Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
532nd Meeting

Docket Number: (not applicable)

Location: Rockville, Maryland

Date: Friday, May 5, 2006

Work Order No.: NRC-1013 Pages 1-28

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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

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532nd MEETING

+ + + + +

FRIDAY,

MAY 5, 2006

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ROCKVILLE, MARYLAND

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The committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Graham Wallis, Chairman, presiding.

COMMITTEE MEMBERS:

GRAHAM WALLIS, Chairman

WILLIAM J. SHACK, Vice Chairman

GEORGE E. APOSTOLAKIS, Member

J. SAM ARMIJO, Member

MARIO V. BONACA, Member

RICHARD DENNING, Member

COMMITTEE MEMBERS: (cont'd)

THOMAS S. KRESS, Member

OTTO C. MAYNARD, Member

DANA A. POWERS, Member

JOHN D. SIEBER, Member at Large

SAM DURAISWAMY, Designated Federal Official

I-N-D-E-X

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

(8:30 a.m.)

CHAIRMAN WALLIS: The meeting will now come to order. Good morning. This is the second day of the 532nd meeting of the Advisory Committee on Reactor Safeguards.

During today's meeting, the committee will consider the following: the NRC staff's response to ARCR -- ACRS comments on the draft final Revision 4 to Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants"; a subcommittee report on the PRA for the SBWR; future ACRS activities; report of the Planning and Procedures Subcommittee; reconciliation of ACRS comments and recommendations; and the preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Mr. Sam Duraiswamy is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments from members of the public regarding today's sessions. We have received a request from Mr. Wes Bowers from Exelon to make an oral statement regarding Regulatory Guide 1.97, Revision 4. And we have also received a

request from Bill Horin of the Nuclear Group on Equipment Qualification to make a similar oral statement.

A transcript of a portion of the meeting is being kept, and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

You have before you a set of items of interest. Note that in there there is a long SECY on the matter of sumps, and there is a statement by Chairman Diaz on security she made before a committee of the U.S. House of Representatives.

So I'd now like to proceed with the meeting. I call upon my colleague, Jack Sieber, to get us started on the first item, which concerns the staff's response to our comments on the draft final Revision 4 to Reg. Guide 1.97.

MEMBER SIEBER: Okay. Thank you, Mr. Chairman. I'm sure the members recall that during the 530th meeting of this committee in March we heard a presentation from the staff related to the endorsement through Reg. Guide 1.97 of a new IEEE standard which related to accident monitoring instrumentation.

We followed up by providing the staff with

a letter stating our views, and we had three conclusions and recommendations, the first of which said Rev. 4 of Regulatory Guide 1.97 should not be issued in its present form. The second one -- recommendation was the staff should revise regulatory position 1 to allow licensees to adopt the IEEE Standard 497-2002 to modify individual accident monitoring instruments without a complete analysis of all accident monitoring instrumentation.

And, lastly, we agree that licensees should not be allowed to use the IEEE standard to eliminate or reclassify -- in other words, downgrade -- accident monitoring and instrumentation required by previous standards in our previous editions of the standard, unless Rev. 4 to the Regulatory Guide is adopted in its entirety.

Staff has considered our recommendations and is proposing a modification to Reg. Guide 1.97, which is intended to address our concerns as we expressed them in March. And so I would recommend that we listen to -- very carefully to the staff's proposed resolution of these issues.

Now, we do have two members of the public who would like to make a statement. And when the staff presentation concludes, we will provide an

opportunity for the two individuals to make a statement.

So with that, I would like to introduce George Tartal, I&C Engineer, who has been working on these issues, and allow him to make his presentation. George?

MR. TARTAL: Thank you. Good morning, everyone, and happy Cinco de Mayo. As Dr. Sieber --

MEMBER POWERS: It's feliz Cinco de Mayo.

(Laughter.)

MR. TARTAL: My name is George Tartal, and I'm from the Division of Fuel Engineering and Radiological Research within the Office of Nuclear Regulatory Research. Also here with me today is Mr. Barry Marcus from NRR. He's the lead reviewer from NRR on accident monitoring instrumentation issues, and he is here to help out with any comments and concerns there might be on implementation of Reg. Guide 1.97.

Today we'll be talking about the discussions that we had during the March 10, 2006, meeting. We'll be talking about what the previous regulatory position 1 said. We'll talk about the comments in the ACRS letter to the EDO dated March 28, 2006; then, the staff resolution of ACRS comments; we'll describe what the revised regulatory position 1

says; and a conclusion.

On March 10, 2006, the RES staff presented the draft final Reg. Guide 1.97 Rev. 4 to the ACRS. The ACRS focused their comments and discussion on regulatory positions 1 and 4. And to refresh your memory on what these regulatory positions say, regulatory position 1 described the use of Rev. 4 by licensees of current operating plants, and regulatory position 4 recommended adding contingency actions within the licensing basis to the scope of potential Type A variables.

And during the discussions that we had with the ACRS, the staff concluded that the ACRS agreed with regulatory position 4 but still had residual concerns with regulatory position 1. That's why we're here today.

So with the previous version of regulatory position 1 from December 2005, it stated that "If a current operating reactor licensee voluntarily converts to the criteria in Rev. 4 of this guide, the licensee should perform the conversion on the plant's entire accident monitoring program to ensure complete analysis."

Now, the supporting text that went along with that regulatory position provided some additional

clarifications, one of which was that the Rev. 4 was primarily intended for licensees of new nuclear power plants, and that licensees of current operating reactors may voluntarily convert to the criteria in Rev. 4.

Now, when we talk about conversion we also clarify that conversion refers to adapting the plant's entire accident monitoring program from Rev. 3 or its current licensing basis to Rev. 4.

It also stated that conversion could involve physical mods and licensing basis changes which could result in significant cost implications, and that's because of the criteria differences between Rev. 3 and Rev. 4. Specifically, Rev. 4 has no design qualification categories, but instead assigns the design and qualification criteria by variable type, and also because Rev. 4 has no prescriptive tables of variables to monitor. Instead, it uses select variables based on the EOPs, AOPs, and similar documents.

Another statement in the regulatory position was that partial conversions were not recommended due to the potential for loss of variables or interaction with other variables without a complete analysis. So those were the main points of regulatory

position 1.

The ACRS and the staff discussed the position during the March 10th meeting, and the result of the discussions was the ACRS letter to the EDO. So in this letter to the EDO that the ACRS wrote on March 28, 2006, there were three conclusions and recommendations, one of which was that the Rev. 4 should not be issued in its present form.

The second was that the staff should revise regulatory position 1 to allow licensees to adopt the standard and modify individual accident monitoring instruments without a complete analysis of all accident monitoring instrumentation.

And, third, that the ACRS agreed that licensees should not be allowed to use the IEEE standard to eliminate or reclassify accident monitoring instruments required by previous editions of the standard unless Rev. 4 to Reg. Guide 1.97 was adopted in its entirety.

The ACRS also commented in the letter that the staff had adopted a position that could frustrate the application of this standard to modifying and upgrading portions of accident monitoring instrumentation in existing plants.

So as a result of the ACRS comments, the

staff considered these comments and attempted to find a solution that would provide more flexibility in current licensing -- for current licensees desiring to make modifications based on the criteria in Rev. 4. And for modifications the staff position is that an analysis should first be performed based on the Rev. 4 selection criteria.

And why is that? And the reason is because Rev. 3 criteria is assigned by Category 1, 2, and 3, whereas Rev. 4 assigns criteria based on variable type A, B, C, D, or E. Since the criteria are assigned differently, there has to be some way of correlating which Rev. 4 criteria apply to which variables, and that's the point -- the intent of this analysis that we're talking about.

I'd like to also point out that the analysis we're talking about here that will be performed as a technical basis for modifications is really a subset of the analysis that will be performed for a conversion.

So for modifications you would evaluate the accident monitoring instrumentation based on the Rev. 4 selection criteria, but for a conversion you would evaluate the instrumentation based on all of the criteria in Rev. 4, that being the selection criteria,

performance design qualification, display and quality assurance.

So this analysis would then produce a list of variables to be monitored and the assigned variable type. Also note that the licensees have already -- already have a list of variables to monitor based on their current licensing basis of Rev. 3, and this analysis would then provide a similar list of variables based on the Rev. 4 selection criteria.

So what might this list of current variables based on Rev. 4 look like compared to the current list? On this slide I've coded the green striped circle to represent the Rev. 3 list of variables and the red striped circle to represent the Rev. 4 list of variables.

Now, after completing the analysis, the list could look closely or perfectly overlapped as you see here. They could start to diverge from each other, or they could have different sizes. We won't know exactly what it looks like until the analysis is done.

MEMBER APOSTOLAKIS: How do you know they are circles?

(Laughter.)

MEMBER POWERS: Do you know that they're

convex?

(Laughter.)

MR. TARTAL: Thank you for lightening it up a little here.

The point of this slide, though, is to demonstrate that once the modification analysis has been completed, and the key variables under Rev. 4 have been determined, that the staff can evaluate the Rev. 4 based modification for a plant whose current licensing basis is based on Rev. 3.

So once the analysis has been done, an evaluation can be done on a Rev. 4 based modification. Again, the analysis should justify which variables are required using the Rev. 4 selection criteria, and then any mods based on Rev. 4 could reference this analysis as a technical basis.

And at this point, we have some examples from Barry Marcus of why this modification analysis is important.

MR. MARCUS: Currently, NRR is reviewing two topical reports, one from the BWR Owners Group, the other from the Westinghouse Owners Group for changes based under Rev. 3. The BWR Owners Group is requesting a downgrade of safety relief valve position indication from current type D category to the type D

category three.

For BWRs, Revision 3 recommends that SRV position is the key variable for monitoring main steam system status to provide detection of an accident and boundary integrity indication, and should be classified as a type D variable and meet the Category 2 criteria.

The BWR Owners Group has presented information that reactor pressure vessel pressure and suppression pool water temperature instrumentation satisfy the accident detection and boundary integrity indication for the main steam system and should be the key variables. The proposed alternate instrumentation meet or exceed the Category 2 criteria. The Owners Group concluded the SRV position could be considered backup instrumentation and, therefore, reduce the type D Category 3.

Under Revision 4, the selection criteria analysis could result in a similar conclusion that reactor pressure vessel pressure and suppression pool water temperature are the key variables for monitoring main steam system status and would be classified as type D, and SRV position would be removed from the Reg. Guide 1.97 list of variables.

In this example, the selection criteria

analysis would show the relationship between variables and would provide a key variable for monitoring the system status in lieu of a variable that is being downgraded.

In the other example from the Westinghouse Owners Group,they are requesting several upgrades and downgrades of multiple variables under Revision 3, and this includes the variables that monitor auxiliary feedwater system status. For Westinghouse plants, Revision 3 recommends that condensate -- excuse me, condensate storage tank level is the key variable for monitoring auxiliary feedwater system status by monitoring the water supply to the auxiliary feedwater system and should be classified as a type D and meet the Category 1 criteria.

Revision 3 also recommends that auxiliary feedwater flow is a secondary variable for monitoring the operation of the auxiliary feedwater system and should be classified as a type D and meet the Category 2 criteria. The Owners Group presented information that auxiliary feedwater flow should be the key variable for verification of automatic actuation of auxiliary feedwater flow, and, therefore, should be reclassified as a type B variable and meet the Category 1 criteria.

They also presented information that the condensate storage tank level provides information to indicate whether continued heat sink can be maintained, and, therefore, should be reclassified as a type B variable and meet the Category 2 criteria.

Under Revision 4, the selection criteria analysis could result in a similar conclusion that auxiliary feedwater flow is a type B key variable, and, therefore, should be a type B criteria -- meet the type B criteria in Revision 4. However, without this analysis, it's not clear if the condensate storage tank level would be a type D key variable, become a type B key variable, or be removed from the Reg. Guide 1.97 list of variables.

In this example, the selection criteria analysis would show what type or types a group of related variables serve even though the type or types may be different from the type designation in Revision 3.

MR. TARTAL: Okay. So what did we do to the regulatory position 1?

CHAIRMAN WALLIS: I think I'll have to give that statement to my students to see if they can figure out what it meant.

(Laughter.)

MEMBER SIEBER: Automatic graduation.

MR. TARTAL: We've revised regulatory --

CHAIRMAN WALLIS: This isn't supposed to be criticism. It's just that it gets sort of complicated when you try to figure it out.

MR. TARTAL: I understand that.

CHAIRMAN WALLIS: All right.

MR. TARTAL: The main point is that the analysis is -- you know, of related variables is needed to really figure out where they end up under Rev. 4.

CHAIRMAN WALLIS: That means you've got to take it seriously.

MR. TARTAL: Yes. So we've revised regulatory position 1 to delete the supporting text of regulatory position 1 concerning not recommending partial conversions, and we've also added a portion to the regulatory position 1 for the option of current licensees to use Rev. 4 as a basis for performing modifications but recommend first performing the analysis discussed in the previous slides to determine the Rev. 4 list of accident monitoring variables and their associated types.

Again, once the Rev. 4 list of variables and their associated types are established, we can

then correlate the Rev. 4 based criteria to the existing accident monitoring instruments and properly evaluate the proposed modification.

In conclusion, Rev. 4 of Reg. Guide 1.97 endorses the current IEEE Standard 497-2002, with exceptions and clarifications. It is intended for new nuclear plants. Current operating plants can also voluntarily convert to Rev. 4 or can also voluntarily use Rev. 4 as a basis for modifications and should first perform an analysis to determine the variable list and their associated variable types based on the Rev. 4 selection criteria.

Comments? Discussions?

MEMBER SIEBER: Anyone have any questions? I guess I would offer a couple of comments. I think that your proposed revision does address our concerns. But it's interesting to note the history of all this. Rev. 1 -- or Rev. 0 of Reg. Guide 1.97 was issued, to my recollection, before your emergency response guidelines were approved.

MR. TARTAL: I believe the first revision was 1981, if memory serves me correctly.

MEMBER SIEBER: Right. And I was also -- at that time, I was an I&C engineer, and also part of the guidelines task force for the Owners Group. And

so we had a list of instruments that you had to have with certain qualification requirements that -- at that time you didn't know how they related to the emergency response guidelines.

And so now where we are with Rev. 4, you're making the qualification -- the list of instruments and their qualification consistent with the requirement for the instrument as it appears in the emergency response guidelines. And to me, that makes sense.

It also makes sense if some licensee or group wants to eliminate instrumentation that you ought to look at the full set to make sure that you have enough instrumentation to accomplish the functions, qualified instrumentation, to accomplish the functions in your EOPs or ERGs. And so the position that you're now proposing appears to do that, and I think it's a pretty good step.

On the other hand, you're not requiring the entire analysis, which was the concern, because if there are certain advantages to Rev. 4 and its -- the standard that it endorses or the standard it -- in my opinion, it's a good standard because it talks to some of the issues that are perhaps not unique to but important to digital instrumentation and control as to

how the system should be defined -- defense in depth, diversity, and factors like that.

And I suspect that licensees, as time goes by, will need to modify their instrumentation because some of it is becoming obsolete, equipment wears out. Some things like one vendor's rod position indication system as an analog system was not as good as what the digital systems of today can do. And so there is incentive to adopt some of these features.

On the other hand, we were concerned that we might be frustrating that purpose by requiring a lot of analysis and potentially an upgrade of all the instrumentation, and so that's where our concerns lie.

I'm sure that the committee will carefully consider your recommended changes, and we will respond to you.

What I'd like to do now is we have Mr. Bowers and Mr. Horin from Exelon and the Nuclear Group on Equipment Qualification that would like to make statements. If you would like to come up to the front, you can speak into one of the microphones, introduce yourself for the Court Reporter, so the transcript turns out well.

MR. HORIN: While they're bringing up the slides, my name is Bill Horin. I'm an attorney with

the law firm of Winston & Strawn. We are counsel to the Nuclear Utility Group on Equipment Qualification.

MR. BOWERS: And I'm Wesley Bowers from Exelon Corporation, and also the Chairman of the BWR Owners Group Committee on Reg. Guide 1.97. I also wear another hat. I've worked with Barry Marcus on the IEEE Standards Committee. I'm on the Nuclear Power Engineering Committee that owns the IEEE 497.

So my remarks today are about the design and qualification requirements in the Reg. Guide. IEEE 497 does provide an important improvement in the selection process for post-accident monitoring. It's based on the plant safety analysis and the emergency operating procedures.

So in the various hats that I'm representing here is Exelon, whereas the BWR Owners Group we really support going to the latest version of the IEEE standard, because it does provide a much closer linkage of the instrumentation that the operators are presented with with the emergency operating procedures.

The comments that were made throughout the development of the Reg. Guide up until very recently restricted, in my view, the adoption of the new IEEE standard for existing plants. So now with the

revision to the wording that was just discussed in position C1, I'm supportive of that. It gives a lot more leeway to existing plants.

So basically, a couple of remarks here to say, yes, the new wording provides the needed flexibility to adopt this standard in existing operating plants.

MEMBER SIEBER: I presume that you -- by saying that that you agree that we should have complained in March when we did?

MR. BOWERS: Yes.

MR. HORIN: I second that.

MR. BOWERS: And the words that were in regulatory position C1 about full conversion were the words that were somewhat troubling, and it restricted the use by the current licensees. Current BWRs do not fully comply with all of the reference standards. But the commitments that current licensees have made to the previous revision of the Reg. Guide did provide an acceptable design and qualification set of criteria.

And here, listed in this slide and the next one, are just six of the particular areas, independence and separation. In the IEEE standard it references the current IEEE standard on independence and separation. Current plants don't meet everything.

They meet kind of the intent of it, but they don't meet every single last word and requirement in the current standards for electrical separation.

And it would be really cost prohibitive to go back and redo the cable routing in a plant in order to meet that. So what's licensed is current licensing basis that has been found acceptable. So when we adopt the new Reg. Guide, or the new IEEE standard, we want to make sure that the words in the Reg. Guide give us the flexibility to continue using the current licensing basis for independence and separation.

So the other items that we've found as we've gone rigorously through the Reg. Guide and the new standard as part of the BWR Owners Group activity, we identified isolation, power supply, environmental seismic qualification, human factors, and quality assurance. They had the same issue.

There was -- in the current version of the IEEE standard there's the latest version of the standard referenced, and current licensees refer to a previous version, that it has been found to be acceptable for each licensee. So with the revised words in regulatory position C1 and the associated discussion, it does I believe allow us, in an operating plant, the flexibility to continue using the

current licensing basis.

So we would end up doing the analysis that George talked about and determine the type of variable, and then apply the design and qualification criteria, such as electrical separation or power supply, in accordance with the current licensing basis. So I support the changes that have been made. Any questions?

(No response.)

Thanks for your time.

MEMBER SIEBER: Thank you. Appreciate that.

MR. HORIN: Okay. Again, my name is Bill Horin. I'm counsel to the Nuclear Utility Group on Equipment Qualification. We are a group that has been in existence since 1981, and we represent well over 80 of the operating powerplants, focusing on equipment qualification issues.

We submitted comments on the proposed revision to the Reg. Guide last October, as well as provided points for requesting further clarification to the ACRS in the meeting in March I believe.

I have two brief points. First, I want to extend our thanks and appreciation, both to the ACRS and to the staff, for working diligently to address

the comments and the concerns. I think that this is the way the process is supposed to work, and I think it's good.

Secondly, to point out that, as modified, we also fully support the revised language. We think that the staff is responsive both to the ACRS comments, to our comments. Don't want to speak for Wes, but I think responsible for them as well. And so we appreciate the opportunity both to, you know, say thank you and also to say that we support the revisions.

One minor point of clarification -- that is, when we talk about prior licensing basis and going from Rev. 3 to Rev. 4, some licensees have Rev. 2 as their current licensing basis, but the analysis doesn't change.

Okay. Thank you very much.

MEMBER SIEBER: Okay. Thank you.

CHAIRMAN WALLIS: This seems to me to be one of the happiest meetings we've had with members of the public.

(Laughter.)

MEMBER SIEBER: Actually, I'm thrilled.

CHAIRMAN WALLIS: Yes.

MEMBER SIEBER: If you liked our last

letter, wait until you read the next one.

(Laughter.)

Do any of the members have any comments to make or questions to ask?

MEMBER MAYNARD: I would just like to say that I agree that I think the process in this case has worked. I think the staff has done an excellent job of being responsive to not only our questions that we raised but the public and the utilities have raised. So I believe overall everybody involved has worked to try to come to the right answer for the right reasons on this issue.

MEMBER SIEBER: Any other comments or questions?

(No response.)

If not, Mr. Chairman, I turn the meeting back to you.

CHAIRMAN WALLIS: Thank you very much. And I'd like to thank the presenters again for their comments.

MEMBER SIEBER: Thank you very much, gentlemen.

CHAIRMAN WALLIS: Thank you very much. And the staff for this -- where they are, thank the staff, too, for doing a good job.

We don't need the transcript anymore. Is that right? Whoever is the Designated Federal Official, we don't need it? So we don't need the transcript from now on.

(Whereupon, at 9:02 a.m., the proceedings in the foregoing matter went off the record.)