at 10 to the minus 8-like levels.
CHAIRMAN JACKSON: All I'm trying to say is --
DR. KRESS: There certainly would be a way to do it.
CHAIRMAN JACKSON: There are two pieces, because I said that's one part of a screen. Okay? The other part of a screen may be one that's rooted in, you know, the defense-in-depth concepts, etcetera.
DR. SEALE: Yes.
DR. KRESS: Yes.
CHAIRMAN JACKSON: And so, since we're talking screens, we're talking gates.

DR. KRESS: yes.
CHAIRMAN JACKSON: Okay. And so, maybe you have an "and" gate that you have "and, and," that you have a screen or a gate that's related to your defense-in-depth pieces but you also do a consistency check.
DR. KRESS: That is, in fact, what I meant by these sets of rules.
CHAIRMAN JACKSON: Right.
DR. KRESS: They would be that sort of "and" gate.
CHAIRMAN JACKSON: Commissioner McGaffigan.
COMMISSIONER McGAFFIGAN: My understanding was -- and you can correct me, because I haven't looked at the documents, but I thought the staff, in the follow-on reg guides for in-service testing, in-service inspection, etcetera -- that they were struggling with exactly these issues, because some of -- they're going to be looking at license amendments in the context of design basis evaluations and yet have to make risk-informed judgements.

So, I hope they're ahead of us in this discussion, but you all probably have looked at these later reg guides, and how are they doing in the more issue-specific reg guides in trying to make this translation from severe accident space to design basis accident space and back?

DR. SEALE: Of course, they're change tech specs, so there's no doubt they have to go through a 1.174.

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CHAIRMAN JACKSON: I think his point --

DR. SEALE: I agree.

CHAIRMAN JACKSON: -- that you're talking about changes the things that fall within design basis.

DR. SEALE: That's an interesting template, if you will, or connection.

COMMISSIONER McGAFFIGAN: We just know they're struggling. I don't know whether they're succeeding, but I know that they're working on it.

CHAIRMAN JACKSON: Is there struggling, Gary?

MR. HOLOHAN: Gary Holohan, Staff.

I'd like to think the staff is succeeding.

CHAIRMAN JACKSON: Thank you so much.

All right. Let's go on.

MR. BARTON: The other recommendations in our December report have been overcome by events. You've issued directions to the staff, and essentially we agree.

CHAIRMAN JACKSON: Well, in fact, I think the direction agrees with -- I mean it resolves essentially all of the kinds of issues --

MR. BARTON: Yes, it does.

CHAIRMAN JACKSON: -- that you had raised.

MR. BARTON: Yes.

DR. SEALE: Okay. Are we through with that one now?

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MR. BARTON: Yes.

DR. SEALE: Okay. Fine.

The next one is on risk-informed performance-based regulation, including use of PRA in the regulatory decision-making process, and if this sounds like deja vu all over again, it's because it is.

George?

DR. APOSTOLAKIS: Thank you, Bob.

The first slide is just some of the activities of the Committee the last several months, so we can skip that.

The next one, on ISI, we are, in fact, meeting with the staff tomorrow morning to discuss the new version of the guide, so I don't have anything to say right now. What we said last July still stands, but I think, in the next few weeks, you will see a letter from us on this guide.

The next one is the major recommendations that the Committee made on Regulatory Guide 1.174 and associated Standard Review Plan. Obviously, we agree with what the staff did there. We think they are succeeding. There's no reason to read what's here.

We have a figure later which will give me an opportunity to talk about some of these things.

Now, the other guides on IST, GQA, and technical specifications -- we also recommended that they be approved.

We were not too excited by the GQA guide, 1.176,

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as you probably have guessed already from the letter.

We felt that this version of a guide was a significant improvement over the first one that we had seen, which I believe we had called timid, but still, it doesn't

go far enough, even if one accepts the fact, which is true, that the lack of a model for assessing the quantitative impact of QA requirements is really a major problem here.

CHAIRMAN JACKSON: Does that imply that you think we have a difficulty or no way of assessing the benefits of our QA program, period?

DR. APOSTOLAKIS: I think the benefits of the QA requirements are grossly exaggerated.

CHAIRMAN JACKSON: This is a Committee point of view?

MR. BARTON: There are some members that agree with Dr. Apostolakis.

CHAIRMAN JACKSON: Let's take a poll.

DR. KRESS: I agree.

CHAIRMAN JACKSON: Do you agree?

DR. SEALE: I think so.

CHAIRMAN JACKSON: Do you agree?

DR. POWERS: I think we have to be very careful about saying we have no way of assessing the benefits of our QA program, period. I think we definitely do have ways of assessing the benefits of our QA program. Are the QA

benefits grossly exaggerated? In the minds of whom?

What I think the more pertinent issue here is, do we have a way to quantitatively describe those benefits and to translate them into a reduction in risk? We do not now, and so, when you ask us to do a risk-informed gradation of QA, we quickly get very handicapped.

What we can do is a risk-informed gradation of systems and components and structures in this system, and then we can assert that surely there must be some gradation in the QA associated with them accordingly.

The problem is how do you judge that?

CHAIRMAN JACKSON: So, it has to do with quantitative modeling.

DR. POWERS: It's the quantitative modeling here. I don't think we ought to get into the subjective and sometimes pejorative statements concerning the QA and QC programs that exist.

There's no question that there's a benefit, and there's no question in people's mind that, even without quantification, for those items that deal with very risk-significant systems, I think everyone, licensee and regulator alike, would just as soon err on the conservative side to assure we have QA.

It is in the lower regions that I think that we worry that too much work is expended, too much work and cost

is expended on assuring the QA of particularly procurement on items that are probably adequately reliable off the shelf rather than having a QA back to the mine in which the metal came from.

Our concern as a Committee, a Committee position, has been the first steps here were timid, that it was possible to take bolder steps.

Our view on the current version of this is a bolder step has been taken, and we understand the inhibitions to going yet farther, and that's why we caveat our endorsement of this by suggesting it be revisited both after experience and additional research.

CHAIRMAN JACKSON: Okay.

DR. POWERS: I think there's room for more here.

COMMISSIONER DIAZ: If I try to extrapolate from

what you said, will it be fair to say that a graded QA focus resources on a matter that there are safety.

DR. POWERS: That's right.

Now, a licensee might well find it in his own interest to grade his QA on reliability and economic impact and loss of time and things like that, but as a regulatory institution, we would want to focus on safety.

CHAIRMAN JACKSON: But nonetheless, you're saying that, in the graded QA area, that the reg guides and the associated SRP sections ought to be issued for use because

you think that out of that will come --

DR. POWERS: We think that experience and comfort -- and in fact, if one looks at this whole business of the quantification of risk since 1974 -- I think that was when it first became very apparent to the community at large -- you find that there is a substantial component of becoming comfortable, to see that it does not immediately result in the madmen running wild on the plants, that in fact this is not a license to kill, it's a license to focus, and so, it takes some comfort, especially as you move in these non-traditional areas.

My own experience within the application of PRA within the Department of Energy was that, before it became at all tolerable to people in maintenance, the PRA people had to learn to speak maintenance-ese instead of PRA-ese, and I think that's -- the graded QA may be a classic example of where we need to develop that language out of the quantification of PRA that the QA/QC professionals in the organization can understand in their context, and then we can take these bolder steps with comfort and assurance.

CHAIRMAN JACKSON: Okay.

DR. FONTANA: I take it we don't have to answer.

CHAIRMAN JACKSON: I'm letting you off the hook, let the record show.

DR. APOSTOLAKIS: Well, when I say they were

grossly exaggerated, I didn't mean that -- we have to be precise here. I'm not saying that we should throw out of the window all the requirements.

What has been grossly exaggerated is the significance of the difference between the current requirements and some form of relaxation.

CHAIRMAN JACKSON: I think we understood that.

DR. APOSTOLAKIS: Okay.

CHAIRMAN JACKSON: And to the extent that your recommendation relates to that, then that's the point you want to make to us. Is that correct?

DR. APOSTOLAKIS: Yes.

CHAIRMAN JACKSON: I think you should go on.

DR. APOSTOLAKIS: Risk-informed regulation -- this was an attempt to -- which I thought was successful -- to show that PRA -- that this is an evolutionary process. We are not about to drop defense-in-depth and safety margins. We do want to proceed in a cautious way. Therefore, changes should be small, and of course, they should be monitored using some strategy.

So, I think these five principles -- the formulation of these principles was a significant step forward.

The next slide shows one of the figures -- one refers to CDF, the other to LERF. This is on CDF, and I

think I should make a few comments here.

First of all, the lines between Region I and the other regions should not have been so bright, but I think it's a problem of software. It should have been a smoother transition to send a message that there are uncertainties in PRA, there are imprecisions.

We are not going to make a decision based on whether a number is 10 to the minus 5 or 1.1 10 to the minus 5. So, the transition should have been smoother.

I think the text makes it very clear, but I think it's worth mentioning that.

Second, the issue of -- well, it doesn't show very well there, but as you see in the actual figures in the guide, we have this shade of gray that becomes darker and darker as we approach areas that we don't like, and it's explained in the footnote that this means we'll pay more attention, we'll scrutinize what you're doing more, and I think that's very important because recognizing explicitly again that there are some issues with PRA, but we are aware of them, we're willing to spend the appropriate time to understand what you're proposing if you are in that region.

So, I think that there is an adequate message that's being sent by these two figures, and of course, the text elaborates on these.

Sometimes, you know, trying, again, to be as

complete as we can, maybe we turn people off, because somebody who does not intend to do a complete PRA picks it up and sees all this discussion on model uncertainty and parameter uncertainty and say, my God, I can't do this. But again, it's trying to satisfy many requirements in one document.

But I think it was the right thing to do.

CHAIRMAN JACKSON: Yes, Commissioner McGaffigan.

COMMISSIONER McGAFFIGAN: When you all saw this view-graph last fall, it had that 10 to the minus 7 and negligible category in it. Should it have been retained? It basically had one ore -- it had Region IV, I guess.

DR. APOSTOLAKIS: I don't remember that.

COMMISSIONER McGAFFIGAN: You don't remember that.

DR. APOSTOLAKIS: I remember that Region III was not going to the right as far as it goes now. No, Region III did not exist at all. That's why I'm confused.

COMMISSIONER McGAFFIGAN: Region III didn't exist? I have seen a view-graph where there is a 10 to the minus 7 and below -- it would imply that the degree of review would be quite modest for things down in that category, and I was wondering whether you had any views on retaining that category or not.

DR. APOSTOLAKIS: My personal view is that it would not really serve any purpose to add it there, but

that's personal. The Committee hasn't discussed this.

COMMISSIONER McGAFFIGAN: You talked about the words, you think, make up for the fact that the lines look sort of bright on the view-graph. I'm not absolutely convinced of that. I think proof will be when somebody comes in at the margins of one of these bright lines and asks something where no changes are allowed.

If I'm not .9 times 10 to the minus 5 today and I propose something that's going to be 1.1 times 10 to the minus 5 and, therefore, is in the region where no changes are allowed, then I'd still be a 2, which is a factor of 5 better than this goal that we don't have of 10 to the minus

4. Should I not be considered at that point, or should I be considered?

I take your remarks to mean that maybe I should get considered even though -- if there's a good reason for it. If I'm going to save large amounts of money and I'm still well within any regulatory requirement, maybe I should be considered.

I'm not sure the words in the reg guide reflect that, but you all are saying put it out and let's get some practice and maybe we'll get some hard cases at that point.

DR. POWERS: I definitely think practice is essential here, but you raised the question of review, how much review is required, a very minimal amount of review.

I think we ought not forget there is a big tough nut to crack when you come into this risk-informed regulation, and that is the review on your PRA that you're basing this on.

That is a non-trivial review that the staff is going to have to undertake, and it's compounded by the fact that, in many cases, the total quantification of risk is going to involve some estimations.

Those estimations become more pandemic once you go to any kind of WARF number. This is a non-trivial burden for a licensee to approach even if he's coming in with one of his 10 to the minus 7th sort of things.

Now, I think he gets over that once -- once he's done one, it becomes a lot easier after that, because staff's not going to go back to ground zero on every review for every licensee, I'm sure, but there is a tough issue we face here for -- in thinking about where your resources -- your manpower resources are going to go in regards to this risk-based regulation.

You've got a front-end cost on this that's non-trivial, and I assure you, the licensees are concerned about that cost. They are not interested in getting involved in something where they will, to quote them, be run ragged chasing thousands of our requests for additional information.

They need some confidence and some standardization here to approach -- whenever we get to talk about fire protection, we'll get into that issue more realistically, because it is a barrier there.

DR. SEALE: I would add, I think the prompt attention to Reg. Guide 1.174-type requests and pilot studies and so forth is probably the single most important aspect of encouraging licensees to be responsive to the offer of risk-informed regulation.

DR. APOSTOLAKIS: Okay.

The next topic is the report we sent in December on uncertainties versus point values, and again, this summarizes the recommendations.

I would like to say a few words about the first bullet, which sounds like a trivial thought, you know, to what degrees are confidence of the PRA results and insights will improve on the existing regulatory system.

I submit to you that is a question that is never asked. The question that is always asked is, is PRA perfect to be applied to this new area and not whether PRA can contribute to doing things better.

So, we thought it was important to put that there even though it doesn't really relate to uncertainties and point values.

COMMISSIONER DIAZ: What is the answer to the

question?

DR. APOSTOLAKIS: What question?

CHAIRMAN JACKSON: The question posed here.

DR. APOSTOLAKIS: It's situation-specific. We had the presentation of higher perfection the other day, and the discussion was all on the limitations of higher PRA. Nobody told me anything about the limitations of the existing regulations regarding fires.

I would like to see two columns. The existing regulation has these problems and it does certain things well. PRA has these problems, but it also does certain things well, and when you put the two together, you have a better system.

CHAIRMAN JACKSON: I think that I would warn against statements that go too far to the pejorative, because I think, in fact, the kinds of questions the Commission was asking in the fire protection briefing, in fact, were exploring just that issue in terms of what the limitations are of the current situation vice where we might go in a risk-informed approach, and the Commission has not made a decision on that yet, and so, I think we should leave it at that.

DR. APOSTOLAKIS: I was not referring to that.

DR. SEALE: We get the language from other places, as well.

DR. APOSTOLAKIS: It was a theme that was coming back when we were discussing the regulatory guides and so on. It was always how good is PRA, PRA doesn't do this, PRA doesn't do that, and what we're saying here that's only one part of the question.

CHAIRMAN JACKSON: I think what you're doing is -- I think we're moving down this track, so let's keep moving down the track.

DR. APOSTOLAKIS: Now, plant-specific application of safety goals -- Dr. Kress will say a few words about that.

CHAIRMAN JACKSON: Slide 23.

DR. APOSTOLAKIS: Twenty-three.

DR. KRESS: The question arose, of course, because the safety goal policy statement specifically says not to do this, and then we come up against what's here called DG-1061, which is now Reg. Guide 1.174, which goes right ahead and does that in the context of requests for changes to licensing basis, and it came to us as a question as to whether that was appropriate or not, and we came down on the side that it certainly was; in fact, there was no other way to do 1.174.

Then the question broadened itself to the whole subject of risk-informed regulations in general, not just in the context of changes to the licensing basis, and it was

our feeling that, in order to have a coherent system like that, you have to do it on a plant-specific basis, and that if you're going to use the safety goals as your top-level criteria, that they have to be applied on a plant-specific basis. It was just apparent to us. So, there was nothing very deep there.

The question then got down to the surrogates, the LERF and the CDF, to the the QHOs, and is it

possible to use those on a plant-specific basis when the QHOs actually involve site characteristics and population and so forth, and our final conclusion was, yes, there's not that much variability in the effects of the site, that you can actually use those and they will focus your attention on the things that we can best deal with in a regulatory agency, and that's the meaning of the other two bullets.

CHAIRMAN JACKSON: Okay.

DR. KRESS: We also did note on this last bullet that there probably ought to be more attention to developing -- if we revisit the safety goal policy statement, there ought to be more attention given to developing a societal risk measure, because the ones we have now intend to do that, but in practice, they focus on individual risk, and we felt one risk -- societal risk was total early fatalities as opposed to individual, was a rather robust one.

It's not the only one. One should think about

land interdiction and other things, but we think that would be a good listing to the safety goals if, indeed, they are revisited.

CHAIRMAN JACKSON: Okay.

DR. APOSTOLAKIS: The final subject is elevation of CDF for fundamental safety goal and possible revision of safety goal policy.

As you see here, we have very carefully listed only facts. We're still debating the issue. There is a meeting tomorrow with the staff to discuss certain things, and we felt it was important to schedule a subcommittee meeting two weeks from today to go more deeply into these issues. So, maybe we should leave it at that today.

COMMISSIONER DIAZ: I just wanted to look at the entire presentation, and like Chairman Jackson said, we already engaged the staff on this.

If you look at your presentation, the presentation was really on risk-informed regulation. Yet, the title says risk-informed performance-based, and I think we are trying to make the point that these issues should be separated, and when they are together, that's fine. They're together, they mean something different, because the process is much more complex than if you look at each one of them by themselves.

And if I might go as bold as going to when I asked what is the answer, I think it would be important if the

Commission would get some sense from the Committee in that, when applied properly, cases in which PRA have definitely improved the regulatory system, because asking a question is great, but if we could have at least some specific answers, like you said, that are area-specific, then that will certainly help us to get a better idea.

DR. APOSTOLAKIS: Did you ask where PRA can or has? I didn't catch the verb.

COMMISSIONER DIAZ: I think both.

DR. APOSTOLAKIS: Okay.

COMMISSIONER DIAZ: It will be an important contribution to our body of knowledge.

DR. APOSTOLAKIS: Regarding the title, I think we sort of routinely, since day one, have been using risk-informed performance-based regulation, you are right, this was on risk-informed part only. From now on we should be more careful.

We did have a discussion today on performance-based regulation, by the way, so we are

following that, but you're absolutely right, this was not part of it.

CHAIRMAN JACKSON: That is not a statement, because you have performance-based regulation without risk-informed.

DR. APOSTOLAKIS: Exactly.

CHAIRMAN JACKSON: And vice versa or both.

DR. APOSTOLAKIS: That's right.

CHAIRMAN JACKSON: That's the point.

DR. APOSTOLAKIS: But this presentation did not address performance-based regulation at all.

CHAIRMAN JACKSON: Well, in some ways one could argue that this presentation was PRA regulation.

DR. APOSTOLAKIS: As it should be.

DR. SEALE: Is that all, George?

CHAIRMAN JACKSON: I think so.

DR. APOSTOLAKIS: Yes.

DR. SEALE: Next we'll discuss --

CHAIRMAN JACKSON: Because I'm chairing this meeting, that's all.

DR. SEALE: We'll discuss the AP600 review.

MR. BARTON: AP600 -- it seems that the meetings have been going on forever, since 1991, the Subcommittee first met with Westinghouse and the staff. We seem to be able to see the light at the end of the tunnel. There have been no recent contentious issues such as in-containment spray system, but I think the process is moving. We've had meetings with Westinghouse this week. Six more chapters were reviewed -- SAR plus draft SERs -- and questions are getting closed out raised by the staff and also by the Subcommittee and the full Committee.

The major hard spots between -- we see between now and the schedule and issuance of the final report are the issues that the thermal hydraulics subcommittee has had with the test analysis program, and Dr. Kress has a few comments on those issues and where he sees their resolution.

DR. KRESS: I don't know that most of these issues arise, thermal hydraulics, because thermal hydraulics is so important or because of personalities. I get different views from the Committee on that.

It does seem that most of the bones of contention have been in that area.

I would like to say that the test analysis program that Westinghouse has done to demonstrate that their plant meets the requirements and that their codes are valid has been very impressive and, I think, a very good set of programs, and we think, as a Committee, that the -- we've listed a number of issues that have come up in the thermal hydraulics subcommittee. We put them, in I think, in our interim AP600 letter -- I forget the date. They were divided between the RCS and the containment in terms of issues.

I don't really see any show-stoppers in either of those. These have been -- the staff has been very responsive in putting these together as requests for additional information from Westinghouse. We are looking

for responses back to those.

I think there are legitimate good answers to all of them, particularly with the RCS.

The one area that I see may still be a problem has

to do with the containment, and the problem is hard to put into words, because I think, if you look at the codes they use, which, in particular, GOTHIC is one of them, it's a lump-parameter code, and in order for the thermal hydraulics part and the fission product behavior part of those to be appropriate for AP600, you have to demonstrate that AP600 is a well-mixed containment, and they have not come forth with an appropriate demonstration to us to convince us that they do, sure enough, have a well-mixed and handle the stratification problem well.

CHAIRMAN JACKSON: Was this the first time these issues had been raised?

DR. KRESS: I think we raised them -- it's a question of how much emphasis is actually put on them, because sometimes you raise an issue in a meeting, a subcommittee meeting, and it gets on the minutes and not much more gets done about it sometimes. But they have been raised.

DR. POWERS: These issues have been focuses of attention -- foci of attention since the AP600 design was first advanced as a passive plant with natural circulation.

COMMISSIONER DIAZ: If I might go to that first bullet, I think this is a matter that even I am confused at times. Lack of adequate justification for level of conservatism. I understand lack of adequate justification, but as to level of conservatism, is it too high, adequate, or too low? It doesn't tell me there which way you're pointing.

And then, in relation to the Chairman's question, there's an enormous laundry list of issues that came very late.

DR. KRESS: Those didn't come very late. They were just consolidated from various lists that existed up to then. We wanted to get them all on one plate.

This one bullet -- number one, I don't think there is a regulatory requirement for level of conservatism. We're talking about peak clad temperature here in design basis space. This is the RCS.

The regulatory requirement says that, when making the analysis to determine what your peak clad temperature is for the various design basis accidents, that you use a conservative analysis.

They haven't demonstrated yet to us that the conservatisms they have claimed for the analysis are really conservatisms that add up to a conservatism that one would be comfortable with.

But I have to say, personally, I think the RCS is not a problem, that they have good ECCS systems. The analysis codes, why they have a lot of difficulties dealing with these low-pressure flows and stuff -- the test and analysis program is very robust and has demonstrated to me that they really do not have a problem. They're a much better system than standard plants.

COMMISSIONER DIAZ: So you would say the level of conservatism in the proposed design based on the calculation is adequate.

DR. KRESS: Not based on the calculation, based on the test and analysis program. But the calculations still need to be -- some issues still need to be -- I do not think they will -- when their issues are finally ironed and the questions are answered, I don't think the answer will be yes, we are in bad shape and the conservatisms aren't there.

I think the answer will be it's okay, we've proven it for the RCS.

It's a little different with the containment. The containment -- what I see there is a code that is a lump-parameter. It has known errors in it that we pointed out. The calculations -- the conservatisms they claim in the calculations haven't been demonstrated at all and are, indeed, somewhat small.

The calculated peak pressure with respect to

design pressure requires you to take credit for all the heat transfer mechanisms, to the thermo-dynamics of mixing with the atmosphere, heat transfer to the walls, heat transfer to the structures, plus the passive containment cooling system, and then you barely peak at the peak pressure, and this is coupled with the fact that they haven't demonstrated it's well-mixed, and if it's not well-mixed, this is not conservative.

Plus they have an aerosol calculation that involves using the lambda, the decay factor, that invokes diffusiophoresis, diffusion, sedimentation, agglomeration, as well as thermophoresis, and basically that's unprecedented in our regulations, we have never allowed that before, and to me, they haven't demonstrated that they've conservatively chosen those values, and with this combination, you end up just barely meeting 10 CFR 100 guidelines, just barely, and what we have is a containment that's basically a volume like a standard plant.

It's relatively weak in pressure, like 45 psi design pressure. That's pretty strong, but -- compared to a BWR, but compared to a large dry -- and it's a thin shell, which we've had little experience with, and think shells tend to fail catastrophically as opposed to leaking like a containment, and you barely meet the design basis criteria and you don't have a spray.

The aerosols stay in there a long time, the pressures stay in there a long time, and although you meet what appears to be all the regulatory requirements, it doesn't leave us with a warm feeling.

COMMISSIONER DIAZ: It might be worthwhile if you would bound your real concerns in this area so the staff will have an area which they can point and focus on.

DR. KRESS: I think we have, and I think it involves looking at the answers to the requests for additional information and seeing what the revised scaling analysis, what the revised code results give us, and then we could make a better assessment.

CHAIRMAN JACKSON: Let me ask you two questions.

You know, the staff has stated that ITAAC will be open still on May 1st on their FSER submittal to you, but they hope to close it out shortly thereafter. Does that pose a problem for you?

MR. BARTON: The information they gave us at the Subcommittee, if they meet the commitment, that will not be a problem. The Final SER by May 1 is the only question-mark at this point, whether they can support that date.

COMMISSIONER McGAFFIGAN: Sort of following on Commissioner Diaz, as I understand this issue --

CHAIRMAN JACKSON: Actually, I wasn't done.

COMMISSIONER McGAFFIGAN: I'm sorry.

CHAIRMAN JACKSON: The second question -- the

staff reduced the open items from about 500 to 7 over the last couple of months, and I understand that you were briefed on one of these open items, fire protection, this week. Do you have some initial assessment of the staff's position in this area?

DR. POWERS: We have an initial assessment that we're going to look at it more carefully. We've asked for that through a fire protection subcommittee activity.

My assessment is that we will find the staff position in their SER and the Westinghouse position in their application supportable, that it's essentially taking an Appendix R position.

We just want to look at it a little more closely, and we have some concerns about feedwater supply and things of detail like that that we just need to look at a little more closely than we were able to do in our grander subcommittee meeting.

MR. BARTON: We will re-look at those in the May subcommittee meeting.

DR. POWERS: We are committed to close that out for Mr. Barton and his work for the may subcommittee meeting, and I would not want to leave you feeling that we have identified some red-flag issue. We just want to walk through the details fairly carefully on this.

This is one of those lovely prescriptive regulations that you can go through check-lists, and we're going through the check-list.

CHAIRMAN JACKSON: Commissioner McGaffigan.

COMMISSIONER McGAFFIGAN: I just want to understand the issue that you're talking about with containment.

The staff isn't here, but I understand the staff doesn't share the same concerns that you all have with the use of the codes, and I'm just trying to understand how we are going to -- whether that is a resolvable matter in the next month.

DR. KRESS: I think it's resolvable. I think the staff has asked for requests for additional information that reflect the concerns that we have on containment, and we're awaiting these answers to come back, and so is the staff. I don't know whether they actually --

COMMISSIONER McGAFFIGAN: When I listen to you, just to try to -- theoretically, one could construe you as saying they have to come up with a new code --

DR. KRESS: Oh, no.

COMMISSIONER McGAFFIGAN: -- invent it as they go along.

DR. KRESS: No.

COMMISSIONER McGAFFIGAN: No?

DR. KRESS: No. In fact, a demonstration by other means that the AP600 is well mixed would certainly go a long way in my mind to saying that the GOTHIC code is an appropriate way to treat the analysis for AP600. No, there's definitely not a need for a new code.

DR. POWERS: I think that, when the examination of AP600 began, it certainly became clear that it would sure be nice to have a code that solved the momentum equation instead of lump-parameter codes, but a stride that has been made over the last few years has been to recognize, indeed, with appropriate calibration against experiments, it is possible to justify the use of a lump-parameter code.

There's no question in our mind that, if we'd had

a fast-running CDF-type code -- competition fluid dynamics code, I'm sorry -- that could apply to this containment, things might have gone more smoothly, but we don't, and we have to rely on a lump-parameter code.

That means you have to have an excellent calibration against experiments and scale properly to the actual plant, and it's those details that you go through, and it's a grinding sort of thing to go through, because you are doing an approximation to the Navier-Stokes equation, and those approximations need to be justified, and there's a rigorous, precise science associated with that. That's all we're doing.

MR. BARTON: That's it for AP600.

CHAIRMAN JACKSON: I actually think I'm going to allow the Commissioners to ask any final questions. We're actually going to end the meeting on this subject.

COMMISSIONER DICUS: To reiterate, you said there's no red flags so far. You should know by now if there are. You don't anticipate any?

DR. SEALE: Well, certainly, if we can get a satisfactory word on this mixing problem in the containment, that's the one area where I see an issue that could give all of us pause.

COMMISSIONER DICUS: Okay. But given that, you think this September date is meetable?

DR. SEALE: Yes. We certainly plan to meet our schedule.

MR. BARTON: Which is a July report to the Commission.

DR. SEALE: That's right. Yes.

CHAIRMAN JACKSON: Very good. Thank you.

I think this has been a very healthy discussion --

DR. SEALE: Thank you.

CHAIRMAN JACKSON: -- and your views are critical in our evaluation of a number of difficulty and, frankly, I think very forward-looking stances and issues that the Commission is dealing with, and I, therefore, encourage you

to continue to be forward-looking in bringing issues to our attention, and we'll cull through the remaining list and see which ones might be appropriate for our next discussion.

DR. SEALE: Let me make one statement.

CHAIRMAN JACKSON: Please.

DR. SEALE: It's a real pleasure for us to get again a demonstration that, when we make our recommendations, they are not recommendations that are -- well, they receive scrutiny --

CHAIRMAN JACKSON: Yes.

DR. SEALE: -- receive critical thought on your part, and that's the only way we can possibly have an impact, is if they do, and we appreciate it very much.

CHAIRMAN JACKSON: Well, that's the game in town.

We're adjourned.

[Whereupon, at 2:35 p.m., the public meeting was concluded.]