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Accidents" Rulemaking

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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PUBLIC MEETING ON "DECOUPLING OF ASSUMED LOSS-OF-
OFFSITE POWER FROM LOSS-OF-COOLANT ACCIDENTS"

RULEMAKING

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WEDNESDAY

OCTOBER 26, 2016

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ROCKVILLE, MARYLAND

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The meeting convened at the Nuclear
Regulatory Commission, Two White Flint North, Room
TWFN-02B1, 11555 Rockville Pike, at 1:00 p.m., Robert
Beall presiding.

NRC STAFF MEMBERS PRESENT:

ROBERT BEALL, NRR/DPR

ROBERT BEATON, NRR

JOSHUA BORROMEO, NRR

STEPHEN DINSMORE, NRR/DRA

VIJAY GOEL, NRR

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OLIVIA MIKULA, Office of the General Counsel

ALSO PRESENT:

ROY LINTHICUM, Pressurized Water Reactor Owners Group

ROBERT RISHEL, Boiling Water Reactor Owners Group

MICHAEL TSCHILTZ, Nuclear Energy Institute

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

1:06 p.m.

MR. BEALL: Good afternoon, everyone. Well, I'd like to thank all of you for your interest in today's public meeting. My name is Bob Beall and I'm the project manager for the risk-informed decoupling of the assumed loss-of-offsite power, or LOOP, from the loss-of coolant-accident, or LOCA, analysis, or as we call it the LOOP/LOCA rulemaking.

I'll be acting as the facilitator for today's public meeting, so my role is to try to make this meeting productive for everyone involved.

At today's public meeting we're going to focus on the need for a LOOP/LOCA rulemaking here at the NRC.

The goal of the LOOP/LOCA rulemaking is to risk-inform the emergency core cooling system, or ECCS functional reliability requirements that's in General Design Criteria, or GDC 35, which is titled, "Emergency Core Cooling" of Appendix A to 10 CFR Part 50. This will relax the current analysis

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requirements for considering in LOOP to concur coincident with a large break LOCA.

Before we begin I'd like to cover some of the meeting agenda and some of the logistics. This meeting is scheduled to last from 1:00 p.m. to 3:30 p.m. today. Once the introductions and logistics are complete, the NRC staff will discuss the history, current status and the outstanding technical issues of the LOOP/LOCA rulemaking. We'll take a short break and then NEI will make a presentation about the LOOP/LOCA rulemaking. We will then open the meeting to the public to ask questions and provide comments on the proposed rulemaking.

For those participating via the bridge line, there will be a designated point during the meeting where you'll be invited to ask questions.

We have a number of people participating by the phone today and also on the webinar, so I'm going to do my best to allow everyone to participate in this meeting fully. I will try to ensure that everyone can follow the discussion as well as have time to speak and ask questions.

I will ask those of you participating here in the room to please turn off or silence your

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electronic devices. I'll also ask the folks on the phone if you could please mute your phone to minimize any background noise during the meeting. If you do not have a mute button on your phone, you can press star, six and that should silence your phone.

During the comment period we'll first take questions from the room and those from the people on the phone lines and then on the webinar. I'm going to ask speakers both here in the room and those on the phone lines to please identify themselves and any group they are with so everyone know who's speaking.

I'd also like to remind visitors in the room that you must be escorted at all times above the first floor of this building. And if you need to leave the room for any reason, please do by the rear doors in the back of the room.

The purpose of today's meeting is to receive feedback on the need for a LOOP/LOCA rulemaking here at the NRC. The NRC staff initially sought industry perspective from NEI via a phone call on May 12th, 2016, but before we had any substantial discussions the NRC staff held a public meeting similar to this on June 28th, 2016, in which NEI and

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other interested stakeholders voiced their opinions regarding this rulemaking.

Today's meeting is a Category 2 public meeting, which means that public participation is actively sought in the discussion of the regulatory issues being discussed today. The meeting is not designed nor intended to solicit or receive comments on the topics other than a need for the rulemaking activity that we're proposing today. Also, there will be no regulatory decisions made at today's meeting.

Also, for those who are attending today's meeting in person, please sign in before you leave. The sign-in sheet is at the podium at the back of the room and a list of attendees and the webinar participants will become part of the meeting summary that will be prepared for today's meeting and will be made publicly available after this meeting. We're also taking a transcript of this meeting, and so the transcript will also be made public within 30 days.

We also appreciate any feedback you may have to help us improve our meeting process. If you'd like to provide any meeting feedback, you may email them to me at robert.beall, B-E-A-L-L,

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@nrc.gov.

I'd also like to -- I'd finally like to ask the speakers to please -- remind them to speak loudly enough to ensure that those on the phones can hear you. For those on the phone, at any point you are unable to hear us during the meeting discussions, please let the -- Kathy know, who is monitoring the phone lines for us.

So are there any questions about the logistics or the agenda?

(No audible response.)

MR. BEALL: Okay. Before we get into the meat of things, I'd like to go around and do introductions here at the table. So if you'd please state your name and what office or group you're with, please?

Like I said, I'm Bob Beall. I'm a senior project manager in the NRR Office of Rulemaking.

MR. DINSMORE: Stephen Dinsmore, a senior risk and reliability analyst in NRR.

MR. BORROMEO: Josh Borromeo, NRR, Division of Safety Systems.

MR. BEATON: Robert Beaton, NRR, Reactor Systems Branch.

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MR. GOEL: Vijay Goel, from NRR,
Electrical Engineering Branch.

MR. TSCHILTZ: Mike Tschiltz, NEI.

MR. LINTHICUM: Roy Linthicum, PWR Owners
Group.

MR. RISHHEL: Bob Rishel, Boiling Water
Reactor Owners Group.

MR. BEALL: And, Olivia, could you do
yours?

MS. MIKULA: Olivia Mikula, Office of the
General Counsel, NRC.

MR. BEALL: Okay. Thank you. So I'd
like go ahead and give some background on the history
of the LOOP/LOCA rule. So in July of 2002 the NRC's
Office of Nuclear Regulatory Research issued a memo
that recommended that the staff move forward to
eliminate on a generic basis the ECCS design
requirements for consideration of assumed LOCA
coincident with a large break LOCA.

This memo also stated that a risk-
informed alternative to GDC 35, which addresses the
overall ECCS reliability and the single failure proof
criterion on a plant-specific basis, was feasible.
The report indicated that there was a number of issues

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that would need to be addressed since the total plant risk needed to be accounted for.

On March 31st of 2003 the Commission issued a Staff Requirements Memo, or SRM, to SECY-02-0057 in which they directed the staff to proceed with rulemaking to risk-inform the ECCS functionality -- functional reliability requirements in GDC 35 or start the LOOP/LOCA rulemaking.

In parallel with the LOOP/LOCA rulemaking, the NRC staff was pursuing a separate rulemaking to risk-inform and redefine the large break LOCA ECCS analysis requirements. This was the 50.46a ECCS rulemaking. When issued as a final rule, the 50.46a ECCS rule would allow both pressurized water reactors and boiling water reactors to decouple a LOOP from a LOCA for certain break sizes.

In December of 2007 the staff informed the Commission that if the BWR Owners Group's topical report or the ECCSa -- the 50.46a ECCS final rule was not approved, it would be unlikely that a LOOP/LOCA rule would be worth pursuing. The Commission approved the staff's request to do further LOOP/LOCA rulemaking activities to keep the existing rulemaking open pending the review of the 50.46a ECCS final rule

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and a topical report.

In SECY paper, SECY-04-0037, in March of 2004, the staff proposed to review the topical report and a pilot exemption request that would be submitted by the BWR Owners Group to relax the assumed coincident LOOP required for a LOCA analysis. If found acceptable and approved by the NRC staff, the topical report was intended to serve as the technical portion of a regulatory basis to support the LOOP/LOCA rulemaking. The Commission approved this proposal in an SRM dated July 1st, 2004.

From 2004 to 2008 the NRC staff and the BWR Owners Group worked to resolve all the issues in the topical report. A number of public meetings were held with formal requests for additional information from the NRC staff.

On June 12th, 2008 the BWR Owners Group withdrew the topical report from further NRC review and discontinued their efforts stating that if ultimately approved in the form presently desired by the NRC staff, adoption by licensees would most likely be prohibitively expensive. The NRC staff notified the Commission of the withdrawal of the topical report and the staff's plan to assess the need for a

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LOOP/LOCA rulemaking was made on December 19th, 2008.

In support of the LOOP/LOCA rulemaking the staff also performed some work on a number of technical issues including the LOCA frequency elimination and conditional probabilities of LOOP given a LOCA. As part of this work the NRC staff identified a number of areas of uncertainty associated with eliminated conditional probability of a LOOP given occurrence or a LOCA. With the withdrawal of the BWR Owners Group topical report in 2008 the staff would need to further develop these areas on certainty in order to complete a regulatory basis for the LOOP/LOCA rulemaking.

Also, recently the NRC has discontinued the 50.46a ECCS rulemaking. A FRN, a *Federal Register* notice, was issued on October 6th, 2016, that formally discontinued that rulemaking effort.

To discuss in more details these areas that require additional development I would like to introduce Stephen Dinsmore. Stephen, as he's mentioned, is a senior reliability and risk analyst in the Office of Reactor Regulations.

MR. DINSMORE: Yes, okay. Hi, this is Steve Dinsmore. I guess briefly the last time we had

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a meeting we kind of relied on memory; I was one of the guys that was working on this topical, and then we didn't realize there was going to be any potential interest. And because there was potential interest expressed, we went back and did some investigation so that we could at least have a fairly good confidence that we identified the right issues.

But we didn't do a whole lot of investigation. So, and the topical came in and then there was a bunch of RAIs and then there was a new topical and some new RAIs. So what we're going to present today is what we believe to be the relevant issues that were left.

And, Bob, I guess you're the BWR Owners Group guy?

MR. RISHEL: I am.

MR. DINSMORE: So if there's something up here that's incorrect, you can just speak up and we'll fix it.

We've got the right slide. Okay. The first thing is that this BWR topical was a topical report, so it didn't change any rules. So it had to identify the regulations for exemptions and the basis for granting the exemptions to be able to make the

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changes that it was proposing to make since those were not -- those changes are not permitted by the current regulation.

And then it went on to identify specific design changes facilitated by the exemptions of the exemption, which would be several. It had seven specific changes in them, but it said a licensee could request additional changes depending on what they find useful.

I'd also provided the 24-step process to prepare the risk-informed exemption request. I can't quite remember why it was that complicated, but it was a long process. It included a generic example risk analysis which considered both the frequency of the LOOP and large break LOCA and use that combined metric as a way of defining the LOOP -- the LOCA size. And it also included evaluation of defense-in-depth and safety margins which are two topics that we always have to address in risk-informed applications.

Next slide. So that was the content. If you have any comments or questions, feel free to speak up.

The proposal. It defined large break LOCA was -- we're using the word "transition break

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size," which came from 50.46a, because it's a convenient phrase. So it would define a transition break size since the frequency of occurrence of that break are large and multiplied by the conditional probability of LOOP equals 10 to the minus 6. What that means is if it's equal or less than 10 to the minus 6, you could make these -- you could normally make these changes using Reg Guide 1.174 risk-informed guidance as an acceptable risk increase.

So one of the assumptions was, well, we don't have to worry a lot about what happens in a LOOP/LOCA because even if the LOOP/LOCA always led to core damage, that would be an acceptable risk increase. Well, one of the issues that came up right at the end was you also have the change in LERF. So the issue came up, well, if you help out the containment failure probability with the LOCA -- and that added another evaluation on, which also I think helped bring this thing to an end.

Anyway, so the LOOP/LOCA combination itself is not completely removed from the design basis, but was redefined as a beyond-design-basis accident for which some mitigation capability must be assured. This is kind of a problem or an issue that

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runs through all of these risk-informed things. If you have some design-basis stuff that you've got to deal with now and all of a sudden you say, well, it's no longer important, the question is what do you do with it?

Do you just ignore it or do you -- so this issue was one of the things we were hoping to address with the 50.46a rulemaking. So we just kind of put it on the shelf and didn't worry a lot about it. The large break LOCA with offsite power available remains in the design-basis, so you couldn't just ignore it. You'd have to do something about it.

And then the next bullet talks about what you have to do about it is you'd have to do a realistic thermal hydraulic analysis with or without single failure. That seemed to have changed during the review as to whether you needed that or not. And that as a result of this realistic thermal hydraulic analysis, instead of having a maximum cladding temperature of 2,200, or whatever it is, some level of core damage would be tolerable. So that's -- so we wouldn't just -- we did kind of address this issue about what to do with the beyond-design-basis

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sequences to some extent by saying, well, you're going to have to -- you're not going to be able to just completely ignore it. But these are very complicated issues that I'm kind of summarizing.

Next slide. The current status. In 2008; I actually remember the telephone conversation which was about what are you going to do about LERF, the change in LERF. And shortly after that the industry wrote us a letter and said it's no longer cost-effective. And as Bob said, implementation cost as envisioned by the staff would be prohibitively expensive. And so, we stopped pursuing it because we're not supposed to spend time on stuff that we're not going to use. So we haven't really done much since 2008. We did a little in the last couple of months to put this together.

Next slide. I'm going really quick here because I understand that there's not a lot of difference of opinion about what we might do with this process. Unresolved issues for rulemaking. Development of plant-specific consequential LOOP fraction methodology. That means when the plant trips, of course there's a certain likelihood that it will bring the grid down with it, which is the LOOP.

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And there was a lot of discussion about -- since that number became important in this process, there was a fair amount of discussion about that.

Usually it's just a number that we kind of use data that we have available, and I think it's like 0.02 or something. And so, but in this case it would become very important. And if that number doubled or halved, then the transition break size doubled or halved. So it was -- it had more importance in this process.

Evaluating risk of delayed LOOP/double sequencing. Double sequencing; I don't know if Vijay wants to define it, but effectively it's worse if you kind of startup sump pumps and then turn them off and then start them again than if you never started them and then tried to start them. There's a higher likelihood that they won't start because of heating the coils or something like that.

The next one was generic versus plant-specific risk assessments. I believe the BW -- or the topical said, well, generic is good enough because we're kind of demonstrating it's all right. And we, as we often do, were pursuing the path of plant-specific risk assessment.

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How to combine the frequency-based TBS and CDF increases with -- from enabled changes. That was the -- if you're saying, well, LOOP/LOCA TBS size is selected because the delta CDF, assuming it goes to core damage, is 10 to the minus 6, and therefore meets the guidelines, well, what happens to the increases from the enabled changes? Because some of the changes would increase risk beyond that.

And then the last bullet there is determination of appropriate design-basis -- well, analysis and acceptance criteria. That's just like the -- when you're above -- we didn't want to just set aside all those scenarios that were being moved out of the design-basis. They weren't -- there's -- we'd have to figure out how to -- what is an appropriate evaluation and what is appropriate acceptance criteria for those.

Next slide. So if we wanted to resume rulemaking, our expectations from industry would be pretty much we have these issues that will remain and we'd -- somehow or another we would expect industry to propose some resolution to these issues. And that would be to develop the method for delayed LOOP/double sequencing, develop methods for consequential LOOP,

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upgrade the PRA models to include those, although I -- well, okay. And then we'd expect that a pilot application -- expect -- we would appreciate a pilot application from -- one for at least BWRs and one for PWRs since there is a good bit of difference between how they react.

And the NRC, what we would do is we'd restart the LOOP/LOCA rulemaking by developing a draft Regulatory Basis. I believe that that -- well, we'd require Commission approval before we even restarted this.

MR. BEALL: Yes, that's correct.

MR. DINSMORE: And so once we get approval, then we start doing that. And that would -- usually takes four to five years before a final rule is issued, however, since all the other risk-informed regulation proposals have kind of not been taken to the very end, it's unclear as to whether this one would also not be kind of excessively complicated and maybe take longer than normal.

Next slide. As an alternative we still have an exemption process you can -- and licensees can take individual changes that they would really like to make and submit a request for an exemption,

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and we would review it.

And LTR could provide guidance for developing -- you could try -- that second bullet is kind of like what the first BWR topical tried to do, which is just kind of generally what we're going to do, could you prove that. And then when we come in with specific ones -- Yes, I guess I would rather not pursue that.

(Laughter.)

MR. DINSMORE: It didn't work very well the first time.

But, okay. Next slide. Okay. That's -- I -- as I said, we had to go back and kind of look through all these documents and collect information and put it together. And we still weren't quite sure whether we were going to do this or not. And so we didn't spend a whole lot of time, just kind of getting an idea.

And so that would be our presentation about what we believe to be the current status and what would need to be done.

MR. RISHEL: So this is Bob Rishel from the BWR Owners Group. So just a sort of generic question, or maybe upgrade the PRA models. That Reg

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Guide 1.200 question, is that really what that is?

MR. DINSMORE: Well, it was two things: One would be the double sequencing the scenarios. They're usually not modeled. And we would expect them to be modeled in order to get a better estimate of the change in risk. Conditional LOOP probabilities is also a number which is kind of just used now, but would become more important.

So there was a couple specific --

MR. RISHEL: Okay.

MR. DINSMORE: -- improvements. Generically, Reg Guide 1.200, Rev 2, came out in 2009 or '10, and that endorsed an ASME standard that had -- or that does include guidance on how -- on what should be included in a seismic environ, high winds and different external events. And generically with risk-informed applications once guidance has been accepted by the staff on what should be included in these types of hazard analysis, we would expect that the hazard analyses be done and included in the PRA.

There is some realistic changes to that kind of hard and fast rule. Okay. It came out in 2009. You've got one year to the end of 2010. You've got to just give us everything, because these are Reg

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Guides and there's -- as long as we have a technically justified reason, we cannot exactly follow every letter in the Reg Guide.

And we have been somewhat flexible. There's really no way of addressing a hazard which isn't really that important to a decision anyway, that we've been accepting that, although with NFP-805 of course because the fires was the central part, so we kind of required fires. And now we're starting to -- seismic is coming in for -- in response to this Fukushima -- whatever that task was. So there's some expectation now that there is a fire PRA and there's expectation developing that there should be a seismic PRA because the methodologies are available and in wide use.

But I can't really -- at the time we wrote this, those hazards were not part of this suite of methods that we were essentially requiring. And I -- whether they would be now or not is something we'd have to -- I mean, I don't -- I can't answer that.

MR. RISHEL: Yes, I don't have any other questions.

MR. BEALL: Okay. Let's move onto the NEI presentation.

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MR. TSCHILTZ: Okay. My name is Michael Tschiltz with NEI. Contacted by Bob Beall to seek industry input or feedback on the staff's decision whether or not to make or go forward with the rulemaking for LOOP/LOCA.

And in order to do that I reached out to the owners groups. We got representatives from both -- Roy and Bob are the chairmen of the risk subcommittees for the BWR and PWR Owners Groups, so that pretty much covers the entire industry as far as risk applications. And I also opened it up for feedback from other people who are interested in -- Southern and Owen Scott was involved in our discussion as well, who I think linked to Bob on the BWR Owners Group. Or PWR Owners Group. Okay.

So next slide. I have one slide here. Tried to be responsive to what the NRC's questions were of the industry and leave no question where we stand on this at this point in time. I think what Steve included in his presentation is -- concerning the topical report submittal, I think we would agree with where we're at and the conclusions that were made in 2008 concerning moving forward with this effort with re-submittal of another topical report

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and then moving forward with a proposed rulemaking.

They're not cost-effective for the industry. There are other risk initiatives that the industry is moving forward with that will provide substantial benefit. Once those are in place, this would have limited benefit and would not justify the effort that would be put in -- needs to be put in to move forward with this. So as far as a pilot application, again both owners groups polled. No interest in moving forward with either a topical report or a pilot application.

As far as priority, there's limited resources on the industry side and the staff side for pursuing risk-informed initiatives. Industry has basically prioritized their efforts and is focusing on specific risk initiatives. That in combination with the fact that it would take four or five years to work through this process in a rulemaking with indeterminate outcome at this point is undesirable for us to want to pursue this at this point.

So and the last bullet is I think we're concerned about the limited staff resources in support of risk initiatives 4b, 5b and the 50.69 applications that are anticipated within the next

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year. So we believe it's more effective use of limited staff resources to focus on those risk initiatives where there is significant interest in the industry, where we do have commitment from the majority of the plants in the fleet to move forward with those initiatives. So those will be our priority.

And at this point I'll turn it over to my colleagues to add any other comments.

MR. LINTHICUM: This is Roy Linthicum from the BWR Owners Group. I agree with Mike. When we polled our members, we feel they're putting a lot of time and effort right now into 50.69 submittals and 4b submittals. And we already -- almost the entire industry has 5b approved already. And with those initiatives underway, there would be limited additional benefit from us from a LOOP/LOCA rulemaking. The costs involved in pursuing that path does not warrant at this time.

MR. RISHEL: This is Bob Rishel from the PWR Owners Group. Correct. Similar conclusions. Polled the members and just not worth the time and effort right now.

MR. DINSMORE: Yes, this Steve Dinsmore

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from the staff. I guess it is correct that these other initiatives are taking up a lot of staff time, and there's not a lot of staff time -- or there's no extra staff time. So your assumption that if you started this that it would kind of detract from the others I believe has some validity.

MR. BEALL: This is Bob Beall from the NRR Rulemaking Branch. So you're saying -- what if the -- once you've completed these other risk-informed initiatives, would the LOOP/LOCA rule be something you would be interested in later on after these others -- or even then you've got everything you really need that's cost-effective, and then you still would not need this rulemaking?

MR. LINTHICUM: The latter. Yes, I think even once we have all these other applications -- so we probably have 95 percent of everything we would expect to get out of the LOOP/LOCA rulemaking.

MR. BEALL: Okay.

MR. LINTHICUM: So there's very little additional benefit to be gained.

MR. BEALL: Okay.

MR. RISHEL: And there would be other -- there are other areas we're looking at to use risk

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techniques besides this item.

MR. BEALL: Right, that you would like the staff to concentrate more on instead of --

MR. RISHEL: Yes.

MR. BEALL: -- this rulemaking effort?

MR. RISHEL: Yes.

MR. BEALL: Okay. Just want to make sure we're clear. Okay.

Any questions from the staff?

(No audible response.)

MR. BEALL: Okay. With that, Kathy? Well, excuse me. Is there any questions from anybody in the audience that would like to ask any questions to the NEI or the NRC staff?

(No audible response.)

MR. BEALL: Okay. Kathy, can you open up the phone lines for anybody on the phone line who would like to ask any questions?

OPERATOR: Yes. At this time if you would like to ask a question, you may press star, one. Please remember to un-mute your phone and record your first and last name clearly when prompted. Once again, if you have a question from the phone lines, please press star, one. One moment, please,

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as we wait for questions.

(Pause.)

OPERATOR: At this time there are no questions from the phone.

MR. BEALL: Okay. Thank you, Kathy.

Is there any questions from the webinar?

(No audible response.)

PARTICIPANT: No questions.

MR. BEALL: Okay. Any further questions from the staff or the NEI? Mike? You guys?

(No audible response.)

MR. BEALL: Okay. Well, the staff will review all the information we've collected today. We will not be providing any individual responses to any questions or comments from this rulemaking or this meeting. Everybody, the members of the public are encouraged to monitor the LOOP/LOCA rulemaking docket, which is NRC-2008-0602 on regulations.gov. The NRC correspondence related to this rulemaking will be posted there, like the meeting summary. Any other staff correspondence that we want to make -- we can make public we'll be putting up there.

The staff will be making a recommendation to the Commission in early 2017 on the need for the

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LOOP/LOCA rulemaking. So if you monitor that web site, then you'll be able to see what the final decision is on that. If there's no further questions, I'd like to thank everybody for your participation today. It was good discussion. We got clear guidance from you guys on what you feel. That's great. And today's meeting is adjourned. Thank you very much.

(Whereupon, the above-entitled matter went off the record at 1:42 p.m.)

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