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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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RELIABILITY AND PRA SUBCOMMITTEE

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OPEN SESSION

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WEDNESDAY

OCTOBER 4, 2017

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ROCKVILLE, MARYLAND

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The Subcommittee 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

DENNIS C. BLEY, Member

MICHAEL L. CORRADINI, Member

RONALD G. BALLINGER, Member

MARGARET SZE-TAI Y. CHU, Member

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JOSE MARCH-LEUBA, Member

DANA A. POWERS, Member

HAROLD B. RAY , Member

JOY L. REMPE, Member

GORDON R. SKILLMAN, Member

MATTHEW SUNSERI, Member

DESIGNATED FEDERAL OFFICIAL:

CHRISTIANA LUI

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P R O C E E D I N G S

8:32 a.m.

CHAIRMAN STETKAR: The meeting will now come to order. This is a meeting of the Reliability and PRA Subcommittee of the Advisory Committee on Reactor Safeguards. I'm John Stetkar, Chairman of the subcommittee meeting.

ACRS members in attendance are Ron Ballinger, Matt Sunseri, Harold Ray, Dick Skillman, Dana Powers, Mike Corradini, Dennis Bley, Jose March-Leuba, Walt Kirchner, and Joy Rempe. Christiana Lui of the ACRS staff is the Designated Federal Official for this meeting.

The subcommittee will hear the staff's presentations on the progress of the Level 3 PRA project. A portion of this meeting will be closed in order to discuss and protect information that is proprietary pursuant to 5 U.S.C. 552 (b)(c)(4).

The subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions as appropriate for deliberation by the full committee.

The ACRS was established by statute and is governed by the Federal Advisory Committee Act. This means that the committee can only speak through

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1 its published letter reports. We hold meetings to
2 gather information to support our deliberations.

3 The ACRS section of the U.S. NRC public
4 website provides our charter, bylaws, letter reports,
5 and transcripts of meetings open to the public,
6 including slides presented at the open meetings.

7 Interested parties who wish to provide
8 comments can contact our offices requesting time. That
9 said, we also set aside some time for spur-of-the-moment
10 comments from members of the public attending or
11 listening to our meetings. Written comments are also
12 welcome.

13 We have received no written comments or
14 requests for time to make oral statements from members
15 of the public regarding today's meeting.

16 We have a bridge line established for
17 interested members of the public to listen in during
18 the open session today. To preclude interruption of
19 the meeting, the phone bridge will be placed in
20 listen-in mode during the presentations and committee
21 discussions.

22 We will unmute the bridge line at a
23 designated time to afford the public an opportunity
24 to make a statement or provide comments. And I'll do
25 that at the end of our open session.

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1 At this time, I request that meeting
2 attendees and participants silence their cell phones
3 and any other electronic devices that are audible.

4 A transcript of the meeting is being kept.

5 Therefore, we request that participants in this
6 meeting use the microphones located throughout the
7 meeting room when addressing the subcommittee.

8 The speaker should first identify
9 themselves and speak with sufficient clarity and volume
10 so that they may be readily heard. Make sure that the
11 green light on the microphone is on before speaking
12 and off when it is not in use.

13 We have a lot of material to cover today.

14 I hope we can get through it all. I want to make sure
15 that we have a good exchange of comments and
16 information. And to not waste any more of our time,
17 let's get started.

18 I don't know, Mark, do you want to make
19 some opening remarks?

20 MR. THAGGARD: Yes, I'll make it quick.
21 So, for those of you that don't know me, I'm Mark
22 Thaggard. I'm the Deputy Director of the Division of
23 Risk Analysis in the Office of Research.

24 I'd like to thank the subcommittee for
25 giving us the opportunity to come and present, provide

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1 you a status on where we are on the Level 3 PRA effort.

2 We find these discussions with the
3 subcommittee to be very beneficial. I mean, seriously,
4 it's provided us some very useful information in order
5 to make the ultimate product the best that we can make
6 it.

7 Back in May, we briefed the subcommittee.

8 And during that briefing, we gave you an update on
9 where we are with the Level 1 PRA on internal fires
10 and seismic events. We also gave you some information
11 on our preliminary thoughts in terms of what we were
12 going to do with the final document, the project.

13 Today what we want to do is we want to give
14 you an update on the actual Part 1 of that NUREG report
15 that we think we're going to develop as part of the
16 documentation for the project.

17 We also want to give you information and
18 an update on where we are with several Level 2 PRA
19 results, Level 3 PRA for internal events and floods,
20 and also give you an update on what we're doing with
21 spent fuel, the spent fuel pool PRA.

22 We are still finding some challenges in
23 terms of meeting our schedule based on, you know,
24 staffing. But so far we seem to be doing the best we
25 can. And I'm sure Alan's going to maybe get into a

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1 little bit of that when he gets into the discussion.

2 So those are the main items I wanted to
3 bring up. So, with that, I'm going to turn it over
4 to Alan. I think most of you probably know Alan and
5 Mary Drouin. They're going to be our key presenters
6 for today.

7 MR. KURITZY: Thank you, Mark. And I want
8 to echo Mark's gratitude to the committee. In
9 seriousness, we do, we very much value your feedback.

10 And we've gotten a lot of feedback from you guys that's
11 really helped us out. And we appreciate your continued
12 interest and almost a full house today, too. So this
13 must be a banner meeting, you know. So we'll try to
14 live up to expectations.

15 This, I think, is about our --

16 MEMBER POWERS: -- meeting tomorrow.

17 MR. KURITZY: This is, I think, our twelfth
18 meeting with the subcommittee, somewhere around that
19 ballpark. And so we've been interacting regularly for
20 quite a number of years. And it's been very beneficial
21 to us.

22 I'm Alan Kuritzky at the Division of Risk
23 Analysis and Research. As Mark mentioned, Mary Drouin
24 is here with me, too. You'll be hearing from a number
25 of other key members of the team later today about

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1 various topics.

2 And even though there's been a number of
3 people who have presented in front of you either at
4 this meeting or at previous meetings, but there's also
5 a huge team of both staff and contractors that have
6 made tremendous contributions to this project. And
7 they don't get the air play that some of us do. But
8 their contributions are, have been substantial
9 throughout the project. And we really appreciate the
10 whole team effort.

11 Going on, to try and keep this thing pretty
12 quick, because as Mr. Stetkar mentioned, there's a lot
13 of stuff on the table today that we want to discuss.

14 My up-front briefings should be pretty quick this time
15 because most of the work now is kind of out of the initial
16 model phase and into the review cycle. So I'll leave
17 most of the technical discussion to the later
18 presentations.

19 MEMBER BLEY: Alan, let me ask you a
20 question up front. But don't answer it now; answer
21 it as you go through. In almost uncountable number
22 of places, as I read through especially the Level 2
23 work, there's, we've only done this much now. The rest
24 is reserved for later.

25 When you go through this discussion, let

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1 me know which of the things are really going to be done
2 later. And if there are some things that you're
3 figuring aren't actually going to be done, let us know
4 about that, too.

5 MR. KURITZY: Okay, will do. Thank you.

6 CHAIRMAN STETKAR: And just, Alan, for the
7 meeting record, we've been joined by ACRS member
8 Margaret Chu.

9 MR. KURITZY: Almost a full house. Okay.

10 So just I think Mark pretty much mentioned the general
11 agenda for the today of what things we're going to cover.

12 In the open session, I'll give a quick overview. And
13 then Mary is going to further discuss the first part
14 of the NUREG.

15 I think primarily her intention is we
16 provide that to you ahead of time. And she's really
17 here to hear what are the comments, you know, what
18 comments you might have on what we're planning to
19 present in that part of the NUREG.

20 So when we go to closed session, we are
21 going to, of course, talk about the Level 2 PRAs. As
22 Mark mentioned, we have several parts of that to
23 discuss, the internal event and flood, seismic high
24 winds and fire, as well as our initial work on shutdown.

25 Then you'll hear the Level 3 work from Keith

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1 Compton for internal events and floods. And finally,
2 Brian Wagner will present information on our ongoing
3 spent fuel pool PRA.

4 MEMBER CORRADINI: So let me just ask you
5 this question. So, in the open -- I guess I'm trying
6 to understand. I view this as essentially a redo of
7 WASH-1400 for a large dry PWR.

8 MR. KURITZY: WASH-1400?

9 MEMBER CORRADINI: Yes, NUREG-1150.

10 (Off mic comments.)

11 MR. KURITZY: WASH-0740 was the one before
12 that.

13 MEMBER CORRADINI: Well, but the reason
14 I'm bringing it up is more in terms of documentation.

15 What is going to be public versus what's going to be
16 proprietary in the final reports, because I've been
17 trying to track in the Level 2 part, and I've been sent
18 to this document and that document. And those are
19 proprietary documents. So it's going to be a roll up
20 of results will be the only public thing, and the
21 analyses will all be proprietary?

22 MR. KURITZY: We haven't actually ironed
23 all that out. Some of that will be involved with
24 discussions with us and people from Southern Nuclear.

25 But in general, approach and results and

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1 insights will be in the public document. A lot of the
2 underlying analyses and plan-specific information will
3 be only in the, we currently call them Tier 3 reports.

4 But it would be kind of like the NUREG/CR-4550 and
5 4551 reports from the NUREG-1150 era. But unlike those
6 reports that were all public at the time, those
7 supporting documents right now would probably not be
8 public.

9 MEMBER CORRADINI: Okay. So, if this is
10 not the time to ask this, then you can postpone me or
11 the Chairman can.

12 But I'm trying to understand what's
13 proprietary that, or what is it about these analyses
14 that make them proprietary. Is it plant data? Is it
15 analyses methods, because it strikes me that if there's
16 some important insights that somebody wants to delve
17 into, do I believe or not believe the insight, I've
18 got to go to analysis, but I can't unless I'm within
19 the NRC family, so to speak?

20 MR. KURITZY: Right. And it's plant data
21 and plant information that is proprietary. Where that
22 boundary gets drawn, what information, plant
23 information that can be released or not, again, that's
24 going to be future discussions between Southern Nuclear
25 and us.

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1 But, unfortunately, you are correct.
2 There's going to be a lot of areas that someone
3 externally at NRC might want to dig into. And they're
4 going to run into a roadblock that's unfortunately --

5 MEMBER CORRADINI: Okay. So then let's
6 say we run into this roadblock. Who do they go to to
7 unblock?

8 MR. KURITZY: Well --

9 MEMBER CORRADINI: Do they have to get
10 Southern permission or your permission or both?

11 MR. KURITZY: They would probably,
12 unfortunately, they may not be able to get it unblocked,
13 because if it deals with proprietary information,
14 Southern certainly can say, hey, we no longer believe
15 this information to be proprietary, and therefore,
16 we're okay releasing it or, NRC, you can release it
17 or they can release.

18 The practical reality is it's going to
19 probably be fairly difficult for someone to get to that
20 next layer of information. People within the NRC or
21 the, you know, federal government community and
22 contractors will probably be able to have access to
23 it. But there is going to be that kind of impenetrable
24 barrier there that the external stakeholders will have
25 a hard time getting --

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1 MR. THAGGARD: Well, they will probably
2 come to us. And we will, as the intermediary working
3 with Southern, to see what we can provide to them.
4 I mean, Alan is probably correct. Ultimately, that
5 information may not be, you know, available to them.
6 But they will come to us.

7 MEMBER CORRADINI: So the usefulness of
8 this primarily is for the staff to keep on top of the
9 state of the art and the practice.

10 MR. KURITZY: Well, there's multiple uses.
11 And I'm not going to go into all of --

12 MEMBER CORRADINI: That's fine. You've
13 answered my question. I don't want to waste your time.

14 MR. KURITZY: Okay. Thank you. All
15 right. So let's see, moving forward.

16 Now, this is the overview presentation.
17 Again, this is a slide you've seen many times. We have
18 our Rubik's Cube.

19 It's really to demonstrate that we have
20 so many different individual PRA models that comprise
21 this project between the various radiological sources,
22 the various internal and external hazards we're looking
23 at, plant operating states, and also the different
24 levels of PRA, 1, 2, and 3. So you have many, many
25 different PRA models.

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1 We've kind of clumped them together for
2 the sake of the presentation as you see on this slide.

3 So I'll be going over them in this particular order.

4 We'll first talk about the internal event
5 and flood PRAs, and then the internal fire and seismic
6 ones, high winds and other hazards. We'll talk about
7 our shutdown models, spent fuel pool, dry cask and
8 integrative site risk. And at the end, I'll just
9 mention some of the near-term deliverables that are
10 coming up or near-term milestones.

11 MEMBER BLEY: Let me sneak in a question
12 here --

13 MR. KURITZY: Yes.

14 MEMBER BLEY: -- because it will come up
15 later. And it came up in previous meetings. And if
16 any of your answer would get into proprietary stuff,
17 we can save it for the closed session.

18 In the past, you had talked about problems
19 with the computer code for the PRA blowing up on certain
20 things. Has that happened primarily when you try to
21 couple all these things together, or is it happening
22 on individual elements of the PRA?

23 MR. KURITZY: Okay. So, for internal
24 events and floods, it was not an issue. Where it really
25 has become an issue was when we linked our Level 1 and

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1 2 models together, because then you have -- of course,
2 as you know, from the event tree structure, every time
3 you add a new node, even if it's binary, you're to the
4 power, 2 to the power of n type thing. So --

5 CHAIRMAN STETKAR: Alan, just for the
6 public record, the Level 2 model is for internal fire
7 events and floods.

8 MR. KURITZY: Internal --

9 CHAIRMAN STETKAR: You said for internal
10 events and floods, it was not a problem. But when we
11 linked the Level 2 model, it was a problem.

12 MR. KURITZY: Right --

13 CHAIRMAN STETKAR: That model is for --

14 MR. KURITZY: Yes, yes, the Level --

15 CHAIRMAN STETKAR: -- internal events and
16 floods.

17 MR. KURITZY: Yes.

18 CHAIRMAN STETKAR: It's all one model.
19 So --

20 MR. KURITZY: Right, right. But when we
21 quantified the Level 1 first, that was not an issue.

22 CHAIRMAN STETKAR: Okay.

23 MR. KURITZY: It's only when we linked it
24 to Level 2 that we ran into --

25 CHAIRMAN STETKAR: Okay.

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1 MR. KURITZY: -- an issue with the code.

2 The second thing, the internal fire model was a huge
3 model in its own right even at the Level 1 stage. But,
4 as we briefed the committee, subcommittee in May, we've
5 knocked down the fire standards in the licensee's fire
6 PRA to like 210 event trees in our model. So it made
7 it more attractable, though still somewhat challenging.

8 When we go to Level 2 for internal fires
9 and some, that's where we really run into a lot of
10 problems. The internal fire model Level 1 would run,
11 but -- I think it was the fire one, or sometimes it
12 would take like 24 hours to run. It was a beast.

13 But when we linked it to Level 2, it was
14 a no-go. And so, as you're going to hear from Don Helton
15 later this morning, we've had to focus all our Level
16 2 work in the internal fire realm to a subset of the
17 total number of sequences.

18 CHAIRMAN STETKAR: Alan, have -- when I
19 -- we're going to get into the Part 1 of the main report
20 next on the agenda. But since this came up, I didn't
21 see much discussion in there on, when you talk about
22 limitations of the study, about the fact that perhaps
23 the tool that you used isn't a state-of-the-practice
24 PRA quantification tool, because others, for example,
25 Southern, seem to be able to propagate thousands of

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1 fire scenarios using whatever software they use.

2 MR. KURITZY: Yes, again, I don't know --

3 CHAIRMAN STETKAR: And that's -- no, the
4 reason -- I don't care about the calculator. In fact,
5 I don't care whether it takes you seven weeks to quantify
6 the model, because you're not going to be trying to
7 do it to make, you know, minute-by-minute, real-time
8 decisions. So that is, the quantification time is
9 irrelevant to me.

10 But if, because of limitations in your
11 available tools you're having to make challenging
12 decisions that affect the technical scope of your
13 analyses -- you said, well, you know, in the Level 2
14 models we had to kind of finesse things so that we could
15 get the software to run.

16 I think that's an important lesson. I
17 don't want to necessarily imply that risk assessment
18 is the calculator, because it isn't. But if, because
19 of limitations in your calculator, you have to, if that
20 imposes real significant challenges in your mind on
21 the ability to develop a comprehensive evaluation end
22 to end, I think that's an important issue that should
23 be discussed.

24 MR. KURITZY: Yes, I agree. If that was
25 an important issue, I don't know -- I haven't --

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1 CHAIRMAN STETKAR: I didn't read it up
2 front. I mean, recognize this is still a work in
3 progress obviously.

4 MR. KURITZY: Right, but --

5 CHAIRMAN STETKAR: But the limitations
6 that I've read appropriately focus on specific methods
7 for specific issues, you know, scope of models in terms
8 of technical scope, if you will, of the PRA itself.

9 There are, as we get into Level 2 later,
10 there are kind of pointers to the fact that, well, we
11 had to some things. But it's your decision.

12 It's just from what I'm hearing is that
13 it may have been a real constraint, or if you had known
14 the constraint going in, been aware of it, you might
15 have organized your level of detail differently. I
16 don't know.

17 MEMBER BLEY: I think we're going to hear
18 more in the closed session. But I'm -- there were
19 places where the report talks about how you gained
20 confidence despite this problem. And that's not been
21 transparent to me. So I want to understand that when
22 we go through the Level 2 stuff.

23 MS. DROUIN: We'll --

24 MR. KURITZY: Let me -- actually, Mary,
25 hold on one second --

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1 MS. DROUIN: I'm just going to just be real
2 quick. I'd like to hear more about this when we get
3 into the discussion of the NUREG, because this was not
4 something we really pursued in the NUREG. So we can
5 talk about it more then.

6 MR. KURITZY: And actually, I want to
7 respond to some of that right now actually. So I agree
8 that if that was a big limiting issue, that's something
9 that should be highlighted, because that would be a
10 driving, influencing factor. And as you mentioned,
11 if we had known that ahead of time and it was a limiting
12 factor, we would probably try to address things
13 differently.

14 In reality, a couple points to be made,
15 Southern's software, an industry software, does not
16 run into these problems. Our software is
17 state-of-the-practice. The other software doesn't run
18 into these problems for, a, they don't link the Level
19 1 and Level 2 together. Southern doesn't have a Level
20 1/Level 2 linkage. And that's where we ran into the
21 biggest problems.

22 Two, for the fire scenarios, the industry
23 uses the Franks software primarily, which is more of
24 a, for lack of a better, a bookkeeping type of software
25 to feed information in and out of the PRA model. So

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1 it's kind of like an adjunct thing that you send stuff
2 off here, and you can deal with all this stuff and then
3 feed it back in.

4 So, yes, we don't use that type of software.

5 Whether or not we could adjust SAPHIRE to feed into
6 that and out, that's -- I'm not the software expert,
7 but I imagine that's something we could do.

8 But the reality is, by making a certain
9 number of assumptions and constraints on the modeling,
10 we've been able to get through the problem so far.
11 And I don't feel we've lost a lot of accuracy.

12 Every time we've done, we've had to make
13 some simplifications, we've done a check to see what
14 we think we might be losing. And we've never come to
15 the point -- and Don will probably talk to you more
16 about it when he talks about the fire, Level 2 later.

17 But I don't think we're really losing much from having
18 to adjust our models to account for the limitations.

19 CHAIRMAN STETKAR: Let's see if we can talk
20 more about a little bit of the details and the
21 constraints when we get into the Level 2 if we want.

22 And thanks for the perspective on what the industry
23 does or doesn't do.

24 MR. KURITZY: My pleasure, to my limited
25 knowledge, by the way.

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1 Okay. So here is a diagram that I think
2 also we showed last time, too. But this kind of puts
3 things in context for when we go into the project status
4 just to understand the various steps that we're going
5 through. And when I tell you where we are in different
6 parts of the study, you'll have a feel for what we're
7 talking about.

8 The first thing that we do, of course, is
9 develop the initial PRA model. And even though that's
10 just one block on this figure, that's really the lion's
11 share of the work. So the bulk of the leveled effort
12 goes into putting that first model together.

13 We then have several layers of internal
14 review that we do on that model. And once it's revised,
15 we send it off for what we loosely term our technical
16 adequacy review. That's kind of like our external to
17 the project team review. And that involves several
18 different layers.

19 Up until just recently, one of the
20 principal parts of that review was PWR Owners Group-led
21 peer reviews to the PRA standards. That's now being
22 scaled back because PWR Owners Group was not only
23 leading those but funding them. And because of their
24 budget constraints, they can no longer do those on a
25 regular basis for us.

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1 So we'll probably rely more heavily on the
2 top block, which is our Technical Advisory Group
3 reviews. And just to remind the subcommittee members
4 or anyone who wasn't involved in previous meetings,
5 the Technical Advisory Group is a set of individuals
6 here at the NRC. It's the senior level advisors in
7 PRA and PRA-related areas from the various offices
8 around the agency, as well as a couple of members from
9 the industry.

10 We have a gentleman from Westinghouse that
11 serves on the TAG, as well as somebody from EPRI. And
12 they serve as kind of our advice. They provide insight
13 and advice and guidance to the team for various issues
14 and review the various documents.

15 And with the limited participation of the
16 PWR Owners Group going forward, we'll probably rely
17 on them more heavily to, not necessarily do a standard
18 space review, but do a more complete structural review,
19 keeping in mind some of the requirements of the
20 standards so that, you know, they can kind of fill that
21 role also.

22 And, of course, the ACRS, which we brief
23 regularly and we get some times voluminous feedback
24 on our various PRAs, and that's served us very well
25 also.

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1 CHAIRMAN STETKAR: Alan, and just I always
2 have to do this. And it was a comment that I was going
3 to make on the NUREG. You have not received any
4 feedback from the ACRS.

5 MR. KURITZY: Sorry, members --

6 CHAIRMAN STETKAR: And be careful when we
7 say that orally on the public record, and be really
8 careful when you write it in the report.

9 MR. KURITZY: Right.

10 CHAIRMAN STETKAR: The only letter that
11 the ACRS has written, surprisingly enough, on this
12 entire project was June 22, 2011 where we recommended
13 that the staff go ahead with a full scope Level 3 PRA
14 for a particular plant. That's the only letter.
15 That's the only ACRS pronouncement on this project.
16 So --

17 MR. KURITZY: I still blame you for that,
18 by the way.

19 CHAIRMAN STETKAR: Oral statements in
20 subcommittee meetings are one thing. But be really,
21 really careful when you document stuff --

22 (Laughter.)

23 MEMBER BLEY: As the Chairman of this
24 subcommittee, are we hitting a point where a letter
25 from the committee begins to be useful? Should we talk

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1 about that later today?

2 CHAIRMAN STETKAR: We should talk about
3 that later today. We were trying to get to a point
4 where there would be some productive use of a letter
5 in the near future, near being within the next six months
6 or so. But we'll talk about that a little bit more.

7 MEMBER REMPE: Even March 2018 might be
8 a good time to try and get a letter out for some reason.

9 MEMBER SKILLMAN: Alan, I would like to
10 ask this question, please.

11 MR. KURITZY: Yes.

12 MEMBER SKILLMAN: It's relating to the TAG
13 review and to the PWROG peer review. What assures that
14 there isn't groupthink? Get a bunch of like-minded
15 people together and they can review a product and pat
16 each other on the back and say this looks pretty good.

17 Where is accommodation made for the, not
18 the cynic, but the critic, the critic that says I'm
19 not sure, I'm not comfortable with this, I think we're
20 missing something? How does that get incorporated into
21 the TAG review and the PWROG review?

22 MR. KURITZY: So let me respond in two
23 ways. First off, with our Technical Advisory Group,
24 as our chair of that group, Nathan Soo, could attest
25 to, it's kind of like herding cats trying to get that

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1 group together to review things.

2 And, in fact, the bulk of our feedback from
3 the TAG to date has really been individual comments,
4 not a consensus report, because they haven't been able
5 to get people to provide it, sufficient people in a
6 sufficient timeframe to give us a consensus report.

7 And so we've gotten various members for
8 different topics who have provided us information.
9 And it's more of their own set of comments. So there's
10 very little groupthink between the individual member
11 feedback.

12 And secondly, it distinguishes itself from
13 the PWR Owners Group, because that's primarily an
14 industry-led process where you do have people from
15 various organizations working on this, and they're
16 working to the standard.

17 And I think that structural review process,
18 which is, has its benefits and its limitations honestly,
19 but it's a very good, established process for doing
20 what it's intending to do, which is do a high level
21 review of the approach, make sure it looks like sound
22 practices are being followed, and it drills down in
23 selective areas to make sure things are on solid ground.

24 It's not, obviously, a six-month effort
25 to find out every last fault tree is totally correct.

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1 But it does a generally good job at making sure the
2 model has a certain level of pedigree.

3 And so those are, they themselves, the TAG
4 review and the PWR Owners Group-led review, are very
5 distinct. And as I mentioned, the TAG members
6 themselves are pretty much, they're kind of following
7 their own path.

8 And that's the nature, that position in
9 the NRC, the BSLs, they're really there for that
10 purpose. They're very experienced and well-known
11 experts in the various areas. And so they're known
12 for having their own personal views. And so that is
13 kind of -- you know, we take advantage of that as part
14 of our TAG reviews.

15 MEMBER REMPE: So the industry folks who
16 serve on the TAG, are they volunteering their time,
17 or are they paid to do this --

18 MR. KURITZY: Yes, the --

19 MEMBER REMPE: -- because sometimes we see
20 -- you get what you pay for in life is why I'm asking
21 that.

22 MR. KURITZY: Right, right, right. So,
23 and a good question. The leader is paid for by the
24 PWR Owners Group. And the travel for the other members
25 is by the PWR Owners, is paid for by the PWR Owners

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1 Group --

2 MS. DROUIN: But she was asking about the
3 TAG.

4 MEMBER REMPE: I'm asking about the TAG
5 --

6 MR. KURITZY: Oh, the TAG or the PWR Owners
7 -- oh.

8 MEMBER REMPE: -- because, I mean, the PWR
9 Owners Group thing is going away. So they don't have
10 the funding anymore, right?

11 MR. KURITZY: Oh, so you're talking about
12 the two external members of the TAG.

13 MEMBER REMPE: Yes, so you don't have the
14 PWR --

15 MR. KURITZY: Right, going forward.

16 MEMBER REMPE: -- peer review anymore --

17 MR. KURITZY: Right.

18 MEMBER REMPE: -- the Owners Group one.

19 MR. KURITZY: Right.

20 MEMBER REMPE: So now you're down to just
21 the TAG, which I understand the senior level experts
22 will devote time as they have it available.

23 MR. KURITZY: Right.

24 MEMBER REMPE: But what about these
25 industry folks? Are they --

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1 MR. KURITZY: Okay.

2 MEMBER REMPE: -- volunteering their time,
3 or are they --

4 MR. KURITZY: Yes.

5 MEMBER REMPE: -- paid?

6 MR. KURITZY: Okay. So thank you for the
7 clarification.

8 MEMBER REMPE: Yes.

9 MR. KURITZY: The two members from
10 industry on the TAG are, their time is being
11 volunteered. Their organizations are paying for it.

12 However, our experience to date, the one
13 gentleman from Westinghouse, who formerly was with
14 NextEra and now moved to Westinghouse and Westinghouse
15 will continue to support his involvement when he moved,
16 he's been one of our most active respondents. And he's
17 actually extremely knowledgeable in PRA. Ken Kiper
18 is very knowledgeable in many aspects of PRA. And so
19 he's been a tremendous asset.

20 MEMBER REMPE: And he is paid. So he --

21 MR. KURITZY: Well, he's being paid by
22 Westinghouse.

23 MEMBER REMPE: Right.

24 MR. KURITZY: Right, right.

25 MEMBER REMPE: But again, somebody --

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1 MR. KURITZY: It's not on their own time.

2 MEMBER REMPE: That gives you -- yes.

3 MR. KURITZY: Right, it's not on their own
4 time.

5 MEMBER REMPE: That gives you a higher --

6 MR. KURITZY: Right, right, level of --

7 MEMBER REMPE: -- focus on it, yes.

8 MR. KURITZY: Exactly.

9 MEMBER REMPE: No, okay.

10 MR. KURITZY: And the same thing for EPRI.

11 The EPRI gentleman that was on the TAG actually moved
12 off. I guess he must have transferred or changed
13 responsibilities. So we're just getting a new member
14 --

15 MEMBER REMPE: Okay.

16 MR. KURITZY: -- from EPRI on there, which,
17 who is also very well, has a lot of experience in PRA.

18 And we're looking forward to interacting with him.

19 But, yes, they're getting paid by their
20 home organization.

21 MEMBER REMPE: That's good. Thank you.

22 MEMBER BLEY: Alan, just as a reminder,
23 while it was still active, what parts of the PRA did
24 the Owners Group peer review consider? I know it did
25 Level 1.

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1 MR. KURITZY: It did Level 1 for internal
2 events and floods. It did Level 2 for, you know, the
3 draft standards for the Level 2 internal events and
4 floods, the draft standard for Level 3 internal events
5 and floods, and then also the Level 1 high wind PRA
6 and our other hazards screening analysis --

7 MEMBER BLEY: So you got a pretty good --

8 CHAIRMAN STETKAR: But you did get what
9 I call an end to end, all the way through Level 3 for
10 internal events and internal floods.

11 MR. KURITZY: Yes.

12 CHAIRMAN STETKAR: Good.

13 MR. KURITZY: Yes, yes. And we got the
14 full peer review that they would do for an industry
15 PRA. It was a full, there was nothing, no shortcuts,
16 no cutting corners on that.

17 MS. DROUIN: And just to answer your
18 question about the group thinking on the peer review,
19 the way the peer review is done is that all the different
20 experts are not physically separated, but they are all
21 assigned different areas. And they don't review as
22 a group. Each expert reviews his assigned area.

23 Then they come together as a group. And,
24 say, you were assigned, you know, the HRA. Well, then
25 in the group, you make your case. You know, I think

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1 that the PRA met these requirements; it didn't meet
2 these. And then they vote as a consensus. Now, if
3 they don't have full consensus, any differing opinions
4 are documented as part of the process.

5 MEMBER SKILLMAN: Thank you.

6 MR. KURITZY: Okay. So just moving back
7 to this chart, so we do the internal reviews, revise
8 model. And as we mentioned, we go down to these
9 external reviews.

10 After that, we move to what I call Phase
11 2. In this presentation today, sometimes I'll loosely
12 refer to Phase 1 and Phase 2 just to kind of make it
13 easier.

14 Phase 1 is the report, the modelings report
15 prior to this external, the team review. And then Phase
16 2 is afterwards.

17 And so, when we move into the Phase 2 area,
18 which often times involves a lot of comments and
19 feedback from the technical adequacy review, we revise
20 the model, revise the report. And then we go through
21 the internal review process again, both the technical
22 review and a project management review. And then it's
23 signed off as final.

24 So it's kind of like the left side is Phase
25 1; the right side is Phase 2. Just kind of keep that

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1 in the back of your mind because I may throw those terms
2 out later.

3 Okay. So, in terms of project status, as
4 I mentioned before, there's probably close to 20 PRA
5 models that are involved with this project. So I didn't
6 want to put 20 lines on this chart. So I've condensed
7 them down

8 It's actually I realize fairly similar to
9 the breakdown that we're going to discuss things today
10 with the exception that the fire, seismic, other
11 hazards, and high winds are all in that second all
12 hazards category.

13 But these are -- so it combines the model
14 in those different categories. Also, as you notice,
15 there's no PRA level here. So I've also combined the
16 Level 1, 2, and 3 models all within that bar.

17 And so what you can see is those that have
18 moved fairly far along, like the internal events and
19 floods for the reactor or the dry cask storage, those
20 have had a lot of progress in all the Level 1, 2, and
21 3 models, where as some of the other areas that were
22 just kind of in the middle there, the Level 1 model
23 has probably been completed or seen a lot of progress.

24 The Level 2 is probably is in midstream somewhere.
25 And then, in most cases, the Level 3 probably hasn't

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1 started yet. And so --

2 MEMBER CORRADINI: Just so I understand
3 what you're trying to tell us, so take the second blue
4 bar. Your point is the Level 1 has gone through all
5 the way, Phase 1 and Phase 2, and has been finalized.
6 And you're still working on the Level 2 part.

7 MR. KURITZY: Not exactly. That's why I
8 used that Phase 1 and Phase 2 thing, too. What it means
9 is that the Level 1 is probably somewhere in the Phase
10 1. But it's in the review cycle, somewhere in the
11 review cycle for Phase 1, whether that's internal review
12 or project management review or technical adequacy
13 review.

14 We don't have to -- essentially, once we
15 have the model for like Level 1 up through into the
16 technical adequacy review, we start the Level 2. We
17 don't wait till it's totally signed off, otherwise the
18 schedule will go out forever. So there's kind of
19 overlap of the Level 1, 2, and 3 to some extent.

20 So what this means is, like for instance,
21 that second bar is a tough one because there's four
22 separate hazards in there. But in general, as an
23 example, we might be in the project management review
24 for the Level 1. The Level 2 is actually going through
25 the, ongoing through the technical work.

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1 It's similar to what you're going to hear
2 later because -- well, last, in May, we presented our
3 work on the fire and seismic. Those are now in for
4 project management review. The Level 2 you're going
5 to hear later today is in midstream. Level 3 has not
6 been started yet for those. So that's kind of an
7 example of where that would be.

8 MEMBER CORRADINI: Okay --

9 MR. KURITZY: And then just at the bottom,
10 the overall, so right now I would estimate we're about
11 70 percent done with the project at this -- yes.

12 MEMBER BLEY: The one right above that --

13 MR. KURITZY: Integrated site.

14 MEMBER BLEY: -- give me a hint what 30
15 percent complete on integrated site means.

16 MR. KURITZY: Okay. That one is -- I
17 actually have an algorithm for calculating all these
18 percentages, assigning weights to every aspect, every
19 block that you saw on that previous diagram and every
20 single piece of the thing made up on my own judgment
21 of how much each piece contributes.

22 The integrated site one is even --

23 MEMBER BLEY: Does 30 percent mean you've
24 kind of figured out how you're going to do it?

25 MR. KURITZY: It means that we have an,

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1 as I'll discuss later when we talk outside, we have
2 an approach. We've been piloting that approach for
3 a number of different of models.

4 As the individual single source models get
5 completed to the Phase 1, you know, the Phase 1 part
6 gets done, then we use that to do kind of a pilot test
7 to see if we had a two-unit model for that, how well
8 does our approach work on that.

9 And so we've been going through those
10 various pilot cases as I'll discuss later. So that's
11 essentially what it means. That one, of course, will
12 not be totally done until all the other ones are done
13 because that's the caboose on the train.

14 MEMBER BLEY: I'm having a little trouble
15 thinking about these pilot cases, because in the end,
16 the claim is you're going to have the whole integrated
17 site all tied together. So you're kind of doing
18 pair-wise things to see how you'd integrate them?

19 MR. KURITZY: Right. Because, yes --

20 MEMBER BLEY: Okay.

21 MR. KURITZY: -- because we want to wait
22 till we see -- our approach, and I'll get to this later,
23 for the integrated site, as we briefed the committee
24 about a year ago on this, we're using the insights and
25 the results and insights from the single source models

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1 to help prioritize where we're looking for multi-source
2 contributors.

3 And so we wait until we get a single source
4 model done, and then we can say, hey okay, now with
5 this approach, how well does it work for those results.

6 So the first thing was the Level 1 internal events.

7 That was the first model done. So we did a two-unit
8 test case for that.

9 And then, as the other pieces started
10 coming done, Level 2 or seismic, we started testing
11 those pieces out, too. So right now, they're just,
12 yes, for lack of a better phrase, pair-wise or
13 individually looking at them, not in combination, but,
14 you know, at a two-unit model for these various single
15 unit models that we have so far just to see what kind
16 of issues would come up and how well we think the
17 approach would work.

18 As we start to get more and more of these
19 models ready, we'll have to start looking more than
20 pair-wise to make sure that the approach will work when
21 you start to throw even more pieces in at once. But
22 right now they've all been essentially pair-wise pilot
23 studies.

24 MEMBER BLEY: You said you're going to tell
25 us later. When today are you going to talk about that,

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1 because I'm a little --

2 MR. KURITZY: Just in this presentation
3 at the end, there's, we'll have a, just a --

4 MEMBER BLEY: Oh, okay.

5 MR. KURITZY: It's not a detailed
6 discussion, but --

7 MEMBER BLEY: I'll wait for that.

8 MR. KURITZY: Yes, we can discuss --

9 MEMBER BLEY: So this morning?

10 MR. KURITZY: Yes, it will be this morning.

11 CHAIRMAN STETKAR: We'll discuss more of
12 it during the spent fuel pool closed session.

13 MR. KURITZY: Okay. So now, moving on to
14 the status of the individual areas, the reactor at-power
15 internal events and floods, that was the cornerstone,
16 the basic piece. As Mr. Stetkar mentioned before,
17 we've managed to get all the way through Level 3 on
18 that right now. This one is, as you saw on the previous
19 diagram, the one that's furthest along.

20 All three PRA levels for internal events
21 and internal floods have already been through the
22 standard space peer review. And they're in various
23 levels of completion.

24 The internal event report is totally
25 complete and signed off. The internal flood report

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1 is just about complete. This is for, sorry, for Level
2 1. So the internal flood one is just going through
3 some final review. And it's about ready to get signed
4 off.

5 On the Level 2, as you'll hear in more
6 details later today, the internal event and flood model
7 is, it's in for project management review. So it's
8 mostly done. And you'll get a detailed presentation
9 on that.

10 Level 3, which you're also going to hear
11 about later today, that one is pretty much near the
12 end of the road. It's still going through some final
13 documentation. I think there's some work still being
14 done on sensitivity analysis and uncertainty analysis
15 in wrapping up some of the documentation. And then
16 it will go into technical review.

17 These are the Phase 2 reports. So once
18 they are signed off, they're done completely.

19 And also, just to remind the subcommittee
20 that we did perform an external solicitation to get
21 better insights onto the frequency of interfacing
22 system LOCA. And that work has already been documented
23 in a contractor report. And we presented that to the
24 subcommittee a year ago or so.

25 Moving on to internal fires and seismic

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1 events, we have completed the initial revisions of the
2 Level 1 seismic and fire PRA models. This is different
3 than Phase 1 or Phase 2. That's why I call it an initial
4 revision.

5 Just to remind the subcommittee members,
6 we had completed Level 1 seismic and fire PRAs about
7 a year and a half ago. Southern provided us all new
8 information and a lot of new information for both of
9 those. So we felt we needed to redo both of them, so
10 almost starting from scratch on those two.

11 But now those revisions have completed.
12 They've gone through the self-assessment, the internal
13 technical review. And now they're sitting either in
14 project management review or in the queue for project
15 management review. They have -- let's see. I guess
16 I covered, yes, covered that.

17 So the Level 2, again, you'll hear more
18 about that this, or later this morning. That is in
19 progress. That's something that you didn't get a
20 report for because that work is right in the middle.

21 We didn't have anything documentation-wise to provide
22 you on that. But Don Helton will, in his presentation,
23 will go over where we stand for those.

24 Basically, we're leveraging heavily the
25 internal event Level 2 model for that. But, of course,

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1 we have to consider the hazard-specific implications
2 for containment, event tree modeling, or human
3 reliability analysis, the various models. We'll have
4 to look and see what those specific hazards, how they
5 impact the work to date. But it does leverage heavily
6 the internal event model.

7 MEMBER BLEY: But when you use the word
8 leveraging here and in the report, that means taking
9 advantage of what the licensee did in their own --

10 MR. KURITZY: No, leveraging, our Level,
11 in other words, our internal --

12 MEMBER BLEY: Okay.

13 MR. KURITZY: Our internal event Level 2
14 for the fire and seismic or high wind Level 2 will
15 basically use that model --

16 MEMBER BLEY: Okay.

17 MR. KURITZY: -- and then adjust it as
18 necessary.

19 MEMBER KIRCHNER: Alan, clarification,
20 what do you mean by project management review?

21 MR. KURITZY: Okay. So let me jump back.
22 So, in those internal reviews, there's three levels.

23 MEMBER KIRCHNER: Right.

24 MR. KURITZY: There's a self-assessment,
25 which is essentially according to the standards, kind

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1 of a standards-based thing that they follow. That's
2 Level, that's the first internal review.

3 Then it goes to what we have as internal
4 technical reviewers. Someone on the project team is
5 assigned to technically review the document in detail
6 or the models in detail and sign off on it.

7 Then it has to come to the project
8 management team for a final sign off. And that project
9 management team up to date has been Kevin Coyne, Mary
10 Drouin, and myself.

11 So one of the three of us will review it
12 also at a higher level and sign off on it. That's that
13 project management review. And as we're going to find
14 out, as I'll discuss later, that's really becoming the
15 big element.

16 Kevin Coyne, who has been an invaluable
17 member of the team to date, he's been transferred over
18 to another organization. John Nakoski is now our
19 cognizant branch chief for the project.

20 Kevin remains part of the project even
21 though it's not his primary role anymore. But he's
22 had tremendous contributions to the project ever since
23 its inception. And he will continue to be involved.

24 And we may even get to squeeze up a project management
25 level review or two out of him also in his new role.

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1 So that's really what that is. It's one
2 of the three leadership team --

3 MEMBER KIRCHNER: But you mean technical
4 review, not project management review --

5 MR. KURITZY: Well, yes, yes, yes, no, no,
6 no --

7 MEMBER KIRCHNER: -- not schedule --

8 MR. KURITZY: Yes, it's a technical
9 review, but it's a higher level by a member of the
10 project management team.

11 MEMBER KIRCHNER: Okay. I'm with you.

12 MR. KURITZY: Moving on to the high winds
13 and other hazards, again, as I mentioned earlier, both
14 those have been through their standards-based peer
15 review.

16 The other hazards report, which was a
17 qualitative screening analysis, that one has been
18 updated to account for all the feedback from the
19 technical adequacy review. It's currently undergoing
20 a final project management review. Mary's got the lead
21 for that.

22 She also -- well, I'll get to that in a
23 second. But she's juggling that with some other work,
24 too. So, when I get to the schedule later, you'll see
25 there's definitely some uncertainty with regard to the

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1 schedule.

2 CHAIRMAN STETKAR: Just for the public
3 record --

4 MR. KURITZY: Yes.

5 CHAIRMAN STETKAR: -- she can handle it,
6 though.

7 MR. KURITZY: We have the utmost
8 confidence in her.

9 The second area is the high wind PRA. That
10 actually is a quantitative PRA model. That went
11 through its peer review. We got a lot of feedback both
12 from the ACRS, from the standards-based peer review,
13 from the TAG.

14 One of the main things that happened after
15 that review is we went out and got Applied Research
16 Associates, which is a very well-known wind PRA company,
17 to go do a plant walkdown and provide us some additional
18 information particularly related to wind fragilities
19 and wind hazards.

20 And so now we've redone that quantitative
21 model. And it's currently going through the internal
22 technical review. Once that's completed, it will go
23 through the project management review and then get
24 signed out.

25 Moving on to the low power and shutdown

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1 model, that initial model also has now been completed.

2 It's internal -- let's see. Okay. This says
3 currently incorporating feedback from internal
4 technical review. That actually was completed on
5 Monday. So this slide is a little bit out of date.
6 That is now in the queue for project management review.

7 The Level 2 work for low power and shutdown
8 is ongoing as we'll hear again more later this morning.
9 We've already completed a lot of the bridge tree and
10 Plant Damage State work for that.

11 In terms of deterministic analyses, we've
12 done the MELCOR runs for the CRA accent progression
13 and timing. We're now focusing mostly on the
14 probabilistic aspects, essentially the containment
15 event trees, HRA, things like that. Again, details,
16 Don Helton will give you more details.

17 And I just wanted to remind the
18 subcommittee that we also did perform a Phenomena
19 Identification and Ranking Table, a PIRT expert
20 elicitation process, to try and prioritize what areas
21 in a shutdown PRA or low power shutdown PRA should be
22 focused on if you don't have the resources and time
23 to do everything completely.

24 And that work was documented in a contract
25 report. It contains a lot of proprietary information.

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1 So we can't release that.

2 But we did feel that this, the results of
3 that expert elicitation may have some benefit to the
4 broader PRA technical community. So we are embarking
5 on making a version of it as a NUREG/CR where we would
6 essentially scrub out the proprietary information and
7 maybe expand some of the discussions and issue that
8 publicly.

9 CHAIRMAN STETKAR: Alan, we haven't seen
10 that PIRT report. But something always bothers me
11 about a bunch of experts who have no experience doing
12 low power and shutdown PRA getting together and giving
13 people guidance on what's important to look at, because
14 of they've only looked at a few things in the past.
15 That's very pejorative, and it was intended to be that
16 way.

17 In particular, everybody always looks at
18 mid-loop operation because everybody always knows that
19 loss of off-site power during mid-loop is the only thing
20 that people need to look at in low power and shutdown.

21 The studies that have been done elsewhere have
22 discovered that that isn't necessarily true.

23 And, therefore, the conclusions from a
24 committee who hasn't had broad actual experience
25 performing full scope low power and shutdown studies

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1 for a variety of different types of plants who organize
2 their outages differently, there's a danger that that
3 process could tend to perpetuate things that we already
4 know and not instill a notion of the fact that low power
5 and shutdown is a beast.

6 You really need to look at plant-specific
7 outage management, plant-specific configuration
8 control. And there may be broad differences.

9 So I just wanted to mention that, that when
10 you start to say, well, we want to publish this perhaps
11 as a NUREG so that everybody can use the insights from
12 this group, without having seen those insights, I have
13 no, you know, notion how far they went in terms of
14 experience from international low power and shutdown
15 PRAs, for example.

16 MR. KURITZY: So thank you very much --

17 CHAIRMAN STETKAR: And the international
18 community actually has done a lot more. And I'm not
19 talking just about Europe. The Russians have done a
20 bunch, for example.

21 MR. KURITZY: Thank you very much for that.

22 Yes, and that's a comment that we've heard before.
23 And we appreciate that. For this work, first of all,
24 I'll just ask, before I get to a little bit on what
25 that PIRT showed, but the --

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1 Well, actually let me mention that the
2 panel that was used for that PIRT, several of the members
3 do have experience doing low power and shutdown PRA.

4 Not probably as -- I don't know how many involved were
5 European versus domestic work. And they don't have
6 probably the plethora of experience that you may be
7 aware of.

8 But, nonetheless, they are, some of the
9 members have direct involvement in preparing and
10 developing low power and shutdown PRAs. Others were
11 plant people who have experience in outage management
12 and outage operations. I can't remember what the other
13 expertises were that were used in the panel. But it
14 was a fairly broad panel of expertise.

15 But I did just -- the idea -- and so just
16 to mention, so what they did was they came up with
17 essentially looking at the different plant operating
18 states. They ranked them in various conditions, really
19 looking at core damage and release, and under each of
20 those, looking at four different hazard types, internal
21 event, internal flood, fire, and seismic.

22 The results were as you mentioned. The
23 areas that were the highest, they felt were the biggest
24 potential risk contributors were those involving the
25 most limited amount, the lower RCS water levels, which

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1 means mid-loop operation or the operating states where
2 you're down around the vessel head flange.

3 But I am curious, because you mentioned
4 a number of times that overseas they have identified
5 a lot, well, I don't know a lot, but other ones. What
6 specifically, like what areas --

7 CHAIRMAN STETKAR: It's been very, very
8 plant specific.

9 MR. KURITZY: But --

10 CHAIRMAN STETKAR: And that's the problem.

11 One thing I can recall is the effects of fire, spurious
12 signals, especially that can open up drain down paths,
13 for example, depending on where you are in the outage
14 has showed up. Seismic events have shown up, again,
15 depending on the plant configuration.

16 MR. KURITZY: But, John, but again,
17 wouldn't those be even more severe when you're at one
18 of these lower RCS levels because --

19 CHAIRMAN STETKAR: No, not -- well, the
20 fact of the matter is that some plants don't go into
21 a mid-loop operation with the core, with the fuel in
22 the core. They wait. They just don't do that.

23 MR. KURITZY: Right.

24 CHAIRMAN STETKAR: You know, so, if you
25 have a plant that doesn't do that, now what do you look

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1 at?

2 MR. KURITZY: Well, except that mid-loop,
3 again, even other states where you do lower the level
4 of, like for instance, if it gets down to the vessel
5 head flange, I mean, there are still states where you
6 are --

7 CHAIRMAN STETKAR: But those tend to be
8 low pressure, also if you're in a high pressure, when
9 the system is bottled up, either coming down at the
10 beginning of the outage or going back up at the end
11 of the outage where you can actually blow the plant
12 down.

13 What else can I -- it tends to be a laundry
14 list of very often plant specific, when they take
15 traditionally their cooling water systems out of
16 service and what vulnerabilities does that leave the
17 plant.

18 But I recall one study that I saw that loss
19 of, for lack of a better term, service water was
20 important --

21 MS. DROUIN: I think --

22 CHAIRMAN STETKAR: -- in particular plant
23 operating states only because of the way that they
24 organize their particular progression of an outage.

25 MS. DROUIN: Well, if I translate what I

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1 think I hear you saying is that you just wanted to make
2 sure that the part that we perform was done
3 plant-specific local.

4 CHAIRMAN STETKAR: Well, and that's good.
5 And I think it should have been.

6 MS. DROUIN: Yes.

7 CHAIRMAN STETKAR: That's very, very
8 appropriate where -- the reason I wanted to get this
9 on the record was what Alan said about perhaps we're
10 going to publish this as a NUREG/CR for public release
11 as guidance for use by the industry so that I now, as
12 a member of the industry, operating Joe's reactor, has
13 guidance from the NRC saying, well, we feel that the
14 only thing you need to look at is plant operating states,
15 you know, 1, 7, and 13.

16 MS. DROUIN: So you don't want a
17 plant-specific study perhaps sending the message that
18 this can be applied generically.

19 CHAIRMAN STETKAR: Exactly. That is
20 precisely correct.

21 MS. DROUIN: Okay.

22 MR. KURITZY: Yes, and we understand that.
23 Right. And I think, though, because we'll have to
24 make sure that whatever we do produce in the NUREG/CR
25 does make that very clear.

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1 Now, this wasn't supposed to be based just
2 for Vogtle. But, nonetheless, a lot of the
3 information, it's certainly biased towards Vogtle, so
4 even though it's not intended to be that. So --

5 CHAIRMAN STETKAR: That's my whole point.

6 MR. KURITZY: Right.

7 CHAIRMAN STETKAR: See, if I had, if I
8 personally had done a similar insight looking at only
9 one study that I had been involved in, I might come
10 up with a different ranking just because that's my only
11 experience base.

12 MR. KURITZY: Exactly, exactly.

13 CHAIRMAN STETKAR: And that ranking might
14 be meaningless, you know, for your plant --

15 MR. KURITZY: Exactly.

16 CHAIRMAN STETKAR: -- or for Vogtle for
17 that matter.

18 MR. KURITZY: No, that is a very valid
19 point. And we'll have to -- and, again, I don't want
20 to speak out of turn, because I'm not sure exactly to
21 what extent the expert panel considered other types
22 of designs. But certainly that's something that we
23 have to be very cognizant of.

24 CHAIRMAN STETKAR: Yes.

25 MR. KURITZY: Even if they did, it's not

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1 going to necessarily be fully applicable to the whole
2 suite of --

3 CHAIRMAN STETKAR: Yes, just remember, and
4 we'd have to be a little bit cognizant of time here
5 --

6 MR. KURITZY: Yes.

7 CHAIRMAN STETKAR: -- but Mike mentioned
8 earlier that this will be the 20, hopefully some between
9 the 2010 and 20-decade incarnation of the NRC's best
10 guidance on how to do an integrated Level 3 risk
11 assessment.

12 MR. KURITZY: Right.

13 CHAIRMAN STETKAR: And still I mentioned
14 this in past meetings, that I think we need to
15 collectively be very careful to avoid very focused
16 guidance that hasn't had a lot of breadth and experience
17 behind it, because people are going to take that focus
18 guidance and says, as I said, the NRC says that all
19 we need to look at is, you know, plant operating states
20 1, 3, and 15 or whatever, because everybody knows that
21 those are the only things that are important.

22 MR. KURITZY: Yes --

23 CHAIRMAN STETKAR: Or that a particular
24 hazard is the only thing that's important, whether it's
25 full power, low power, or shutdown, or whatever.

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1 MR. KURITZY: That's excellent. That's
2 right on the money. And we'll --

3 CHAIRMAN STETKAR: Okay.

4 MR. KURITZY: We'll definitely make sure
5 that when the public, even our internal documents should
6 make that very clear. So I --

7 CHAIRMAN STETKAR: Yes, and certainly, as
8 I said, certainly when it says public release --

9 MR. KURITZY: Right.

10 CHAIRMAN STETKAR: -- on this --

11 MR. KURITZY: Right.

12 CHAIRMAN STETKAR: -- that's where I get
13 really, not concerned, but --

14 MR. KURITZY: The antenna goes up.

15 CHAIRMAN STETKAR: Yes, that's right.

16 MR. KURITZY: Thank you very much. Okay.

17 So let's see. I'm trying to move forward quickly.
18 We're getting near the end.

19 Spent fuel pool, well, again here, I don't
20 need to say much because you're going to get a full
21 discussion of this later. Just to mention that the
22 Level 1 analysis is mostly done, going back to what
23 Dr. Corradini was mentioning in the bars, so the Level
24 1 analysis. It's the Phase 1 report that is pretty
25 much complete. And now we are working mostly on the

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1 Level 2 part of that, looking into the HRA acts of
2 progression.

3 Documentation is ongoing, as some of the
4 members may be already painfully aware that we didn't
5 really have a report to provide you that was a polished
6 product. It was really a totally in-progress thing
7 that we kind of put together for your purposes.
8 Probably ahead of time we would have done it normally.

9 So I'm hoping that it was at least -- I
10 know we had some issues last presentation last meeting
11 with some of the reports we gave to you that weren't
12 quite cohesive and connected. This one hopefully was
13 enough that you could follow what was going on.

14 But Brian Wagner will be here in the
15 afternoon to try and untangle any knots that we tied
16 you into during your review.

17 MEMBER BLEY: I'm not quite sure how to
18 say this. You succeeded in burying us in information.

19 There seem to be ties from the main report, loose links
20 out to other places that justify things.

21 When I try to chase those, there is so much
22 information out there that finding just what it is that
23 justifies what you did in the main report isn't
24 transparent or easy to chase. But I think you've got
25 the links there. So you can do that better later.

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1 But, yes, you gave us lots of connecting
2 information. And that's helpful. But you got a lot
3 of work to do to really pull it together. But I think
4 you're set up to do that better than many people have
5 done it.

6 MR. KURITZY: Thank you. Yes, and we
7 recognize that. That was really an in-progress report.

8 But thank you. We will try and make sure that the
9 references are a little more targeted or focused in
10 the final product, not left in a sea of paper.

11 Okay. So moving on to the dry cask storage
12 PRA, this view graph I think is the same one that I
13 showed you in May. Really nothing was happening on
14 dry cask storage PRA. The report was waiting for
15 project management review, just sitting collecting dust
16 on a desk. I'm not going to say whose desk.

17 Anyway, but then finally their time freed
18 up. And they started making a good faith effort to
19 get it out, ran into a few issues with the documentation.

20 So that person is currently juggling the
21 other hazards review and this one together. And
22 hopefully both of them will be getting out soon. I'll
23 talk about schedule in a moment.

24 MS. DROUIN: And I wonder who that person
25 is.

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1 MR. KURITZY: Not going to mention names.
2 Okay. This is the integrated site PRA. I think maybe
3 Dr. Bley was the one who mentioned he wanted to hear
4 about this. I don't have much here actually to talk
5 about. Dan Hudson is going on so he can give you more
6 information.

7 We did, about a year or so ago, we did
8 present to the subcommittee our approach. Just to
9 remind everyone, that was basically looking at the
10 results and insights of the single source models to
11 help us focus on what, you know, to help, you know,
12 prioritize what we were going to focus on in looking
13 for multi-source contributors.

14 Also, though, to provide additional
15 insurance that we weren't missing anything that could
16 be important, we have a number of other systematic
17 approaches that we are employing, things such as looking
18 at those things that were screened out on the single
19 source models to see, again, whether they might have
20 greater implications from a multi-source point of view
21 either due to their frequency or their consequences,
22 also looking, for instance, at operator actions that
23 were important to the single source models to see
24 whether those actions could be heavily influenced by
25 an event occurring at another source on the site, also

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1 looking, for instance, at multi-source operating
2 experience, any experience that's out there where
3 things had some impact on more than one radiological
4 source on site to see whether or not that's kind of
5 captured by what we're looking at.

6 So we have a number of these supplemental
7 approaches that we're using to kind of increase our
8 confidence that we haven't, nothing has fallen through
9 the cracks.

10 Also, just to mention the pilot
11 applications we talked about before, as Dr. Bley
12 mentioned, kind of pair-wise, but really individually
13 looking at the two-unit reactor model for internal
14 events, a two-unit model for internal events with floods
15 for Level 2.

16 We also just recently completed the
17 two-unit Level 1 PRA for seismic events, our pilot case
18 for that. I haven't yet been briefed on it. We had
19 a briefing that got postponed. So I haven't heard it
20 yet.

21 My understanding is that that went fairly
22 well. There were a couple of technical challenges that
23 they recognized they were going to have. But there
24 was nothing that was a showstopper that they couldn't
25 kind of work around.

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1 And one thing that's not on here yet, we've
2 already started now that we have the low power shutdown
3 model, Phase 1 model, complete. We've started looking
4 at a two-unit shutdown model where one unit is on
5 operation and the other unit is in various stages of
6 operating states. And so we're seeing how well that
7 works, too.

8 (Off mic comments.)

9 MEMBER BLEY: Can you tell us a little bit
10 about how you're laying that out? Are you laying out
11 a combinatorial set of these where you are in shutdown
12 versus where the other operating plant is in its
13 operation?

14 MR. KURITZY: Honestly, I had forgotten
15 we were doing that part today. And that's why it's
16 on the slide until Dan mentioned to me about last night
17 --

18 MEMBER BLEY: We'll look forward to
19 learning more about that.

20 MR. KURITZY: But Dan can speak to it --

21 CHAIRMAN STETKAR: There is, this
22 afternoon, we'll hear something about that in the spent
23 fuel pool study. And I hope they're using that same
24 concept.

25 MEMBER BLEY: Structure, okay.

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1 CHAIRMAN STETKAR: And without --

2 MEMBER BLEY: But save it till then.

3 CHAIRMAN STETKAR: -- going into the
4 details.

5 MEMBER BLEY: Yes.

6 CHAIRMAN STETKAR: So I think we'll see
7 it this afternoon.

8 MR. KURITZY: Okay. Dan, you'll be here
9 in the afternoon, right? Okay. Thank you.

10 MEMBER CORRADINI: So maybe this, you've
11 answered this one. So is this some sort of general
12 methodology that can be applied regardless of --

13 CHAIRMAN STETKAR: Yes.

14 MR. KURITZY: Yes, yes, oh, definitely.
15 This is, yes, definitely, is not design specific. This
16 is more like modeling specific.

17 MEMBER CORRADINI: So is this applicable
18 to NuScale?

19 PARTICIPANT: Yes.

20 MR. KURITZY: Theoretically, if you have
21 -- it should be practicable for anything you have a
22 PRA for. If you had PRAs for the various individual
23 sources and hazards, then you should be able to apply
24 this approach to that.

25 MEMBER CORRADINI: And the NRO PRA team

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1 that's reviewing NuScale is aware of this and
2 communicating with you?

3 MR. KURITZY: Right now they're not,
4 because we are in the early stage of this work. But
5 they will certainly be -- I mean, we are working as
6 a multi-office project. So there will be an
7 interaction all along.

8 The NRO, our TAG has a senior level advisor
9 from NRO on it. So they've already been briefed on
10 the approach. So that, so NRO is aware of the approach
11 that we're following.

12 MEMBER KIRCHNER: So do they, are they,
13 to follow up, are they in sync on the basic methodologies
14 that you're applying, the combinations and such to
15 putting multi-sources in?

16 MR. KURITZY: Yes, so far, we have not
17 gotten any, I don't think any negative -- Dan could
18 speak to it more complete. But I don't think we've
19 gotten any negative feedback about the approach. So
20 --

21 MEMBER KIRCHNER: Thank you.

22 MR. KURITZY: -- I'm assuming, what is it,
23 negative consent. I don't know.

24 MEMBER CORRADINI: All I want to do is make
25 sure that connection is being maintained, because, to

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1 me, that's important since that's going to come up as
2 part of that review.

3 MR. KURITZY: Right. And that's why we
4 do -- in fact, that's one of the reasons we impound
5 the TAG, not just so that we would get the benefit of
6 their input on our models, but to make sure that the
7 other offices would also be aware of what's going on.
8 That's one of our main connections in the field office.

9 I mean, we brief the other offices at
10 various levels on various parts of the project all
11 along. But we also have tightly connected with the
12 senior level advisors in PRA for those different offices
13 so that they are aware of all the work that we're doing.

14 And we'll maintain that all through the project.

15 MEMBER REMPE: So, without going into too
16 much detail on bullet 2, are you seeing that some items
17 that were screened out are important because you are
18 going to multi-source accidents scenario evaluations?

19 MR. KURITZY: I don't -- Dan will speak
20 to this. I'm not sure how far along we are on that
21 --

22 MEMBER REMPE: Okay.

23 MR. KURITZY: -- approach yet.

24 MR. HUDSON: Good morning. Good morning.
25 Is this on? Can you hear me? Okay. Dan Hudson,

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1 Division of Risk Analysis in the Office of Nuclear
2 Regulatory Research, I'm the technical lead for the
3 integrated site PRA task.

4 And to follow up on some of the questions
5 and comments that have been made on this technical
6 element for the Level 3 PRA project, I'd just like to
7 remind the ACSR subcommittee members and other members
8 who are here in attendance today that we did brief this
9 subcommittee on the integrated site PRA approach in
10 December of 2016. So, if you went back, you'd see the
11 overall approach that we've laid out.

12 And it is a generic approach that's
13 technology neutral. The principal change that's been
14 made to the approach since we've briefed the
15 subcommittee last year is bullet 2.

16 We heard your comments loud and clear about
17 what could potentially be missed by focusing primarily
18 on the risk insights obtained from the individual
19 single-source models that are providing input to this
20 task. So that's a big change.

21 But we haven't quite gotten to that next
22 stage where we're actually applying these systematic
23 techniques. We've identified some approaches that we
24 think are going to be useful to provide some rigor,
25 to look into what might be missing. But we haven't

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1 actually applied it in practice yet. So we don't have
2 insights from that quite yet.

3 MEMBER REMPE: Thank you.

4 MR. HUDSON: You're welcome.

5 MR. KURITZY: Thank you, Dan. Okay. So
6 let's wrap this up quickly, so just some near-term
7 milestones.

8 Actually, when I was going through this
9 presentation yesterday afternoon, I recognized that
10 every single one of these upcoming milestones is either
11 in the so-called project management review or in queue
12 for project management review. So the bottleneck sits
13 in front of you right now at the front of this table.

14 Like I said, Kevin Coyne is back in the
15 fold. I'm hoping we can squeeze a review or two out
16 of him. But right now, we are clearly the bottleneck.

17 The updated other hazards report, Mary is
18 currently reviewing. We hope that one will get signed
19 out and be done by the end of this month.

20 Dry cask storage is another one that Mary
21 is juggling. And hopefully once the other hazards is
22 out, she can resolve the documentation issues for the
23 dry cask storage. And that will get out hopefully by
24 the end of this month or the next month.

25 The internal fire one is sitting on my desk.

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1 It's been there for a few months I think. And I get
2 some hours to work on it. And then I get pulled away.

3 And then two weeks later I'm back looking at it again
4 and trying to remember what I did two weeks ago.

5 I'm sure the subcommittee remembers, there
6 was a lot of issues with the documentation in that
7 report. So there was a lot of restructuring and
8 redocumenting of it.

9 As part of my review, I'm doing a lot of
10 rewriting of it just to try and be consistent with some
11 of the feedback we received from the subcommittee and
12 elsewhere. So that review is just taking a little bit
13 longer than the typical review. But I will slog my
14 way through it eventually. And --

15 CHAIRMAN STETKAR: Alan, ACRS does not get
16 involved in NRC management decisions. But in my own
17 personal experience reviewing things, what you just
18 mentioned is really difficult for me to do.

19 When I review something, I find it
20 necessary, at least for my personality, to kind of get
21 immersed in it and start really thinking about what
22 I'm reviewing. If I spend a day or two on it one week
23 and then come back to it a couple of weeks later, I
24 personally have an awful difficulty remembering where
25 I was.

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1 So there's inefficiency there, or there's
2 that propensity to say, well, okay, I'll just pick up
3 where I left the little yellow sticky and go forward.

4 And I miss things that way.

5 So this notion of kind of reviewing things
6 in fits and spurts is not only inefficient in terms
7 of time management, it might not be as thorough in terms
8 of technical feedback as a more intense, focused,
9 end-to-end review, if you will.

10 And that's, as I said, that's time
11 management. It's not what we get involved in. And
12 you're well-aware of this. But I'm saying it on the
13 record because it's on the record. And I'm saying it
14 because of the management folks are in the room.

15 MR. KURITZY: And I appreciate it.

16 CHAIRMAN STETKAR: And I won't say
17 anything more about it.

18 MR. KURITZY: And I appreciate it. I just
19 want to give you one case in point, though. One thing
20 to take solace on is that my review anyway, the project
21 management review, is more of a are we giving the right
22 message, is it clear what we're saying. The technical
23 detail is really coming from the technical review below
24 us. But we still always pick up things.

25 But example of the rank, so in the fire

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1 report, there was a whole section I had apparently,
2 as I came back to it after several weeks, I found a
3 section that I decided to rewrite because it didn't
4 seem consistent with what my current thinking was.

5 And then as I was looking back some ways
6 for something else, I realized that I had rewritten
7 all that in a different section earlier. And I'm like,
8 oh, you know, and then I had to go kill all those changes.
9 So it's not efficient. But it's what it is. So thank
10 you.

11 CHAIRMAN STETKAR: It isn't. I don't care
12 about efficiency. I care about kind of technical
13 continuity. And to say that you're not technical is
14 not true, you know. Regardless of what elements of
15 the review you're checking off the boxes on, you're
16 a technical person.

17 MR. KURITZY: Right.

18 CHAIRMAN STETKAR: And Mary's a technical
19 person. And Kevin's a technical person.

20 MR. KURITZY: Kevin's a technical, yes.

21 CHAIRMAN STETKAR: So --

22 MR. KURITZY: The point is valid. The
23 point is definitely valid. And we appreciate it being
24 on the record.

25 MEMBER BALLINGER: At what point would we

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1 -- excuse my ignorance. At what point would we be,
2 could we expect to be able to see some of this?

3 MR. KURITZY: So most of these things, we
4 try to provide these reports to you when we get to that,
5 at the end of Phase 1 so we can incorporate your feedback
6 in Phase 2.

7 It's led to some frustration because you
8 guys are getting stuff that may or may not, depending
9 on where the meeting times out to where we are, you
10 may get a completed Phase 1 report, which is great,
11 or you may get one that's in progress, which is not
12 so great.

13 But we try to time it so you get it near
14 the end of Phase 1 so that we can incorporate your
15 feedback into Phase 2.

16 Today you're going to get a briefing on
17 the Phase 2 report just because they are some of the
18 first ones to get wrapped up. And I'm not sure we ever
19 gave you a really good briefing. At some level, we
20 gave you it, but not necessarily a complete Phase 1
21 report. So we wanted to at least go through the Phase
22 2 report with you.

23 So it just kind of depends on where the
24 meeting falls out on the schedule, because, remember,
25 we had like 20 horses running in the race at different

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1 points. And we have fixed points where the meetings
2 are. So we --

3 CHAIRMAN STETKAR: I mean, just for the
4 record, what we've tried to do is sort of intercept
5 the project and schedule a subcommittee meeting at the
6 time when it seemed to be reasonable to do that. So
7 it isn't that the subcommittee meetings are scheduled
8 for a date, and they just dump on us, you know, whatever
9 is available at that date.

10 There's some notion of trying to intercept
11 the schedule at points --

12 MR. KURITZY: Right.

13 CHAIRMAN STETKAR: -- where there's some
14 level of, reasonable level of maturity in each of the
15 technical tasks so that we get a snapshot of those tasks
16 at a time that we can give them feedback that might
17 be useful before they get too far along and at a point
18 where they're far enough along so that --

19 MR. KURITZY: We have something --

20 CHAIRMAN STETKAR: -- there's enough meat
21 there for us to dig into.

22 MEMBER BALLINGER: So, for example, the
23 dry cask storage, is that October 2017 a hard date?

24 MR. KURITZY: No --

25 MEMBER BALLINGER: Because this is

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1 October.

2 MR. KURITZY: Right --

3 MEMBER BALLINGER: I see.

4 MR. KURITZY: So the plan is to have that
5 done by the end of the month. So --

6 MEMBER BALLINGER: Okay.

7 MR. KURITZY: So we're still targeting.
8 Again, I have confidence that the other hazards one
9 will be done by October.

10 The dry cask storage one, it just depends
11 how much documentation has to be modified to see whether
12 we can still make the October date. But that's one
13 that we already briefed the subcommittee on --

14 MEMBER BALLINGER: Yes.

15 MR. KURITZY: -- a while back. So we
16 wouldn't come back to you on that one.

17 But as Mr. Stetkar mentioned, so we do some
18 -- it's not ad hoc when the meetings show up. They're
19 timed. There's certain completions.

20 But what happens is then when we have that
21 date, often times we'll try and throw some more stuff
22 on you. And so you'll get the things that are ready
23 for that period of time, but also some in-progress
24 stuff, too, that we might -- or things that got completed
25 a while back that we never got to brief you on. So

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1 it's -- we stuff everything in there that we can as
2 today is an example of.

3 So let's see. So I guess --

4 CHAIRMAN STETKAR: Don't ever do this
5 again.

6 MR. KURITZY: Are we driving you into
7 retirement?

8 CHAIRMAN STETKAR: I think you might have
9 accomplished that. And thank you.

10 MR. KURITZY: Needed a push.

11 MEMBER BLEY: Level 2, we have two hours
12 scheduled for the day --

13 MR. KURITZY: Yes.

14 MEMBER BLEY: -- to talk about Level 2.
15 We could have two hours or half a day or longer to talk
16 about the HRA for Level 2 or the, your document on
17 questions and answers or the phenomenology. So we're
18 jamming an awful lot of stuff into that two hours.
19 And we'll see how we manage to cover it --

20 MR. KURITZY: Right.

21 MEMBER BLEY: -- because I think at least
22 back when we started with Level 1 and the structure
23 of Level 2, we had more time to dig --

24 CHAIRMAN STETKAR: Yes, let's, I want to
25 keep moving here. I personally am viewing this

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1 subcommittee meeting as a work in progress. If the
2 subcommittee feels that we need to have another
3 subcommittee meeting to delve into more details on a
4 particular issue, particular topic, we'll work with
5 the staff and make that happen.

6 So it isn't necessarily true that those
7 two and only two hours will be our entire shot at
8 something.

9 MR. KURITZY: Right. This isn't
10 necessarily your last word.

11 Okay. So I think, so we talked about
12 internal fire. The seismic one is just sitting in the
13 queue. Whoever gets done, Mary or I, first or if Kevin
14 is willing to do it, that will be the next person to
15 look at that.

16 Then comes the Level 2 internal event and
17 flood that you're going to hear about this afternoon.

18 That one is all done except for the project management
19 review, too. And it's just sitting in the queue for
20 whenever one of us can get to it.

21 And the same thing for the Level, or the
22 low power shutdown Level 1 internal event PRA, that
23 one just, as I mentioned, got through a technical review
24 on Monday. It's now in my, on my desk. And it will
25 get farmed out to whoever has availability as soon as

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1 we do.

2 So that's where we stand on those
3 milestones that are coming up the rest of this year.

4 I just want to end with acknowledgment.
5 Southern Nuclear, again, we can't express enough how
6 much we appreciate all the support they've given us
7 both in terms of the tremendous volume of information,
8 the time and effort they put to gather that and send
9 it to us, hosting us for numerous and numerous site
10 visits.

11 We have a couple of Southern Nuclear
12 personnel here in the meeting. We express our
13 gratitude to them.

14 One thing, while I have it on my mind, I
15 think, unfortunately, we didn't really have time in
16 this meeting. As you know, the agenda is quite packed.

17 But I think in the next meeting we have with the
18 subcommittee, Southern Nuclear would like a few minutes
19 to kind of give their view on how they see the results
20 are coming out from our study. And so we certainly
21 want to afford them that opportunity at the next
22 available meeting.

23 We also want to acknowledge, as we
24 mentioned before, the PWR Owners Group, which not only
25 supported or led those PWR Owners standards-based peer

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1 reviews, but actually funded much of it. So we're
2 greatly indebted to them.

3 Westinghouse and EPRI, as I mentioned, both
4 providing members to our Technical Advisory Group, and
5 so thanks are due there.

6 We've gotten support and very good
7 contributions from all the main program offices here
8 at the NRC, NSIR, NRO, NRR, NMSS, either as individual
9 technical reviewers or people on rotations,
10 participation and review panels, or just providing
11 information or answering questions. So it's really
12 been a cross-agency effort. And we appreciate that.

13 All of our contractors, the National Labs,
14 and our commercial contractors, as well as many, many
15 staff that have been involved in this project, have
16 all made tremendous contributions. And we appreciate
17 all of that.

18 Lastly, we threw in the ACRS because we
19 know where our bread gets buttered. And we wanted to
20 make sure that we acknowledge the great feedback we've
21 gotten from the subcommittee, as I mentioned, I think
22 a dozen meetings already. So we greatly appreciate
23 --

24 MS. DROUIN: From the members.

25 MR. KURITZY: From the individual, and

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1 again, the individual -- well, so let me point, there's
2 three things that we've gotten.

3 We have gotten oral comments from
4 subcommittee meetings. We've got either oral or
5 written comments from individual members as part of
6 fact-finding meetings. And I'm trying to remember what
7 the third avenue. I guess it was just, it was really
8 just oral feedback.

9 So we appreciate that, because it really
10 has been a tremendous boon to the project. May not
11 help our schedule so much, but it's helped the quality
12 of the models. So we appreciate that. And that's all
13 I got.

14 CHAIRMAN STETKAR: Anything more for Alan?

15 Okay. If not, Mary, you're up. We're running short
16 on time, but we'll probably make it up later or not.

17 MS. DROUIN: How much time do I --

18 CHAIRMAN STETKAR: Let's try to get done
19 with this by 10:15 to 10:20 at the latest.

20 MS. DROUIN: Okay.

21 CHAIRMAN STETKAR: So we had you down for
22 40 minutes. I don't want to cut you too short, so 30
23 to 35 minutes.

24 MS. DROUIN: Okay. Try and do that.

25 One of the things I want to say up front

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1 that, you know, this, what you all have seen is a very,
2 I'm sorry, is a very early draft. It hasn't gone
3 through any technical editing. It hasn't -- we're at
4 the very beginning of Phase 1 here.

5 But I felt it was important before we start
6 getting into these reviews to get a sense of feedback
7 from the members right now, you know, not, you know,
8 feedback on how a particular sentence. But, you know,
9 the scope and the content of Part 1 would be very
10 beneficial at this time.

11 So, you know, the NUREG report, we gave
12 you a briefing, you know, across the whole, you know,
13 outline of the NUREG report. And, you know, we wanted
14 it to be user friendly. We wanted it to be accessible,
15 you know, all of these good things here.

16 But today, and in doing this report, you
17 know, we have lots of goals and challenges. You know,
18 we want to have sufficient information, you know, to
19 understand the design and operation of the plant without
20 getting down into, you know, very specifics.

21 You know, we want the readers to understand
22 overall the technical approach, you know, what are the
23 major assumptions, you know, the major results, you
24 know, the major insights and perspectives, you know,
25 what potential uses of this NUREG, and, you know, what

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1 potential future work.

2 But in trying to, you know, meet those
3 goals, we have some, you know, significant challenges,
4 you know, the level of information that we can go to,
5 recognizing, you know, the proprietary information,
6 you know, the significant, just the sheer size of the
7 project and how to contain that, you know, into a usable
8 document, and so how to represent the information, you
9 know, when you're looking at this four-dimensional
10 project, you know, that's addressing multiple hazards
11 and et cetera.

12 So today --

13 MEMBER REMPE: Mary?

14 MS. DROUIN: Yes.

15 MEMBER REMPE: I focused more on the Level
16 2 when I was trying to read the massive amount of
17 material we were given on this meeting.

18 But a comment that I planned to give Don
19 later is that up front I think it would be good to
20 highlight what you've done to advance the state of the
21 art or how you've pushed the boundary of what's been
22 done from prior risk assessments.

23 And I don't know if that's going to be in,
24 or if it's in your draft document for the Level 3 or
25 not, but, and the limitations just highlighted up front.

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1 You know, we did something that hasn't been done before
2 in this evaluation. And also there's some limitations
3 associated with what we've done, whether it's due to
4 lack of information or methods or whatever.

5 MS. DROUIN: Okay. Good comment. That
6 was not something that we had particularly addressed,
7 but good comment. And this is the kind of feedback,
8 you know, we're looking for, you know, addressing some
9 things that, you know, we just hadn't really thought
10 about.

11 So today, you know, I'm just focusing on
12 Part 1. And Part 1 is three major sections to it, an
13 introduction, the summary of plant and site design,
14 and the summary of the approach. And this is probably
15 Part 1 in my mind very challenging of what is the level
16 of information we can put in here, you know, to be
17 informative.

18 Now, we have pushed the boundary in terms
19 of the amount of information we're putting here. It
20 goes way beyond than what was in 1150. So did we go
21 too far? Did we go far enough? Those are all, you
22 know, the kind of questions.

23 So, at this point --

24 MR. KURITZY: One second, Mary. And one
25 of the -- so I just wanted to mention that, as Mary

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1 mentioned, we're pushing, some places we're including
2 a lot more information that was in NUREG-1150.

3 I think, and Mary can correct me if I'm
4 wrong, that one of the reasons is because, unlike as
5 we mentioned before, 1150, I also have the NUREG/CR-4550
6 and 4551 supporting documents, which were all publicly
7 released. This is our essentially one document --

8 MS. DROUIN: -- yes.

9 MR. KURITZY: So we're trying to put what
10 we can into it.

11 MEMBER CORRADINI: So here's my question
12 and don't answer it now. But somewhere in there, you
13 decide where, it strikes me, as an engineer, I want
14 to see an example. I see a lot of generalities. I
15 want to see an example that takes me all the way from
16 A all the way to B to C, Part 1, 2, 3, an example of
17 how I walk through this.

18 If that's in the summary of the approach,
19 which we had in Part 1, I missed it, because there is
20 -- and I don't think this is proprietary, but some sort
21 of methodological explanation by one example.

22 MS. DROUIN: I will --

23 MEMBER CORRADINI: Well, I had -- I can't
24 remember the number. I had 36 internal events. And
25 I took one of these, which led me to some sort of bridge

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1 tree that led me to some sort of containment event tree
2 that led me to some sort of consequence analysis. And
3 here's an example case, non-proprietary, but some
4 example case that shows the method. Without that, I
5 don't see the benefit in any of this.

6 MS. DROUIN: I will tell you my initial
7 reaction is that probably isn't going to happen. But
8 it's certainly something that we can talk about on the
9 team. That would be a real challenge to do to be honest.

10 CHAIRMAN STETKAR: Well, I think what Mike
11 is -- we've been having kind of a side conversation
12 here. I think what Mike is concerned about is that
13 if this study is going to have benefit to the industry,
14 to the public, if you will, and if the study has either
15 applied methods that have been developed, you know,
16 in the past whatever, 25, 30 years since the 1150
17 analyses were done, or as Joy mentioned, if this project
18 by itself has extended some of those methods, where
19 is that information available to the industry?

20 In other words, where is the distinction
21 between the Southern Nuclear proprietary data, if you
22 want to call it that, or details of the Vogtle
23 plant-specific design configuration layout, which is
24 not a methodological issue? It's not, you know, how
25 do you do a seismic analysis or how do you link a Level

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1 1/2/3 model together or how do you do an off-site
2 consequence analysis. That's not integral to the
3 details of the Vogtle plant design.

4 But where is that methodological
5 information documented so that it can be used as a
6 reference --

7 MS. DROUIN: Well --

8 CHAIRMAN STETKAR: -- as an industry
9 reference --

10 MS. DROUIN: Yes --

11 CHAIRMAN STETKAR: -- without it being
12 tied into the fact that I can't tell you about this
13 methodology because I have to redact, you know, seven
14 pages of it because it's got numbers that apply to Vogtle
15 in it?

16 MS. DROUIN: I think, you know, to me
17 personally I would put that, you know, somewhere in
18 Part 3 under your perspectives. And --

19 CHAIRMAN STETKAR: But this is, the way
20 that this is written now it's more of perspectives on
21 the results rather than --

22 MS. DROUIN: Well, we haven't, you know,
23 talked about --

24 CHAIRMAN STETKAR: It's not written yet.

25 But, I mean --

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1 MS. DROUIN: It's not yet --

2 CHAIRMAN STETKAR: -- the way it seems to
3 flow is --

4 MS. DROUIN: -- but, I mean, that was our
5 initial thinking.

6 But if we're going to try and bring
7 methodological, get that word out, approach insights
8 and what we've learned from that perspective, which
9 would be a complete departure from 1150 which did not
10 really do that -- and I'm not saying, you know, we can't
11 do that; we just hadn't thought about it -- then I would
12 probably try to do it in Part 3 and not overburden Part
13 1, which is more the introduction.

14 MEMBER CORRADINI: I don't care where you
15 do it. I just want to have some sort of -- it seems
16 to me somewhere in the public document there ought to
17 be something that describes the method.

18 If the method isn't advanced and this piece
19 of the method isn't advanced, so noted. If this method
20 is state-of-the-practice, so noted.

21 But at least people understand what you
22 did. And then buried under the hood, which they can't
23 see or need permission to see, are the details of the
24 methods. They've got the numbers that you can show
25 publicly.

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1 CHAIRMAN STETKAR: It could even be -- you
2 know, we don't get into chapter numbers in a report.
3 It could even be a separate standalone report.

4 MEMBER CORRADINI: Yes.

5 CHAIRMAN STETKAR: Title of the report,
6 methods used in the NRC staff's Level 3 integrated PRA
7 report.

8 MR. KURITZY: So let me just make --

9 MEMBER BLEY: You know, what comes to mind
10 to me thinking about it, the main report for 1150 kind
11 of did this.

12 If you go all the way back to WASH-1400,
13 the summary report, although it had some problems that
14 got them into trouble, but the idea of it kind of was
15 a map of how you'd go through all this stuff to see
16 how it all hangs together and what the methods were.

17 MR. KURITZY: Yes, so let --

18 MEMBER BLEY: As a summary report, it seems
19 to me would cover the kind of things Mike is looking
20 for.

21 MR. KURITZY: Yes, I think it's a very good
22 comment. And Mary is right. We haven't necessarily
23 thought all the way through that.

24 But now that we have that feedback I think
25 one thing that we'll take back and consider is, you

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1 know, we had the technical analysis approach plan that
2 we put together initially on how we were going to address
3 all these things. That, which was a publicly available
4 document, since that time we have modified our
5 approaches in many ways.

6 I think we can take an updated version of
7 that, now what do we actually do, and not -- that was
8 a document this thick. But we can take a condensed
9 version that focuses on, as Dr. Corradini said, working
10 your way from Level 1 to Level 3.

11 MS. DROUIN: We have that.

12 MR. KURITZY: Yes, it's in ADAMS.

13 (Off mic comments.)

14 MR. KURITZY: Yes, it's publicly
15 available. It was one of the first -- actually, it
16 went over two different meetings because it was quite
17 voluminous. And so we can use that updated to actually
18 what we applied to kind of walk that through.

19 And I think it might work as an appendix
20 to Part 1, because we have the summary of approach
21 chapter there, which it kept it more high level to keep
22 the document and the flow manageable, but can then refer
23 to an appendix that then goes into more detail, you
24 know, using an example, more detail about how we did
25 the various pieces of the study --

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1 MS. DROUIN: Yes, I --

2 MR. KURITZY: -- including highlighting
3 those things that we have advanced or done differently.

4 MS. DROUIN: I agree with Alan. I think
5 it would be helpful if the subcommittee went back and
6 looked at that. You know, the trick would be how do
7 we par it, you know, slim it down, because it is like
8 a 400-page document. I mean, but there's -- because
9 that was laying out the template for, you know, the
10 whole project. And so there's a lot in there that can
11 be cut away.

12 But I think just getting some initial
13 feedback from the subcommittee of what you all thought
14 about that as a place, you know, as a starting point,
15 I think would be very helpful.

16 CHAIRMAN STETKAR: Do you remember? I've
17 been trying to find that. Do you remember roughly when
18 in geologic time that was done?

19 MR. KURITZY: Well, we -- okay, that was
20 one of the first things --

21 MEMBER BLEY: Wasn't that before you'd
22 picked Vogtle?

23 MR. KURITZY: No, no, it was after Vogtle.
24 (Simultaneous speaking.)

25 MEMBER BLEY: It was after you'd picked

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1 Vogtle, okay, because I remember a document before that
2 considered lots of things.

3 MR. KURITZY: We picked Vogtle in like
4 January or February of 2012 I think. And this was,
5 we presented to the ACRS subcommittee in December of
6 2012. And then I think we had to complete it in like
7 February of 2013 or something like that.

8 MEMBER BLEY: Thanks.

9 MR. KURITZY: But we updated -- that was
10 one version. We have an updated version that we made
11 public later, too.

12 MEMBER BLEY: Might never have looked --

13 PARTICIPANT: Yes.

14 MR. KURITZY: Which we can -- I mean,
15 unfortunately, I just don't have the ADAMS number
16 written down anywhere. But --

17 (Simultaneous speaking.)

18 CHAIRMAN STETKAR: At least one of us has.
19 It's titled --

20 MS. DROUIN: We'll take it as an action
21 item.

22 CHAIRMAN STETKAR: -- technical analysis
23 approach plan for Level 3 PRA project.

24 MR. KURITZY: Right, Rev. 0b is the one
25 that we ended up --

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1 CHAIRMAN STETKAR: Rev. 0b, okay.

2 MS. DROUIN: We'll send it to you.

3 MR. KURITZY: We briefed you on an earlier
4 version.

5 CHAIRMAN STETKAR: Yes, send it to Chris

6 --

7 MR. KURITZY: Yes.

8 CHAIRMAN STETKAR: -- so that we have a

9 --

10 MR. KURITZY: Yes, yes, will do.

11 CHAIRMAN STETKAR: -- stable version of
12 it.

13 MEMBER KIRCHNER: Mary, is Part 2 going
14 to be public as well?

15 MS. DROUIN: Everything here is what's
16 going to be public.

17 MEMBER KIRCHNER: Okay.

18 MS. DROUIN: This is the public NUREG.

19 MEMBER KIRCHNER: Then I agree with Mike's
20 comment that Part 1 and 3 ought to talk about methodology
21 at a very high level.

22 MS. DROUIN: Well, it does at a very high
23 level. That's what Section 3 does. But it's very high
24 level.

25 MEMBER KIRCHNER: But is it approach to

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1 the project or is it approach to actually doing the,
2 you know, the risk analysis?

3 MS. DROUIN: Well, let's get through --

4 MEMBER KIRCHNER: All right.

5 MS. DROUIN: So --

6 MR. KURITZY: Yes, Mary is going to walk
7 through each of the sections there. So you'll see
8 what's involved.

9 MS. DROUIN: So, I mean, all I was planning
10 on doing in this presentation -- go ahead, go to the
11 next one -- was just to go through each section and
12 see what feedback, you know, we may have.

13 So, you know, Section 1, you know, talks
14 about the history and the background. It goes through
15 the objectives of the project, you know, what is the
16 scope, what issues are included and not included. You
17 know, we compare the scope to 1150. And it talks about
18 all the PRA elements.

19 And then 1.4 goes through the assumptions
20 and limitations. We may not have gotten into the level
21 of detail in terms of the limitations that, you know,
22 we heard about discussed today. And then 1.5 gets into
23 the document structure.

24 So, if you don't have any comments, then
25 we'll just move on to --

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1 (Off mic comments.)

2 MS. DROUIN: Section 2 goes through and
3 it's divided up for the reactor, the dry cask storage,
4 and the spent fuel pool. And it describes the site
5 at a high level.

6 So there's a brief description for each
7 structure system modeled. And it goes through and
8 talks about the purpose and function, the
9 configuration, the actuation, the success criteria and
10 dependencies.

11 And we've been developing simplified
12 schematics. Now, these schematics have no specific
13 information in terms of labeling tied back to Vogtle.

14 And there's no plant layout on these schematics.
15 They're very similar to what was in 1150.

16 We have dependency diagrams that I think
17 we're like 95 percent complete in doing all the
18 dependency diagram.

19 So 2.1 is the Vogtle site. This is the
20 kind of level of information, which is publicly
21 available. And, you know, it's a high level
22 description of the plant site and location. Go ahead.

23 These are the various systems for the
24 reactor that, you can see there on the left these are
25 all the front line systems we've described, and then

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1 on the right-hand side, you know, all the support
2 systems.

3 And again, these are simplified
4 discussions. I think the most we have on any system
5 is maybe three-fourths of a page. Most of the time
6 it's a couple of paragraphs.

7 Spent fuel pool, you're going to see the
8 same type of thing. We've got the spent fuel pool
9 cranes, the purification system, and the HVAC because
10 those are the primary systems that were modeled with
11 lots of drawings.

12 Dry cask storage, this is one where you've
13 really just kind of seen a brain dump at this point.

14 And we recognize we need a much better organization
15 to it. But this is where we were. So we wanted to
16 go ahead and send it on out to you.

17 Okay. So then Section 3 gets in the
18 summary of the approach. And this one was, you know,
19 very challenging because, again, with the size of this
20 project, really how much information. So we made the
21 decision to keep this a very high level discussion.
22 So that was deliberate.

23 So 3.1, let's just go through each one of
24 them at a time. So here, you know, the overall approach
25 -- okay, I don't have the figure here. I think it's

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1 easier to talk to the figure. You know, but we talk
2 about this in that, you know, we've got separate models
3 for each source.

4 And then for the reactor, for example, we
5 started with internal events, and it expanded. For
6 spent fuel pool and dry cask storage, we started with
7 a single integrated model for the Level 1/Level 2, and
8 it was expanded.

9 So this is what I mean when we talk about
10 the overall approach, you know, how we started. And
11 so it's a very high level discussion. You know, we
12 weren't trying to get into details here.

13 CHAIRMAN STETKAR: Mary, in the interest
14 of time, I'm going to -- I, you know, not surprisingly
15 have a lot of nitpicky comments that we'll get to you.

16 You just mentioned that -- one
17 recommendation I would make is that when you discuss
18 these various models, the figure is really good, but
19 when I read it, I was left with the impression that
20 there might be, I don't know, 20 disjoint, standalone,
21 separate models.

22 Now, one might think of them that way, if
23 you think about pushing a button and executing a version
24 of a model that's got some sort of date and time stamp
25 on it.

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1 However, it's important for a high level
2 overview to understand that the model for internal fires
3 during plant power operation, the basic logic structure
4 of that model, may or may not be different than the
5 basic logic structure of the internal events at plant
6 power operation model.

7 And what I mean by that is primarily event
8 trees and things like that, so that at a high level
9 I think it would be useful to say, well, you know, we
10 took -- let's say, if you want to call the internal
11 events at-power model, the base, give it a name, Joe.

12 We took Joe, and here's what we did to Joe to adapt
13 it for these other hazards. You know, we used it
14 directly, or we only used the transient part of it,
15 or we built a whole new standalone model.

16 MS. DROUIN: Okay.

17 CHAIRMAN STETKAR: Follow me? You know,
18 that we scrubbed it --

19 MS. DROUIN: No, good comment because I
20 --

21 CHAIRMAN STETKAR: -- and started with a
22 blank piece of --

23 MS. DROUIN: You know, we'll have to go
24 back and --

25 CHAIRMAN STETKAR: That's important for

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1 a high level because it sort of develops the philosophy
2 for approaching the problem that -- and that philosophy
3 may not be as disjoint, if you will, as some readers
4 might infer from the discussion in the report right
5 now.

6 In other words, you know, I'm going to do
7 the internal fire analysis, so I'll start with a blank
8 piece of paper and draw my own model. And I'm going
9 to do the seismic analysis, so I'll start with a blank
10 piece of paper and draw my own model. And somehow we're
11 going to fit all of those models together later on.

12 MR. KURITZY: Right. Good point --

13 CHAIRMAN STETKAR: And it's not --

14 MR. KURITZY: -- siloing each of these
15 things.

16 CHAIRMAN STETKAR: That's right, yes.

17 MR. KURITZY: And it's an integrated look
18 at these things.

19 CHAIRMAN STETKAR: Yes.

20 MS. DROUIN: No, good comment, because
21 when you're this close to it, I thought it communicated
22 that.

23 CHAIRMAN STETKAR: No, no, it --

24 MS. DROUIN: So --

25 CHAIRMAN STETKAR: Well, I'm sensitive to

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1 the other --

2 MS. DROUIN: -- we will go by --

3 CHAIRMAN STETKAR: -- to the other
4 experience. So --

5 MS. DROUIN: -- and really look at it a
6 lot better from that perspective, because I think that's
7 probably one of the key points to explain.

8 CHAIRMAN STETKAR: It is. That's the only
9 reason I brought it up this morning.

10 MS. DROUIN: And good point. So, when we
11 got into how we were going to explain this, what we
12 decided to do is that, when you look at the technical
13 elements of a PRA and whether you're applying it for
14 the reactor development or the spent fuel pool or the
15 dry cask storage, you know, they really all have a common
16 set of technical elements.

17 So we thought we'd have a dialogue, you
18 know, up front that went across all the technical
19 elements in the PRA and talk about it at a high level
20 of how we, you know, not trying to educate people on
21 how to do this, but this is what they meant in terms
22 of the study. So that's what was in Section 3.2.

23 So let's ahead and -- then we wanted to
24 get in and say, okay, how did we do this now in the
25 study. So 3.3 talks about, you know, the reactor risk

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1 model. We organized it by plant operating state, the
2 risk level, and the hazard.

3 So, when you read 3.3.1, which is the Level
4 1, we say, okay, we started with internal events model
5 based on the Southern Nuclear model that was converted
6 to SAPHIRE. We expanded it to address. So that's how
7 the dialogue, you know, is set up, and again, talking
8 at a high level, not getting into the details of, you
9 know, what Dr. Corradini is looking for.

10 So then the same thing, you can go to the
11 next one. The same type of thing, you know, how did
12 we take all those technical elements and apply them
13 to create our spent fuel pool risk model, you know,
14 what were some of the key assumptions.

15 Like here we developed a prioritization
16 scheme, you know, to help us focus, you know, and the
17 criteria, you know, whether those three things that
18 we focused in on. And probably for sake of time, we
19 probably fell too much back on just referring you back
20 to Section 3.2 where we could probably develop better,
21 you know, discussion. Go ahead.

22 Dry cask storage, the same kind of thing
23 again, you know, how did we pull this model together.

24 Go ahead.

25 And then you've heard a lot about this from

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1 Dan, so here, you know, the major way we approach our
2 site risk model.

3 CHAIRMAN STETKAR: By the way, Mary, just
4 because of time here, I found it useful to say point
5 me back to Section 3.2 --

6 MS. DROUIN: Oh, okay.

7 CHAIRMAN STETKAR: -- because that, to me,
8 that reinforces integration. It says I don't have a
9 separate spent fuel pool model standalone starting off
10 with a blank piece of paper. I want to know where it
11 differs from what was in 3.2.

12 MS. DROUIN: And that is what --

13 CHAIRMAN STETKAR: So, you know,
14 elaborating all of the information that's in 3.2,
15 repeating it essentially in 3.3 and 3 whatever 4 would
16 reinforce to me anyway this notion that they're
17 standalone models. So I found it useful to say, well
18 --

19 MS. DROUIN: Okay.

20 CHAIRMAN STETKAR: -- we did the same stuff
21 that we talked about earlier.

22 MS. DROUIN: And that's what, you know,
23 the focus we were trying to show where we differed from
24 those technical elements in 3.4, 5, and 6.

25 CHAIRMAN STETKAR: Right, right.

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1 MS. DROUIN: I might not be saying the
2 sections right. Go ahead.

3 (Off mic comments.)

4 CHAIRMAN STETKAR: That's all right.
5 Let's go on.

6 MS. DROUIN: So this one is kind out of
7 sync. But we ended up putting it at the end because
8 it just seemed to disrupt the flow.

9 So, yes, we already talked about dry cask
10 storage and spent fuel pool, and then we come back to
11 the reactor. But it was just more we just felt it flowed
12 better from a reader not to have this huge, you know,
13 thing there on these other hazards.

14 CHAIRMAN STETKAR: If you remove the word
15 reactor from this, since the other hazards pretty much
16 affect the whole site, it would make a lot of sense.

17 MS. DROUIN: Right, but this -- I
18 understand. But this was applied just for the
19 reactors, this section --

20 MR. KURITZY: Right --

21 MS. DROUIN: -- because like aircraft
22 crashes was screened out for reactors. It's not
23 screened out for dry cask storage.

24 CHAIRMAN STETKAR: I understand. But
25 that's telling the story. That's --

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1 MR. KURITZY: Right. Actually, your
2 comment is very much on point, because when Mary and
3 I were looking over this, originally it didn't say
4 reactor. And so it looked like it was okay at the end.

5 And then we had the discussion, and we
6 realized, hey, but it really doesn't apply for spent
7 fuel pool or dry cask storage --

8 CHAIRMAN STETKAR: It's a work in
9 progress. You could address all of the other hazard
10 risk models and say where do those other --

11 MS. DROUIN: Yes, we could. We could come
12 in --

13 CHAIRMAN STETKAR: -- hazards apply within
14 the scope of this particular study.

15 MS. DROUIN: Yes.

16 MR. KURITZY: Right.

17 MS. DROUIN: Yes, we could. And then for
18 ones that weren't screened out for like dry cask
19 storage, we could point them back.

20 So that's, you know, a good thought to think
21 about. We hadn't thought about that. I'll be honest.

22 But it just did not seem to flow, and it seemed to
23 be better here.

24 So, again, what this goes through, it lists
25 all the 30 hazards. It lists them with the definition

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1 of what that hazard, you know, means. I felt that was
2 very important to explain, you know, in words the
3 definition of that hazard.

4 CHAIRMAN STETKAR: Mary, one question I
5 had on this is it does have that laundry list and explain
6 what it is. Where in the overall report is the
7 documentation for why I today screened out a particular
8 hazard from the reactor at-power model, if you will?

9 MS. DROUIN: Okay. There is a separate
10 technical report.

11 CHAIRMAN STETKAR: Okay. Thanks.

12 MS. DROUIN: But one of the things -- you
13 can get feedback on this. But one of the things I
14 thought of adding in this section would be another table
15 or the same table adding another column, excuse me,
16 that said whether or not it was screened and based on
17 which criteria was it screened.

18 CHAIRMAN STETKAR: That might be useful
19 at a high level. I think details you don't want to
20 get into in this report.

21 MS. DROUIN: No, the details would be, but
22 just --

23 CHAIRMAN STETKAR: But at least which ones
24 were -- I think you do list which ones were retained,
25 but it's been a few days since I read this one. But

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1 at least the basis for their screening, the particular
2 criteria, was it quantitative, was it qualitative, was
3 it, you know --

4 MS. DROUIN: Yes, so, if you go to --

5 CHAIRMAN STETKAR: Yes, it's that big one.

6 MS. DROUIN: -- you know, that table there
7 --

8 CHAIRMAN STETKAR: Yes, yes.

9 MS. DROUIN: -- I thought of adding another
10 column --

11 CHAIRMAN STETKAR: That might be useful.

12 MS. DROUIN: -- that just had a --

13 CHAIRMAN STETKAR: Think about it. It's
14 just --

15 MS. DROUIN: -- you know, the screening
16 criteria, why it was --

17 CHAIRMAN STETKAR: It could get busy if
18 you screened it out for some plant operating states
19 and kept it in for other hazards.

20 MS. DROUIN: I know. So --

21 CHAIRMAN STETKAR: You know, just think
22 about it. But --

23 MR. KURITZY: Yes.

24 MS. DROUIN: It's what we're thinking
25 about. Okay. Go ahead.

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1 So, for Part 1, this is just Part 1. So,
2 you know, this is the -- I can't emphasize. This is
3 an initial draft. It's not gone through -- you're
4 seeing the first cut without any kind of review among
5 the teams or anything. So we'll be starting that pretty
6 soon.

7 And, you know, the other thing, you know,
8 we're thinking about is when to initiate a public review
9 on this NUREG. And we're talking with publications
10 on this. You know, we're going to be writing this NUREG
11 as information comes in. So we're trying to get Part
12 1 done and behind us.

13 So do we maybe get our public review on
14 Part 1 now, or do we just wait until this whole NUREG
15 is done? So just things we're thinking about. And
16 I think that's my last slide. Yes.

17 MEMBER BLEY: I've been going back and
18 forth, so I might have missed your description of this.

19 But what does public review mean to you guys?

20 MS. DROUIN: The NUREG would be sent out
21 for public review and comment --

22 MEMBER BLEY: For comment.

23 MS. DROUIN: -- just like we did --

24 MEMBER BLEY: Just a normal --

25 MS. DROUIN: -- NUREG-1150.

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1 MEMBER BLEY: -- release for comment.

2 MS. DROUIN: Yes.

3 MR. KURITZY: Just to amplify a little bit,
4 our plans for the NUREG are, I guess, like two-fold,
5 besides internal, obviously, comment. But it's to go
6 out for a public review and comment period and also
7 to put together an August expert panel that will also
8 review the NUREG.

9 Unfortunately, budgets have been whittling
10 down. The scope of that, we had grand plans initially.

11 And with every successive year of budget shrinkage,
12 our plans have been whittling down. But nonetheless,
13 we still want to have at least a set of maybe domestic
14 and international August experts to look over the NUREG
15 and give us comments on this.

16 MEMBER BLEY: An actual formal review by
17 --

18 MR. KURITZY: Yes --

19 MEMBER BLEY: But only of the public
20 document.

21 MS. DROUIN: Right. That's an important
22 thing. This would be, for the people who were involved
23 in 1150, this would be like the Kastenberg report.
24 They only looked at 1150.

25 So how does this NUREG, you know, stand

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1 on its own merits, you know, as a public document and
2 a useful, informative document. I think having this
3 outside August review to me is a critical part of the
4 program at the end.

5 MEMBER BLEY: I'm just kind of hanging
6 between the two. The things that are proprietary
7 aren't the results. They're the data that goes into
8 getting to the results. So, in the public document,
9 you can't have the actual quantification results. Is
10 that true?

11 MR. KURITZY: Yes. We will provide the
12 approach and the results. The gray area, and this is
13 going to require some iteration or interaction between
14 Southern Nuclear and the NRC, is in the insights,
15 because the insights become more difficult to express
16 if you don't bring in certain plant design information.
17 They wouldn't make sense, or you wouldn't be able to
18 describe them.

19 So, but without the insights, I mean,
20 that's the main purpose of a PRA. So our default
21 position will be to be fairly open about the insights.

22 But we will want to work with Southern Nuclear. If
23 there are areas where they think maybe we're getting
24 a little too, digging into proprietary information,
25 then we may try and reword things a little bit

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1 differently.

2 But the insights are going to be the main
3 focus of the report --

4 MEMBER BLEY: The design is public
5 information. The FSAR is valid. That defines --

6 MR. KURITZY: Actually, FSARs I don't
7 believe are public anymore. So that's why Mary --

8 MEMBER BLEY: Is that true?

9 MR. KURITZY: -- said the drawings scrub
10 out all the plant identification information on the
11 various components. They're almost like, to some
12 extent, generic drawings of various systems. So --

13 MEMBER CORRADINI: But if I go back to the
14 older plants, the FSARs all have that information.

15 MR. KURITZY: Yes, but I think they pulled
16 them back, though. I think you can't -- I don't think
17 the public can get access now. They're not like in
18 the, well, not in the public document --

19 MEMBER CORRADINI: But if I have a paper
20 version, I have it.

21 MR. KURITZY: If you -- right. Well,
22 post-9/11 there was a lot of stuff that was already
23 out in the domain. But we went back and reclassified
24 --

25 MEMBER CORRADINI: In the PDRs --

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1 MR. KURITZY: -- doesn't mean that, you
2 know, black-suited troops are going through the country
3 and pull back every electronic and paper version. So,
4 yes --

5 (Off mic comments.)

6 MR. KURITZY: -- there is a lot of that
7 information that's out there. But yet it still may
8 be --

9 MEMBER BLEY: But actual like simplified
10 schematics of systems and how they operate, that might
11 not, that might be proprietary.

12 MR. KURITZY: Well, specific drawings for
13 Vogtle with their actual component IDs and stuff --

14 MEMBER BLEY: Yes.

15 MR. KURITZY: -- could be proprietary.
16 But there are all kinds of textbooks and manuals out
17 there on general Westinghouse --

18 MEMBER BLEY: For similar systems.

19 MR. KURITZY: Right, that you would see
20 almost identical layout of the system. So --

21 MS. DROUIN: So --

22 MEMBER BLEY: This becomes tricky for you,
23 though, when you have a review of the public document
24 in which the reviewers can't go back and see if the
25 results are justified.

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1 MR. KURITZY: Right.

2 MEMBER BLEY: It's pretty tricky.

3 MR. KURITZY: It is a little bit tricky.

4 MS. DROUIN: Well, you know, if you go and
5 you look at the schematic that we have in here, this
6 is to the same level that is in NUREG-1150, which is
7 publicly. You know, what you don't see is you won't
8 see the plant-specific labeling of anything. That's
9 --

10 MEMBER BLEY: But the simplified
11 schematics that show here are two clean water pumps.
12 That's okay as long as you don't say it's CP-32A.

13 MS. DROUIN: We've followed with what's,
14 you know, in NUREG-1150.

15 MEMBER BLEY: Well, that may be okay.

16 MS. DROUIN: And so that's why we felt this
17 was okay, because it's, you know, it doesn't have the
18 plant-specific labeling, and it doesn't show where it
19 is in the plant. So there's no layout --

20 MEMBER BLEY: Layouts, okay.

21 MS. DROUIN: -- included anywhere in here.

22 So --

23 MEMBER BLEY: That may be okay, yes.

24 (Off mic comments.)

25 MEMBER REMPE: So earlier I mentioned some

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1 of the comments I plan to give to Don. There's another
2 one that you might want to consider that up front it
3 might be good to highlight the insights about future
4 activities, because, you know, you advanced the
5 state-of-the-art in certain areas, and you saw, well,
6 it would have been good if we could have also done this
7 or something else should be done in the future.

8 And I think those things, having them up
9 front really would help his document. And you might
10 think about that --

11 MS. DROUIN: Oh, if I had had my druthers,
12 I would have made this all virtual reality
13 documentation. I mean, truly, I looked into that.
14 And it's incredible what you can do in that realm.
15 But that's beyond NRC.

16 MEMBER REMPE: But just to have a little,
17 you know, a few highlighting, and then ultimately, if
18 some point you guys do a brochure at the end of this
19 project, it will make it easier to do that brochure
20 if you've got those things up front instead of digging
21 through all the different sections and missing some
22 of the highlights.

23 MR. KURITZY: Right. And that's a good
24 point. And we actually -- each of the, what we call
25 again, Tier 3 internal reports, have a chapter or

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1 section, appendix, whatever that identifies all the
2 --

3 It goes a little bit to what Dr. Bley was
4 asking about before where we identify things that, a,
5 either need to be done and if it's in a Phase 1 report,
6 things that we might still do in Phase 2, or if it's
7 a Phase 2 report or even some of the things identified
8 in Phase 1 are things we're not going to do in this
9 project, but they're things that we think are good
10 candidates for future work.

11 Each of the reports internally has that.
12 And that's going to be actually -- I don't remember
13 the layout. But there's either going to be a section
14 in the, either, maybe not in front, but it's going to
15 be part of, somewhere in the back where we have the
16 insights or perspectives or something, we're going to
17 have the list of things that we propose for candidates
18 for future work.

19 MEMBER REMPE: I think that's helpful.

20 MS. DROUIN: The other thing, you know,
21 we talked about it at the previous subcommittee meeting,
22 that one of the things we're thinking about is right
23 now we're calling it a roadmap report. And it would
24 walk you through the NUREG. It would have a lot of
25 links in it. It would have like frequently asked

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1 questions with links to where in the report.

2 But, you know, that's kind of -- I think
3 it would be a very useful document. But we just may
4 not have the resources and time to do something like
5 that. But I think it would be a vast improvement on
6 the documentation part of this project.

7 CHAIRMAN STETKAR: I have two technical
8 things that I wanted to wait until the end and
9 unfortunately I did. I did not read the Level 3 stuff.
10 I ran out of time. I'm assuming, and correct me if
11 I'm wrong, that you used LNT to evaluate off-site risk.

12 MR. KURITZY: That was our base case.

13 CHAIRMAN STETKAR: Okay.

14 MR. KURITZY: We may have -- I can't
15 remember. Keith will let you know --

16 CHAIRMAN STETKAR: That's -- stop.

17 MR. KURITZY: Yes.

18 CHAIRMAN STETKAR: I did not see any
19 discussion of that as a potential limitation in the
20 consequence analyses up front in this report.

21 MS. DROUIN: Okay.

22 CHAIRMAN STETKAR: Okay. I'll just put
23 that on there.

24 MR. KURITZY: Okay.

25 CHAIRMAN STETKAR: The second one, and

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1 this is kind of philosophy, is in this report and in
2 other reports that I did read, there is this distinction
3 between large early release, large late release.
4 There's a quote that says the analysis was sufficient
5 to determine whether large early release or large late
6 release occurs.

7 Do we want to maintain that artificial
8 distinction in the context of this study? It was an
9 artificial back fit because people did not have full
10 scope Level 2/Level 3 PRAs. So it was applied as a
11 crutch back in the 1990s for somebody to get quick and
12 dirty answers because they didn't have this.

13 So the whole question that I have is do
14 we want to perpetuate that artificial notion, or do
15 we just want to say we did a full scope Level 3 PRA
16 and some things led to early fatalities and some things
17 led to late releases, and here's the risk from all of
18 that stuff.

19 Somebody else -- and then some of the
20 lessons learned might be do our current notions of
21 artificial distinctions between large early, late,
22 small, whatever the heck it is, still fit given what
23 we've learned from this study.

24 In other words, the way I read this report
25 it goes in saying I want to know a large early release

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1 frequency because that is something that is inherently
2 determined by physics.

3 MR. KURITZY: So --

4 CHAIRMAN STETKAR: And I'm challenging
5 that notion to say do we just want to do a full scope
6 Level 3 PRA, and then reexamine whether the notions
7 that we've established over the last 20 years on large
8 early release frequency, whether those notions still
9 seem to be relevant.

10 MR. KURITZY: So, a good point. And in
11 interest of time and my limited knowledge, I'll leave
12 most of that discussion to Don.

13 CHAIRMAN STETKAR: Yes.

14 MR. KURITZY: But I just wanted to point
15 out that one of the things we are trying to do with
16 this project is to go ahead and compare how things or
17 see how things compare to what was done, for instance,
18 in NUREG-1150 or how things compare to the safety goals.

19 So some of those interim metrics that
20 theoretically if everybody always done Level 3 PRAs
21 from the beginning and never did Level 1s and 2s by
22 themselves might not have been important, but if you
23 regulate to LERF and CDF. And so some of these interim
24 metrics might have value and for different people might
25 get value from them.

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1 So, but whether or not these distinctions
2 make sense in the modern world, well, I'll leave to
3 Don.

4 CHAIRMAN STETKAR: Well, they might, but
5 they're artificial boxes that people have struggled
6 in terms of throwing things into those artificial boxes.

7 I'm just challenging whether that box should be a
8 fundamental element of this study.

9 In other words, I've defined the box. So
10 a priori, I'm going to make sure that I dump things
11 into that artificial box. And to me, that's not the
12 intent of this study.

13 The intent of this study is to do a full
14 scope risk assessment, and then perhaps go back from
15 that full -- what have we learned about that artificial
16 box? Does it still seem to make sense?

17 MEMBER BLEY: John's emphasis of
18 artificial bothers me a bit in his discussion. I know
19 he's making a point.

20 The history of where they came from is of
21 interest and was less than arbitrary when it was,
22 artificial when it was done. But it does make sense
23 that it would be good not to preset the problem in that
24 direction, but to go back and see if those things are,
25 in fact, generalizations or if they do end up appearing

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1 to be artificial in the end.

2 MR. KURITZY: Don is here. Just, I know
3 we're running late. But if you could just very quick
4 --

5 MR. HELTON: Just one aspect, sorry, Don
6 Helton, Office of Nuclear Regulatory Research. So just
7 one part of that I wanted to clarify just for the public
8 part of the record, and then we can talk later as you
9 want.

10 The Level 2 PRA for this project for each
11 of the different at-power, shutdown, whatever, and for
12 each of the different hazards develops a full Level
13 2 and develops a set of release categories that are
14 not LERF or non-LERF determinant.

15 They are things like containment failure
16 at a certain time, interfacing systems LOCA, that these
17 types of release categorizations that are not LERF and
18 non-LERF.

19 We then, once we have those release
20 categories, in terms of their source terms and
21 frequencies, then ask the question, okay, now which
22 of these would meet a particular definition of LERF
23 for the point of calculating that intermediate value
24 that is of interest to some people.

25 But I just wanted to clarify that the models

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1 do not set out with developing a LERF and non-LERF output
2 that is an outcome after the full release categorization
3 has been done.

4 CHAIRMAN STETKAR: And, Don, thanks for
5 that clarification. That was the point that I was
6 trying to make, that this study, as it's been
7 structured, does not a priori make those distinctions.

8 And, therefore, since we are talking about
9 this high level report, kind of an overview of the
10 philosophy, if you will, of the study, I'm kind of
11 challenging whether or not we ought to give the
12 impression that this study does a priori make those
13 distinctions and that was a focal point for either the
14 construction of the analyses or a fundamental element
15 of bending the results, if you will.

16 MEMBER BLEY: And your comments were on
17 the Level 1 report as such.

18 CHAIRMAN STETKAR: No, this --

19 MEMBER BLEY: Because the Level 2 report
20 doesn't imply --

21 CHAIRMAN STETKAR: No, I'm talking about
22 this public NUREG report --

23 MEMBER BLEY: Yes, okay.

24 CHAIRMAN STETKAR: -- which covers
25 everything, the whole study.

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1 MS. DROUIN: But I didn't think we had made
2 that distinction. I mean, did you find that
3 distinction in there?

4 CHAIRMAN STETKAR: I did.

5 MS. DROUIN: Okay.

6 CHAIRMAN STETKAR: That's why I brought
7 it up.

8 MS. DROUIN: Okay.

9 CHAIRMAN STETKAR: And I'll make sure, you
10 know, you get our more detailed comments through the
11 pipeline that we've been using.

12 MS. DROUIN: Right. And that was going
13 to be my last question. Because of sake of time, are
14 we going to receive comments on this --

15 CHAIRMAN STETKAR: We'll --

16 MS. DROUIN: -- from various member?

17 CHAIRMAN STETKAR: Yes, we'll work that
18 out the way that we've done in the past. And we can
19 discuss that more in the closed session.

20 MS. DROUIN: Okay.

21 CHAIRMAN STETKAR: Any more questions or
22 comments for Alan and Mary? If not, what I'd like to
23 do now, because we're going to end the open session,
24 is there anyone in the room who'd like to make a public
25 comment? If there is, please come up to the microphone

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1 and do so. I'm not hearing a stampede.

2 If there's anyone on the bridge line who'd
3 like to make a comment, please just speak up, identify
4 yourself, and do so. The bridge line should be open.

5 I'm not hearing any of that.

6 MR. LEWIS: Marvin Lewis, a member of the
7 public.

8 CHAIRMAN STETKAR: Marvin, Mr. Lewis,
9 thank you. We hear you. Please make a --

10 MR. LEWIS: Okay. They took a few seconds
11 more to open up the line, but I'm glad somebody did.

12 CHAIRMAN STETKAR: Yes, we got you.

13 MR. LEWIS: Okay. Look, I appreciate you
14 looking into this. I appreciate you looking into this
15 a lot. However, I do have a problem with this. Can
16 you hear me? There's an awful lot of static on the
17 line.

18 CHAIRMAN STETKAR: Yes, you're breaking
19 up a little bit. I don't know why.

20 PARTICIPANT: We are hearing you, though.

21 CHAIRMAN STETKAR: Well, he was fading in
22 and out a little bit. So stay close to whatever
23 microphone or phone you're using. And we'll see how
24 it works.

25 MR. LEWIS: Is this any better?

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1 CHAIRMAN STETKAR: That is -- well, so far.
2 Keep going.

3 MR. LEWIS: All right. Look, hydrides
4 have been ignored. A few people have pointed them out.
5 I think somebody on the ACRS actually pointed out
6 hydrides and spent fuel containers have not been looked
7 at sufficiently in various analyses. I just hope that
8 you guys are at this point thinking of that and starting
9 to look at them. Thank you.

10 CHAIRMAN STETKAR: Thanks, Mr. Lewis.
11 And we heard you loud and clear. Are there any other
12 members of the public on the line who'd like to make
13 a comment? If so, identify yourself.

14 MR. LEWIS: Can I have a second bite of
15 the apple?

16 CHAIRMAN STETKAR: You may if -- yes,
17 certainly.

18 MR. LEWIS: All right. The other part is
19 I'm glad somebody mentioned WASH-1400 at the very
20 beginning. And I hope that you understand that we're
21 just not after, the public is just not after cosmetic
22 numbers. We are after reality hopefully. And
23 hopefully, the PRAs will look strongly at reality and
24 not just make up funny numbers. Thank you.

25 CHAIRMAN STETKAR: Thank you very much.

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1 And again, just to make sure, are there any other members
2 of the public who'd like to make a comment?

3 If not, as we always do at subcommittee
4 meetings, I like to go around the table and see if any
5 of the members have any final comments you'd like to
6 make. Ron?

7 MEMBER BALLINGER: No, thank you.

8 CHAIRMAN STETKAR: Matt?

9 MEMBER SUNSERI: No, thank you.

10 CHAIRMAN STETKAR: Margaret?

11 MEMBER CHU: No, thank you.

12 CHAIRMAN STETKAR: Mike?

13 MEMBER CORRADINI: No.

14 CHAIRMAN STETKAR: Dennis?

15 MEMBER BLEY: Nothing additional.

16 CHAIRMAN STETKAR: Jose?

17 MEMBER MARCH-LEUBA: No.

18 CHAIRMAN STETKAR: Walt?

19 MEMBER KIRCHNER: No, thank you. Thank
20 you.

21 CHAIRMAN STETKAR: And Joy?

22 MEMBER REMPE: No additional comments.

23 CHAIRMAN STETKAR: Okay. With that, we
24 will end the open session of the meeting. Let's try
25 to take a ten-minute break and come back at 10:45 for

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1 the closed session.

2 (Whereupon, the above-entitled matter went
3 off the record at 10:35 a.m.)

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The NRC logo is located in the top-left corner of the slide. It features a stylized blue atom with three elliptical orbits around a central sphere, all set against a white background.

Full-Scope Site Level 3 PRA

Advisory Committee on Reactor Safeguards
Reliability and PRA Subcommittee

October 4, 2017
(Open Session)

Alan Kuritzky
Division of Risk Analysis
Office of Nuclear Regulatory Research
(301-415-1552, Alan.Kuritzky@nrc.gov)

Outline

- Open Session
 - Project status overview
 - Documentation – NUREG, Part 1
- Closed Session
 - Level 2 PRA
 - Internal events and floods
 - Internal fires, seismic events, high winds
 - Shutdown
 - Level 3 PRA – internal events and floods
 - Spent fuel pool PRA



Level 3 PRA Project Status Overview

October 4, 2017

Alan Kuritzky

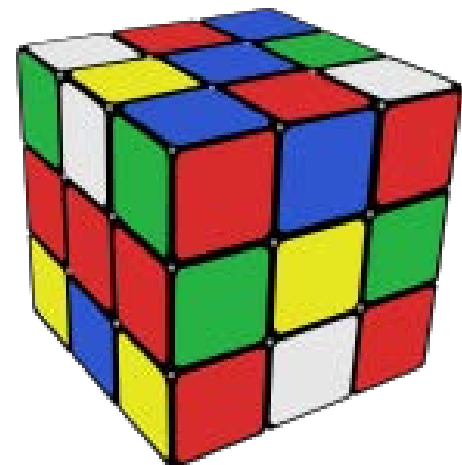
Division of Risk Analysis

Office of Nuclear Regulatory Research

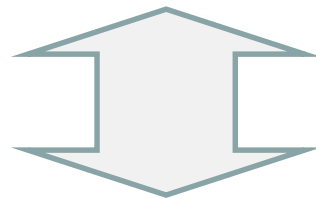
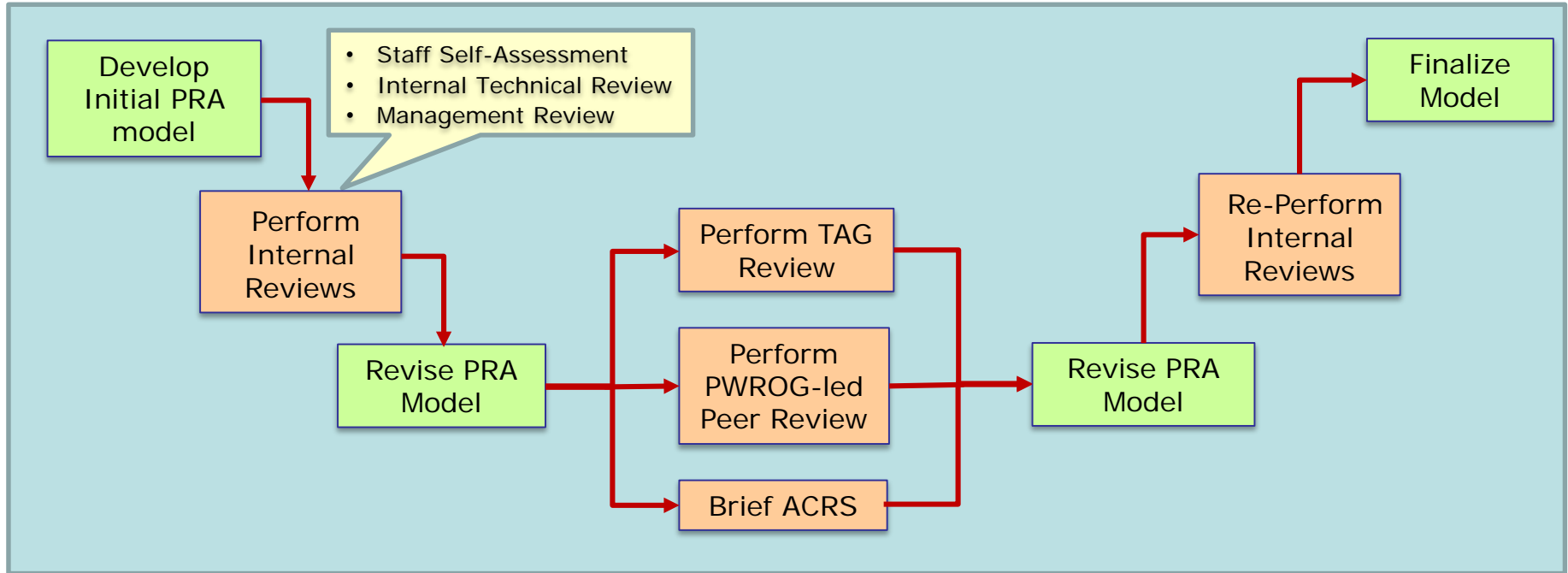
(301-415-1552, Alan.Kuritzky@nrc.gov)

Outline of Presentation

- Reactor, at-power, internal events and floods
- Reactor, at-power, internal fires and seismic events
- Reactor, at-power, high winds and other hazards
- Reactor, low power and shutdown
- Spent fuel pool
- Dry cask storage
- Integrated site
- Path Forward



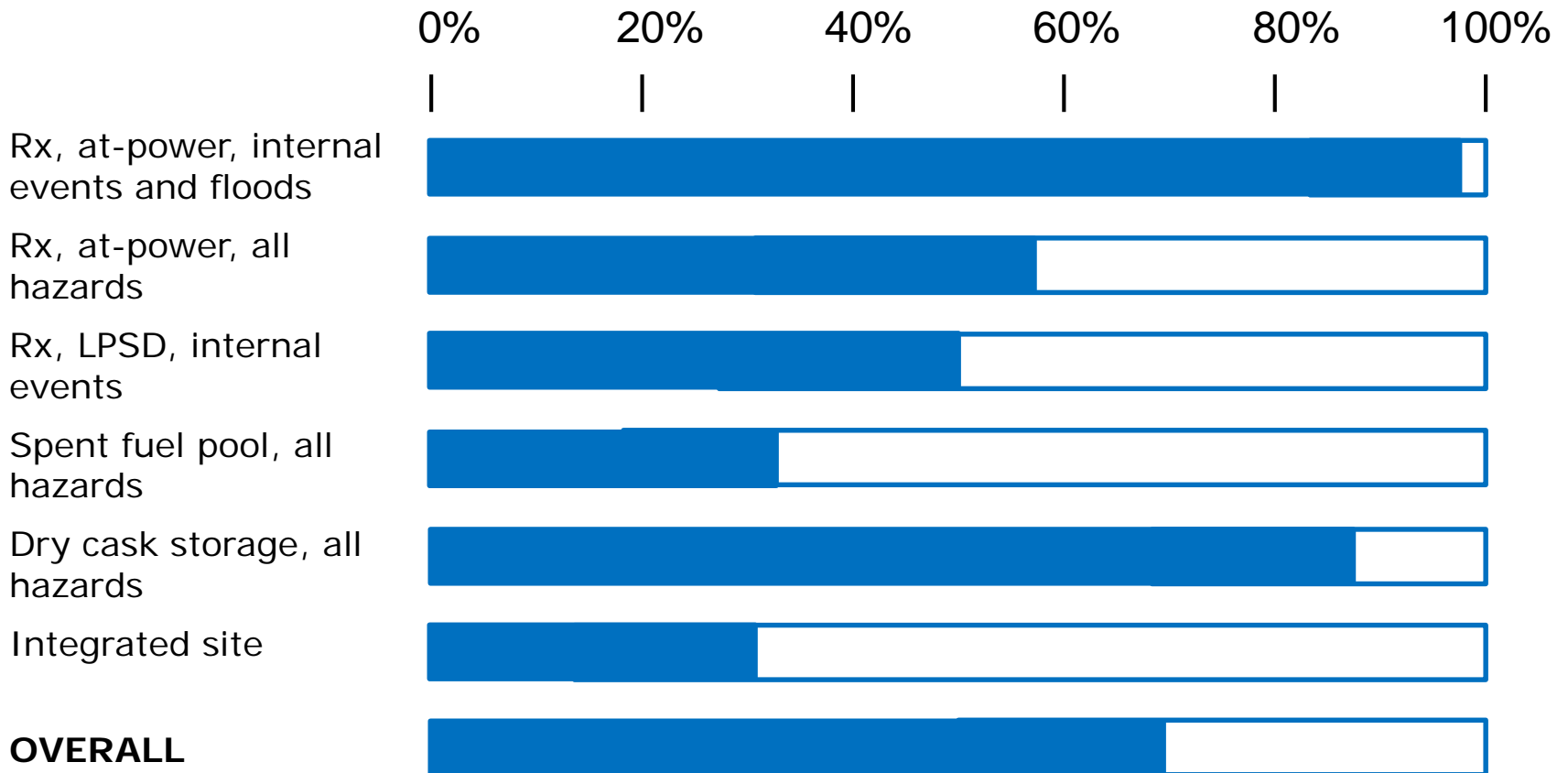
Generic Process for PRA Model Development



Develop Documentation

Project Status

Combined status of model development, project reviews, and project documentation



Reactor, At-Power, Internal Events and Floods

- Completed ASME/ANS PRA standard-based peer review of Level 1, 2, and 3 PRAs, led by PWR Owners Group
- Completed substantive update to Level 1, 2 and 3 PRAs to address peer review and other comments
 - Level 1 internal flood report nearing completion
 - Level 2 internal event and flood PRA undergoing internal technical review
 - Level 3 internal event and flood PRA report being finalized (prior to internal technical review)
- Completed expert elicitation for interfacing systems LOCA

Reactor, At-Power, Internal Fires and Seismic Events

- Completed initial revision of Level 1 fire and seismic PRA models and documentation based on new input from SNC
- Both models and documentation have been updated to incorporate internal technical review comments
- Revised fire PRA is undergoing project management review; revised seismic PRA is in the queue for project management review
- Level 2 modeling for internal fires and seismic events is on-going
 - Leveraging internal event Level 2 PRA
 - Hazard-specific adjustments made to bridge tree and plant damage state (PDS) modeling
 - Working on impacts to system performance, human reliability analysis (HRA), and containment event tree

Reactor, At-Power, High Winds and Other Hazards

- Completed ASME/ANS PRA standard-based peer review, led by PWROG
- Completed substantive update to “Other Hazards” report to address peer review and other comments
 - Currently undergoing final project management review
- Performed substantial update of high wind PRA to address peer review and other comments, as well as incorporate additional information obtained from high wind walkdown and follow-on analyses
 - Currently undergoing internal technical review

Reactor, Low Power and Shutdown

- Completed initial LPSD Level 1 PRA model for internal events
 - Currently incorporating feedback from internal technical review
- Work continuing on LPSD Level 2 PRA
 - Completed bridge tree and PDS modeling and quantification
 - Completed MELCOR analyses
 - Working on containment event tree and HRA
- Performed a Phenomena Identification and Ranking Technique (PIRT) expert elicitation to identify ranked list of focus areas for LPSD PRA
 - Contractor report completed (contains proprietary information)
 - Work initiated on a NUREG/CR (for public release)

Spent Fuel Pool PRA

- Level 1 analysis is nearly complete for most of the initiating events under consideration
- Continuing work includes:
 - Human reliability analysis: method has been defined and is being exercised for the events of interest
 - Accident progression analysis: preliminary results are under investigation
 - Documentation is ongoing

Dry Cask Storage PRA

- Completed initial Level 1/2/3 model and documentation for all hazards
- Revised consequence analysis to be Vogtle-specific
- Completed internal technical review (NMSS)
- Currently undergoing project management review

Integrated Site PRA

- Developed an approach for an integrated site PRA model using single-source PRA model results and risk insights to prioritize the systematic identification and modeling of multi-source accident scenarios and inter-source dependencies
- To provide additional confidence that potentially important multi-source accident scenarios are not missed, this approach is coupled with the use of systematic techniques to search for and prioritize potential multi-source accident scenarios that may not be captured by relying only on results and insights from individual single-source PRA models.
- Completed pilot applications of the approach for:
 - Reactor Units 1 & 2, at-power, internal events, Level 1 PRA
 - Reactor Units 1 & 2, at-power, internal events and floods, Level 2 PRA
 - Reactor Units 1 & 2, at-power, seismic events, Level 1 PRA

Key Upcoming Milestones


- Complete updated reactor, at-power, other hazards report (October 2017)
- Dry cask storage, Level 1, 2, and 3 PRA ready for technical adequacy review (October 2017)
- Reactor, at-power, Level 1, internal fire PRA ready for technical adequacy review (November 2017)
- Reactor, at-power, Level 1, seismic event PRA ready for technical adequacy review (December 2017)
- Complete updated reactor, at-power, Level 2, internal event and flood PRA (December 2017)
- Reactor, LPSD, Level 1, internal event PRA ready for technical adequacy review (December 2017)

Acknowledgements

- SNC
- PWR Owners Group
- Westinghouse
- EPRI
- NSIR, NRO, NRR, NMSS, Regions, TTC
- National Laboratories (INL, SNL, PNNL, BNL)
- Commercial Contractors (ERI, ARA, IESS)
- ACRS

Acronyms and Definitions

ANS	American Nuclear Society
ARA	Applied Research Associates
ASME	American Society of Mechanical Engineers
BNL	Brookhaven National Laboratory
EPRI	Electric Power Research Institute
ERI	Energy Research, Inc.
HRA	Human reliability analysis
IESS	Innovative Engineering & Safety Solutions, LLC
INL	Idaho National Laboratory
LOCA	Loss of coolant accident
LPSD	Low power and shutdown
PDS	Plant damage state
PIRT	Phenomena Identification and Ranking Technique
PNNL	Pacific Northwest National Laboratories
PRA	Probabilistic risk assessment
PWR	Pressurized-water reactor
PWROG	PWR Owners Group
SNC	Southern Nuclear Operating Company
SNL	Sandia National Laboratories
TAG	Technical Advisory Group



Level 3 PRA Project Draft Report – Part 1

Advisory Committee on Reactor Safeguards
Reliability and PRA Subcommittee

October 4, 2017
(Open Session)

Mary Drouin
Division of Risk Analysis
Office of Nuclear Regulatory Research
(301-415-2091, Mary.Drouin@nrc.gov)

NUREG Report

- User friendly
- Accessible
- Retrievable
- Understandable
- Informative

Goals and Challenges

- Contains sufficient information to understand:
 - Design and operation of the plant
 - The technical approach
 - Major assumptions
 - Major results
 - Major insights and perspectives
 - Potential uses
 - Potential future work
- Major challenges
 - The level of detail of information in the report recognizing concern regarding propriety information
 - The significant amount of information – what to and not to include – so as not to overwhelm the reader but remain informative
 - How to represent the information in an efficient, effective, and understandable manner for a “four dimensional” PRA model that addresses multiple sources, multiple hazards, multiple operating states, and all three PRA levels

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Part 1

- 1 Introduction
- 2 Summary of Plant and Site Design
- 3 Summary of Approach

Part 2

- 4 Summary of Reactor Risk Results
- 5 Summary of Spent Fuel Pool Risk Results
- 6 Summary of Dry Cask Storage Risk Results
- 7 Summary of Integrated Site Risk Results

Part 3

- 8 Overall Risk Perspectives
- 9 Perspectives on Reactor Risk
- 10 Perspectives on Spent Fuel Pool Risk
- 11 Perspectives on Dry Cask Storage Risk
- 12 Perspectives on Integrated Site Risk
- 13 Comparison to Previous Studies
- 14 NUREG-XXXX as a Resource Document
- 15 References

Appendix

- Appendix A Glossary
- Appendix B Project Organization
- Appendix C Quality Assurance
- Appendix D Results of External Reviews

Section 1 -- Introduction

1.1 Background

- History of project

1.2 Objective

- Stated objectives from SECY papers

1.3 Scope

- Issues included and not included
- Compared to NUREG-1150
- PRA elements

1.4 Assumptions & Limitations

- High level across the project

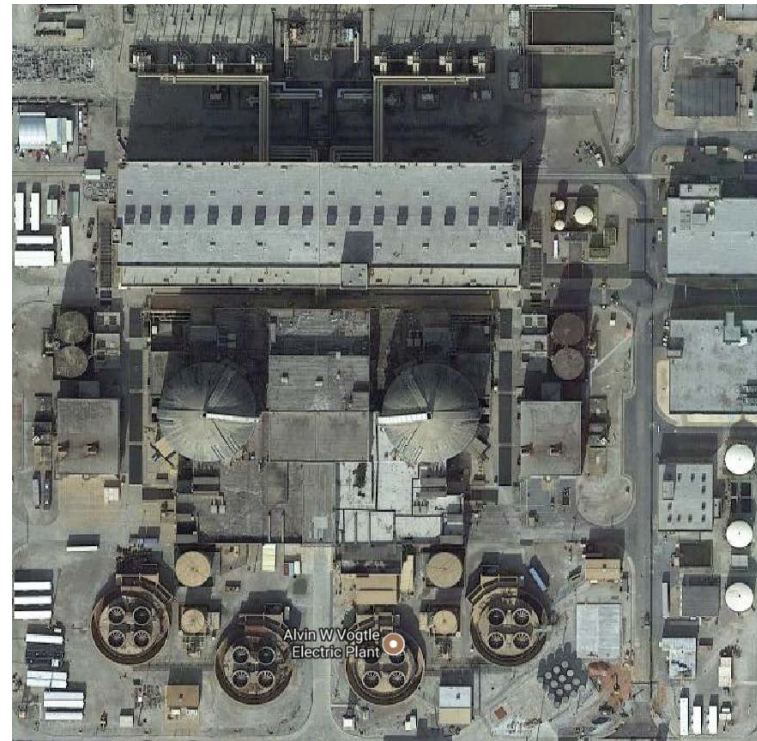
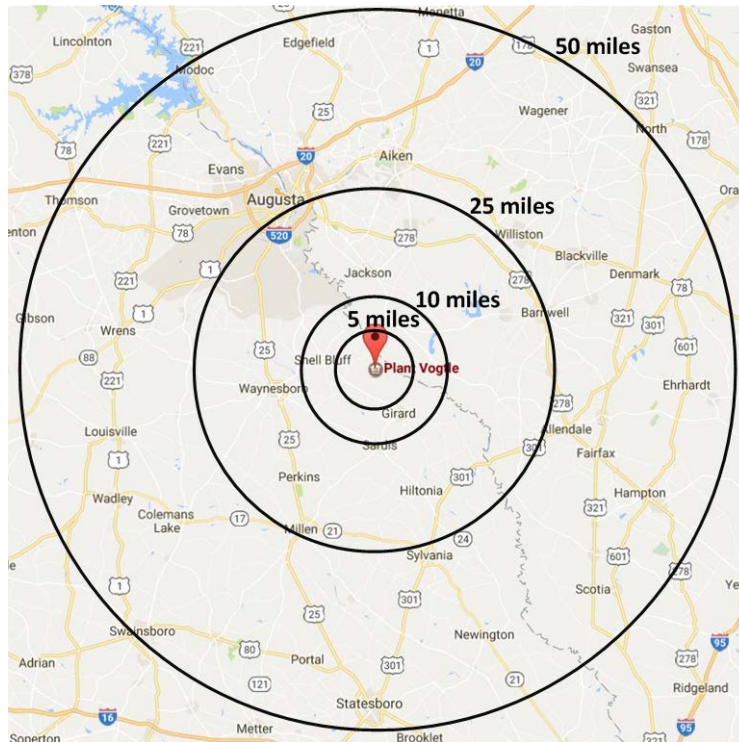
1.5 Document Structure

Section 2 – Summary of Plant Design and Operation

- Description of site, reactors, spent fuel pools, dry cask storage
- Brief description provided for each structure and system modeled
 - Purpose and function
 - Configuration
 - Actuation
 - Success criteria
 - Dependencies
- Simplified schematic provided for structures and systems
- Dependency diagram provided
- No actual system layout provided nor plant-specific labeling

Section 2.1 – Vogtle Site

- High level description of plant site and location



Section 2.2/2.3 – Reactor Plant Design

- Includes descriptions, schematics and dependency diagrams

Front Line Systems	Support Systems
Accumulators	AC and DC electrical
High pressure injection/recirculation	Nuclear service cooling water
Low pressure injection/recirculation	Component cooling water
Primary operated relief valves	Auxiliary component cooling water
Residual heat removal	Circulating Water
Main feedwater	Turbine plant closed cooling water
Auxiliary feedwater	Turbine plant cooling water
Reactor protection	Instrument air
Containment spray	
Containment cooling	
Containment isolation	

Section 2.4 – Spent Fuel Pool Storage

2.4.1 Overview

- High level discussion of spent fuel pool (SFP) structure and associated systems

2.4.2 Spent Fuel Pool Cranes

- Cranes used to move fuel assemblies within the pool and for transporting new fuel containers

2.4.3 Spent Fuel Pool Cooling and Purification System

- System removes the decay heat from the SFP

2.4.4 Auxiliary and Fuel Handling Building Heat, Ventilation, and Air Conditioning

- System provides ventilation and filtration and maintains suitable atmosphere for personnel and equipment

Section 2.5 – Dry Cask Storage

- Dry Cask Storage (DCS) System
- Multipurpose Canister (MPC)
- Transfer and Storage Overpacks
- Dry Cask Storage Operating Stages
- Dry Cask Storage Process
- SFPs and Cask Loading Pit
- Cask Washdown Area
- Cask Transfer Facility
- Independent Spent Fuel Storage Installations
- Vertical Cask Transporter
- Alternate Cooling Water System
- Supplemental Cooling System
- Forced Helium Dehydration System
- Automated Welding System
- Low Profile Transporter
- Mating Device
- Other Plant Dry Cask Storage Supporting Systems

Section 3 – Summary of Approach

- Section 3.1 – Overall Approach
- Section 3.2 – Technical Analyses
- Section 3.3 – Reactor Risk Model
- Section 3.4 – SFP Risk Model
- Section 3.5 – DCS Risk Model
- Section 3.6 – Site Risk Model
- Section 3.7 – Other Hazards

Section 3.1 – Overall Approach

- Basic approach
 - Separate models for each source (reactor, SFP, DCS)
 - For reactor, started with internal events and expanded
 - For SFP and DCS, a single integrated model was constructed that addressed the risk from significant hazards

Section 3.2 – Technical Analysis

- For each technical element
 - Purpose/objectives of analysis
 - Major steps associated with analysis
 - Output/products of the analysis
- Technical elements
 - Plant Familiarization
 - Screening analyses
 - Initiating event analyses
 - Structural analyses
 - Human reliability analyses
 - Quantification analyses
 - Consequence analyses
 - Hazard and fragility analyses
 - Uncertainty analyses
 - Systems analyses
 - Accident progression analyses
 - Parameter estimation analyses
 - Source term analyses

Section 3.3 – Reactor Risk Model

- Organized by plant operating state, risk level, and hazard
- Level 1, at-power conditions
 - Internal events model based on SNC model that was converted to SAPHIRE
 - Expanded to address other hazards while leveraging the work performed by SNC
 - Where work on particular technical element was needed, followed guidance in Section 3.2
- Level 2 & 3, at-power conditions
 - Based on guidance in Section 3.2
- LPSD – Level 1, 2 and 3
 - Ranked risk significance of plant outage types, plant operating states and initiating event categories to focus analysis

Section 3.4 – SFP Risk Model

- Single integrated Level 1 and Level 2 model was constructed
- Prioritization scheme developed to focus the SFP PRA model
 - Speed of the accident
 - Amount of sloshing
 - Significance of the hazard
- SFP model involved seismic hazard with fuel uncovering from sloshing
- Model followed the technical elements as described in Section 3.2

Section 3.5 – DCS Risk Model

- Single integrated Level 1 and Level 2 model was constructed
- Level 1 and Level 2 model based on NUREG-1864 and expanded
 - Modeled in detail all known hypothetical hazards/events that had the potential to challenge systems and result in radionuclide release
 - Screened hazards/events based on previous experience
- Level 3 model followed the guidance in Section 3.2

Section 3.6 – Site Risk Model

- Assumed risk dominated by dependencies among risk sources and significant contributors from individual risk sources
- Developed scheme to logically combine important accident scenarios from the individual radiological sources
- Only evaluating consequences
- Used a systematic scheme to identify and prioritize potential scenarios that might be missed by solely relying on results and insights from the individual single-source models

Section 3.7 – Reactor: Other Hazard Risk Models

- Over 30 other hazards identified, examples

Aircraft	Coastal erosion	Damn failure	Fog
High temperature	Landslide	Meteor	Pipeline accident
Soil shrink-swell	Storm surge	Transportation	Volcanic

- Developed criteria for screening
 - The hazard does not result in a plant trip (manual or automatic) or a controlled manual plant shutdown while at power and does not impact any SSCs that are required for accident mitigation from at-power transients or accidents.
 - The hazard cannot occur close enough to the plant to affect it.
 - The hazard is included in the definition of another analyzed hazard.
 - The hazard has a significantly lower mean frequency of occurrence than another hazard.
 - The current design-basis hazard has a mean frequency less than 1×10^{-5} per year, and the mean value of the conditional core damage probability is assessed to be less than 1×10^{-1} .
- All other hazards were screened from detailed analysis

NUREG REPORT Part 1-- Status

- Initial draft is complete
- Starting the review process:
 - Internal reviews – staff review then management review
 - TAG review
- Need to decide when to initiate “public review”
 - When entire NUREG is written or in pieces?