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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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618TH MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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FRIDAY

OCTOBER 3, 2014

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ROCKVILLE, MARYLAND

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The Advisory Committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 8:30 a.m., John W. Stetkar, Chairman, presiding.

COMMITTEE MEMBERS:

JOHN W. STETKAR, Chairman

HAROLD B. RAY, Vice Chairman

DENNIS C. BLEY, Member-at-Large

RONALD G. BALLINGER, Member

SANJOY BANERJEE, Member

CHARLES H. BROWN, JR. Member

MICHAEL L. CORRADINI, Member

DANA A. POWERS, Member

JOY L. REMPE, Member

PETER C. RICCARDELLA, Member

MICHAEL T. RYAN, Member

STEPHEN P. SCHULTZ, Member

GORDON R. SKILLMAN, Member

DESIGNATED FEDERAL OFFICIAL:

KATHY WEAVER

ALSO PRESENT:

ANDY CAMPBELL, NRO

JOHN D. MONNINGER, NRO

WILLIAM RECKLEY, NRR

*Present via telephone

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P R O C E E D I N G S

8:31 A.M.

CHAIRMAN STETKAR: The meeting will now come to order. This is the second day of the 618th meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the committee will consider the following: clarification of the process for addressing reevaluated flooding hazards identified from Japan lessons learned activities for operating nuclear power plants. There will be clues on the name for that one. Meeting with NRC Chairman, Allison Macfarlane. Future ACRS activities and reports of the Planning and Procedures Subcommittee. Reconciliation of ACRS comments and recommendations. Assessment of the quality of selected NRC research programs for the Fiscal year 2014 and preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Ms. Kathy Weaver is the Designated Federal Official for the initial portion of the meeting. We have received no written comments or requests to make oral statements from members of the public regarding today's sessions. There will be a phone bridge line. To preclude

interruption of the meeting, the phone will be placed in a listen-in mode during the presentations and committee discussions. And I would ask everyone in the room to make sure your little BP devices are turned off and silenced.

A transcript of portions of the meeting is being kept and it is requested that speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard. And with that, if there's no other further comments, we'll turn to the first item on our agenda. And Dr. Stephen Schultz will lead us through that. Steve.

MEMBER SCHULTZ: Thank you, Chairman Stetkar. I wanted to -- you've given the name and the title for this session and it's a mouthful. So I wanted to simplify.

First, I wanted to welcome Bill Reckley to the meeting this morning. He's going to be the presenter of this topic. Bill came to me about a month ago under the auspices of the Fukushima Subcommittee and we talked about a couple of things. The first item was just by information that we all know. Under the Fukushima activities, there's a number of programs that are ongoing, both in terms

of the regulatory action, industry action, and so forth. And one of the things that the staff is working on is coordination of those items from a regulatory perspective. And here, we have the Mitigating Strategies Program moving forward, both in terms of the overall rulemaking activities, as well as industry activities. And we have flooding reevaluations that are ongoing, not only in the flooding area, but seismic areas and so forth. They are activities that are already in process.

And what Bill came to discuss was the coordination of things moving forward. And all of that is not fully in place in terms of an overall regulatory approach and the staff is working to identify the appropriate processes that should be in place in order to establish what would happen as these reevaluations are being done. What should happen in terms of regulatory changes, plant modifications, and so forth associated with those. So I'm going to let Bill tell the story.

A month ago, the staff was working on a white paper associated with this. Came to the committee in our planning sessions and talked about that we would receive a paper. The staff is still working on that paper. And the white paper is

intended to be a COMSECY to the Commissioners. But it's still being discussed. And Bill is going to talk about its status.

So we determined that the best thing to do rather than hold a subcommittee meeting on this was to have this session with the full committee, a brief session, for Bill to let us know what the proposal is all about and what the status of it is. So with that, I'll turn it over to Bill for your presentation this morning.

MR. RECKLEY: Thank you, Dr. Schultz. I guess it's not that unusual for us to be late in providing a paper. But as Dr. Schultz mentioned, this paper will be going up to the Commission and the reason that we talked was they didn't want a surprise for you guys to read this paper and then kind of have it come out of the blue. So we're here today to talk about the paper.

Things have changed. We will probably now not issue a white paper for public comment. It will go directly from the staff to the Commission and then you guys, the committee, would see it at that time. So I'll give you a little briefing today of what the intent of the paper is, what it's going to lay out, and then --

CHAIRMAN STETKAR: Is there some reason we won't see it before it goes to the committee?

MEMBER SCHULTZ: Commission.

MR. RECKLEY: Well, maybe we can talk about that at the end once you hear the subject matter and we can revisit. Right now the plan would be that it would go directly to the Commission.

MEMBER SCHULTZ: Thanks.

MR. RECKLEY: So in the discussions we had in public meetings and internally, I have found it useful to just back up and start at the beginning.

What is it that we're trying to accomplish and what is the issue? And as Fukushima pointed out, there are external events that can occur causing a plant upset and then traditionally we would have said well, we have plenty of safety systems to deal with plant upsets. But the dilemma is when the external event that caused the upset also challenges those safety systems. And obviously, Fukushima is the example of that with the loss of electrical power and other safety systems caused by the tsunami.

So what we set out in the orders and in the requests for information to evaluate external

hazards, was what can be done or what should be done for U.S. power plants in terms of being able to mitigate beyond design basis events through protection of equipment and the development of mitigating strategies.

So basically, the trick is to have the connection between boxes two and four. You have to have equipment that provides the core cooling and other key safety functions and that equipment or some other equipment that would be introduced as part of mitigating strategies has to be able to provide that function given the external event. So that's basically the 100,000 foot summary of why we're here and why there's now a Japan Lessons Learned Division in NRR and why we've issued the orders and requests for information.

As Dr. Schultz mentioned, the dilemma that was introduced from the staff's point of view was time, right? We are doing things in parallel that in logical sequence should be in sequence. The evaluation of the hazard and then the mitigating strategies to deal with the hazard makes sense to first evaluate the hazard and then decide how you're going to mitigate it, but the understandable response was we can't wait to do this. And what

might be the most logical thing, we're going to have to do it in parallel. We're going to have to make adjustments as we go along and that is where we are today. It is time where we have to look and say how are these things in parallel affecting each other.

So we're looking at it from a regulatory perspective and that's -- I'm a licensing guy. I'm not a technical, so you don't have to worry about challenging me on a technical matter, because I'll default right away to somebody else. But from a regulatory standpoint, we were looking at how we were going to do this.

MEMBER CORRADINI: So may I ask, Bill, just because you said -- what you said seems what I saw to be the case. So let me make sure. Is it by Commission direction that you had to do it in this parallel fashion? Or was it by staff decision? Because the parallel versus serial has bothered at least me.

MR. RECKLEY: Right.

MEMBER CORRADINI: So is it viewed by the staff as by Commission direction in terms of these things must be done by X time?

MR. RECKLEY: Largely, but I mean it's both staff, Commission, public, Congress. I mean no

matter how you want to look at this, the expectation was not that the response to Fukushima should be evaluate a hazard for five years and then determine a regulatory action after that time period. There was general consensus, I think, across all communities that things needed to be done quicker than open up a new generic safety issue, process it through, see how it was, and maybe ten years from now we'll have an action in place. I think all of the above.

MEMBER CORRADINI: So then just ask the next question, but if you choose a parallel iteration strategy, are you really going to get to the same place faster or are you going to be there in ten years in the place?

MR. RECKLEY: I think personally we'll be somewhere better, faster, and in the real permanent end state. It might take just as long or even a little longer, but in the interim there will be actions taken. There's actions being taken right now at the plants that are improving the situation. I think there will be adjustments and improvements through rulemaking and other regulatory processes that will drag on. And we've seen this in any number of examples.

If you go back to 9/11, you can say we did some actions that were immediate and beneficial and the rulemaking didn't catch up and things didn't necessarily get finalized for maybe ten years after. But you shouldn't fall victim to saying oh, we didn't take action for ten years. We took a lot of actions in that step and the end state was all wrapped up maybe in the same time frame.

MEMBER CORRADINI: Thank you.

MEMBER BROWN: I want to address that from his standpoint because I'm not quite sure I'm on the same page as you are. I mean I can understand the parallel approach. I mean the FLEX program is one that was laid on the table. You have loss of power, but you also had instructions to the facilities at Fukushima and there was no infrastructure to get power in to the plant. So an immediate action proposed by industry was to set up centers. Have whatever the machines you needed, so you could bring them in and make sure you had the capacity to bring them in. And I don't know what the status of those regional facilities is yet, but it's in process, isn't it?

MR. RECKLEY: They're basically now ready.

MEMBER BROWN: Three years.

MR. RECKLEY: Three years.

MEMBER BROWN: That's pretty good. So you've got an interim, an interim action to address the basic issue which was loss of power, can't get power in. But -- hold it, Mike. But I mean you had infrastructure destruction. You had the diesels on site buried. You had flooding in places. But now if you can get people back in and you can get power in, now you can do clean up. You can get power and some of this would not have happened if they had had that capability.

My point being is that when you think ten years to do that, I was aghast that the thought process would take you ten years. So some interim transition action that seems to address a good bit of the issues while you then go reevaluate. Then you evaluate all the other side pieces that go with that. I thought that came out pretty decently.

MEMBER CORRADINI: Just to carry on the conversation a bit, I don't disagree with you there, but the timing of when these regional centers have to act and the timeliness of their action and what they have to act against. What does the on-site structure have to withstand whether it be seismic or

flooding? How long does the on-site structure have to withstand -- not structure, but equipment have to withstand it before the regional relief comes in? All of that -- what concerns me is you're going to design it for X and you're going to find oops, I've got to do it for X plus delta X and then you modify it.

MEMBER RICCARDELLA: And then you spend more money and staff is doing --

MEMBER BROWN: I would disagree with that because I've had circumstances where we had something -- I'm just relating back to the program I came from. We had something that occurred in a particular place and we didn't have these absolutely well-designed connections. We need to cut some holes, put some stuff in and got some stuff done and took the mitigating -- I mean you can do it.

CHAIRMAN STETKAR: Charlie, you're missing a bit of Mike's point. Mike's point is people are out there spending real money today designing equipment in their plants, in their plants, to sustain things like their interpretation of the current regulatory requirements for an earthquake acceleration. And they are -- although this particular discussion has floods in it, it's

the same thought process for earthquakes and their strategies in terms of timing and when and what they call in the cavalry for depend on their assumptions about the survivability of that equipment, that they're now spending money to make design changes to. They will then at some time later discover that indeed the earthquake that their design making the changes and spending the money for is maybe one and a half times bigger than the earthquake that they're doing today. So they're going to have to either redesign all of that equipment and spend a lot more money or they're going to have change their entire mitigating strategies and figure out that the cavalry needs to drop in a lot of other stuff --

MEMBER BROWN: Ten hours earlier.

CHAIRMAN STETKAR: Yes, ten hours earlier. So that's Mike's point.

MEMBER BROWN: But still you were better off in the interim.

CHAIRMAN STETKAR: Exactly.

MEMBER BROWN: You might spend more money, but in that interim period you were better off.

MEMBER CORRADINI: So we're debating in front of Bill, but I guess my only point is and just

to be provocative, it's not adequate protection. The NTTF July report said this was not for adequate protection, that everything was safe. Therefore, if everything is safe, then again, maybe it's just the engineer in me, I would like to do it in some prescribed fashion that doesn't, and excuse my English, waste money and waste resources which would take away from other safety issues that are probably of higher probability to worry about.

VICE CHAIRMAN RAY: Not only that, but backfit is an issue here. What you're saying, Pete, actually involves multiple backfits. Do it this way now. Later on, do it a little bit differently. You have to look at each of those incrementally, not what the end state was compared to the beginning state, but how does each one of those backfits justify, meet the requirements, assuming it's not adequate protection. That's a different ballgame from a regulatory process standpoint.

MEMBER CORRADINI: Right, which these guys understand. I don't.

VICE CHAIRMAN RAY: Oh, you do. You deny understanding it because you want to be --

MEMBER CORRADINI: No because I want to --

VICE CHAIRMAN RAY: The reality is that it's easy to understand.

MEMBER SKILLMAN: You described it, Mike. You described it very well.

MEMBER CORRADINI: Okay, but I just wanted to kind of talk it out because this is -- this continues to bother me and I'm -- because eventually it's going to come down to at least in my mind, it's going to come down to what is the extreme event that's within the envelope and outside the envelope and what's the timing I have to respond to the extreme event. And there's going to be a gap. And that gap either has to be taken up by on-site equipment that qualifies or changing the timing which also is going to change response, so that's all. I'll stop.

MEMBER SCHULTZ: Between all of our comments, we've set the stage for Bill to work through his presentation because each of his slides is working to address these issues and that's why the staff is -- and as Bill said, this is, a large part of this is the regulatory process. How should this regulatory process work through these issues?

MEMBER CORRADINI: And the issue is everybody is right. Everybody who has talked here

is right. Not that I'm sucking up for anything.

MR. RECKLEY: And that's really the dilemma of trying to do these things as the way within timeframes and defining the relationship. So this first slide is one approach that could be considered is more or less a parallel track. Licensees would identify the mitigating strategies as a basically all-hazard plan to the best of their knowledge. They're going to assume seismic events. They're going to assume flooding events. And they're going to design that mitigation system on those assumptions and install the -- make any changes to the installed equipment. Make provisions for the installation of the portable equipment based on those assumptions.

MEMBER SCHULTZ: And that's happening.

MR. RECKLEY: That's happening. And that would be in compliance with the order and then that logic would get taken into the rulemaking, the mitigation of beyond design basis events rulemaking.

The evaluation of flooding hazards, seismic hazards, other hazards under Recommendation 2.1 would continue also on a parallel track and at some point those reevaluated hazards would be assessed under backfit provisions or other

provisions and would get addressed, either as changes to mitigating strategies or as changes to other parts of the facility. So that's one aspect that was considered.

And another approach that was considered is that mitigating strategies should address the reevaluated hazards coming out of Recommendation 2.1. And so you just see the same boxes, but physical protection, the mitigating strategies, and also the development of strategies would be captured under that regulatory activity, under mitigating strategies, ultimately through the rulemaking.

So this discussion actually has occurred a couple of times on what's the right approach. The discussion we had a year ago or a little over a year ago when we were doing the regulatory basis document for what was then the SBOMS, station blackout mitigating strategies, rule and now is the mitigation of beyond design basis events rule --

MEMBER CORRADINI: The unpronounceable.

MR. RECKLEY: If we wait, it will change again. But what was decided when we did that reg basis document was that we wanted, the staff wanted, the Agency wanted this approach where the mitigating strategies and related equipment would be able to

address the reevaluated hazards coming out of 2.1. So that's basically that language.

So my joke is everybody gets confused on four blocks, so I'll clarify with ten blocks. This is my attempt and it's probably not successful, to put together our activities related to Recommendation 2.1 and our activities related to mitigating strategies. And of course, try to see how they can tie together.

The complication with mitigating strategies is it's being done in two steps. It's being done by the order that's real time. People are making changes to the facility to comply with that order. And then also that will be captured in the subsequent rulemaking.

The current guidance is that licensees should use the most recent site flood analysis. So if they have information, they should use it. If an operating plant is located next to a new plant, they should use the flooding information from the new plant. If they have any other information that they've incorporated over the years, they should use the most recent site flood analysis. But for some, the reevaluated hazard coming out of the full blown 2.1 request for information won't be ready. So

again, we're back to the fact that the rule may require licensees to do assessments and possibly, if the assumptions are different, changes to accommodate that. And I'll have a slide basically for how the industry proposes to work through this.

The relationship though between the 2.1 activity and the recommendation for mitigating strategies activity is fairly straight forward then. It's going to take information out of the flooding reevaluations and kind of test mitigating strategies against that hazard. It's a fairly traditional way that we do activities and test design capability. You have a design and now I'm going to throw assaults against it, seismic events, flooding events, other failures, to see if it performs adequately. So that's a fairly standard approach and the general agreement, again, based on the regulatory basis document for the rule, but this is the approach we want to take.

There was a little more internal discussion about other possible changes to the facility other than mitigating strategies and that's currently what we're trying to work through as we speak. And it's also the -- we remain unwilling to say that the only thing that will come out of the

flooding evaluations are changes to mitigating strategies.

There is always the potential when you're doing assessments and analysis that you're going to learn some lesson and you're going to say mitigating strategies was, is a last line of defense against a beyond design basis event. Maybe we don't want to rely on that last line of defense for a hazard that's been identified. Maybe there's something else that should be done and as the box shows, we would consider doing that under the backfit provisions.

VICE CHAIRMAN RAY: Can I make a comment here? I mean obviously, we're in an environment where people aren't -- licensees aren't going to challenge doing things that they know they want to do for their own reasons.

MR. RECKLEY: Right.

VICE CHAIRMAN RAY: Be that aside, if the upshot is you spend more money as you say, Pete, even though you get some benefits in this interim period, but the effect of spending that extra money is you can't at the end of the day justify doing what you want to do. You've really defeated your purpose, your long-term purpose, because you've

spent money doing this. Now you want to do something else, but the totality of what you're spending isn't warranted under the backfit rule because you've spent all this money in the one direction and now you've got to spend money to do the additional whatever it is.

MR. RECKLEY: Right.

VICE CHAIRMAN RAY: So I think that the concern that Mike had is really affected by what drives the whole industry and Agency and that is what you mentioned, Bill, to start with which is the need to show action. But at the end of the day, it's possible that what you'd really like to have done you can no longer justify because you've already done what you've done. And I know the industry views it that way.

MR. RECKLEY: And that is really point 7 on this graph, which is when we do an assessment on whether something beyond mitigating strategies should be imposed, you have to assume the mitigating strategies has been implemented which will affect directly the safety benefit of the alternate action.

VICE CHAIRMAN RAY: Without attributing it to anybody else, if I'm the licensee I want to rush out and do what I can do at this price, rather

than wait around and have to do something much more dramatic at a higher price. For example, there was a time when I was responsible for a plant where I had to actually change the design basis. That's really expensive. I much more would have preferred mitigating the fact that there were external events that could exceed the design basis.

So strategically, it's not a bad idea to go out and implement the mitigating strategies because now I've made less compelling the need to change the design basis. There are lots of dynamics that go on here in this setting that don't apply necessarily to other things that would not have the urgency that this does.

MEMBER-AT-LARGE BLEY: Let me ask a question. I mean this whole discussion is very interesting. I know you folks have had it for a long time and we've written letters related to this from the beginning of this whole issue. In the end, we'll have something that's pretty good and maybe it would have been better if we had done it in the most logical approach. But we would have had a period of time where we weren't as well protected. So there's a real trade off here.

How -- and I haven't thought this

through, it just popped in my head. How is this process, if it comes up with a less than optimal result, going to impact new plants coming along? Will they lock into where we end up or will they be able to take advantage of what we would have liked to have done if we had known enough in the beginning? And I don't have a real answer to that.

MEMBER SCHULTZ: There's always an advantage for new plants in that you're going to start with knowledge of the reevaluated hazard already. So when I'm doing the siting and when I'm doing the plant design, I'm going to put in provisions and include appropriate margins for that new plant.

In addition, and you guys are very familiar with Part 52, there's other requirements that differentiate new plants from operating plants in terms of safety features and passive approaches that have been adopted that will help in this. So this focus and I'm from NRR, is really on operating reactors. The new reactors, yes, the rule will apply and they will have to address --

MR. RECKLEY: And they're responding to it.

MEMBER-AT-LARGE BLEY: Yes.

MR. RECKLEY: Even before they're built so they'll have the design.

MEMBER SCHULTZ: There is that aspect, but there's also the -- what is the process to evaluate the expectations related to the beyond design basis event?

MR. RECKLEY: Yes, but again, and especially here, there sort of ends up being a differentiation because the 2.1 activity is for operating reactors to assess what would be the design basis flood for a new reactor to incorporate all of the new guidance and all of the provisions that have been developed over the last 30 years. And so new plants are already going to be evaluating against that. This is really when you take an operating plant and say okay, take all of the lessons learned over the last 30 years and apply it to your facility, what's the delta?

Andy, did you want to --

MR. CAMPBELL: Yes, I'm Andy Campbell. I'm the Deputy Director of the Division of Site Safety and Environmental Analysis. And Bill has characterized it, I think this is correctly. The evaluation criteria under 2.1 is the criteria we use with regards to new reactors. It's under Part 52.

So it's 30 years of knowledge and how we're evaluating it.

The plants we're talking about were licensed many years ago and therefore have the deltas between that criteria and how they were licensed originally, and the impacts of some of what we know about flooding events and seismic events now compared to the past.

MEMBER CORRADINI: So may I just ask since you brought this up or somebody brought it up, but maybe through Dennis, so if I have a new plant and I don't think, I'm not sure we're part of the process, but if I have a new plant and I apply 2.1 and I have to mitigate, there is a possibility that they can't meet --

MR. CAMPBELL: No, we've already applied 2.1 to them because that is how the design is. That's the criteria that's being used for licensing. The approach is the methodologies and the guidance.

MEMBER CORRADINI: There's no chance that meeting the 72-hour expectation in some of the new plant designs with RTNSS equipment would be challenged by a re-evaluation of the design base following 2.1?

MR. CAMPBELL: There should not be. We

have a working group within NRO that's looking at ensuring that that's the case.

MEMBER CORRADINI: I'm looking at John, if I've stated it right because my impression was there's -- there is a chance that that -- there's a gap. And you're saying there's not a chance.

MR. CAMPBELL: For the evaluation of flood hazard and the evaluation of the seismic hazard.

CHAIRMAN STETKAR: I think the key, Mike, is they're carefully saying our concern has been what is the beyond design basis event that you're mitigating? They're currently -- they've reevaluated, for example, the seismic hazard using the current seismic hazard information, according to 2.1. They're now designing on-site mitigation equipment to survive that design basis earthquake. They're not designing it to survive anything beyond that design basis earthquake which is a different question.

MEMBER CORRADINI: So if the site comes up with --

CHAIRMAN STETKAR: So for example, if you have a -- without getting specific, if you have a site with an existing reactor and a new planned

reactor, the current existing reactor might have a design basis earthquake acceleration of pick a number, .2G. And they're reevaluating it.

The reevaluation shows that the design basis acceleration is .3G. The new plant at the site should be designing their equipment to survive .3G. But they're not designing it to survive anything more than .3G. The existing reactor now has to deal with what's the difference between .2 and .3 and when in time do they enhance the design to survive .3G. Have I got it right, Bill?

MR. RECKLEY: Yes.

MEMBER CORRADINI: But if I might just ask John, just to clarify. But again, not to specifics, but if I have RTNSS equipment in the new plant that's certified and I don't expect it to need to be used -- or I expect to want to use it after some amount of time to get me to 72 hours where I can again with expectation use active equipment, you're saying that in some sense is covered. I'm not real --

CHAIRMAN STETKAR: It's covered under .3G in my example. It's not covered for .5G.

MEMBER CORRADINI: Which still may come up.

CHAIRMAN STETKAR: It may come up. The likelihood of .5G is not zero.

MR. MONNINGER: If I may, this is John Monninger from the Office of New Reactors Division of Safety Systems and Risk Analysis.

With regard to the specifics of RTNSS in 72 hours, credit is not given for RTNSS in the 72 hours. The ability of new reactors to meet the 72 hour phase 1 time period is solely based on the safety systems, the passive safety systems. It's post-72 hours --

MEMBER CORRADINI: I'm sorry. I said it wrong. I apologize.

CHAIRMAN STETKAR: You should have been talking about 72 hours to 7 days.

MEMBER CORRADINI: Yes, thank you. It was my mistake, I'm sorry.

MR. MONNINGER: And then from the 72 -- after the 72 hour time period, the staff's curve position is at that time they could then transition to off-site resources. So there's a big question of whether phase 2 is even needed for the new reactors even though they do have that capability.

MEMBER CORRADINI: Okay, I made the mistake. I should have said after three days

instead of under three days.

But John, just to be clear, after the three days to the seven days at least my interpretation is is it's not clear that you can -- it's not clear what the staff's guidance is to these new reactors to qualify to if they wanted to make claim from three to seven.

MR. MONNINGER: We do believe we have a criteria out there for RTNSS for the seismic capability, for the structurals, for flooding protection, etcetera. So we do believe there is a good story for RTNSS equipment if RTNSS equipment is to be relied upon in the staff's finding.

CHAIRMAN STETKAR: And that story is that it must be qualified to survive the design basis earthquake or in my example, .3G. Is that correct?

MEMBER CORRADINI: Did you hear that, John?

MEMBER RICCARDELLA: Why would you do that? You don't need it in a new plant.

CHAIRMAN STETKAR: No, let him. I reevaluated my seismic hazard according to 2.1 and I for whatever reason said .3G is my evaluated design basis earthquake. It occurs at the magic 10 to the

minus 4 event per year. Okay. And the guidance from the staff says that now I must -- I have to be careful because "must" is kind of a shaky word in the terms of RTNSS, but the expectation is that the RTNSS equipment and its structures will be designed to the design basis earthquake, or in my example, .3G. Is that correct?

MR. MONNINGER: Yes.

CHAIRMAN STETKAR: Thank you. Not to .5G.

MEMBER RICCARDELLA: But you don't need the RTNSS equipment in a new plant for .3G, do you?

VICE CHAIRMAN RAY: They may want to credit it --

CHAIRMAN STETKAR: They may want to credit from three to seven days, after three days. If I have a .5G earthquake and the RTNSS equipment is in rubble, I now need the cavalry to drop the stuff --

MEMBER CORRADINI: I default to what the current plans require.

CHAIRMAN STETKAR: It's 72 hours. And that changes my strategy for calling up Memphis and saying get the planes flying, when they fly, and maybe what I might need. Because what you might

need -- because what decay heat is, because what pressure temperature might be. I've said enough.

MEMBER CORRADINI: I get it now. Thanks for correcting me, John.

MEMBER SCHULTZ: Bill, before you move forward, you said this is your picture of what is being proposed and as you think it should be. So could you walk through it?

MR. RECKLEY: Sure. So in the tan or pink, whatever color that is, you basically what is a summary of what's being done under Recommendation 2.1. You are evaluating flooding hazards. You are looking at various mechanisms, dam failures, tsunamis, seizures, rain events, flooding events from rivers. You're looking at those various things and comparing it against the design basis. The existing design basis flooding events for an operating plant.

And in some cases, the design basis is bounding for those events and we basically would stop there. For others, the reevaluated hazard will be higher than the design basis and you enter into an assessment of what is the effect of that new event or different event than the design basis event?

The strategy then was once we have that assessment, we would enter phase 2 of Recommendation 2.1 flooding and decide what to do with that reevaluated hazard. The change here to the degree that it is a change is that the thinking is that we need to take those assessment in flooding hazards and right now start thinking about how they affect mitigating strategies equipment and so that is now the connection back between integrated assessments, looking at it, a targeted look at mitigating strategies and making sure that the mitigating strategies, the equipment and the strategies, a combination are able to address that reevaluated hazard.

In addition to that, how does the flooding hazard evaluations and integrated assessments licensees may identify improvements they want to make on their own. That would be number five. They might say hey, as an asset protection measure or some other benefit that we see, it makes sense to raise a barrier or do some other action.

In addition to that. there may be cases, as I mentioned earlier, where a particular flooding event due to its expected frequency or something else is such that we want to consider more than

mitigating strategies. As Harold already said, we'd have to consider while we've already installed mitigating strategies, what is the benefit of an extra measure, but that's the way it would be pursued.

Within the mitigating strategies blue box is the acknowledgement that we are now implementing the order, EA-12-049 is being implemented. Changes are being made to sites. They're doing that on the most recent site flood analysis which could be different than the reevaluated flood. And so that's now 2b in the box there a possibility that licensees are going to have to make a change. And now the slide where again, the industry is already thinking about this and now they will walk through the difference between 2a and 2b.

CHAIRMAN STETKAR: Bill, I know you've got a lot of slides and I know this is cast in the context of flooding, but I keep coming back to seismic because I know that, for example, some -- at least one, I don't know many, but I know of at least one plant that to develop their mitigating strategies approach now under the existing order is upgrading existing plant equipment to survive the

current design basis earthquake, despite the fact that they reevaluated the site hazard.

But in order to satisfy the timeline of the current requirement, their interpretation is I need to upgrade this equipment that I haven't taken credit for previously. It's not safety-related equipment, but it's part of my mitigating strategies. But I'm only going to upgrade it to the current design basis earthquake in my previous example, .2G, let's say. Even though I know I've reevaluated the site that the new seismic acceleration might be .3G, but they're saying I don't know what I need to do with that because the regulator hasn't told me what I need to do with that. But I know I need to do something today. So I'm doing it to .2G.

MEMBER CORRADINI: To meet the timeline.

CHAIRMAN STETKAR: To meet the timeline for what I'm calling mitigating strategies. So how do you address that because they're spending real money doing it?

MEMBER CORRADINI: And if they addressed it that way, would it be backfit? Would it be a backfit analysis or would it be an order to say nope, you didn't do enough, go back and do it again?

MR. RECKLEY: Well, the way we're viewing it and seismic has its unique aspects and we'll have to address seismic after we get through flooding, but as I mentioned earlier, this is the risk and it is the problem that enters into it. I think the industry, again, when I get to that slide, they've thought of this in order to try to minimize it. But you can't eliminate -- once we made a decision that mitigating strategies should address reevaluated hazards, you cannot totally escape the potential that when the reevaluated hazard is done that you missed it. Licensees would be wise to build in some margin if they think they need to, but we'll get to what the industry is proposing.

Sort of related to the discussions we've been having, I'll just skip this slide, and I'll try to do it real quick, but a lot of the issue revolves around the same discussions we've been having for nearly 40 years, really, in terms of relationships and how we address different problems. So I tried to on this slide for a public meeting and internal discussions, lay out the terminology that we use because we get tripped up on this constantly.

So you have a design basis event. The importance of the term design basis event is it's

used in the definition of safety related. So it's tied directly to the safety classification of equipment. Design basis is a more generic term and applies to really any safety function that a piece of equipment is serving and that could be a design basis event which caused that equipment to be safety related or it could be something different. And I'll go through an example real quick.

Then you have licensing basis which is another reason that a licensee said I'm going to credit this piece of equipment and the NRC said okay, you can do that, but it's incorporated within the licensing basis, but it doesn't form part of the design basis for that piece of equipment.

And then lastly, there's the engineering design basis which we came up in the 1990s just because these are industrial facilities and power plants and there are things -- I know it's hard for us to imagine, but licensees have to consider that's outside of our regulatory area.

So let me go through an example real quick. And the box with design basis events just says this is the confusing part. That spans everything. Right? I can have a design basis event that shows up almost anywhere except safety

classification because as soon as I say it's a beyond design basis event, I'm saying it doesn't need to be safety related equipment. That's basically the terminology that we get tripped up and you can see all the similarities of the language.

So let me take something like auxiliary feedwater. Auxiliary feedwater for many plants is a safety related piece of equipment. It's credited in Chapter 15 for loss of heat sink accidents. It might be credited for other design basis events. So auxiliary feedwater is safety related in my example. As soon as I say it's safety related, it has to be protected against the design basis earthquake and the design basis flood. Okay? Among other things.

Auxiliary feedwater might get credited for other things. It might have gotten credited in the old station blackout rule. It's definitely for some plants going to get credited as part of their installed mitigating strategies for beyond design basis external events. It now has a new design basis element for that component or system. Now only does it have to satisfy all the requirements of Chapter 15 and I have additional requirements on it.

In the case of flooding, let's say this plant is subject to a fast flood, a flood with

little warning so there's no time to prepare. Not only does auxiliary feedwater have to protect against the design basis flood, the original design basis flood, we would say it now has to be protected against the reevaluated flood, auxiliary feedwater. Maybe just the turbine driven auxiliary feedwater. The motor driven auxiliary feedwater has to meet all the safety-related components, safety-related requirements because that's also credited in the design basis events. But it would not have to be protected against the reevaluated flood because it's not used as part of mitigating strategies. We're only using the turbine driven.

This is not really complicated. I mean licensees understand that one piece of equipment has a lot of demands and requirements that are coming from various directions. So in that particular case, the design basis for auxiliary feedwater includes all the safety-related functions. It also includes for our purpose additional requirements for mitigating strategies. That's part of the design basis for that equipment, right?

I wished we could have used different terminology over the years, but we didn't and it's just --

MEMBER SKILLMAN: In that example, what is important is what you mentioned is accurate as long as the licensee has credited the device for that specific event.

MR. RECKLEY: Yes.

MEMBER SKILLMAN: And so the magic in this is understanding where the licensee has taken credit for the SSCs.

MR. RECKLEY: Yes.

MEMBER SKILLMAN: Thank you.

MR. RECKLEY: In this example --

VICE CHAIRMAN RAY: Dick, can I -- excuse me, Bill. Would you agree to say it another way where the NRC has granted credit as opposed to where the licensee has taken credit?

MEMBER SKILLMAN: Yes, sir. Where the -- it's where the licensing documentation credits those devices.

VICE CHAIRMAN RAY: My point being that you don't need to inquire -- you should have to inquire of the licensee if he had taken credit or not. It should be. This goes in the licensing basis.

MEMBER SKILLMAN: Yes.

MR. RECKLEY: It's worked out in the

interim actions between the licensee and NRC.

In this example, I don't have one, but I'm sure there are cases where auxiliary feedwater is used in plant licensing discussions for something other than those two things. That might show up in the FSARs. Hey, we use it for this. Within the engineering design basis maybe they use it in a plant startup and it has functions in that regard that really aren't related to a regulatory matter. So that one system can cross all cases.

MEMBER SKILLMAN: And Bill, one other point.

MR. RECKLEY: Sure.

MEMBER SKILLMAN: We've heard around this table a number of times licensees have told us we're a pre-GDC plant.

MR. RECKLEY: Right.

MEMBER SKILLMAN: And a lot of the pre-GDC plants have auxiliary feedwater or emergency feedwater or startup feedwater they use almost interchangeably that were off the shelf from the garage down the street. And so there has been a huge effort --

MR. RECKLEY: And that's the difficulty is depending on the age of the plant and when it was

licensed, you can have a variety in any of these examples. So I do want to get to one last slide, if I can.

MEMBER RICCARDELLA: I've just got a question on this one if I could. Going back to your example, the auxiliary feedwater system. If the licensee goes out and does everything that's needed to be done and let's say it's an earthquake and you go from John's .2G to .3G. He updates it. He makes modifications or sharpens his pencil and says okay, this is good, this auxiliary feedwater system is good for .3G. Does he have to submit a license amendment then in your view? This is something Harold and I have been debating. Does that require a license amendment?

MR. RECKLEY: Not the way it's currently laid out because the .3G in this example is going to be in this space. They're going to say our design basis earthquake remains .2G. Auxiliary feedwater needs to survive .3G, but that's this function. It's now design basis. It has to be -- we even use different terminology. It's now seismically rugged and it will reevaluate it up to .3G. But that's in this space and that's captured under the documentation and licensing submittals related to

mitigating strategies.

MEMBER CORRADINI: So it avoids the need of a license amendment.

MR. RECKLEY: Yes. There's really no -- they will do this to comply with the rule, but it would not change the technical specifications or other elements of your operating license such that they need.

Now if they want to come back later and try to credit this in some other way, that they're going to now say okay, now that I've done that improvement I want to come back and get relief in another area of the technical specifications, that would be license amendment. But the way we've laid it out it would not.

VICE CHAIRMAN RAY: We shouldn't pursue this -- the question isn't the question the way I would have asked it, but let's just leave it. It alludes to what he just said. But it's too lengthy. We're running up against --

MR. RECKLEY: I do want to walk through, we had a meeting last week with the industry to talk about this and they laid out how they were thinking about doing it and this was one meeting, one slide, so obviously we'll have to work through all the

details, but the industry is basically at that meeting acknowledging this part that mitigating strategies they would think needs to address reevaluated hazards. And they laid out this flow chart as to how it would work.

So just quickly going across it, you have the new hazard, the reevaluated hazard. Just like now if that hazard is no worse than my existing design basis hazard, I basically stop here. I don't need to make plant modifications. I don't need to do any more.

The next one is did I build margins in because I had information or just did it that I -- when I installed my mitigating strategies, let's say my connection point for portable equipment, did I make it higher than my existing design basis flood? Go look and say that was a wise move. Now I don't have to change that connection point because it's always high enough.

They would look -- the next block where it gets a little more complicated, especially in flooding events, you introduce a time element. How much warning do I have between the initiating event, let's say an upstream dam failure and the arrival of a flood? Do I have time to shut down the plant, for

example, and use my portable equipment in which case my connection point needs to be high enough to address the reevaluated flood, but my installed equipment is not going to be used because I'm going to shut down the plant before the flood waters arrive.

In that case, again, they would not need to make changes to their mitigating strategies or equipment because time works in their favor for that scenario. Now they'll have to go through the different scenarios to see, but for this example.

Then you cross the line in their slide and basically now their assessment is what we put in place as part of our all hazard mitigating strategy doesn't address the reevaluated flood. Now this is what we were trying to avoid, but we didn't. And licensees now have a choice under what they're proposing. The first was the hardware change. Hey, the reason my mitigating strategies doesn't address the reevaluated hazard is because my connection point should be ten feet higher. Well, they have a choice. And under the first green box, they'll say, hey, we can do that. We can run the pipe a little longer. We can make the connection point the next elevation up and we can do it through a hardware

change. Right?

The next one is keeping in mind that mitigating strategies is basically addressed as all hazard plans, you can say we addressed -- the licensee can say we addressed most of the hazards we've identified. But there's a scenario coming out of our reevaluated flood that it didn't address. A scenario. They can come up with a targeted approach for that scenario. They can identify perhaps equipment or strategies different than what was put in place for the order. Now that will get captured by the rule, it will get brought into place that for a scenario, they have a targeted approach.

This is the slide the industry used, but it basically is consistent with the discussions we had with the industry as to how we thought it would fit together by saying mitigating strategies has to address the reevaluated flood, including the last box. But if they had to come up with a targeted approach that might be acceptable, but it is part of the rule that that is needed to have, that targeted approach.

MEMBER CORRADINI: And that would be everything to the right of the line would be judged because the rule requires it. It wouldn't be a cost

benefit analysis.

MR. RECKLEY: That's right.

MEMBER-AT-LARGE BLEY: Bill, is there anything in the thinking of staff that would restrict this to reevaluated flood that would be applied to reevaluated any aspect of the design basis?

MR. RECKLEY: There's a logical connection that once you define this process and say it works for floods, that it has implications for other areas. We just haven't thought all the way through the seismic area and to be honest, we're just -- we haven't done a whole lot for other hazards, but we're thinking it will be much easier for other hazards we haven't really started yet. So knowing this is in place, we'll have a process to evaluate them a little easier. For seismic, we're well along and another case where we had basically flooding hazards, seismic hazards, and mitigating strategies in parallel, so we're going to have to look and say how can we marry these things up. There's an obvious implication.

CHAIRMAN STETKAR: I guess I'd ask why would this process be different for seismic versus flood?

MEMBER-AT-LARGE BLEY: Or any.

CHAIRMAN STETKAR: Or anything.

MR. RECKLEY: And we're just not ready to say whether it will or won't be different. We are looking at it --

CHAIRMAN STETKAR: Let me -- what about those other hazards would make this process different? I mean let me phrase it --

MR. RECKLEY: I guess I'll say I can't think of anything, but we have to really look through it to see how we've been addressing it and how it might work to make sure that they marry up appropriately.

CHAIRMAN STETKAR: I'll let you finish. Sorry.

MEMBER SCHULTZ: But I want to come back to this after this next two slides.

MR. RECKLEY: This slide is just basically a summary at a minimum. The reevaluated hazards would have to be addressed through mitigating strategies. Through this process, there is a discussion of what the impact would be on the further assessments, how much further do you go in assessing flooding events beyond its impact on mitigating strategies. That's really where we are.

I wish instead of "reduces" I would have said "affects." And then -- because that's really the discussion we're trying to have is what impact does this have on the broader assessment of flooding events. And then as always, there's a possibility that we'll identify something that results in further actions.

So the last one on next steps, so today's meeting, we're revising the COMSECY, taking into consideration various internal and legal comments. And our plan is to issue a COMSECY probably in October. Once we do this, obviously, we will need to talk with industry about the implications of it of what guidance might need to be changed and how we'll work through this.

CHAIRMAN STETKAR: Just to clarify in my mind, this COMSECY will be uniquely focused on the title of this presentation which is uniquely focused only on flooding. Is that correct?

MR. RECKLEY: Yes. Again, with an undercurrent, if you will.

MEMBER-AT-LARGE BLEY: Let me just say what eats at me when you say it that way, I just hope the others aren't moving especially seismic, but anything else that's going on isn't moving

forward with its own approach separate from what this looks like, on purpose, without being really tied together.

MR. RECKLEY: We are talking both internally and with the industry and I think all the parties are aware of where we are and what we're doing.

Again, the biggest thing is we just are not quite ready to say how in the details if it would work out for seismic that might be a little different than flooding.

CHAIRMAN STETKAR: That's troubling, by the way on the record, the notion that it might be different and you haven't thought it through, especially at this level.

MEMBER BROWN: The industry seems to -- I don't see flooding in here anywhere. This looks pretty generic. Like you say --

MEMBER SCHULTZ: The corollary concern is what is the forcing function related to flooding that would push it so hard that we need to get it out for flooding in October and we're still thinking a bit, we, the NRC, is thinking a bit about seismic and other events, whereas industry in their discussions are laying it out for a complete picture

of beyond design basis events.

MR. RECKLEY: There's a number of reasons that get -- we were just at a point where the flooding reevaluations and mitigating strategies was one, it's an easier example to think about to be honest because flooding in its impact --

MEMBER SCHULTZ: And that's a good thing. But if one then sets in a -- if one puts in a set process that's going to handle floods and then needs to be modified for other events, that's another inefficient process.

MEMBER CORRADINI: Another iteration loop.

MEMBER SCHULTZ: Another iteration loop.

MR. RECKLEY: I understand the concern and it's one we talk about. I don't -- I'll be honest. I don't really have a good answer as to why. We have thought about it. It's not lost on us, the points that you're making, but we can move forward, we think on flooding. It's not logically that these other hazards are different. It's that we've thought flooding through better and seismic.

For example, in seismic, you have -- the industry has proposed an expedited approach. We're going to look at selected important equipment like

mitigating strategies. And the interim approach or the expedited approach is for those plants where the new seismic hazard is considerably higher, though at least look two times the event.

Well, for some plants, the seismic event might be slightly more than 2. Well, we haven't thought all of the way through that and how that might work here between the interim actions, in this case, the expedited approach and how this process would work because there's still technical work in the seismic area that's ongoing. So -- but again, now you're getting back to the point where I should have shut up five minutes ago saying I'm a licensing guy and I don't understand seismic stuff.

So --

CHAIRMAN STETKAR: Well, but Bill, don't do that. Because as Charlie noted, I don't see anything on this slide that says flood, flood, flood versus seismic, seismic, seismic. And this is your bailiwick. This is licensing. It's not designing a pump or a hanger.

MR. RECKLEY: And again, and it wasn't lost on us and it's not that this kind of approach if we accept it for flooding sets the stage for the other hazards. And I'm not trying to argue that it

will be dramatically different. I'm just saying it hasn't been thought all the way through in terms of where we are in the reevaluations and all of the technical matters to say it would work exactly like this.

MEMBER SCHULTZ: Bill, can you share with us now what the SECY is going to request of the Commission in terms of their decision making?

MR. RECKLEY: Basically, it's asking the Commission to agree that the intent all along has been that the mitigating strategies and this is in particular the rulemaking activity is intended to capture the reevaluated hazard, boiling it down to the real bottom line. That's what we expect to ask the Commission to affirm.

CHAIRMAN STETKAR: Steve, if you can, because we're running a little short of time.

MEMBER SCHULTZ: We might have been asked it, but back to my first question, why aren't you bringing the COMSECY to the ACRS before you send it up to the Commission to get our input? Or rather than saying why aren't you, will you? I'm requesting it.

MR. RECKLEY: I will have to -- this is a case where I can say I'm just way down here in the

organization.

MEMBER SCHULTZ: I'll just put it on the record. There's enough here, I think, that we've got enough, based on this exchange, at least in my mind, concerns about not only this process within the focused construct of flooding, but how it might affect all of the other hazards and how the plants might react to that. I think at least we would benefit from seeing what you're sending up and perhaps the Commission might benefit from our input before the --

MR. RECKLEY: We will --

MEMBER SCHULTZ: And that's why I was asking about timing because we have a full meeting, the Fukushima Committee does on mitigating strategies and combined rulemaking in November. A letter expected based on our known schedule now in December. So this is coming in -- if we don't see it now before it's issued, then it's going to be sitting there for us to comment on later. That's not efficient for us to communicate with the Commission that way.

MR. RECKLEY: I will certainly take back the request and really it would come down to a matter of before or after issuance of the paper.

I know the preference is always before.

MEMBER SCHULTZ: John put it on the record. With that, I'm going to ask now for public comments. If any in the room -- Cathy, can you make sure the line is open? We have had the line open for listening-in mode while the meeting has been held. We'll open up that line.

Any comments from individuals in the room?

Our line is now open and if there is a member of the public or interested parties out there listening in, could you please identify yourself or just say that you're out there so we know that you -- our line is open for verbal comment?

MS. RALEIGH: This is Deanne Raleigh with Curtis Bright. I have no questions. Thank you.

MEMBER SCHULTZ: Is there anyone else on the line that does have a comment they'd like to present to the committee?

Hearing none, we'll close the comment line. And with that, I'll first ask if there are any additional comments from members of the committee?

Hearing none. John, I'll turn the

meeting back to you.

CHAIRMAN STETKAR: Great, thank you very much. With that, we will recess until 10 a.m.

(Whereupon, the above-entitled matter went off the record at 9:42 a.m.)

United States Nuclear Regulatory Commission

Protecting People and the Environment

ACRS Meeting

Clarifying Relationship Between Mitigating Strategies and Flooding Reevaluations

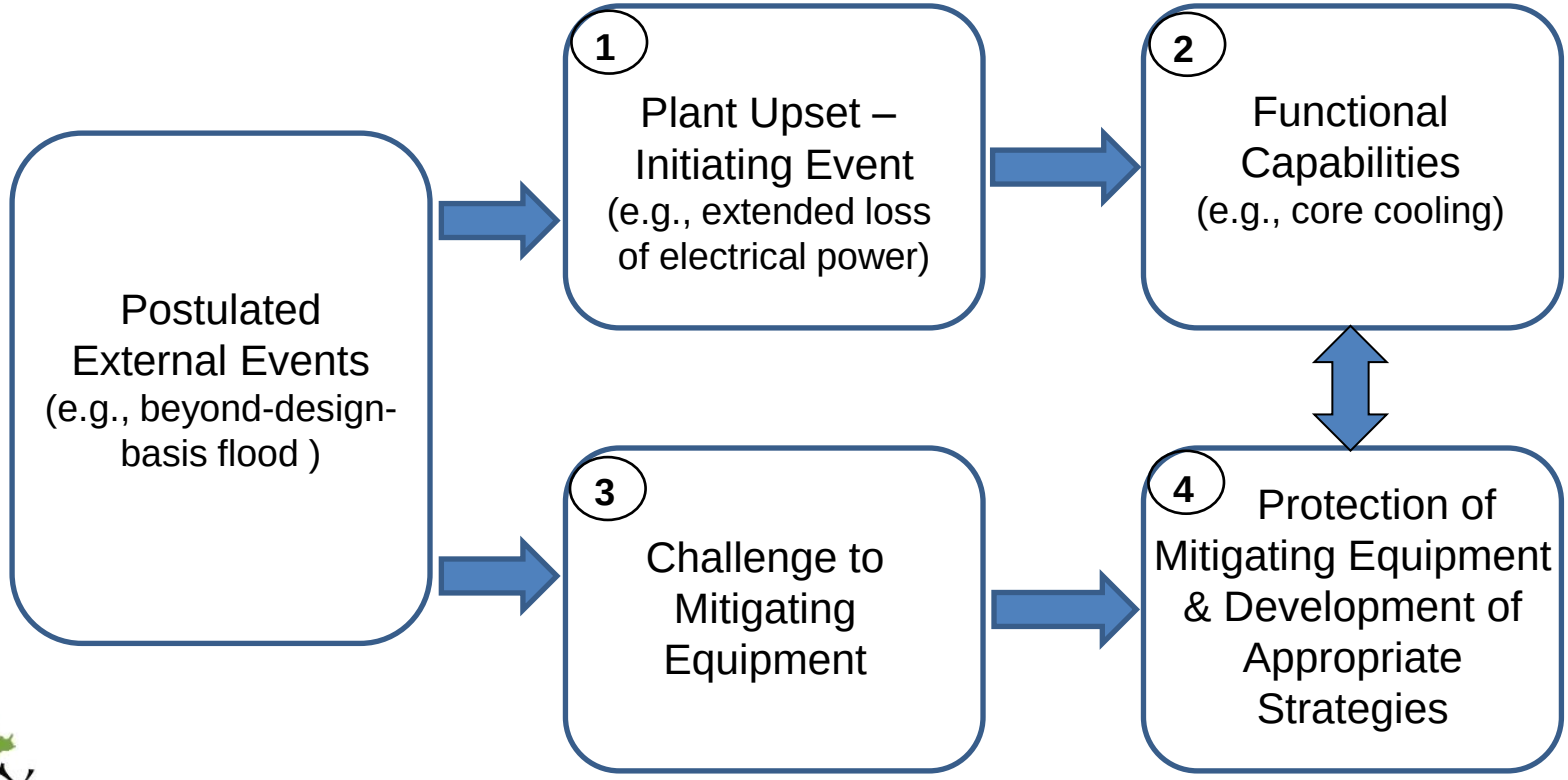
October 3, 2014

Japan Lessons Learned

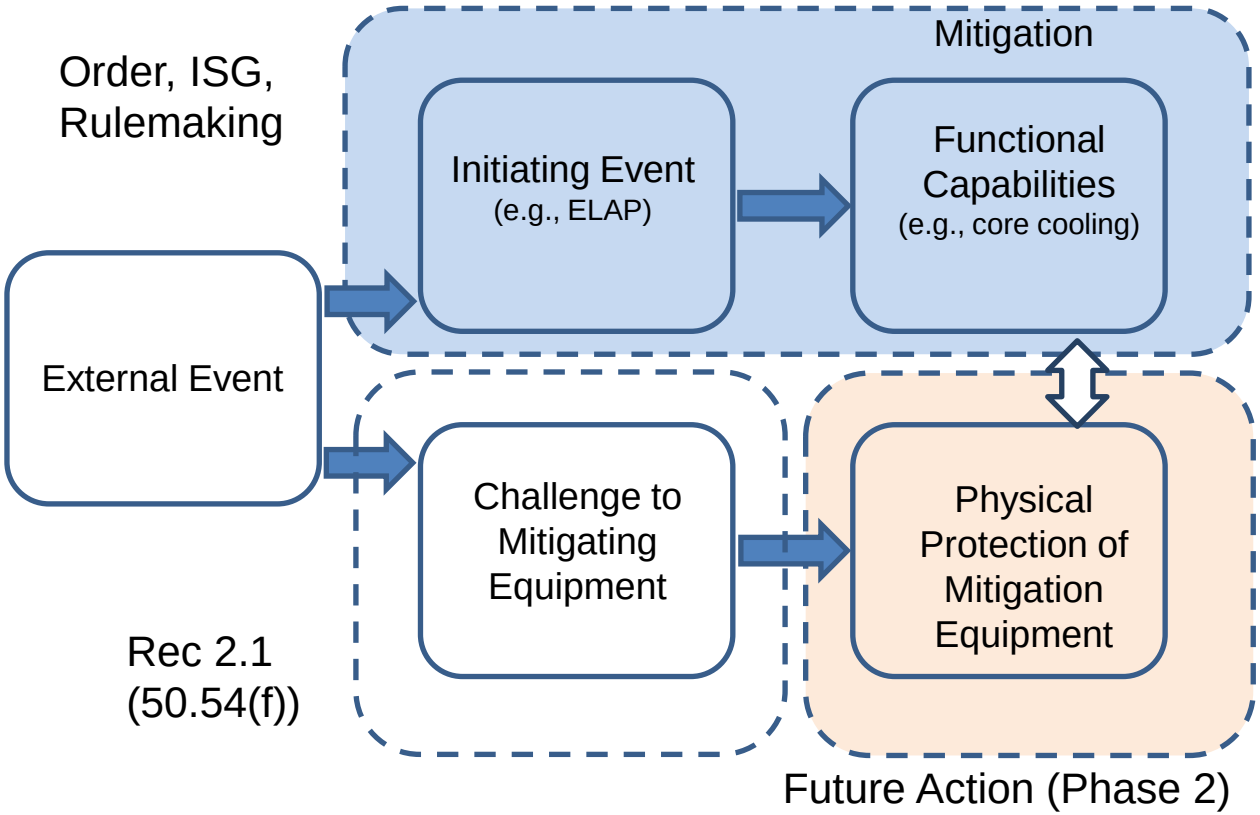
Purpose & Objectives

- Describe NRC staff plans to clarify relationship between mitigating strategies and flooding reevaluations
- Describe path forward

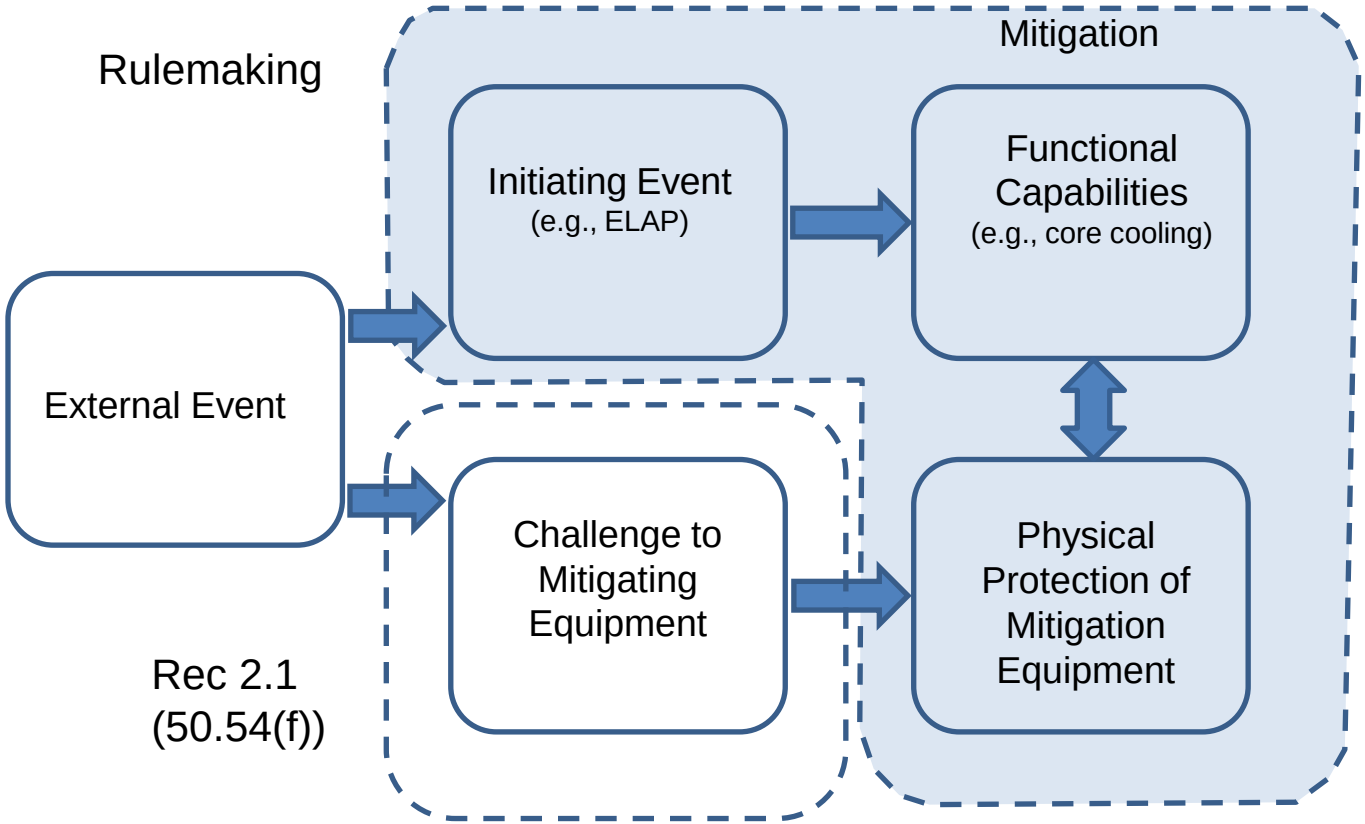
Simplified Representation: Mitigating Strategies for Beyond Design Basis External Events



Background –
Possible Regulatory Approaches (1)



Background –
Possible Regulatory Approaches (2)

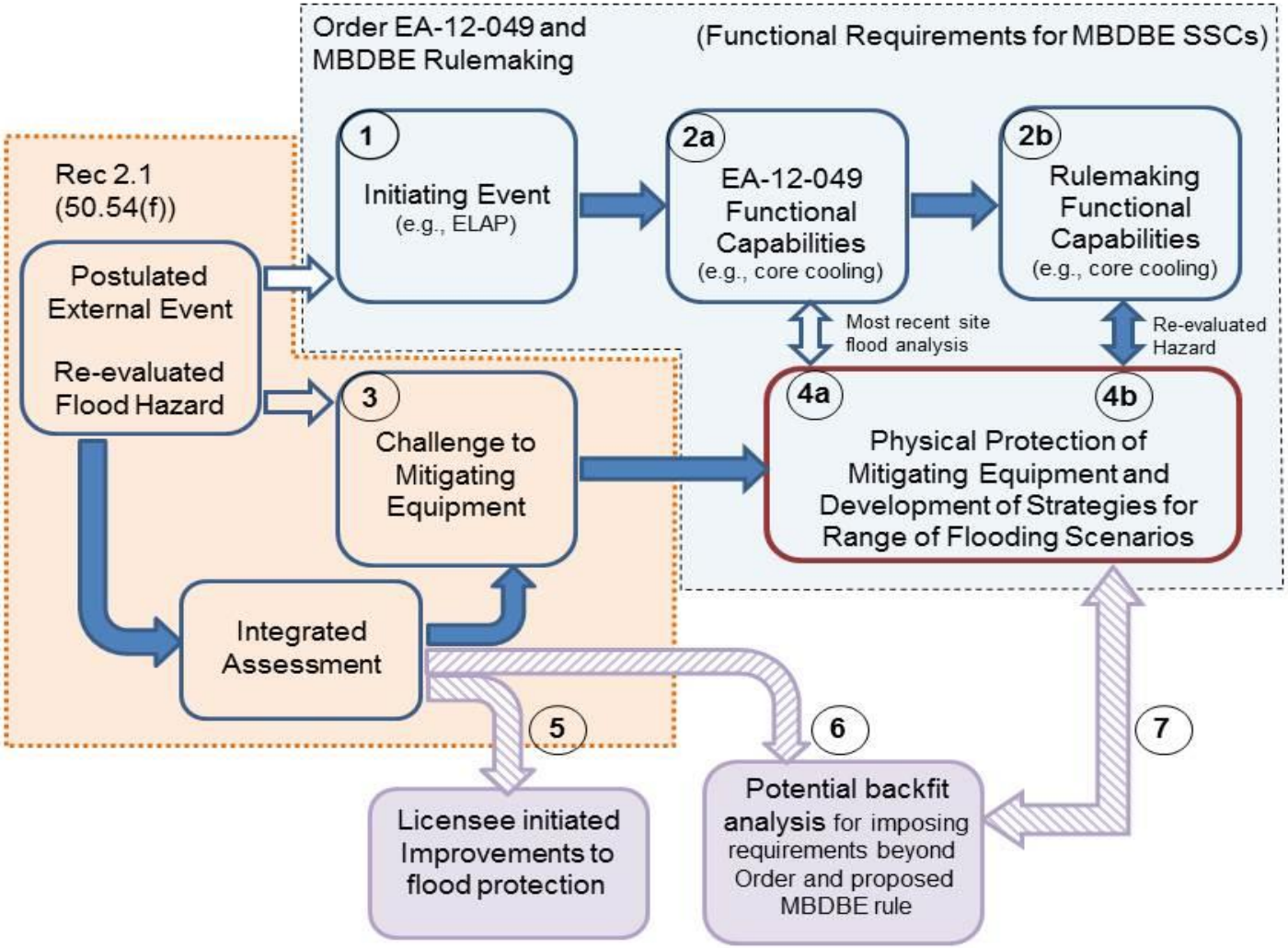


SBOMS Regulatory Basis (July 2013)

Preferred Option was reflected in SBOMS Regulatory Basis Document

Since the purpose of the SBOMS [Station Blackout Mitigating Strategies (SBOMS) now referred to as MBDBE] rulemaking would be to provide mitigation capability for extreme external events, information from NTTF Recommendation 2.1 regulatory activities or other re-evaluations of site-specific hazards would be relevant and need to be addressed and could result in changes to the facility. These changes could include changes to: installed equipment; portable equipment; portable equipment connections; and/or guidance and strategies. Consistent with Order EA-12-049 and related regulatory guidance, it is expected that the SBOMS rule would contain requirements to maintain the SBOMS capabilities, including the protection afforded the equipment consistent with any updated hazard analyses. The supporting SOC and regulatory guide would indicate that the meaning and intent of this provision would be to ensure that new information or operating experience feedback (e.g., new information about a re-evaluated hazard) that impacts the SBOMS equipment and strategies would need to be addressed, and the SBOMS strategies and equipment protection would be updated accordingly.

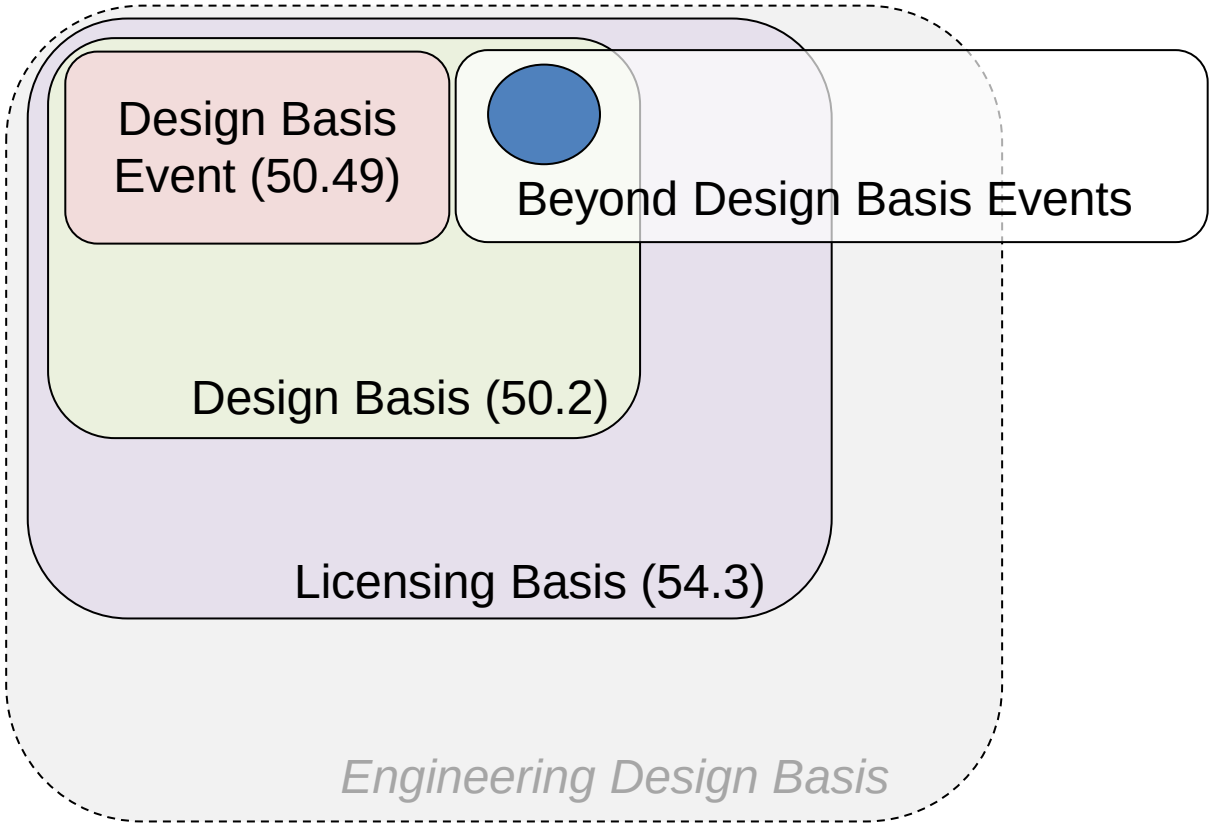
Proposed Flowchart



Discussion

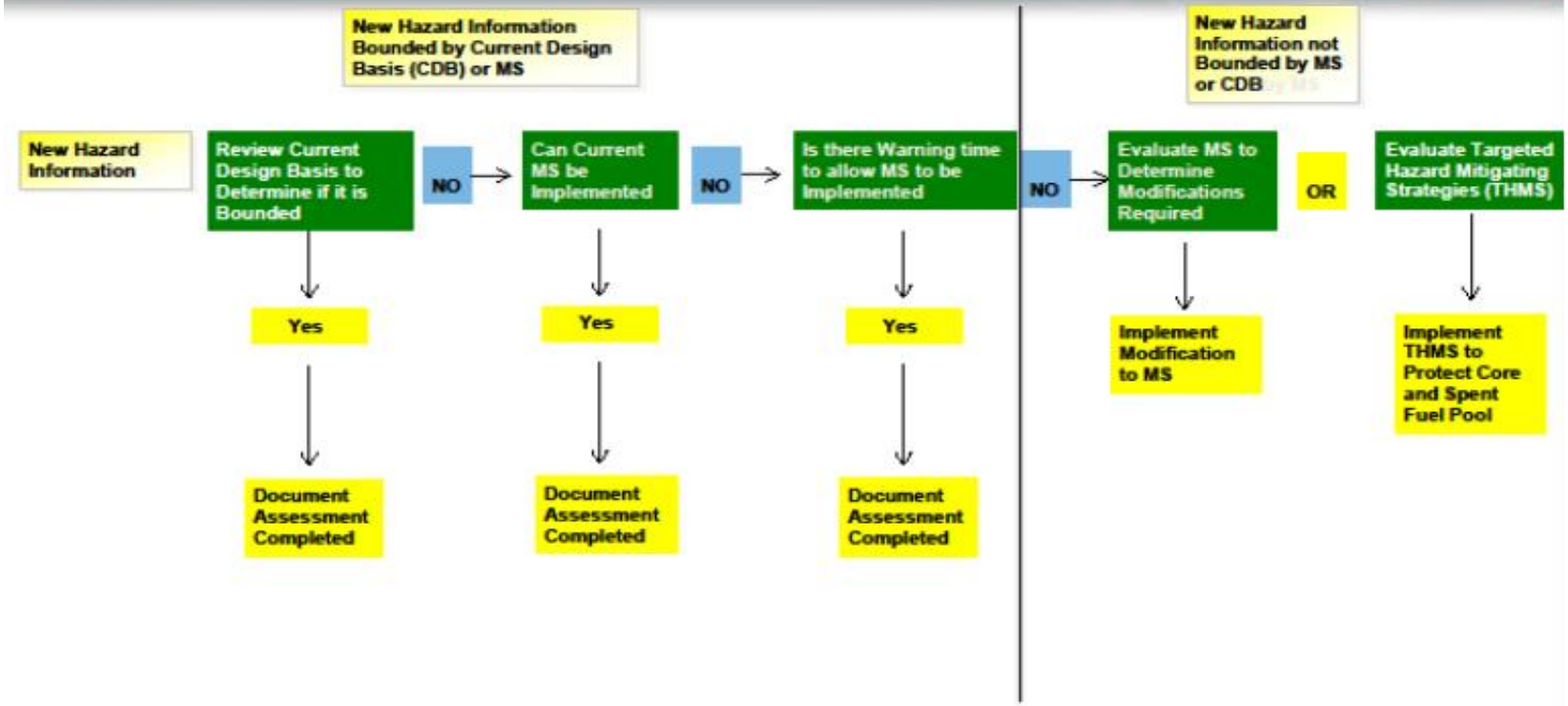
From July Meeting & Draft Paper

- Clarification of Terminology



Industry Presentation

Mitigating Strategies New Hazard Assessment (MS)



Relationship Summary

- At a minimum, additional capabilities for dealing with the beyond-design-basis flooding scenarios identified from the Recommendation 2.1 activities will be provided by the requirements for improved mitigating strategies
- Reduces need for a broader assessment of the plant response as described in current plans and guidance for integrated assessments
- There is a possibility that circumstances at some nuclear power plants may warrant the NRC considering additional assessments and requirements

Next Steps

- *Joint Steering Committee Meeting (23 Sept)*
- *Consideration of insights from meeting*
- *ACRS Meeting (3 Oct)*
- Revising COMSECY
- Issuance of COMSECY – TBD (near future)
- Meetings to discuss revisions to guidance documents – TBD
- Ongoing Activities (12-049 Implementation, flooding evaluations, MBDBE rulemaking, other hazards, etc.)