UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

March 6, 2015

MEMORANDUM TO: ACRS Members

FROM: Michael R. Snodderly, Senior Staff Engineer **/RA/**
Technical Support Branch, ACRS

SUBJECT: CERTIFIED MINUTES OF THE MEETING OF THE FUKUSHIMA SUBCOMMITTEE ON NOVEMBER 20-21, 2014

The minutes for the subject meeting were certified on February 6, 2015, as the official record of the proceedings of that meeting. Copies of the certification letter and minutes are attached.

Attachment: As stated

cc with Attachment: E. Hackett
M. Banks

cc w/ Attachment: ACRS Members

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

MEMORANDUM TO: Michael Snodderly, Senior Staff Engineer
Technical Support Branch
Advisory Committee on Reactor Safeguards

FROM: Stephen P. Schultz, Chairman
Fukushima Subcommittee
Advisory Committee on Reactor Safeguards

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ACRS FUKUSHIMA SUBCOMMITTEE ON NOVEMER 20-21, 2014

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting on November 20-21, 2014, are an accurate record of the proceedings for that meeting.

/RA/ **February 6, 2015**

Stephen P. Schultz, Chairman
Fukushima Subcommittee

Date

Certified on: February 6, 2015
Certified by: Stephen P. Schultz

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF THE ACRS FUKUSHIMA SUBCOMMITTEE MEETING
NOVEMBER 20-21, 2015

The ACRS Fukushima Subcommittee held a meeting on November 20-21, 2015 in TWFN 2B1, 11545 Rockville Pike, Rockville, Maryland. The meeting convened at 8:32 a.m. on November 20, 2014 and adjourned at 4:44 p.m. on November 21, 2014.

The entire meeting was open to the public.

Dr. Edwin Lyman of the Union of Concerned Scientists made a presentation which is described in further detail in the summary portion of these minutes. No other written comments or requests for time to make oral statements were received from members of the public related to this meeting.

ATTENDEES

ACRS Members

Stephen P. Schultz, Chairman
Ron Ballinger, Member
Dennis Bley, Member
Charles Brown, Jr., Member
Michael Corradini, Member
Harold Ray, Member
Joy Rempe, Member
Peter Riccardella, Member
Michael Ryan, Member
Gordon Skillman, Member
John Stetkar, Member

ACRS Consultant

William Shack, Consultant

NRC Staff

Michael Snodderly, Designated Federal Official
Ed Hackett, Executive Director
Stewart Bailey, NRR
Jeremy Bowen, NRR
Eric Bowman, NRR
Jack Davis, NRR
Clint Ashley, NRO
Sud Basu, RES
Howard Benowitz, OGC
Tony Brown, NRR
Andy Campbell, NRO
Patrick Castleman, OCM
Yas Hsien Chang, RES
Theresa Clark, NRO
Antonio Dias, NRO
Michael Eudy, NRO

Ken Erwin, NRO
Rocky Foster, NRO
Mike Franovich, NRR
Ed Fuller, RES
Lauren Gibson, NRR
Anne Marie Grady, NRO
Tara Inverso, NRR
Diane Jackson, NRO
Lauren Kent, NRO
John Lehning, NRR
Shanlai Lu, NRO
Tim Lupold, NRR
Mike Markley, NRR
John McKirgan, NRO
Jeff Mitman, NRR
Lynn Mrowca, NRO
Charles Murray, NSIR
Ryan Nolan, NRO
Eric Oesterle, NRR
Mark Orr, RES
Malcom Patterson, NRO
Bo Pham, NRR
Marie Pohida, NRO
Bill Reckley, NRR
Tim Reed, NRR
Carla Rogue Cruz, NRR
Jeff Schmidt, NRO
Suzanne Schroer, NRO
Ken See, NRO
Courtney St. Peters, NRO
Angelo Stubbs, NRO
Summer Sun, NRR
George Tartal, NRO
Jenny Tobin, NRR
Sunil Weerakody, NRR
Robert Weisman, OGC
Sheena Whaley, NRR

Other Attendees

Phil Amway, Nine Mile Point
Scott Bauer, NEI
Jana Bergman, Curtiss-Wright/Scientech
Dan Brush, Exelon
Randy Bunt, SNC/BWROG
Gene Eimar, Palo Verde
Patrick Fallon, DTE Energy
Kurt Flaig, Dominion
Bryan Ford, Entergy
Terri Forthing, GEH
David Gambrell, Southern Nuclear
John Giddens, Southern Nuclear

Bob Ginsberg, Duke
Greg Hatchett, Areva
Scott Head, NINA
Dennis Henneke, GE Hitachi
Lesa Hill, SNC/BWROG
Tom Jackson, Rizzo Associates
Steven Kraft, NEI
David Llewellyn, Duke Energy
Ed Lyman, Union of Concerned Scientists
Nick Pappas, NEI
Sue Perkins-Grew, NEI
David Petro, First Energy
Joe Pollock, NEI
Michael Powell, Arizona Public Service Palo Verde
Jim Riccio, Greenpeace
Jim Riley, NEI
Steve Swantner, Westinghouse
Mike Tschiltz, NEI
Bill Webster, Dominion
David Young, NEI

SUMMARY

The purpose of the meeting was to review the staff's proposed COMSECY, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," draft proposed rule language for the mitigation of beyond-design-basis events rulemaking and supporting documents and guidance. The meeting transcripts are attached and contain an accurate description of each matter discussed during the meeting. The presentation slides and handouts used during the meeting are attached to these transcripts.

SIGNIFICANT ISSUES NOVEMBER 20, 2014	
Issue	Reference Pages in Transcript
1. S. Bauer of NEI introduced the panel of industry representatives that would describe their experiences responding to Order EA-12-049, "Requirements for Mitigation Strategies for Beyond-Design-Basis External Events."	9-11
2. G. Eimar described Arizona Public Service's experience responding to Order EA-12-049 at Palo Verde.	12-106
3. G. Eimar defined the problem as developed in NEI 12-06.	13
4. Member Ballinger asked if the functional recovery box on Slide 5 would lead one to the FLEX procedure. G. Eimar responded that functional	52

recovery does not take the operator directly to the FLEX procedure, but there is a section that directs you to the blackout procedure which then directs you to the FLEX Support Guideline.	
5. Member Bley asked if the Severe Accident Management Guidelines recognized the existence of the FLEX equipment. G. Eimar responded that they don't now but they will. He then used refilling the steam generators as an example where specific FLEX equipment will be referred to.	84
6. B. Webster described Dominion's experience responding to Order-EA-12-049 at North Anna.	107-178
7. Member Bley pointed out the prevalence of color blindness in individuals and the possible impact on color coded connections.	119
8. Member Stetkar asked about flow testing of FLEX Connections. B. Webster responded that they had not done actual flow testing but the connections were hydrostatically tested.	125
9. B. Webster described the qualifications of FLEX equipment, including seismic qualifications, in response to questions from Chairman Schultz and Member Stetkar.	130
10. Member Skillman asked about transporting FLEX equipment that cannot be delivered by a tractor trailer.	137
11. Members debate the validity of the assumption that all power is lost but it is not attributed to any specific external event.	165
12. Member Corradini asked about the importance of the condensate storage tank for BWRs.	174
13. P. Amway described responding to Order-EA-12-049 at Nine Mile Point Unit 1 and 2.	179-214
14. Member Bley asked about emergency condenser performance.	184
15. D. Brush presented the status of the National SAFER Response Centers and the role they play in licensees' response to Order-EA-12-049.	215-265
16. D. Brush stated that all flex equipment is specified to not exceed 8,500 lbs. He further stated that commercial helicopters have about a 70-mile round trip capability with this load.	240
17. D. Brush is asked about how hazardous conditions created from an external event will be handled.	250
18. M. Powell reminded the Committee that all FLEX strategies can be met with Phase II equipment that is on site and that Phase III equipment from the National SAFER Response Centers is for defense in depth.	259
19. M. Powell confirmed that the staff and Arizonia Public Service are coordinating an ACRS visit to the SAFER Response Center in Phoenix, Arizona.	265
20. J. Davis, JLD Director, makes an opening statement and introduces the staff presenters.	267-268
6. J. Bowen presented how the NRC staff reviewed licensee responses to the order and the NRC staff's plans for final close-out of the order.	269-308

7. Chairman Schultz asked how many plants have requested relaxations from the December 2016 deadline for complying with the order.	271
8. Member Ray emphasized J. Bowen's point that it is not only multiple additional sources of long-term decay heat removal but diverse methods. That these multiple diverse methods are not equal.	277
9. Chairman Schultz asked how the staff determined when the site was ready for the on-site audit.	285
10. Member Skillman asked how licensees can make changes to their integrated plan if they find a strategy requires modification.	289
11. Member Corradini asked about maintenance and training after the staff makes it safety finding on the order.	294
12. Member Rempe asked about the relationship between the licensee and a commercial entity, like Fedex, that is credited by the licensee for meeting the order and eventually the rule.	304
13. S. Bailey presented alternative approaches. Some licensees proposed approaches not described in NEI 12-06.	309-335
14. S. Bailey discusses the staff's review of RCP seal performance on extended loss of AC power.	312
15. Consultant Shack asked how the staff assesses the use of equipment qualified for design basis accidents for beyond design basis events.	318
16. Chairman Schultz asked about assurance that the equipment can be placed in service.	324
17. S. Bailey discussed the review of instrumentation to support the Order EA-12-049.	329
18. Member Rempe asked how the staff is addressing differences in identified needed instrumentation. She gave the example of water level in the RWST.	332
19. E. Bowman discussed the staff's evaluation of the feasibility and reliability of manual actions.	336-359
20. Member Stetkar asked if the staffing reviews were being done on a per unit or a per site basis.	342
21. Chairman Schultz asked about ensuring credited actions after the validation.	348
22. Member Stetkar asked if the staff had seen any plants with only motor operated isolation valves on their normal let-down lines with relief valves that go back to other places upstream of the next available isolation valve.	355
23. Industry panel on plans for addressing confirmatory and open items and experience gained from the staff's interim evaluations.	360-391
24. Chairman Schultz asked about the pedigree of calculations used to support the licensee's integrated plans.	373
25. Chairman Schultz asked how the potential cause of the ELAP and loss of ultimate heat sink was considered. More specifically, how an external event may impact implementation of the integrated plan.	378

26. Member Skillman asked how much drilling of the integrated plan is too much such that it is a distraction.	384
27. Chairman Schultz asked fellow subcommittee members for comment.	392
28. Chairman Schultz adjourned the meeting.	395

SIGNIFICANT ISSUES NOVEMBER 21, 2014	
Issue	Reference Pages in Transcript
1. A. Mohseni, Deputy Director, Division of Policy and Rulemaking, makes an opening statement and introduces the staff presenters.	9-10
2. T. Reed discussed the preliminary proposed rule language that was made publicly available on November 13, 2014.	11-107
3. T. Reed described the overall objective of the proposed rule.	12
4. In response to a question from Chairman Schultz, E. Bowman commented that the filtering strategies issue is so integral to the SAMGs that perhaps it should have been included in this consolidation.	17
5. Chairman Schultz asked about requirements for the spent fuel pool at a decommissioned plant once all fuel has been transferred from the reactor to the spent fuel pool.	21
6. Member Ray asked whether given that this would be a beyond-design-basis rule if anybody sees this changing the design basis. E. Bowman responded that one of the fundamental reasons for Order EA-12-049 was recognition that there can be uncertainties in calculating hazards from external events.	29
7. E. Bowman commented that one challenge of promulgating a beyond-design-basis rule is whether this equipment could be credited as part of the significance determination process. Member Rempe asked about possible enforcement of the preliminary rule.	33
8. Members Stetkar and Corradini questioned the preliminary rule language that equipment must be reasonably protected from the effects of severe natural phenomena that are as severe as the design basis external events in the licensing basis for the facility.	47
9. E. Bowman said that the staff limited the preliminary rule to design basis external events because of how they interpreted the Commission's direction to SECY 11-0093. In that SRM the Commission directed the staff to address beyond-design-basis events as part of Recommendation 1.	49

10. Chairman Schultz commented that the Commission has recognized that our regulatory process is fundamentally sound and that plants are fundamentally safe. This proposed rule is to codify that there are things that we can do to respond to beyond-design-basis events. Member Brown expanded upon this concept and he questioned enveloping the event and scope of equipment.	60
11. Member Stetkar asked about plants that are taking actions to respond to the design basis expectation and what if this design-basis expectation changes as a result of the reevaluated hazard.	66
12. Member Riccardella asked if this rule as written would have allowed the licensee of Fukushima Dai-ichi to install the required equipment at the same elevation as their existing diesel generators.	71
13. Member Skillman asked about the proposed training requirement and its interface with EOPs and explicitly calling out beyond-design-basis ELAP, EDMGs, and the SAMGs.	77
14. G. Tartal from the Office of New Reactors presented the proposed rule language for Paragraph D, “New Reactors.”	81-85
15. Member Stetkar asked about ELAP evaluations for non-passive new reactor designs that incorporate batteries and therefore require load shedding.	82
16. T. Reed resumed the generic presentation with a discussion of drills and exercise requirements in Section F. T. Reed then proceeded to discuss change control.	86
17. Chairman Schultz pointed out that the proposed requirement is not like an emergency planning situation where any degradation to the program needs to be reviewed and evaluated; rather, a licensee could change the program, not get review and evaluation, as long as long as they meet the requirements.	89
18. Member Bley asked why there was not a statement establishing the synergy between FLEX equipment and the severe accident management guidelines.	97
19. E. Fuller discussed the five additional candidate high-level actions to the EPRI Technical Basis Report in support of the severe accident management guidelines.	102
20. B. Reckley presented the draft white paper on the integration of mitigating strategies and the reevaluation of flooding hazards.	108-120
21. Member Ray commented that mitigating the consequences of something that you can't make some change to prevent may be okay given whatever probability you want to assign to it but preventing it from happening in the first place is clearly what has traditionally been viewed as the better choice.	114
22. Member Skillman agreed with Member Ray and argued that an option should be offered that provides the opportunity to adjust your design basis	115

or screen out events when addressing Recommendation 2.1.	
23. B. Ford, Senior Manager of Regulatory Assurance at Entergy, presented an industry perspective on the draft rule language for mitigating beyond-design-basis events.	121-131
24. Member Stetkar questioned B. Ford whether or not he was changing his original position. Member Stetkar recalled that the original approach was not to define a specific hazard but to provide systems and processes that are not specific to a given hazard. He asked whether specific strategies were being defined for a site-specific hazard.	128
25. R. Bunt, Southern Nuclear and Chair of the BWR Owners' Group Fukushima Response Committee, discussed whether the FLEX equipment credited in responding to Order EA-12-049 would have prevented the events at Fukushima Dai-ichi.	131
26. M. Lewis expressed his concerns with the spent fuel pool at San Onofre.	132
27. Chairman Schultz introduces the NRC staff with differing views.	134
28. S. Schroer presented 12 concerns of some non-concurring staff on the white paper. Two main concerns are the white paper approach will not systematically cover flooding protection of safety related equipment and the white paper approach results in non-safety-related mitigating strategies for reevaluated flooding hazards.	135-154
29. S. Schroer stated that the white paper approach assumes that the NRC already knows which plants will require additional action. She referred to Page 2 of Enclosure 1 of the white paper which says the NRC staff does not expect the reevaluated flood hazard for most plants to affect the design-basis flood against which safety-related SSCs would need to be protected.	143
30. S. Schroer responded to Member questions on the criteria for plants screening out of the process. The letter on trigger conditions for performing the integrated assessment was mentioned (ML12326A912). The trigger letter says these are the conditions by which you have to do an integrated assessment.	145-150
31. J. Mitman presents the reevaluated hazard results from three plants.	155-194
32. Member Bley asked where in the draft white paper it says you don't need an integrated assessment if you can demonstrate that FLEX will work, no matter what is going on with the flood.	162
33. In response to question from Member Bley, S. Schroer quoted from Enclosure 2 on the first page, “focusing the flooding reevaluations on the SSCs serving key safety function within the mitigating strategies requirements will, in many cases, improve the efficiency of the NRC's	168

regulatory process by eliminating the need for a broader assessment of the plant response, as described in current plans and staff guidance for integrated assessment.	
34. K. See mentioned the deferment letter (ML14303A465).	170
35. G. Holahan presented the concerns of three managers in the Office of New Reactors with the draft SECY paper on integration. He said the draft SECY will have important implications for not only flooding, but it has implications for future decisions because it relates to the relationship between or among adequate protection, design-basis, beyond-design-basis events and how decisions are made in the light of new information.	195-218
36. Members Skillman and Corradini asked about non-safety-related system or collection of systems, intended for beyond design-basis events that could be used to compensate for potential weaknesses in or even non-compliances with flooding design-basis protection requirements.	203
37. Member Ray asked G. Holahan where backfitting would show up in his approach. Chairman Schultz asked G. Holahan to distinguish between reevaluated seismic and flooding events.	209
38. Member Bley questioned whether the integrated assessment, which is a graded approach, wouldn't provide that kind of information G. Holahan was advocating for.	214
39. E. Lyman of the Union of Concerned Scientists presents his comments on the draft white paper on integration.	219-235
40. Member Ray asked for E. Lyman's opinion on an assessment of external events every ten years.	233
41. Chairman Schultz requested comments from interested members of the public.	236-243
42. Chairman Schultz asked fellow subcommittee members for comment.	244-263
43. Chairman Schultz adjourned the meeting.	263

Documents provided to the Subcommittee

1. ACRS Letter, "Proposed Rulemaking on Station Blackout Mitigation Strategies," June 17, 2013 (ML13161A247)
2. Letter from R. W. Borchardt, EDO, "Response to ACRS Regarding Proposed Rulemaking on Station Blackout Mitigation Strategies," August 1, 2013 (ML13189A125)
3. NRC Whitepaper/COMSECY, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards." (ML14314A063)
4. Letter from NRR/NRO Directors to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status, "Request for Information Pursuant to

Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3 and 9.3 of the Near-Term Task Force Review of Insights From The Fukushima Dai-ichi Accident, dated March 12, 2012 (ML12073A348)
5. Letter from Nuclear Energy Institute (NEI), Tony Pietrangelo to Chairman Macfarlane, “Integration of Mitigating Strategies with Reevaluated External Hazards Information,” dated November 4, 2014 (ML14309A544)
6. Letter from Chairman Macfarlane to Senator Dianne Feinstein, response to a recent GAO study entitled “Natural Hazard Assessments Could Be More Risk-Informed” dated July 30, 2012 (ML12192A057)
7. Commission Paper SECY-11-0124, “Recommended Actions to be Taken without Delay from the Near-term Task Force Report” dated September 9, 2011 (ML12192A057)
8. Preliminary Proposed Rule Language, “Mitigation of Beyond-Design-Basis Events Rulemaking,” dated November 12, 2014 (ML14316A297)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Fukushima Subcommittee

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Thursday, November 20, 2014

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

FUKUSHIMA SUBCOMMITTEE

+ + + + +

THURSDAY

NOVEMBER 20, 2014

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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., Stephen P. Schultz, Chairman, presiding.

COMMITTEE MEMBERS:

STEPHEN P. SCHULTZ, Subcommittee Chairman

RONALD G. BALLINGER, Member

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR. Member

MICHAEL L. CORRADINI, Member

HAROLD B. RAY, Member

JOY L. REMPE, Member

PETER C. RICCARDELLA, Member

MICHAEL T. RYAN, Member

GORDON R. SKILLMAN, Member

JOHN W. STETKAR, Member

ACRS CONSULTANT:

WILLIAM J. SHACK*

DESIGNATED FEDERAL OFFICIAL:

MICHAEL R. SNODDERLY

ALSO PRESENT:

EDWIN M. HACKETT, Executive Director
PHIL AMWAY, Nine Mile Point
STEWART BAILEY, NRR
SCOTT BAUER, NEI
JEREMY BOWEN, NRR
ERIC BOWMAN, NRR
DAN BRUSH, Exelon
JACK DAVIS, NRR
GENE EIMAR, Palo Verde
KURT FLAIG, Dominion
BRYAN FORD, Entergy
JOHN GIDDENS, Southern Nuclear
TOM JACKSON, Rizzo Associates*
DAVID LLEWELLYN, Duke Energy
MIKE POWELL, Palo Verde
BILL WEBSTER, Dominion

*Present via telephone

T-A-B-L-E O-F C-O-N-T-E-N-T-S

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Adjourn

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

8:32 a.m.

CHAIRMAN SCHULTZ: This meeting will now come to order. This is a two-day meeting of the Advisory Committee on Reactor Safeguards, the Fukushima Subcommittee.

I'm Stephen Schultz, Chairman of the Subcommittee. Members in attendance today are Pete Riccardella, Ron Ballinger, Dick Skillman, Harold Ray, Dennis Bley, John Stetkar, Michael Ryan, Joy Rempe and Mike Corradini. Our consultant from our ACRS Chairman, Dr. Bill Shack, is on the line.

The purpose of today's meeting is to discuss industry and staff experience in implementing Order EA-12-049, order modifying licenses with regard to requirements for mitigation strategies for beyond-design-basis external events.

Today's discussions will assist in preparing the Subcommittee for our agenda tomorrow. That will include our review of two related activities: The NRC staff and industry will discuss first the staff's preliminary proposed rule language for the mitigation of beyond-design-basis events rulemaking. And then the staff's draft white paper on the integration of mitigation strategies for

beyond-design-basis external events with the reevaluation of flooding hazards.

Mr. Mike Snodderly is the designated federal official for this meeting.

We've received no written comments.

We have arranged for Dr. Ed Lyman of the Union of Concerned Scientists to make an oral statement to the Committee which has been scheduled for tomorrow afternoon.

This meeting is open to the public and with the exception of portions that may be closed, if necessary, to protect information that is unclassified safeguards information pursuant to 5 U.S.C. 522B(c)(3), it is our understanding that today's presentations and its material does not contain such information. We're going to rely upon the presenters to notify us if our questions may stray into material which may contain unclassified safeguards information. We do not want that material to be disclosed. If we run into questions that may pursue that discussion, we can establish a closed session within the meeting.

The Subcommittee intends to gather information, analyze relevant issues and facts and formulate proposed positions and actions as appropriate for deliberation by the Full Committee.

Rules for the conduct of and the participation in this meeting have been established in the *Federal Register* as part of the notice for this meeting.

A transcript of the meeting is being kept and will be made available as stated in the *Federal Register* notice. Therefore, we request that when addressing the Subcommittee all participants will use microphones that are located throughout the meeting room. All participants should first identify themselves and speak with sufficient clarity and volume so that they may be readily heard. Also, we now request you to silence your cell phones or any other electronic devices that may disrupt the meeting. I understand that there are individuals on the bridge line who are listening in on today's proceedings. To effectively coordinate their participation in this meeting we will be placing the incoming bridge line on mute so that those individuals may listen in during the discussions. At appropriate times later in the meeting we will provide the opportunity for public comment from individuals on the bridge line, as well as from members of the public in attendance.

We'll now proceed with the meeting. And I want to go over the agenda briefly again to just

describe at some level of detail what we're intending to do today.

Today we have the discussion from members of the industry regarding mitigating strategies in response to the direction that was provided by the Commission in 2012. The industry and the NRC staff have been working together to move forward on implementing these strategies and developing the processing of doing so. We're going to hear about that today first from the industry. Then we will hear from the staff about their views on how this overall program is progressing.

Tomorrow, as I indicating in the opening remarks, we're going to be discussing the next stage of the program, which is rulemaking to codify the process that will be used to move forward and set a regulatory program in place to establish this within the overall regulatory framework.

There are some other issues that we will be discussing tomorrow. As I indicated, there are some policy issues associated with how mitigating strategies can be utilized, will be utilized with regard to determining how regulatory policy will be established for issues such as the beyond-design-basis events such as flooding or seismic events. We also are

going to be discussing various viewpoints associated with the implementation of mitigating strategies in the future.

We'll now proceed with the meeting today. I'm going to call on Scott Bauer of the Nuclear Energy Institute to open the presentations today and focusing on the ongoing development and implementation strategies.

Scott, some members of the Committee over the past two years have seen mitigating strategies at the plant sites. We have visited the Peach Bottom site as a Full Committee to meet with the staff there last year. And this year we met with the staff at Palisades in Region III. This is the first opportunity the Committee has had to see the progress that's made its way to this point, so we're looking forward to the presentations today.

As you and the panelists make your presentations this morning, if you could first introduce yourself, your position, a few sentences of your background and what you're going to be presenting today as an introduction to the Committee, I would appreciate that.

So, Scott, why don't you begin?

MR. BAUER: Okay. Thank you. Again, my

name is Scott Bauer. I'm a loaned employee at NEI from Palo Verde Nuclear Generating Station via the STARS Alliance. I was actually at NEI during the time of the Fukushima event and was asked to be the project manager for FLEX or mitigating strategies. And when I went back to Palo Verde in July of last year, I retained that role. So I'm basically a virtual loaned employee at NEI continuing in the role as FLEX project manager.

So what we're going to do this morning, first of all, through the years that we've been doing this, we've been surrounded by a team of very talented industry people, some of which are sitting here before you today and some of which are in the audience out there. So we've had some of the best in the industry working on this issue and we believe we've developed a process and a product that is going to serve us very well going forward.

So what we're going to do today is -- to my right is Gene Eimar. He's a shift manager at Palo Verde. He's going to give us a depiction of what this event would look like, an extended loss of AC power event would look like from a control room standpoint and actually walk through the event and how the procedures would be deployed in the case of the event. So that will give you kind of a hands-on look at what

it would actually look like if this were to occur.

Next Bill Webster, who's from Dominion. He is the Fukushima lead there. And they just implemented at the North Anna plant, so he's going to talk about the experience of actually implementing the strategy and going live with it.

Similar, Mike Powell will be up here probably after the break and he's from Palo Verde. He's the Fukushima lead there. And similarly they are now live with the strategy at Unit 1 at Palo Verde.

Phil Amway is from Nine Mile Point. He's going to give us -- so Bill is going to talk about what it looks like to implement this involving the strategies, the modifications, training, all the aspects of it. Phil is going to talk about the differences between a BWR and a PWR, essentially what the differences are and the implementation for that.

And then finally we'll have a presentation by Dan Brush, who is the lead for our implementation of our National SAFER Response Centers.

So we have an ambitious schedule here; there's quite a few slides involved, but I think as we go through this hopefully we'll be able to make it through all these presentations. We do have a couple of videos that we might stick in here at points in time

that show some of the validation activities at Palo Verde. And then we have one of a control room exercise where they actually did an extended loss of AC power event at a BWR control room that we would include in here if we have the time to do that.

So that's essentially the flow we're going to go through this morning.

CHAIRMAN SCHULTZ: I did want to interrupt you just for a moment and indicate to members in the discussion on the bridge line that we did not have the slides available online this morning. If you would like to get a copy of this morning's slides, I would request that you email Michael Snodderly, M-I-C-H-A-E-L, dot, S-N-O-D-D-E-R-L-Y, @nrc.gov. And over the course of the morning Mike can provide you those slides. Thank you.

Scott, sorry for the interruption, but go ahead.

MR. BAUER: No problem. Gene?

MR. EIMAR: My name is Gene Eimar. I'm a shift manager at Palo Verde. Next month is my 33rd year at Palo Verde, so I've got several years experience at the station. I got my first senior reactor operator license at a Westinghouse four-loop PWR in 1976 and my license at Palo Verde in 1985. Been a shift manager

since 1978. So lot of control room time.

So this morning I'm going to talk about Palo Verde FLEX strategies that we developed to respond specifically to the Palo Verde System 80 plant.

So I'm going to talk about the FLEX Support Guideline implementation, Extended Loss of All Site AC Guideline and we'll look at a couple of the appendices that we have included in our AC Guideline. And this would -- FLEX Support Guideline is one of the common terms, or FSGs, for that.

So we looked at the definition that was provided by NEI-12-06 for what the event specifically was. We had an undefined external event that occurred which resulted in a loss of off-site power. We had a successful reactor trip with all control element assemblies being inserted into the core. We had a failure of all on-site AC sources to function. So none of the emergency diesel generators at Palo Verde, which we have six, functioned for this event. And at Palo Verde we rely on station blackout generators, and those generators were unavailable for the event, which left us with no 4160 class power, no 480-volt class power and no non-class power.

Per the NEI guidance there were no other equivalent failures. We had no other event in

progress, so no loss of coolant accidents, excess steam demands, steam generator tube rupture, or any of those, and no security event was in progress at the same time. Those are the rules basically as specified in NEI-12-06.

So the first thing that happens in a control room after a reactor trip is the operators at Palo Verde use what's called a standard post-trip action flowchart. We use a diagnostic flowchart. Control room supervisor runs this. The reactor operators are responding to the safety functions in order. So we go through this chart and the control room supervisor looks -- the first thing he looks at is reactor power less than 10 to the minus 1 percent and dropping. Well, with all rods inserted into the core, he's going to respond to this as a yes.

The next block he's going to look at, does at least one vital AC and DC train have power? So in this case we won't have power because the 4160 buses are de-energized at Palo Verde. So he would respond with a no.

The next one he's going to look at, does at least one vital DC train have power? Palo Verde has four battery trains. All of those would still be energized because the batteries are still available,

so he would respond to that with a yes.

MEMBER BLEY: Hey, Gene?

MR. EIMAR: Yes, sir?

MEMBER BLEY: Excuse me just a second. You've been using this kind of flowchart arrangement all along, is that right, or is this --

(Simultaneous speaking)

MR. EIMAR: For the last about 15 years at Palo Verde, yes. Yes, it's a flowchart we use for standard post-trip action. It goes in order of safety functions. The ROs will address the safety functions because they have hard cards to do that. And the control room supervisor uses to help them diagnose what recovery operation procedure to go to, whether it's reactor trip, steam generator tube rupture, station blackout.

So this, case because we addressed reactivity first with control rods and then we go to maintenance of vital auxiliaries, that's a second safety function. This is where we're at. So at this point he's going to go yes on the DC power, because we do have it. And it says consider blackout. Then the chart will have you continue on and evaluate the rest of the safety functions. In this case they said there were no other events, so the control room supervisor

then would diagnose that this is station blackout event initially.

MEMBER CORRADINI: So just two clarifications. So if you start deviating from your procedures that you used to have or currently have to the new ones, could you let us know so we --

(Simultaneous speaking)

MR. EIMAR: Yes, I will. Yes.

MEMBER CORRADINI: And the second part of that is, so, you're going to take us through the yes/no/yes path.

MR. EIMAR: Yes.

MEMBER CORRADINI: So what happens if there's a yes/no/no path?

MR. EIMAR: If there's a yes/no/no path, if I end up with no DC power, then we would go to our functional recovery procedure at Palo Verde currently.

MEMBER CORRADINI: Can you tell me what you meant by that? I'm sorry.

MR. EIMAR: Palo Verde has -- our emergency response procedures are divided up into optimal recoveries for specific events. Loss of all feed, LOCA, steam generator tube rupture. So we have specific recovery operation procedures for those. If you have a multiple event -- say you have a stuck-open

safety with a steam generator tube rupture, it's a dual event. You can go to our functional recovery procedure. So the functional recovery procedure at Palo Verde allows the control room supervisor and the shift manager to get together and assemble a procedure to respond to that event based upon those conditions.

MEMBER CORRADINI: Okay. Okay. All right.

MEMBER BLEY: I think I've seen these before. There's kind of a format and they pick the steps they think --

(Simultaneous speaking)

MR. EIMAR: Right. Yes, you determine if it's a challenge or jeopardizes safety function, and then by priority on safety functions you address those in order.

MEMBER BLEY: Okay.

MR. EIMAR: So that we're always focused on safety functions.

MEMBER BLEY: Okay.

MR. BAUER: The other thing I might inject at this point is Phil Amway was a shift manager at a BWR, so if he feels like he wants to interject at any point in time, that would be beneficial, too.

MR. EIMAR: Okay. So since I said we

would diagnose a station blackout, we would go to the station blackout procedure. There are no other events, so we go to the blackout recovery operation procedure. Our blackout procedure is not a flowchart, but for presentation sake I converted it into a flowchart so we could use the same yes/no kind of logic.

So the first thing the control room is going to do is confirm a blackout. Relatively easy to do at Palo Verde because you've lost your 4160 buses. That's pretty obvious in the control room. You get a lot of alarms. You don't have your 480. So you can definitely tell you're in a blackout condition. It doesn't take long to diagnose this event. So they'll go yes.

The next chart is SFSCs, or safety function status checks. Our shift technical advisors have a duty to perform a safety function status check as well as the control room operators to ensure that we're meeting all of the safety functions for each recovery operation procedure. So that action would be performed. In this particular case you are meeting all safety functions for station blackout because you have DC power. And all the other ones are met because you've been able to successfully shutdown the reactor. Your auxiliary feedwater pump would be running, so you're

removing heat. So all safety functions would be met.

The next one is several steps in a blackout procedure that you have to do. One is classify the event. You want to actuate a main steam isolation signal to bottle up the steam generators, to preserve inventory. You inform the Energy Control Center to find out the status of the switch yard and the bus, or the grid so you can tell if you're going to get power back from them. You're going to get area operators out to the station blackout generators. Because our strategy, we're a 16-hour blackout coping plant with the station blackout generators, alternate AC. They have to be started within one hour of the event so that we can take credit for the blackout. So our station blackout generators are located about a mile away from the units. So the auxiliary operator has to travel that mile and get that station blackout generator started. So one of the first steps is to dispatch an auxiliary operator out there to get those station blackout generators running.

MEMBER SKILLMAN: How does that operator get to that location, Gene?

MR. EIMAR: On a vehicle. And then we have security. And depending on where he's at we have one security gate he may have to go through if he's not

outside the security. And security goes there to open the gate for him. So part of that process is to notify security.

MEMBER SKILLMAN: Is he chauffeured or does he have to start the vehicle?

MR. EIMAR: He has his own vehicle. The auxiliary operator that has that area has his own vehicle to get there.

MEMBER SKILLMAN: Thank you, Gene.

MR. EIMAR: And normally he's outside because his area of responsibility is outside the protected area. So he would be close to the station blackout generators.

MEMBER SKILLMAN: Thank you.

MR. EIMAR: And normally when we respond to this, the auxiliary operators get there in plenty of time to get the station blackout generators. It actually takes the control room longer to do the control board alignment to receive power from the station blackout generators than it does for the AO to get out in the field and start it.

The other thing we're going to do is we're going to place the charging pumps and pull the lock because they have no power. And if they restart, we'll shock the reactor coolant pump seals, so we put those

in pull-to-lock. Then we minimize RCS leakage. We want preserve the inventory in the reactor coolant system. And then we maintain our reactor coolant system Tc less than 570 degrees using our atmospheric dump valves. The atmospheric dump valves remove steam from our steam generators. They're manually operated from the control room. They're not automatically operated. So you operate those to prevent secondary safeties from lifting.

And then we ensure that at least one steam generator is restoring level to 45-60 percent narrow range. So we want to have adequate feed to a steam generator.

MEMBER CORRADINI: And that comes from aux feed?

MR. EIMAR: That comes from auxiliary feedwater, yes, sir.

MEMBER CORRADINI: Which is steam-driven?

MR. EIMAR: It is a steam-driven aux feedwater pump.

MEMBER CORRADINI: And then just -- maybe you'll get to this later --

MR. EIMAR: Sure.

MEMBER CORRADINI: -- is the interlock such that if you lost DC power that aux feed could not

function, or it would just function on its own?

MR. EIMAR: If we lost DC power, Palo Verde has -- a couple of outages ago in Unit 1 we ran a test with no DC power and we were able to operate the auxiliary feedwater pump locally with auxiliary operators in the field without DC power.

MEMBER CORRADINI: So there's no interlocks that would trip it off?

MR. EIMAR: There's no interlocks that would prevent it. It would over-speed if we had a condition, but you could reset it and then restart the pump.

MEMBER CORRADINI: Okay.

MEMBER BLEY: And you don't need it for the atmospheric dumps?

MR. EIMAR: Pardon me?

MEMBER BLEY: You said manual.

MR. EIMAR: Well, they're manually operated from the control room, right?

MEMBER BLEY: Remotely?

MR. EIMAR: It's remote operated, yes.

MEMBER BLEY: But, so they need some kind of power to operate?

MR. EIMAR: They have nitrogen and they have DC. If that fails to the atmospheric dump valves,

they can be operated manually in the main steam support structure.

MEMBER BLEY: Okay.

MEMBER RAY: If you have your ear plugs in.

MR. EIMAR: Pardon me, sir?

MEMBER RAY: If you have your ear plugs in.

MR. EIMAR: Yes, if you have your ear plugs in. That's correct. It gets very loud up there when you operate those valves.

MEMBER SKILLMAN: When you are making up for the inventory that's lost through the ADVs, that inventory is coming from your feedwater storage tanks, or originally from the hot well?

MR. EIMAR: It's a condensate storage tank. Okay. We use a condensate storage tank for the auxiliary feedwater supply.

MEMBER SKILLMAN: Okay. Thank you.

MEMBER CORRADINI: And that -- sorry, I'm just --

MR. EIMAR: That's okay.

MEMBER CORRADINI: We'll go a different route. You tell us to stop when we take you too far.

So when you said you did the test without DC power, how long did you run the test with the aux feed without DC power?

MR. EIMAR: We ran it for just a -- we were able to start it and feed the steam generators. We verified that we could start and feed steam generators with an auxiliary feedwater pump.

MEMBER CORRADINI: So has there been any sort of test to see -- not just you guys, but in the industry to look at essentially any sort of transient operation of the aux feed when I didn't have DC power? In other words, I'm curious about oscillatory behavior and be able to survive that because you have to do it manually versus with DC control.

MR. EIMAR: Well, manual operation is you're basically controlling the throttle valve.

MEMBER CORRADINI: Okay.

MR. EIMAR: You're actually controlling the turbine itself, so you're in good shape. So there would be no other signals in there but what you're putting in.

MEMBER CORRADINI: And then last question: A condensate storage tank, that water supply would get you how long even if you didn't have DC power?

MR. EIMAR: Seventy-two hours.

MEMBER CORRADINI: Okay.

MR. EIMAR: Okay. We have water available for 72 hours at Palo Verde.

So you go through those actions. So one of the actions was to declare an emergency plan. So the shift manager's responsibility then is to look at protecting the health and safety of the public, so he's going to be looking at the emergency plan. So --

MEMBER CORRADINI: I'm sorry.

MR. EIMAR: Yes?

MEMBER CORRADINI: Last one.

MR. EIMAR: Sure.

MEMBER CORRADINI: And he'll tell me to stop.

So is 72 hours unusually long, or normally what we'd expect in PWRs for condensate storage?

MR. EIMAR: I can't answer for anybody else.

MEMBER CORRADINI: I'm sure you can't, but I'm kind of --

MR. WEBSTER: I can -- for Dominion plants that is long. Some of our sites go four hours, six hours.

MEMBER STETKAR: You usually see about 6 to 12, maybe, if you're stretching it.

MR. WEBSTER: Right. When I do the presentation for the meeting, I'll go over a little bit of our strategy for the aux feedwater supply.

MEMBER SKILLMAN: Okay. Seventy-two is generous.

MR. EIMAR: It's generous, yes.

MR. POWELL: Gene?

MR. EIMAR: Yes?

MR. POWELL: I think you're confusing batteries and CST.

MR. EIMAR: No, I'm good. We'll talk about that in a minute.

MR. POWELL: All right.

COURT REPORTER: Would you please identify --

(Simultaneous speaking)

MR. EIMAR: I'll get there in the strategy.

MEMBER STETKAR: Mike, yes --

MR. POWELL: I'm Mike Powell, director of Fukushima --

(Simultaneous speaking)

MEMBER STETKAR: Yes. No, come up to the microphone, Mike. Otherwise, he won't pick you up.

MR. EIMAR: Yes. No, we'll get there.

MR. POWELL: I'm Mike Powell, the director of Fukushima Initiatives. The CST has to be refilled at 34 hours. All right?

MR. EIMAR: Yes, we have water capability of feeding with the auxiliary feedwater pump up to 72 hours.

MR. POWELL: Using a combination of CST and the refueling water storage --

(Simultaneous speaking)

MEMBER CORRADINI: Yes, the answer is -- so, what I hear is it's variable. It could be as little as something that's less than 10 hours to something that's 3 days.

MR. POWELL: And it varies based upon the analysis that you perform. If you use a standard decay heat, you might see something around 14 to 16 hours. If you use best estimate decay heats using scale and origin, you can get significant improvement in that time beyond 24 hours. We were able to use a best estimate technique to extend that time out to 34 hours to refill the CST. We also were able to do a water quality analysis to line up other water sources to get us beyond 72 hours, but it's a combination of the condensate storage tank and the refueling water storage tank that gets us there.

MEMBER CORRADINI: Okay. Thank you. Sorry to interrupt.

MR. EIMAR: That's all right.

Okay. I was talking about an emergency plan. If we break this down to an individual unit, that means it's possible at Palo Verde to have this event occur in a single unit, because we're a multi-unit site. So if we looked at -- just if one unit at Palo Verde had this, the initial classification for this would be -- this was like lost off-site and on-site AC power for greater than 15 minutes would be a site area emergency. Once you get to the point you determine that your station blackout generators are not available and you're not going to recover the switch yard, you go into the extended loss of AC power, and that would be an general emergency.

But also at Palo Verde, because of the way our station blackout generators are designed, they're capable of only supplying power to two of the three units. If this was a site-wide event, the site would be in a general emergency as soon as they determined that they did not have power from the grid or power from the station blackout generator. So we could be in a general emergency initially right off the -- as the initial call for a site-wide event.

So then the next thing you look at in blackout is do I have one vital 4160 bus energized within one hour? If I do, then I just continue on. If

I don't, then I've got to look at is a station blackout generator or a diesel generator available from another unit? And if that's not the case, this is where I deviate from my procedures and I look at -- I have the 4160 not expected. I use this contingency step if the SBOGs are not available and it would direct the control room to perform the FSG or Flex Support Guideline. And also we stay in the station blackout procedure so that we can maintain command and control under the emergency operating procedure.

So at that point we'll perform the extended loss of AC Power Guideline. This is the point where we would deviate from what we would normally do.

MEMBER BLEY: Gene, excuse me. Just so I understand what you guys have done, the actual procedure is a step-wise procedure, so you must have like a little caution box or something --

(Simultaneous speaking)

MR. EIMAR: Yes. Yes, it's a contingency step in the procedure. When you get down and don't have another diesel generator, you don't have a station blackout generator and you're going to be greater than a one-hour time frame, it directs you go to the AC Guideline, Extended Loss of AC Power Guideline procedure.

MEMBER BLEY: And you guys have actually run training on these?

MR. EIMAR: Yes, we have.

MEMBER BLEY: Yes, okay.

MR. EIMAR: The video that I have shows a little bit of the simulator training. But we ran all of the crews through this, the initial onset of this event from the time they had the blackout, determined the extended blackout, and then get cooled down and stabilized temperatures.

MEMBER BLEY: Okay.

MR. EIMAR: So we did that for all the crews. So that's been completed for Palo Verde.

MEMBER STETKAR: Gene, the way the procedure is set up also, you say is power available from the -- within one hour?

MR. EIMAR: That's correct.

MEMBER STETKAR: That to me says that there's that kind of one-hour time window that you give people to try to get power back. So I'm trying to think of the timing of the event.

MR. EIMAR: Right.

MEMBER STETKAR: So is it reasonable to expect that the guys would be trying to get power back for an hour before you transition out?

MR. EIMAR: Our station blackout is we have one hour to get the station blackout generator power to it. If you're going to be unsuccessful, you're at -- now the thing is if I recognize it at the half hour point -- most of our crews recognized it within 30 minutes of the time that we had initiated the event. They said I'm going to extend loss AC power because of the situation, the information they were provided by the simulator instructors.

MEMBER STETKAR: Yes.

MR. EIMAR: And they declared the event and went right to the procedure. The expectation is if you have any doubt at all about that one hour is to enter this procedure.

MEMBER STETKAR: Okay.

MR. EIMAR: We're training the operators to do that, not to --

MEMBER STETKAR: I was going to say --

(Simultaneous speaking)

MEMBER STETKAR: -- the tendency is to go I almost got it. I almost got it.

(Simultaneous speaking)

MR. EIMAR: I'm almost there. And then it's three or four hours later you're waiting for somebody to start a diesel generator and all of that.

MEMBER STETKAR: Okay.

MR. EIMAR: The way we train the operators is as soon as you recognize that you're not -- you have to be sure you're going to get power back in an hour before you decide not to enter this procedure.

MEMBER STETKAR: Thanks.

MR. EIMAR: So that was our goal.

We're going to continue in the blackout procedure because there's some --

MEMBER SKILLMAN: Gene, let me ask a quick question here.

MR. EIMAR: Sure.

MEMBER SKILLMAN: Back onto your slide 14 --

MR. EIMAR: Back up?

MEMBER SKILLMAN: Yes. Back one or two more.

MR. EIMAR: One more?

MEMBER SKILLMAN: Yes, go to 14. Back one more.

MR. EIMAR: Fourteen?

MEMBER SKILLMAN: Yes.

MR. EIMAR: Yes, sir.

MEMBER SKILLMAN: At each of these stages you're required to make your notifications.

MR. EIMAR: That's correct.

MEMBER SKILLMAN: When you're in a blackout situation things get very busy very quickly in a control room.

MR. EIMAR: That's correct.

MEMBER SKILLMAN: You've got more lights, bells, whistles, indicators.

MR. EIMAR: Yes.

MEMBER SKILLMAN: The lighting probably changes because you're swapping onto your DC. What amount of resource is absorbed on your operating team in making timely notifications to your local communities and to the state?

MR. EIMAR: Okay. The control room supervisor and two reactor operators are responding to the plant, the shift manager and the shift technical advisor. The shift manager and the shift technical advisor share this responsibility. The shift manager's primary duty is he is ultimately responsible for classification. It's non-delegable. But we have the STA do a peer check so that -- an independent basically check of it. He does an independent verification of the classification.

So at one point the shift manager asks the STA to observe -- to basically take control room

oversight so that we have control room oversight either provided by the shift technical advisor or the shift manager. During that time period the shift manager goes to our EAL charts, determines what classification to make. He makes a classification. Then he takes back the control room oversight. Asks the STA to do the same thing.

They have two separate charts. They come to what they think the classification is. They compare it and say, okay, this is the classification we have. If there's any discrepancy, they talk about it and hopefully they get the correct classification. This one is pretty straightforward. They'll end up in a general emergency. So that is done by the shift technical advisor and the shift manager, not impacting the internal supervisor or the reactor operators responding to the plant.

MEMBER SKILLMAN: So who makes the call?

MR. EIMAR: Who makes the call? The shift manager classifies it and then the STA makes the notifications.

MEMBER SKILLMAN: Now, I understand. Okay. Back to 18.

MR. AMWAY: And if I could just interject a minute. What Gene just described at his plant is

identical, the same way we do it at our boiling water reactors as well. Same process.

MEMBER BLEY: Gene?

MR. EIMAR: Yes, sir?

MEMBER BLEY: I have two questions following up on something John had asked you. Make sure I can remember. It seems to me we have a better case here than in some places when we talk about wanting to go directly here and not wait in that I don't -- is there any flexibility or significant troubles introduced to the operators by going onto this --

MR. EIMAR: Oh, you mean if they entered it and then an hour later they got power back?

MEMBER BLEY: Yes. MR. EIMAR: No,

because --

MEMBER BLEY: There's no obstacles to --

(Simultaneous speaking)

MR. EIMAR: There's no real obstacles. When we get into the strategy, I'll talk about those, if we could.

MEMBER BLEY: Okay.

MR. EIMAR: And we'll get there.

MEMBER BLEY: And the related question --

MR. EIMAR: Sure.

MEMBER BLEY: -- once you get this thing fired up is all of the loading a mandated process?

MR. EIMAR: As far as bringing the FLEX equipment over and stuff?

MEMBER BLEY: Yes.

MR. EIMAR: Yes, it is.

MEMBER BLEY: So there aren't any interlocks we have --

(Simultaneous speaking)

MR. EIMAR: There's no interlocks, yes. We specifically looked at Fukushima Daiichi's event where they had their isolation condenser where they didn't know that they had a failure that basically interrupted core cooling. When we did our modifications we installed the penetration into like the steam generator feed lines for aux feed water downstream of the last operated, or motor-operated valve so that it's between that valve and containment penetration. So the only thing that's in between delivering water and the steam generator are manual valves that the operators will operate.

MEMBER BLEY: Okay.

MR. EIMAR: So we didn't have to worry about a failure of a component upstream in that. So the only thing between that point and the steam

generator are the check valves. So you'd have to have a mechanical failure of a check valve to have an issue.

MEMBER BLEY: Good. Thanks.

MR. EIMAR: Okay.

MEMBER CORRADINI: And that was just at Palo Verde or --

MR. EIMAR: Yes, this was Palo Verde. I can't answer for whatever everybody --

(Simultaneous speaking)

MEMBER CORRADINI: That's fine. That's fine. I just wanted to make sure I was clear.

MR. EIMAR: Yes.

MR. WEBSTER: This is Bill Webster, Dominion. That manual operation he described is the same as for our Westinghouse three and four-loop plants.

MR. EIMAR: So then we're going to get into the Extended Loss of All Site AC Guideline itself. And the guideline is basically to provide a strategy for coping with the extended loss of all site AC power.

Now realize the other part of this is the loss of ultimate heat sink, but for Palo Verde if I lose AC power, I lose my spray pond pumps, I have lost my ultimate heat sink. So the initial focus is basically to cool the reactor coolant system and maintain spent

fuel pool inventory and cooling. By cooling the reactor coolant system I maintain containment. So containment for Palo Verde is not an issue because of the size of our containment, large dry containment.

Yes, sir?

MEMBER CORRADINI: This of course is all to your point. So repeat that last thing, the connection between the ultimate heat sink again, please?

MR. EIMAR: At Palo Verde we don't have a river or a lake or an ocean, right? We have spray ponds for our ultimate heat sink. And those spray pond pumps are 4160-volt powered.

MEMBER CORRADINI: Okay.

MR. EIMAR: And so with lots of diesel generators on the grid, I have no power for them. So the ELAP results in a loss of ultimate heat sink.

MEMBER CORRADINI: So is there no cross-tie that you could take that as the water source for your aux feed?

MR. EIMAR: There is no cross-tie. The water is available if I wanted to use it, but I have other water that I'd prefer to use.

MEMBER CORRADINI: Okay.

MR. EIMAR: It is a seismic structure that

I would have seismic water available. But I don't need to use it, so it's not part of our strategy. Yes, we're trying to keep clean water --

(Laughter)

MR. EIMAR: -- because we'd like make electricity again some day.

MEMBER STETKAR: Well, you could put boron in there maybe.

MR. EIMAR: Yes, boron is okay. Used to be good in steam generators.

So our cooldown logic. Normally in a blackout procedure we don't cool down until we restore power from a station blackout generator. So we just stabilize and maintain something less than 570. You only cool down and maintain 50 degrees sub-cooling, and that's it. That's all you do is you just cool down a little bit in a blackout procedure. Then when once you get power, then you decide what kind of power is it and do I need to go to cold shutdown or can I stabilize here? If I get the grid back, I'm going to stabilize so I can turn around and make electricity. But for this event I need to cool down. And so we have two big reasons for cooling down. One is it allows -- by cooling down I depressurize. It allows me to inject my safety injection tanks. So the passive injection

will inject water in the reactor coolant system, compensate for water that's leaking out of the reactor coolant system.

And then we assume at Palo Verde a 25-gallon-per-minute seal leak instantaneously with a loss of power. So we put in basically 101-gallon-a-minute leak coming out of our reactor coolant system. And as you're cooling down, the RCS is going to contract. So you're losing that volume of water. So by depressurizing I decrease that leak rate across the seals and it allows me to minimize RCS leakage. So I get water coming from the safety injection tanks and I decrease the amount of water going out of the reactor coolant system.

So we cool down to somewhere that's an elevated T_{cold} temperature, 155 degrees. It's high enough to allow steam generators to have enough pressure to supply steam to the turbine-driven auxiliary feedwater pump, 155 psia. And it's low enough so that the RCS differential pressure is -- the leak is small enough from the leak because of that differential pressure that it's within the capacity of a single charging pump at Palo Verde. Palo Verde has three positive displacement pumps. We don't have centrifugal charging pumps. So we get the leak within

the capacity of a charging pump. So now we can start putting water back into the reactor coolant system.

MEMBER STETKAR: Gene, you said you have nitrogen -- you had pneumatically operated atmospherics. You have nitrogen bottles for those?

MR. EIMAR: Yes, there's nitrogen accumulators for them. They're good for 15 hours.

MEMBER STETKAR: Sixteen hours? All right. Thanks.

MR. EIMAR: Because we're a 16-hour coping plant --

MEMBER STETKAR: Yes, okay.

MR. EIMAR: -- with alternating AC within an hour.

MEMBER STETKAR: And that's holding them open? I mean --

MR. EIMAR: No, that's when you have the really sloppy operator that opens them up fully, closes them fully, does all kinds of -- when you make the assumptions for --

MEMBER STETKAR: So it's got some --

MR. EIMAR: -- the event.

MEMBER STETKAR: Okay.

MR. EIMAR: There's a lot of extra room in there.

MEMBER STETKAR: Okay.

MR. EIMAR: So we just assume 16 hours for our vent, but we expect that it would last longer, because we expect the operator to come up and stabilize. We watched the operators during the cooldowns in the simulator. They were able to operate ADVs and not have an issue. Okay?

So then the Support Guideline, it's basically an emergency coordinator who -- initially in the event the shift manager becomes the emergency coordinator at Palo Verde. So put emergency coordinator or shift manager basically directs entering the FLEX Support Guideline. Now the control room supervisor is going to come to him and say, look, we've got this condition. We've got a blackout. The grid's not coming back, the diesels aren't running and the station blackout generators are gone. It's not a tough decision to say, yes, we're going to go to the FLEX Support Guideline.

So it's basically loss of power, diesel generator, station blackout and if you have any doubt that you're going to get 4160 power in a timely manner. And that's what we've emphasized with the operators. If you have any doubt at all, go here, because it's not going to hurt you to go here.

MEMBER SKILLMAN: How do you ensure that your operators aren't timid in communicating their doubt? In Region I for the many years I was there we would declare inoperability when we lost our confidence.

MR. EIMAR: Right.

MEMBER SKILLMAN: And that was good enough.

MR. EIMAR: Right.

MEMBER SKILLMAN: And I'm wondering if there is code language or part of your culture where any doubt really means even the slightest doubt. Hey, I'm there.

MR. EIMAR: For this event that's the way we train the operators. I mean, if you have a mechanic up there and say I'm going to get you the diesel in the next 30 seconds or -- but he says I'm not sure, then you -- or you talk to the system operator and he says, yes, we know exactly what happened. We can close this breaker. You'll have power in the next 15 minutes, but -- or he goes, you know, I don't know. And so, and in this event, for Palo Verde our biggest threat is seismic, so it would be an issue with the seismic condition of our switch yard. So if our switch yard is not available, it's going to be longer than the one

hour to four-hour time frame that we would need to get power back.

MEMBER SKILLMAN: So you're saying --

MR. EIMAR: So it's pretty -- this one's a little --

MEMBER SKILLMAN: But you're saying your culture accepts --

(Simultaneous speaking)

MR. EIMAR: Yes, our culture -- oh, yes.

MEMBER SKILLMAN: How about at the other stations?

MR. WEBSTER: For Dominion the way the procedures -- again, it's a training. And the way the procedures are if they know they're there, they'll go early. But the procedure says at an hour point you're not there, then you go. So at most it would be that hour, and all our analysis would support that being sufficient to be successful. So it's training and procedures.

MR. AMWAY: And similar at my station there is direction as a station blackout procedure where you can make an attempt to manually start a diesel generator, but it's a very short sequence. Check this, this, this, this. If you're started, you're good. If you're not started, you continue on.

MR. EIMAR: And the same for us. If you get to the one hour point, you're here.

MEMBER SKILLMAN: Okay. Thank you.

MR. EIMAR: No matter what you're being told by anybody else. You're at one hour, you enter this guideline.

MEMBER BLEY: I think that's good. I think where Dick was going a little is we've known people here or there or cultures in plants; not yours, where to express doubt is something that gets you in trouble, gets you chastised. You ought to know that. And so people are really afraid to come forward.

MR. EIMAR: Right.

MEMBER BLEY: And we wanted to hear what you said, yes.

MEMBER SKILLMAN: Yes, that's exactly what I was trying to --

(Simultaneous speaking)

MR. EIMAR: Yes, and as I said earlier, there is no impact. If I enter this procedure, there's a couple things you got to do, but it's not like -- there's no detrimental impact to the plant if I've entered this and started taking actions before that one hour point and --

MR. WEBSTER: You're not putting water in

the generator.

MR. EIMAR: Yes, not putting seawater or getting it into the steam generator that I have to worry about it. Now, I may have de-energized the things that I want to get energized again, but it's not really a major issue.

MR. AMWAY: And I think really to address your concern, I know when I was a shift manager in -- I gave that up in 2012, but it's fairly recent experience, that during the training scenarios I would make sure -- I'd try to -- don't keep a secret. If you've got a problem in implementing the steps you're implementing, I need to know as soon as possible so I can start considering alternatives. But I don't think you'll find across the industry that we have problems that operators are afraid to raise concerns with their success path that they've been assigned.

MR. EIMAR: Okay. All right. So let's go through the event initiation timeline. So initially we have an event occur at time zero. Within the first five minutes we expect that the turbine-driven auxiliary feedwater pump starts. It's either going to start because an operator recognizes he needs to start it because he doesn't have any feedwater, or we get an aux feedwater actuation signal.

It's a busy time in the control room. I think we only had about a quarter of the crews started the pump before the aux feed. And it happens quick. The aux feed signal came in and started the pump. So it's something that happens relatively quick for the control room. And they're busy addressing other safety functions before they get there. So but it's something that the aux feedwater pump will start automatically. If it doesn't, within a minute or so of the time that it would have started the operator would have been at that point on the safety function flowchart to get there. So he would have gotten the pump started.

We figure the longest time to do a standard post-trip action for this would be about 15 minutes. I think our slowest crew was like 12 minutes in the simulator, so they all met their 15-minute time frame for that. And at that point, because you recognize you're not going to be going to a reactor trip, you'll enter the blackout emergency operating procedure. And then sometime less than an hour you're going to determine you don't have station blackout generators and no other power source, so you'll enter the Extended Loss of AC Guideline, the ELAP procedure.

MEMBER BALLINGER: I have a question.

MR. EIMAR: Yes, sir?

MEMBER BALLINGER: When you're doing these things, do you keep track of the error rate that the staff has and feed that back in to correct procedures in any way?

MR. EIMAR: Yes, the procedure writer and myself -- I attended almost all of training sessions. I only missed like one or two of them, but I was there for most all of the training sessions. But the procedure writer I had was there for the other ones. So we took input from the crews because we were kind of in a room writing these things. And so we wanted to have the crew input. So we did take input from all the crews to help improve our FSG, our FLEX Support Guidelines. And so we really didn't have an issue with the strategies or with some of the phrasing. It was mostly administrative changes we made. The operators had no issue with the strategy itself, so we didn't have any change at all how we accomplished the task through the procedure.

MEMBER CORRADINI: Yes, but just to follow on --

MR. EIMAR: Yes?

MEMBER CORRADINI: -- so far as you've taken us through this nothing has changed prior to

-- these are all procedures that would have been trained on and implemented years ago.

MR. EIMAR: Well, but station blackout. Once I said go to the FLEX Support Guideline, we're in the new stuff, right?

MEMBER CORRADINI: At least so far what you've explained to us, it still seems --

MR. EIMAR: On this --

MEMBER CORRADINI: -- that you're using all the equipment that you already --

MR. EIMAR: That's correct.

MEMBER CORRADINI: Okay.

MR. EIMAR: We have not mobilized any portable equipment at all for this so far.

MEMBER CORRADINI: Okay.

MR. EIMAR: Now this is where we start to deviate, because once we enter the FSG, we start deviating from what has existed for years.

MEMBER CORRADINI: Okay.

MR. EIMAR: We have a parallel procedure we use to take actions for the FLEX Support Guideline. Because it's going to direct us to do things that the station blackout doesn't do. The first one is we're going to do a battery load shed to extend battery life. Our batteries, by design-basis, are good for two hours.

If we didn't have a design-basis accident, they would last about eight hours if we just let the battery sit there and didn't do anything. By doing our load shed we extended our battery life out beyond 35 hours. So the shortest battery is about 35 to 37-hour time frame.

So we do a radical load shed. We go down to one channel of indication, the Bravo channel. We de-energize Alpha, Charlie and Delta. We run auxiliary feedwater Alpha, so it's taking DC power there. And then we run the Bravo train atmospheric dump valves. So we split out. We shared loads where we could. Make sure that we maximize the time available for batteries, because batteries and water are really important for this event. The batteries give you 120-volt AC for control room indication.

MEMBER STETKAR: Are there contingencies? You said there's dictated -- you know, lined this up to the Alpha battery --

MR. EIMAR: Yes.

MEMBER STETKAR: -- this stuff up to the Bravo battery. Suppose some of this stuff doesn't work? I mean --

MR. EIMAR: If it doesn't work, we have options. Well, for the indication, or the atmospheric dump valves we have a step in there to re-energize the

Bravo, if we had to.

MEMBER STETKAR: Okay.

MR. EIMAR: Okay. And then the other option is you could still operate them manually. The only two things I need to remove decay heat are the auxiliary feedwater pump and atmospheric dump valves. Both of those can be locally operated by an auxiliary operators in the field. They don't have to be operated for the control room.

MEMBER CORRADINI: So the load shed is the first thing that is in the FSGs that is different than what you had years ago?

MR. EIMAR: That's correct. Load shed is the first thing we're going to do that deviates, because we don't do any load shedding at all for our blackout procedure at Palo Verde.

MEMBER CORRADINI: Okay.

MR. EIMAR: Now the Westinghouse plants do. I don't know about the BWRs. They have a load shed.

MR. AMWAY: We had a load shed before. We have expanded it in some cases to increase the coping time of the battery.

MEMBER CORRADINI: And so just to follow on John's question: So when you do these simulator

trainings, do you do the "what if," that the procedure says X, but X is unavailable, and you see if they think out of the box and use Y? You know what I'm asking?

MR. EIMAR: We trained specifically to the strategy itself. We didn't do any faulted -- like a faulted GPM. We didn't do faulted events. We wanted to train the operators on what the strategy was. Because the rules were there were no other equipment failures, so we assumed that it worked as is.

MEMBER CORRADINI: Okay. Sometimes things happen and they don't follow the rules.

MR. EIMAR: That's correct.

MEMBER CORRADINI: So I'm just trying to figure out what you do to -- this kind of goes back to Ron's --

MEMBER BALLINGER: Yes, I'm circling back to slide No. 5, that little box on the right that says "go to functional recovery."

MR. EIMAR: Yes.

MEMBER BALLINGER: Okay. Does that drop you into the FLEX thing? I mean, that seems to me like where the rubber really hits the road.

MR. EIMAR: Functional recovery does not direct you directly to the FLEX procedure, but there's a section in there that directs you to the blackout

procedure which directs you to the FLEX Support Guideline. So the issue comes in -- if we lose DC power, then there are some other things you need to do, which would be go manually and operate those components. Okay? So it's kind of --

MEMBER BALLINGER: I probably have more questions, but --

MR. EIMAR: Yes, I know.

MEMBER CORRADINI: But if I might just say Ron's question differently, because you kind of answered it in pieces, which is that you can with ear plugs manually operate the atmospheric dumps for a while, you can run the aux feed manually --

MR. EIMAR: Yes.

MEMBER CORRADINI: -- but you need operators at the locations --

MR. EIMAR: That's correct.

MEMBER CORRADINI: -- dispatched appropriately?

MR. EIMAR: That's correct.

MEMBER RAY: What's happening to the reactor coolant pump seals at this point in time?

MR. EIMAR: I'm sorry, sir?

MEMBER RAY: What's happening to the reactor coolant pump seals at this point in time?

MR. EIMAR: Well, we assume that the seals failed instantaneously at the onset of the event.

MEMBER RAY: Meaning what?

MR. EIMAR: Meaning that at Palo Verde it's a 25-gallon-a-minute leak per reactor coolant pump.

MEMBER RAY: And it's limited to that indefinitely?

MR. EIMAR: That's correct.

MEMBER RAY: And then as we cool down, it's obviously going to be less because we decrease the differential pressure.

MEMBER RAY: Okay. You have pressurizer level indication?

MR. EIMAR: We have pressurizer level indication, but it's going to go out the bottom. Okay?

MEMBER RAY: Right.

MR. EIMAR: And we will actually form a void in the head.

MEMBER RAY: Correct.

MR. EIMAR: Because of the amount of leakage and the RCS cooldown.

MEMBER RAY: And the natural circulation that you're depending on to transfer the decay heat to the steam generator, it lasts --

MR. EIMAR: It's not interrupted during this event. Okay?

MEMBER RAY: Even with a bubble on the head?

MR. EIMAR: Even with a bubble on the head because it doesn't get into the outlet plenum. We have the head and the outlet plenum. So as long as the bubble stays in the head, you still have natural circulation. We don't go to reflux boiling. Okay?

The other thing that we do different in this procedure compared with the blackout is we start the cooldown. And like I said before, we stabilize in the blackout and don't do a cooldown until we get power back. In this case we're not getting power, so we have to do the cooldown.

MEMBER STETKAR: How fast do you tell them to cool down?

MR. EIMAR: Okay. We're going to talk about that.

MEMBER STETKAR: Okay.

MR. EIMAR: So the load shed itself takes less than hour if we use one auxiliary operator. We performed that. We validated that with auxiliary operators. Our slowest operator was 54 minutes. But it naturally has a break into two separate buildings

so we could dispatch AOs and get it done in half the time. Most of the crews who went through the simulator, they said I think I'd have two AOs do this. But we've designed it so they could do it with one.

MEMBER STETKAR: Back shift on a Sunday, how many AOs --

(Simultaneous speaking)

MR. EIMAR: Well, Palo Verde's minimum admin level 24 hours a day, 7 days a week, not counting security, is 51 people.

MEMBER STETKAR: How many?

MR. EIMAR: Fifty-one people.

MEMBER STETKAR: Yes, but -- oh, okay. So that's --

MR. EIMAR: That's everybody.

MEMBER STETKAR: Yes, but that's everybody.

MR. EIMAR: That's everybody.

MEMBER STETKAR: That's --

(Simultaneous speaking)

MR. EIMAR: For operators, we have four to six auxiliary operators per crew. We have seven reactor operators.

MEMBER STETKAR: Okay. So you've got one guy in the aux building.

MR. EIMAR: Yes.

MEMBER STETKAR: You've got another guy out at the diesel. So I got --

MR. EIMAR: Well, there's none left. Basically there's not going to be anybody at the diesel, because once -- if the diesel doesn't start from the control room, there's not much --

(Simultaneous speaking)

MEMBER STETKAR: No, no, no. The SBO diesel.

MR. EIMAR: The station blackout. Well, he's an extra operator.

MEMBER STETKAR: Oh, okay.

MR. EIMAR: He's --

MEMBER STETKAR: He's not a part of the --

(Simultaneous speaking)

MR. EIMAR: He's part of the -- at Palo Verde we have three units --

MEMBER STETKAR: Okay.

MR. EIMAR: -- with -- each unit is staffed by a shift crew.

MEMBER STETKAR: Yes.

MR. EIMAR: So there's a site crew and then there's a shift crew. So you have this -- it's called area nine. And the area nine operator works for all

three units.

MEMBER STETKAR: Okay.

MR. EIMAR: And he's got the station blackouts and stuff outside the protected area.

MEMBER STETKAR: He's got the blackout.

MR. EIMAR: Right.

MEMBER STETKAR: Okay.

MR. EIMAR: And he's got the switch yard, he's got the cooling towers --

MEMBER STETKAR: Okay.

MR. EIMAR: -- he's got the station blackout generator. So that's why I say he's probably outside of the protected area most of the time, because he's got a lot of equipment to check.

MEMBER STETKAR: All right. So you got you said four to six per unit inside.

MR. EIMAR: Yes. Yes, depending on whether we're running radwaste and condensate demands and things like that. So we have adequate staffing to do this because there's not going to be much else for them to do with no power. Okay?

MR. WEBSTER: And just to add to that, we did staffing analysis. They went through the minimum staff and the specific steps for this type of event and verified it.

MEMBER STETKAR: I mean, I'm just thinking of you've probably got a guy in the aux building and it's not clear whether you're going to pull him out of the aux building because he's checking stuff.

MR. EIMAR: He's coming out of the aux building because --

MEMBER STETKAR: Coming out of the aux building? Okay.

MR. EIMAR: -- there's nothing to do in the aux building other than part of the battery load shed. So the auxiliary operators will come to the control room and be dispatched to do the load shed and some others we give to them.

MEMBER STETKAR: Okay.

MR. EIMAR: Okay? So we basically have selected loads. Like I talked before, we have selected. The Alpha train auxiliary feedwater pump, the Bravo train atmospheric dump valves. We have selected instrumentation that we remain energized to monitor the plant for the control room. And the load shed itself also provides the equipment name and breaker number so that if we had to -- if something was broken, the control room supervisor can look and say, okay, I need pressurizer level, because it's not indicating. So which breaker do I close? He goes

through another channel. Looks up pressurizer level. Finds the breaker and he can re-energize it. Okay?

The alternates there would be to use our Charlie and Delta, because they're not feeding a auxiliary feedwater or atmospheric dump valves. So there's extra power on our Charlie and Delta batteries. So their priority is going to look at those two for an alternate instrument. Okay?

So our selected instruments for cooldown, we got core exit thermocouples, reactor vessel water level, our steam generator level, wide range, and steam generator pressure, reactor coolant system T_{hot}, T_{cold}, reactor coolant system pressure, subcooling and saturation margin for both reactor coolant system and core exit thermocouples. We got pressurizer level.

Safety injection tank. This is where we use two indicators, one on 2-Alpha and one on 2-Bravo, because we have four of them tied to the loop. So we're making an assumption if these two the pressure and level are going down, the other two that we don't have indication are doing the same thing because they're maintained within tech spec level, they're maintained within tech spec pressure band. So they're tied to the same system. So we expect that it would have the same effect.

It's important to know this because when we get down in level we want to isolate it so we don't push nitrogen into the reactor coolant system, in effect being natural circulation with a nitrogen bubble in the steam generator tubes.

MEMBER STETKAR: Operator's okay just having sort of having half the plant?

MR. EIMAR: It was interesting for especially the new operators. For us old guys that are used to looking at analog indicators to operate the plant -- we've got a lot of new digital stuff in the control rooms now. And so the younger operators that are used to playing with computers since they've been five years old, it was tough for them to -- oh, wait, the computer doesn't work? I have to look at this analog indicator? So it was eye opening to them. But we've been doing that in our simulators. Take away the computer to make them look at that stuff. And so it was interesting, and especially with just one channel.

MEMBER STETKAR: Yes, that's what I was getting to.

MR. EIMAR: Yes, it was --

MEMBER STETKAR: Switch over from normal to alternate displays --

MR. EIMAR: Alternate, yes.

MEMBER STETKAR: -- you only got sort of half of that stuff available.

MR. EIMAR: Yes, and you get one of them. And so, but they did well. They accepted it -- understood the reason for it, because we want to extend battery life. So as long as you can provide an operator justification for why we're doing something, then they're okay.

Also we looked at containment pressure. Then we got atmospheric dump valve position for the control room. And then we want to look at auxiliary feedwater flow for each of the steam generators, because we do a symmetrical cooldown. At Palo Verde we use both steam generators.

MEMBER REMPE: What about water sources? Why don't you have like a water level in the condensate storage tank or the --

(Simultaneous speaking)

MR. EIMAR: Well, because it's available locally as a manual indicator, so we don't have to have that in the control room.

MEMBER REMPE: Okay.

MR. EIMAR: And it's not going to go down that fast.

So get to symmetrical cooldown. We cool

down at 70 degrees an hour. So somewhere between 70 and 100 degrees per hour. We want to cool down in three hours. So we're cooling down from a normal operating pressure down to 360 degrees T_{cold} and the steam generator pressure 155 pounds. And in addition to that we're going to feed the steam generators up outside the 40 to 60 percent range up to 80 to 85 percent so that if we did have a problem with our auxiliary feedwater pump, it gives us about 20 to 30 more minutes of water that we can use to remove heat to troubleshoot that pump and get it back in service.

MEMBER BLEY: Yes, and that's right after shutdown, so a few hours in --

MR. EIMAR: Yes, that's right.

MEMBER BLEY: -- you have a lot more time.

MR. EIMAR: Yes, a few hours in, if we have a problem, we have more time. Right.

So then at the two-hour point we expected the battery load shed would be completed. Also at that point we need to open up our doors to our turbine-driven auxiliary feedwater pump because it's lost its cooling. So at Palo Verde our turbine-drive aux feedwater pump sits in a room probably a third the size of this room. And so it's got a turbine-driven pump in there. It needs to be ventilated. The issue is actually the

controller itself overheats. At 150 degrees it doesn't control the pump.

So by opening up the doors we did a GOTHIC analysis of the thermogradients in the room and determined that the room temperature never exceeds 135 degrees no matter what the outside air temperature is by opening the doors outside so that the pump will continue to operate indefinitely without an impact from temperatures.

MEMBER STETKAR: It's pretty warm if the operator's got to be in there.

MR. EIMAR: Pretty warm if the operator's got to go in there, but we do have portable fans that we put in there to ventilate for operators. But we don't need to do that for the equipment.

MEMBER STETKAR: No electricity though.

MR. EIMAR: Yes. What's that?

MEMBER STETKAR: No electricity yet.

MR. EIMAR: Well, no electricity yet, but when we get electricity, we'll be okay.

So at the four-hour point, three hours later, we have the cooldown complete by four hours after the event.

We assumed at 16 hours that the nitrogen goes away from the atmospheric dump valves that may

still be there; may not. At that point we might need to send an operator in every once in awhile to close down the atmospheric dump valves because you've completed your cooldown and decay heat is lowering. So you're going to maintain your pressure at 155 pounds. So you want to close down that atmospheric dump valve to keep that pressure to run the auxiliary feedwater pump.

And then at hour 34 we need to bring over our --

MEMBER STETKAR: I'm sorry, close down the atmospheric dump you said when the nitrogen goes away? Atmospheric dumps has got to fail closed on loss of nitrogen.

MR. EIMAR: Yes, but go down and manually --

MEMBER STETKAR: Crack them open.

MR. EIMAR: -- open. And they might have to send an operator in every once in a while to close them.

MEMBER STETKAR: Okay.

MR. EIMAR: Right?

MEMBER STETKAR: Thanks.

MR. EIMAR: Okay. Thirty-four hours is when Palo Verde needs to get an AC power source because

of the amount of water that we have and the size of our batteries. The first thing is with the 25-gallon-a-minute leak we need to get a charging pump running about at the 34-hour point. So by 34 hours we'll have moved over if we're able 800 kW generators. Put them onto our 480-volt load centers so we can provide power to battery exhaust fans, a battery charger, a charging pump, maybe control room fans. And if for some reason you happen to have pressurizer level, you could have pressurizer heaters, but that's just only on there because it's one source. Once you get enough water in there you'll be able to use pressurizer heaters.

MEMBER CORRADINI: So at 34 hours these come from where?

MR. EIMAR: These are going to come from the FLEX storage facility on site.

MEMBER CORRADINI: On site? Okay.

MR. EIMAR: On site. This is really when we use the first piece of Phase II FLEX equipment.

MEMBER CORRADINI: So this comes from the bunkered facility on site?

MR. EIMAR: Yes, at Palo Verde we have -- our protection is a little bit different than everybody else because our hazards are only seismic and

high heat. So currently they're on a seismic pad and they're seismically restrained for the seismic event. So we'll move that equipment over from the storage area to the units.

MEMBER BLEY: In a seismic building?

MR. EIMAR: It's the seismic pad itself and then the building that's going around that. We won't have a building around it until next year.

MEMBER BLEY: But it will be a seismically --

(Simultaneous speaking)

MR. EIMAR: Yes, it will be a seismic structure. Yes, it's ASCE-7-10, a rugged structure.

MEMBER BLEY: Have you installed some kind of quick connects for hooking these things up?

MR. EIMAR: Yes, we did. Yes, the 480-volt -- I don't know if -- they're a 180 --

(Simultaneous speaking)

MEMBER BLEY: I haven't seen any of the stuff.

MR. EIMAR: Okay. Yes, it's 180 turn. And if you get to see our video, you'll see the guys putting it together.

MEMBER BLEY: Oh, I'd like to see that, yes.

MR. WEBSTER: We'll have some pictures of connections --

(Simultaneous speaking)

MR. EIMAR: Yes.

MR. AMWAY: The same for mine. You'll find that throughout the industry they're pretty standard connections.

MR. EIMAR: Yes, we did get a standard connection, so we have to use the stuff from the SAFER Response Centers. And so we're using storage fittings for low-pressure mechanical. And then we have these quick connect 480 volts and then a 4160 or bolted connections.

MEMBER BLEY: Okay.

MEMBER STETKAR: Gene?

MR. EIMAR: Yes?

MEMBER STETKAR: You're charging -- I've listened to all this stuff. The charging pumps are not safety-related, I'm assuming.

MR. EIMAR: At Palo Verde they are.

MEMBER STETKAR: They are safety-related?

MR. EIMAR: Yes.

MEMBER STETKAR: Okay.

MR. EIMAR: Yes.

MEMBER STETKAR: So they're

seismically-qualified?

MR. EIMAR: They're seismically-qualified at Palo Verde. There are three positive displacement pumps.

MEMBER STETKAR: There are? Okay. Thanks.

MR. EIMAR: Okay. And then at that point we'll have to establish spent fuel pool makeup. Same time frame.

MEMBER SKILLMAN: Gene, let me ask you a question.

MR. EIMAR: Yes, sir?

MEMBER SKILLMAN: If you have made the connections to your generator, your 34-hour generator, if power to come back on from off-site, how is that device protected or those buses protected so there isn't common concurrent --

(Simultaneous speaking)

MR. EIMAR: The procedure we're going to use when we power up the 480-volt load centers from the FLEX generators will be that we will isolate that load center from its power supply. So the supply breaker to that load center will be opened so that you will not be able to cross-connect, because there's no way that that generator is going to -- you can't -- it's going

to be a dead bus transfer. If I want to get power backing 40 from a normal supply, I'll have to de-energize. I'll have to take this generator out and then restore power from the normal supply.

MEMBER SKILLMAN: Thank you.

MEMBER STETKAR: Four-eighty-volt breaker operation DC control power to the open and closed --

MR. EIMAR: It can be manually operated by auxiliary operators.

MEMBER STETKAR: Closing?

MR. EIMAR: Yes, sir. So it's a spring, right? So you charge the spring, push a button, the breaker closes.

MEMBER STETKAR: But you have an actual button? I mean, a lot of plants don't have those buttons --

MR. EIMAR: Yes, we do.

MEMBER STETKAR: -- that you can release -- you do?

MR. EIMAR: Yes.

MEMBER STETKAR: Good. That's unusual.

MR. EIMAR: Okay. Then at the 36-hour point we'll need to install the RCS makeup pump so we can put additional water in. The normally installed

charging pump is our first place of getting water, but then we're going to move over an alternate make up pump per the NEI-12-06 guidance. So we have this alternate pump to inject water. So we'll now have two pumps that inject in the reactor coolant system and make up for the volumetric loss of water.

MEMBER STETKAR: Shutoff head on that alternate makeup pump is?

MR. EIMAR: This one is 600 pounds.

MEMBER STETKAR: Six hundred pounds? Okay.

MR. EIMAR: Yes.

MEMBER STETKAR: Thanks.

MR. EIMAR: And then the safety injection tanks, we figure at about 38 hours they'll be empty. And for this procedure we're defining empty as 10 percent, wide range. So that that way we know there's water still in there so we don't put nitrogen in the reactor coolant system. At that point our vent valves are classed DC-powered. So we'll have DC power to those and we'll just open and vent the nitrogen in the containment so that the passive injection no longer works. It will go below RCS pressure.

And at that point we'll also install the FLEX or alternate secondary makeup pump. So it would

be one that's stored at the FLEX building so that it can eventually take over for the auxiliary feedwater pump.

MEMBER STETKAR: Safety injection tanks vent into the containment, or they vent in the --

MR. EIMAR: They vent into the containment.

MEMBER STETKAR: They do?

MR. EIMAR: Yes, they vent into the containment.

MEMBER STETKAR: That's different also.

MEMBER CORRADINI: So can you go back to 42, because you said --

(Simultaneous speaking)

MR. EIMAR: Sure.

MEMBER CORRADINI: No, no, no, no, no. Not --

MR. EIMAR: Forty-two hours?

MEMBER CORRADINI: Yes, T plus 42.

MR. EIMAR: Yes.

MEMBER CORRADINI: So what happens there again? Excuse me.

MR. EIMAR: Okay. Well, I was doing 38. I'm going to 42 now.

MEMBER CORRADINI: Okay. I'm sorry.

MR. EIMAR: At 42 the condensate storage tank is essentially empty. Okay.

MEMBER CORRADINI: Well, that's fine, but --

MR. EIMAR: Right. So we --

MEMBER CORRADINI: -- what I understand is now you're not going to use aux feed anymore and look for a different water supply.

MR. EIMAR: No.

MEMBER CORRADINI: You're going to go to a different pump.

MR. EIMAR: No, I'm still going to continue to us auxiliary feedwater if I can.

MEMBER CORRADINI: Oh, okay.

MR. EIMAR: If I have enough decay heat and enough pressure to run it, I will. What I do is I swap its suction to a reactor makeup water tank --

MEMBER CORRADINI: Okay.

MR. EIMAR: -- at Palo Verde, which is its normal alternate suction. So the combination of those two tanks gives me beyond 72 hours of water. Okay? That's what I said earlier, we had 72 hours of water.

MEMBER CORRADINI: Okay.

MR. EIMAR: And I was thinking more normally and Mike was thinking just the CST. So, but

if that doesn't work, I also have an alternate strategy to move water from my refueling water tank into the condensate storage tank. So I will be using borated water to feed the steam generators. And we'll talk about that in a minute. I've got a slide on that.

MEMBER CORRADINI: But I just want to make sure --

MR. EIMAR: Sure.

MEMBER CORRADINI: -- I thought you said you'd go to a FLEX pump. But at this point we're still trying to find the appropriate water supply for the aux feed?

MR. EIMAR: Well, the aux feed water pump normally sucks from the condensate storage tank. At the 24-hour point when I don't have any water left, I will swap it over to the reactor makeup water tank. And that would be a source of water for that other pump when I get it installed.

MEMBER CORRADINI: Okay.

MR. EIMAR: What I'll do is I'll transfer water into my condensate storage tank and use the alternate pump. Okay?

MEMBER RAY: Before we move on --

MR. EIMAR: Yes, sir?

MEMBER RAY: -- let's stop for a second

here and think about the reactor coolant system inventory. So we've been leaking out of the four reactor coolant pump seals at 25, you said.

MR. EIMAR: Well, initially it was 25. Yes, sir.

MEMBER RAY: And it declines as pressure is brought down.

MR. EIMAR: Right.

MEMBER RAY: And you've got some shrinkage taking place. But all of that you can still persist with natural circulation to 36 hours before making up to the reactor coolant system?

MR. EIMAR: That's correct.

MEMBER RAY: What's the level in the reactor vessel at that point in time?

MR. EIMAR: Basically the upper head, we have four level indicators, right? And when you go below, it basically shows a bubble.

MEMBER RAY: Yes.

MR. EIMAR: The largest bubble we expect to get, it would be three of those indicators would indicate a void. So we still have water in the upper head.

MEMBER RAY: Okay.

MR. EIMAR: At 21 percent minimum level.

MEMBER RAY: And when we're doing this sometimes we get confused between best estimate and --

MR. EIMAR: Right.

MEMBER RAY: -- decay heat level. What are we using?

MR. EIMAR: Best estimate decay heats.

MEMBER RAY: Okay.

MR. EIMAR: We did not use the one we would use for an accident analysis.

MEMBER RAY: Right.

MR. EIMAR: Right?

MEMBER RAY: Okay.

MR. EIMAR: Okay? Anything else?

MEMBER RAY: No.

MR. EIMAR: Okay. The next one would be at about hour 72. At that point we would have -- now this is where -- 4160, where it's in here. It's part of our guideline, but Palo Verde can cope to the 72-hour point for indefinite coping with 480 volt. We don't need 4160 for coping. We're going to get 4160 from the National SAFER Response Center as defense-in-depth. Because when I initially power up the buses, the 480-volt, I'm going to power up one side of the Alpha side. When I get the 4160, I can tie it onto the Bravo side and it gives me those four 180-volt

buses. So it will give me additional equipment. So the 4160 for Palo Verde is like a defense-in-depth, so it's like I want to say FLEX-plus. It gives us the other side to energize with the SAFER Response Center generators that we'll be receiving.

At that point at Palo Verde when we trip our control rods we're at a negative 14,000 pcm of reactivity, so we don't have a restart concern. And the lowest shutdown margin is at 72 hours is a Keffective of 0.93. So we're in good shape there from a restart concern.

And then at that point we also have our water reclamation facility at Palo Verde. That's where we get our cooling water from. And we have a pipeline that we can install. We have a contract with a vendor that will fuse together some 12-inch high-density polyethylene 20-foot sections of pipe. A crew of 26 people in 48 hours can run the pipe from water rec over to the units to give us water reclamation water, if we needed to use it. So we get plenty of water from water rec.

MEMBER RAY: I guess one other point from the members here, it's important on this -- reactor coolant inventory is a concern of mine.

MR. EIMAR: Yes.

MEMBER RAY: Is you get the pressure down so you can get the safety injection tank inventory added to the RCS inventory is what makes all of this work from an RCS inventory standpoint.

MR. EIMAR: Yes, sir.

MEMBER RAY: So you got to get that cooldown, not just remove decay heat, but get the cooldown going to reduce the pressure to the point where the safety injection tanks will dump into the RCS.

MR. EIMAR: Yes, that's the whole purpose of cooling down --

MEMBER RAY: Absolutely.

MR. EIMAR: -- to decrease that leakage through the seal and then get the safety injection tanks --

(Simultaneous speaking)

MEMBER RAY: In the past we would just stand by --

MR. EIMAR: And we'd just sit there and wait, yes.

MEMBER RAY: -- and naturally circulate and remove decay heat that way.

MR. EIMAR: Yes, sir.

MEMBER RAY: But then you run out of RCS inventory much quicker than this.

MR. EIMAR: Yes.

MEMBER RAY: So to get credit for the SIT tanks you got to get the pressure down.

MR. EIMAR: Right. And to back up our strategy -- we did CENTS analysis to do that. So the CENTS analysis validated what we wanted to do, and we used that to help us develop the strategy.

MEMBER CORRADINI: What analysis? I'm sorry.

MR. EIMAR: CENTS. It's a code, a computer code.

MR. BAUER: It's a thermohydraulic code for CE plants.

MEMBER CORRADINI: Oh, okay.

MR. EIMAR: Okay?

MEMBER SKILLMAN: Gene, when you say you've reached our lowest shutdown margin of decay effective --

MR. EIMAR: Yes, sir.

MEMBER SKILLMAN: -- are you communicating that it will not go lower than 0.93?

MR. EIMAR: Yes, it won't go any closer to Keffective equal to one, right. This is as high -- Keffective is 0.93.

MEMBER SKILLMAN: That's the greatest

that it's going to be?

MR. EIMAR: Right. As far as Keffective, that's the largest it's going to be.

MEMBER SKILLMAN: Thank you.

MR. EIMAR: Yes, the 14,000 pcm on negative reactivity.

MEMBER SKILLMAN: Okay. Thanks.

MR. EIMAR: Okay? And then also the safety injection tanks when they go in add borated water, so that helps out.

MEMBER SKILLMAN: Okay.

MR. EIMAR: Okay? And then at 75 hours is when we would be putting on the alternate pump, if required. Because at that point we figure we got really low decay heat and it would be good to have a FLEX pump running to feed the steam generators.

MEMBER CORRADINI: Because it's not steam-driven?

MR. EIMAR: It's not steam-driven. That's correct.

MEMBER CORRADINI: Okay. So at least at Palo Verde the strategy is to stay with the aux feed as long as possible?

MR. EIMAR: As long as possible. That's correct.

MEMBER CORRADINI: But it is available at about the 36-hour point -- well, the 38-hour point it's available, so if I needed it before then, I could have it.

MEMBER CORRADINI: Okay. But that's an on-site FLEX pump?

MR. EIMAR: It's an on-site FLEX pump. That's correct.

The only thing that's here that comes from the National SAFER Response Center for this timeline is the 4160 generators at the 72-hour point. Everything else that's on here is either an installed component or comes from the Phase II stuff stored on site.

MEMBER CORRADINI: And then the only other thing I guess, just to make sure I understood your timeline, is that you do need power at 34 hours to --

MR. EIMAR: Right.

MEMBER CORRADINI: -- do the venting of the safety injection tanks, etcetera, etcetera.

MR. EIMAR: We don't need the power to vent the safety injection. We need the power to power up a charging pump so that we maintain natural circulation to go to reflux cooling. So the priority there is to get injection into the reactor coolant system. But by

getting that generator to power the 480, I get a battery charger which allows me DC power, but I do have adequate DC power without that to vent the safety injection tanks.

MEMBER CORRADINI: Oh, you do?

MR. EIMAR: Yes.

MEMBER CORRADINI: Okay.

MR. EIMAR: Because of the tanks -- the particular vents that we selected. So we would have adequate. Okay? But the primary purpose is to get RCS injection to make up for the volume loss of water.

Okay. We already talked about this. The safety injection tank, we're going to have the operators at about 500 degrees start monitoring the level. We may revise this in the future because when we did it in the simulator it was way early. We could probably wait until about 400 degrees to start monitoring it, but it's one of the things we're looking at for a future revision to the procedure. So that way we don't forget that we have to worry about nitrogen getting into the RCS. And I said before, a 10 percent wide range we'll vent the safety injection tank to containment atmosphere so that that way the passive injection will no longer function.

So to exit this procedure, there's just

three ways you can get out of it, is basically you restored a class 4160 bus. So you have capability from diesel generator from the grid to restore that 4160 bus. That's one way to get out of it.

The other one is that we -- basically the emergency coordinator directs the unit to enter procedures basically developed by the tech support center. Now we may have alternate generators on site and we'll create a procedure to get there.

And the other one is if conditions have degraded where you're going to get core damage, you're no longer in FLEX support and you need to go to the Severe Accident Management Guidelines, if necessary.

MEMBER CORRADINI: Gene, what powers your tech support center?

MR. EIMAR: What powers the tech support center? At Palo Verde it's got its own diesel generator, which is not seismic and may fail.

MEMBER CORRADINI: Okay.

MR. EIMAR: But for communications we've done a communications modification so that we'll still be able to communicate and have computers. So they will have a way to communicate with the control room, if they need to. But this -- at the point you get here for the tech support center taking over would be beyond

24-hour time frame.

MEMBER BLEY: Gene, do the SAMGs, or will the SAMGs recognize the existence of the FLEX equipment?

MR. EIMAR: They don't now, but they will. The issue is like steam generator fill for our Severe Accident Management Guideline, right now it takes water out of our circ water canal --

MEMBER BLEY: Yes.

MR. EIMAR: -- through a fire truck and it pumps it into vents on the feedwater system inside our turbine building. Well, that doesn't work for this event because the turbine building is not seismic and we don't want to us circ water because circ water is really dirty. So we had to change the injection point. We had to change the water sources.

So I'd expect eventually that as we get done with this project that we'll go back and modify the SAMGs and realize that there's other places you can inject water. And it makes it a little bit easier because of the connections and where they're located. At Palo Verde we took the option of most of all of our mechanical connections are outside the building. We don't do anything inside the building. So from the wall of the plant into the injection point it's

hard-piped. So we welded pipe all the way down. And we have isolation valves.

For our electrical connections we have a plug-in on the wall on the outside of the building. And then inside the building it's cable inside conduit that goes to either a breaker or a disconnect switch or something so that we don't run hoses or cables inside the plant. With the exception of one of our pumps, our alternate RCS injection pump can be installed on 100 foot of our auxiliary building. And that will have a short run of pipe, or a short run of hose to install it to the piping.

But the primary strategy is external to the plant. So we specifically did that because of our weather conditions. It gets hot and will be really hot in the building, so wanted to minimize the amount of hoses and cables that we had people hauling through the plant in the heat.

MR. AMWAY: And our SAMGs will recognize the FLEX equipment as well.

MEMBER SKILLMAN: Let's just pull on that thread. For Nine Mile under 7 to 10 feet of snow how do you do this?

MR. AMWAY: Well, there's snow removal equipment that we'll have. I mean, we do have --

(Laughter)

MR. AMWAY: -- removal equipment. We're certainly used to snow, in feet, not inches, and we have sufficient snow removal equipment that will be able to clear paths, keep the access paths clear.

We'll get an opportunity to see one of the pieces of debris removal equipment we have that will certainly push the snow out of the way.

MEMBER SKILLMAN: I wasn't trying to be razzle-dazzle. I was just -- it's real, and we're seeing that right now.

MR. AMWAY: Absolutely. That's correct.

MEMBER SKILLMAN: Yes. Thank you.

MR. EIMAR: We'll just wait for ours to melt, I think.

(Laughter)

MR. EIMAR: One of the major appendices in our FLEX Support Guidelines is our Appendix Alpha, which is the DC load shed. And again, that's to extend the life of the class batteries primarily so we can maintain heat removal with aux feed water and atmospheric dump valves. It allows for continued operation of those two pieces of equipment from the control room. We wanted to make sure the control room operators were doing it rather than someone in the field

on a sound-powered headset. And it complicates things the more people have to communicate with. But that is our alternate, is to operate in the field using sound-powered phones.

We want to get this accomplished in less than two hours, because every minute you delay getting it, it shortens the life of the batteries. If we took up to nine hours after the event to complete this, the batteries only last 24 hours, so we would lose a little over a minute for every minute that we delay. So it's important to get this done. It was emphasized with the operators. They understand that. The auxiliary operators that we had walked it down, understood the importance of it. So it's quite an extensive list.

And as I mentioned earlier it lists the breaker number and the equipment that's being supplied. So if you needed to pick an alternate instrument or an alternate component, you'd say, okay, I've lost the Bravo this. I'm going to go to Charlie that. And now you have a breaker number. Send and AO out. Hey, go close this breaker. He knows which one to close.

MEMBER BLEY: Is all of the DC load shed -- by analysis and walkdown is there any effort during the shutdown to see what -- the thing I'm thinking about is at least in some places I've been things like DC can

leak through places you don't expect and if you don't actually go through and open breakers and see what happens, you might get surprised.

MR. EIMAR: We did not go through and open breakers in an operating unit. To do this it was based upon system analysis of the drawings, the plant drawings and things like that. And it's pretty clear when you get on the class side.

And then this is one of the things we talked about: if we got into this event where would there be a problem? Well, if I started down this line and I've got an AO and I send two AOs out and in a half an hour they get this done, and then 20 minutes later I get DC power. I haven't completed the cooldown and I haven't got my FLEX equipment to energize any of the buses so I could start restoring things and get a battery charger back in service, but then I can send AOs out to re-close the breakers that they'd opened. So the only impact on this would initially be that I cool down a little bit and now I've stabilized and I've got some DC loads that are de-energized that I now want to re-energize.

MEMBER STETKAR: Have you looked at what happens if you re-energize those things? Because I've seen plants where stuff locks in --

MR. EIMAR: Locks in, right. Yes.

MEMBER STETKAR: -- and when you bring power back --

MR. EIMAR: Right.

MEMBER STETKAR: -- stuff does stuff that you didn't really expect it to do.

MR. EIMAR: Yes.

MEMBER STETKAR: It's not a clean --

MR. EIMAR: Yes, we know that is a possibility. But again, we did not go out into the real plant and de-energize it to see what that impact would be.

MEMBER STETKAR: Well, it isn't even de-energized. It's when you bring power back.

MR. EIMAR: When you bring it back, right.

MEMBER STETKAR: There's stuff locked in that you didn't recognize that that valve is going to go open because there's something --

MR. EIMAR: Well, right. For valves and things like that we do have -- for actuation systems we do have procedures for de-energizing them during outages. So we know the impact from that sort of thing from our outage experience when we de-energize buses. So for component movement. But instruments that may lock in at a certain value we don't necessarily know that.

What we did for the simulator, one of our simulator instructors was able to trick our simulator into the load shed. So it was interesting to watch the crews, because as they're responding the plant, this would go away, that would go away. And he did it as an AO going out there to de-energize equipment. Then he also simulated the -- even though the non-class batteries are in a non-seismic building, we left those energized for the event. And then they went away after a certain period of time because our computer is non-class powered. So that computer went away and that shifted them to specifically looking at analog meters that were energized.

MR. AMWAY: And I wanted to address that because that point is well taken. Sometimes it's not when you lose the power. It's when you're bringing it back.

MR. EIMAR: Bringing it back, yes.

MR. AMWAY: And our restoration procedures will generally -- where that DC power impacts instrumentation and control for systems we will generally take manual action to remove that equipment from service, put a pump control switch and pull the lock, de-energize, whatever, to make sure that it won't automatically restart when you re-energize the load.

MR. EIMAR: And we learned that the hard way many years ago at Palo Verde when we de-energized things and then re-energized them. And, oh, that comes on. So as I said, now we've got it into our outage so that we control that activity so we don't get auto starts or things failing when we bring power back. Okay?

MEMBER BLEY: At least from your experience in outages a lot of this has actually been --

MR. EIMAR: Right. Yes.

MEMBER BLEY: -- is coming through.

MR. EIMAR: These parts. I mean, never have we --

MEMBER BLEY: Yes, not the whole thing.

MR. EIMAR: Not the whole thing, but bits and pieces --

(Simultaneous speaking)

MR. EIMAR: -- over the years.

MEMBER BLEY: Okay. Yes.

MR. WEBSTER: And a lot of these are built on existing procedures that are like maintenance operating procedures where you're taking this thing out of service so that information is used to determine what's going to happen, when the power can move and it's

been validated through the outages again.

MR. EIMAR: Okay. The next couple of appendices are important because they give us the control room -- the status of the plant. So we send operators out to do walkdowns. The primary walkdown, that's going to look at the spent fuel pool gate seals and ensure there's no issue there. So he goes and verifies it. We've done a modification to our spent fuel pool gates to supply an extra air supply bottle at the 100-foot elevation.

MEMBER BLEY: I've lost that slide a little bit.

MR. EIMAR: Okay.

MEMBER BLEY: What trigger is doing this Appendix B walkdown?

MR. EIMAR: Oh, this is when you get into the procedure.

MEMBER BLEY: Yes.

MR. EIMAR: You've sent a AO or two out to do the DC load shed. Now you've got a couple other AOs, going to send them out to do other things.

MEMBER BLEY: This is like the next thing you after that?

MR. EIMAR: This is the next step, right.

MEMBER BLEY: Okay.

MR. EIMAR: So they're going to go out and do this walkdown, the primary guys. We purchased as a response to IER-11-4 some submersible instruments for a spent fuel pool level and temperature. You drop them in the pool and it tells you the temperature where the probe is at.

MEMBER BLEY: Yes.

MR. EIMAR: It tells the height of water above it. This is not part of FLEX because it doesn't meet the order for spent fuel pool level, but it's the defense-in-depth that we have at Palo Verde. So one of the actions is the guy will put those in the pool. They have a remote indicator on a cable. You run it out and you can tell what the spent fuel pool level and temperature is. We'll probably run it outside the building where our makeup connections are to give the people operating out and indication where the spent fuel pool level is.

MEMBER BLEY: Oh, from outside?

MR. EIMAR: From outside, right. Yes, because it's on a cable and the temperature probe that goes into the water.

MEMBER BLEY: Right.

MR. EIMAR: And then it's got wiring that you can run down and, you know, be a couple of hundred

feet away and tell what the level is.

MEMBER BLEY: Is that a common thing? I've never heard of --

MR. EIMAR: It's not. No, it's not common.

MEMBER BLEY: Okay.

MR. EIMAR: They're on the instruments that we purchased in response to INPO's IER-11-4.

MEMBER BLEY: Okay.

MR. EIMAR: Because that was the guidance we had earlier before we had the orders.

We're going to open up our fuel building roll-up door because we're going to -- the strategy in the spent fuel pool is to have it boil, and we want somewhere for that steam to go. So that's going to go out through the full building roll-up door.

He's going to look at the status of equipment that's necessary, like anything in the aux building. He's going to make sure that there's some containment integrity actions he needs to take. We have one valve that does not close. It's a chill water valve. But there is check valve on that line, so it needs containment integrity. But we'll have manual capability of closing that valve to ensure that everything else in the containment is bottled up so we

have containment integrity.

He's going to look at the spent fuel pool status, get level, temperatures, things like that. Then he's going to go out and look at our reactor makeup water tank, because it is a backup to our condensate storage tank, to ensure that it's available.

Then he's also going to look and see if we're doing any dry cask storage operations and make sure that those guys are aware of what's going on and that they can put it in a safe condition. They have procedures to put it in a safe condition with loss of power. So if we're doing dry cask operations --

MEMBER BLEY: There's nothing active going on out there, is there, unless you're moving a cask?

MR. EIMAR: Well, at Palo Verde we have fuel movements going on in the fuel building almost all the time because we do an outage every six months. And so either you're moving in new fuel --

MEMBER BLEY: Yes.

MR. EIMAR: -- or moving out old fuel or you're refueling your reactors.

MEMBER BLEY: So there's pretty much something going on all --

(Simultaneous speaking)

MR. EIMAR: So the fuel team stays pretty busy between the three units.

MEMBER BLEY: Yes, okay.

MR. EIMAR: Secondary operators are going to look at the condensate storage tank. This is where he can go get the local level of the tank to ensure that there's adequate level there.

He's going to look at the main turbine generator, if the turbine building survives the event. We're going to vent the hydrogen from the generator because once the seal oil pump goes away on loss of power, it's going to free release hydrogen to the building and we'd rather vent it outside than have it go in the turbine building and cause potential for fires.

He's going to break condenser vacuum. Then we're going to isolate our diesel generator -- yes, sir?

MEMBER STETKAR: Do you think about a fire starting when you vent the hydrogen? I've seen hydrogen vents open up and you get nice flames out of the vent.

MR. EIMAR: Right. Ours vents outside the building, so we're in good shape. But you could have a fire; that's true.

MEMBER STETKAR: Yes.

MR. EIMAR: But again the rules for NEI-12-06, there's no other event. So at this particular time there is no fire.

MEMBER STETKAR: Okay. So according to the rules the hydrogen --

MR. EIMAR: Yes.

MEMBER STETKAR: -- knows that it's not going to burn.

MR. EIMAR: Yes, it does what it's supposed to do.

(Laughter)

MR. EIMAR: It follows the rules. It knows what they are.

MEMBER STETKAR: No, I'm mean, seriously. I've actually vented hydrogen --

MR. EIMAR: I know, yes.

MEMBER STETKAR: -- and you get -- it's not a big flame, but it is a flame.

MR. EIMAR: Oh, it's a flame.

MR. AMWAY: If I could add to that just a second, I mean, because boilers have the same hydrogen in the generator.

MR. EIMAR: Yes.

MR. AMWAY: That process of venting off

the hydrogen initially before you even purge it with Co2 is really no different than you'd do under normal ops. It goes right up the vent pipe. I mean, it's designed for that function, to vent off the hydrogen.

MR. EIMAR: And we do this every outage.

MEMBER STETKAR: I'm just saying about distractions of what's going on. My God, we have a fire going on.

MR. EIMAR: And you're right, that's important, but our fire department -- Palo Verde has our own fire department on site and their priority is the reactor first.

MEMBER STETKAR: Yes.

MR. EIMAR: And if the turbine building burns, the turbine building burns.

MEMBER STETKAR: Okay.

MR. EIMAR: There's no equipment in the turbine building I need to respond to this event. So the priority rests with maintaining core and the spent fuel pool.

MEMBER STETKAR: Okay.

MR. EIMAR: So the next thing we're going to do is we're going to isolate the starting air receivers for the emergency diesel generators. We don't have a leaky air system, but we want to make sure,

so we're going to get as close as we can to the accumulator so that if I do get a diesel back, I'll have starting air for it so I can run it.

We're going to look at the nitrogen system status, instrument air, fire protection, if those survive the event. Then we're going to look at the turbine-driven auxiliary feedwater pump. Make sure that there's no issues down there. He's also going to look at our transformers and our spray ponds and see what their status is.

Then the control room is basically going to keep track of all those actions. They're going to track the status of the information gathered by the auxiliary operators. They're going to keep track of the class battery status. They're going to direct that the main turbine generator hydrogen will be vented, to make sure that it is done. They're going to track the starting air receiver status, coordinate with water rec and fire department for providing water to the units. Because if I don't get to install that piping in, at Palo Verde we have enough fire hose and fire vehicles to pump water over from water rec if I needed to. And they're also going to look at the nitrogen usage for the atmospheric dump valves to ensure that they last for 16 or more hours.

So at Palo Verde we rank water so we can determine what is a priority, to let operators know, here, this is the water you want to use. We contracted with Westinghouse to do this. They had a 1 to 10 ranking system, 1 being the best. So our condensate storage, demin water, surge rinse tank, those were things that were high on the list. We got down to the cooling water and evap ponds. That's the water don't want to use. So it was lower on their list. So just a way of prioritizing water to help the operators. If you go to an alternate source, here's a place to get water from. But our strategy relies on using the condensate storage tank, reactor makeup water tank. So that that water is all ranked as a one.

Then we have a Appendix Kilo. This is where we get into security, because we're going to pop open security doors. So it basically provides a list of doors that will be open to implement the guideline. It notifies security of the doors. And in particular we're going to open up the roll-up door, turbine building aux feedwater pump, which is a vital area that opens that up. Control building doors, if we need to ventilate the control room, and supply the 480-volt load centers, if we have to go an alternate way to do that.

So we get into this. Security has to consider implementation of 10 CFR 73.55(p). that you have to declare 10 CFR 50.54(x). So the control room is going to be -- this will be place per the regulations where you would have to get 50.54(x) for them to deviate from the security plan. But initially when you're in the event, up early, when you start de-energizing class batteries and deviating for your station blackout procedure, you'll probably want to consider 50.54(x) at that time.

Then Appendix Tango is another one of our appendices that talks about deployment of the equipment. We divided our delivery into three different packages based upon priority. Our first priority is communication vehicles. We want to be able to communicate off site. We did modifications at Palo Verde that allows us -- we put a satellite on Unit 1's control building. It's seismic, so it's a satellite dish that deployable from the control room. We've tested it. We can make outside phone calls with it.

And then the three units are connected together with antennas. So Unit 1 has the communication off site, but all three units can communicate at time zero in this event. It's got a UPS backup. But then by the six-hour point we need to

install the communication vehicles because they provide a link to areas outside the plant into the protected area for deployment of equipment. So Attachment T-1, Package 1 is communication vehicles and some 10 kW generators to provide light stands and ventilation into the control room, if needed.

Attachment T-2, this is where we start moving over the bigger stuff, the 800 kW 480-volt generators. And we move that over and a reactor coolant system makeup pump, because that's the first component we really need to inject water into the reactor coolant system. And then the last one brings over another generator, a spent fuel pool makeup pump, and a steam generator makeup pump.

So we have a T-6 schedule that we've laid out for deployment of this. We have the resources set aside. We did this as part of our validation and our staffing study to determine what resources we needed to move equipment. So that's what we did.

MEMBER CORRADINI: And this is on site?

MR. EIMAR: This is on site. That's correct. This is not the SAFER Response Center equipment.

MEMBER CORRADINI: Okay.

MR. EIMAR: And that's the end of my

presentation. Are there any other questions?

CHAIRMAN SCHULTZ: Questions from the Committee?

MEMBER RAY: Scott, Arizona still has retrospective rate making, I assume, don't they?

MR. BAUER: Retrospective rate --

MEMBER RAY: Rate making, yes. Recovery of costs that are prudently incurred?

MR. BAUER: Yes.

MR. EIMAR: Yes.

MEMBER RAY: Okay.

MR. BAUER: Fortunately.

MEMBER RAY: Yes, we have this discussion sometimes. It's more difficult to recover prudent costs in other places.

MEMBER Other questions for Gene?

CHAIRMAN SCHULTZ: Was there a video you were going to show?

MR. EIMAR: Bill's going to show it after --

MEMBER STETKAR: Okay.

MR. EIMAR: -- if we have time.

MR. BAUER: Yes, so just to check on time here, I know it's break time. We had hoped to get through two presentations by now, so obviously we're

running a little behind. But I think if we go through Bill's, it gives the gist of what it took to get to a point of having all this implemented. And then we do have two videos. One is some elevation exercises done at Palo Verde, along with some control room training. And then we have an actual -- the control room video for a control room simulator event that basically shows when this starts, the actions in the control room when they're being taken. And Phil was going to preface that before he started his presentation.

CHAIRMAN SCHULTZ: Good. Scott, let us do this: I'm going to call for a break now. I am going to --

CONSULTANT SHACK: Well, I'd like to ask a question, Steve, before we --

(Simultaneous speaking)

CHAIRMAN SCHULTZ: Yes, go ahead, Bill.

CONSULTANT SHACK: In 12-06 the only qualification for equipment tells you that portable towable equipment that's designed for over-the-road transport is sufficiently rugged to function following the seismic event. Is there any portable equipment that doesn't meet this requirement that's dependent upon your Phase I and Phase II?

MR. EIMAR: No, sir.

CONSULTANT SHACK: Communication vehicles, you're not really depending on those? Those are just convenient?

MR. EIMAR: Well, they're for communications. They're not to mitigate the event, right? They're to communicate what's going on, but they're also -- they're over-the-road vehicles. I mean, they were built in Idaho. They drove them down from Idaho. Or Montana. Excuse me. Montana.

CONSULTANT SHACK: Okay. Thank you.

MR. EIMAR: Yes.

CHAIRMAN SCHULTZ: Okay. So what the plan will be is I'm going to call for the break. I am going to allow the break to run until 10:20, and that can allow you to organize and make sure that the presentations are ready to go. And we will run those from 10:20 until the time we break for lunch. We are scheduled to break for lunch at 12:00, but I'm expecting we will go into the lunch hour and shorten the lunch hour so we can keep the Committee's schedule relatively in place for the afternoon.

I want to thank you, Gene, for your presentation.

MR. EIMAR: Thank you.

CHAIRMAN SCHULTZ: That was very good this

morning to get us started here.

I do also want to note since we've been talking about Palo Verde that the Committee is now scheduling a Region IV trip this spring and we are likely to be on site the week of May 18th for a visit to see the equipment we've discussed.

MEMBER STETKAR: They may not have heard about this yet.

(Laughter)

MR. BAUER: It cools off at night in May.

CHAIRMAN SCHULTZ: With that, I'm going to recess the meeting for a break.

(Whereupon, the above-entitled matter went off the record at 10:07 a.m. and resumed at 10:22 a.m.)

CHAIRMAN SCHULTZ: I'd like to bring the meeting back into session. I did want to announce for the record that Member Charlie Brown joined us at the beginning of the last session, but was not here for the roll call.

And with that, I would like to start the next portion of this morning's meeting. And, Scott, I'll turn it back over to you to tell us where we're headed next.

MR. BAUER: I'd like to introduce Bill

Webster from Dominion. He's going --- he was in charge of the implementation of FLEX at North Anna 2.

MR. WEBSTER: Correct.

MR. BAUER: And former STA, so again with an Ops background here. And he's going to walk through, basically, the process of getting this implemented at a site. So, there's a lot of pictures of the installation and stuff like that in his presentation.

CHAIRMAN SCHULTZ: Thank you, Bill.

MR. WEBSTER: All right. So, again, we're going to talk about the implementation for Dominion and the lessons that we learned. We're going to look at how the strategies and the modifications that we did were developed and installed. We're going to look at we call it the beyond design basis storage facility that houses the FLEX equipment. The site portion of the Phase 3 with the National SAFER Response Center implementation, the programs, the communications that we established, some training, and then finally the validation of the FLEX strategies that we performed at Dominion.

So, Dominion fleet, we have two operating units at Millstone. One is a CE PWR and the other one is a Westinghouse 4-loop PWR. There's also a --- Millstone 1 has been shut down and decommissioned now for more than 10 years.

At North Anna we have two operating units. They're both Westinghouse 3-loop PWRs, and at Surry it's the same, Westinghouse 3-loop PWR. And Dominion also has Kewaunee unit that was shut down last year, and that's going into decommissioning, so it's not included in discussion of these slides.

So, the strategy development, initially, we began the strategy of what to do in an extended loss of AC power following the Fukushima event, basically started with the IER from INPO 11-4. We began at Dominion putting our teams together to look at how to analyze what response we could develop that would prevent core damage with that, and it was a multi-discipline team, including Engineering and Operations in the 11-4 development. So, that went into the Order EA-12-049, and the things that were done for the order was --- the kickoff was from the work that we did prior to the order from 11-4.

So, the strategy, we did detailed analysis to determine the timelines and the strategy would be successful, and they included battery analysis following load shedding, and some of Gene's information, he talked about how load shedding allowed batteries to be extended so we maintain DC power for instrumentation.

We did secondary auxiliary feedwater source analysis, and determined how much auxiliary feedwater we had, how long it would last, you know, what sources they were to give us a timeline for that.

We did the primary calculations, Westinghouse --- the PWROG, the Owner's Group did some work for the Westinghouse sites. And, actually, they did some work for Westinghouse CE & B&W. They gave us some information about how the RCS responded, so Dominion used that information and compared it to applicability to sites, and that determined when we --- when we determined when we needed RCS injection.

We also did detailed reactivity analysis to make sure that Keffective less than .99 throughout the event, and some of that analysis that we did was just what is the limiting case, where does it begin the life, end the life, and when exactly we needed a boron addition to maintain criticality after the event.

We also did some detail hydraulic analysis to verify that the pumps and equipment that was installed would be successful in delivering the water that was needed. We did some ventilation analysis in various areas to make sure that the equipment would be functional with the loss of power from the normal ventilation equipment, and also those areas would be

accessible for people to get in and do actions in the areas.

And then, finally, was a detailed electrical analysis to make sure that the equipment that we needed to restore the AC power sources would be adequate to meet the loads that were needed to maintain the function that we needed.

So, once we got the analysis done, then we C-the strategies were developed, and then we submitted that to the NRC in response in February 2013. And then after that, we started developing the design changes to implement the modifications and the strategies at the site.

MEMBER BLEY: Bill, before you go to that one.

MR. WEBSTER: Yes. We're going to cover some more details, but ---

MEMBER BLEY: Did you have to do things like open doors, or set up some kind of portable ventilation?

MR. WEBSTER: In some cases we did. In some cases for North Anna, for example, similar to Palo Verde, the turbine-driven aux feedwater pump house temperature was elevated, but if you open the door that temperature was maintained in that room, so that was an example where we had to --- when ventilation now is

closed we had to take an action that would open doors, yes.

MEMBER BLEY: All of that is built into the C-

MR. WEBSTER: All of that is built into the strategies, and the procedures, and the validation that the operators know that that specific door has to be open, and what time frame it has to be opened in. Yes?

MEMBER STETKAR: Bill, one --- I don't care about the details but just sort of general philosophy. I heard one philosophy from Palo Verde about load shedding, where they essentially got you half plant indication. Is that sort of the same philosophy in your fleet, or do you load shed them both down so that you have full indication?

MR. WEBSTER: Generally speaking, that we were load shedding to where you typically had one train ---

MEMBER STETKAR: Okay, thanks. That's all I have was looking for. Thank you.

MR. POWELL: Yes, the concept that we all typically are not --- a lot of us ---

MEMBER STETKAR: That's what I'm trying to get.

MR. POWELL: Rigged for reduced electrical

demand, similar to what was done on submarines. And you'd go to a minimum set of instrumentation but to maintain the plant.

MEMBER STETKAR: Yes. There's different ways you can get rid of loads. Thanks.

MR. WEBSTER: So, we looked at the Palo Verde response and the timeline, and this is just a comparison to similar parameters at our plant. And we talk a little bit about the emergency condensate storage tank, and you can see for North Anna and Surry we basically have about four hours worth of water initially before we have to do some action to add water to the emergency condensate storage tank.

And, again, decay heat removal, there's a local manual action to operate the PORVs at North Anna, and again at Surry. For our load shedding it's an 8-hour battery life at North Anna, 14 hours at Surry. Inventory at all of our units we need to make up water prior to 17 hours, prior to getting into reflux boiling areas. Actually, the reactivity makeup is many hours later, generally in the 25 to 35-hour range, so the limiting action is generally the RCS makeup.

Spent fuel pool, you know, is varying for the pools, about 9 to 12 hours for boiling, and then before the water actually reaches 10-foot above the

fuel, you know, between 40 and 60 hours to add water to make sure that we had adequate water in the pool at North Anna and Surry.

MEMBER SKILLMAN: Bill, please explain what you mean by local manual operation of the PORVs.

MR. WEBSTER: At North Anna, we do actually have capability from doing it in the control room, but after that then it's a handwheel on the PORV and the main steam valve house.

MEMBER STETKAR: Well, but do you instruct people to go locally mechanically, manually operate these or what's your strategy?

MR. WEBSTER: The procedure we have you start from --- you could do it in the control room as long as --- it's similar to Palo Verde. We have an air accumulator that would maintain ability to do it from control room for a period of time. After that, the operators ---

MEMBER STETKAR: And that period ---

MR. WEBSTER: --- would relocate and have to operate it manually in the control ---

MEMBER STETKAR: And that period is minutes, hours, days, months?

MR. WEBSTER: It's several hours for North Anna.

MEMBER STETKAR: Several hours.

MEMBER SKILLMAN: So, those are really atmospheric dump valves on secondary ---

MR. WEBSTER: That's correct. Power operator relief valve on the secondary, that's what we --- that's just another --- ADVs are what they are.

MEMBER SKILLMAN: Oh, it's a manually operated ADV.

MR. WEBSTER: That's correct.

MEMBER SKILLMAN: Copy that. Thank you.

MR. WEBSTER: Okay.

MEMBER SKILLMAN: And then ECST is the condensate storage tank?

MR. WEBSTER: That's correct.

MEMBER SKILLMAN: Okay, so in deference to 34 hours before you do a switch, it's four hours.

MR. WEBSTER: That's correct.

MEMBER SKILLMAN: So, at that point just to do a comparison, I want to make sure I understand, aux feed would then have a different point of water supply, or you would transition to something other than aux feed?

MR. WEBSTER: So, it's different at each site, so ---

MEMBER SKILLMAN: Sure.

MR. WEBSTER: --- at North Anna, because we have the ability to use fire protection, our fire protection, diesel-driven fire pump is located inside of a missile protected building, so we're able to use that to have --- to supply suction to the turbine-driven aux feed pump. If that's not available, then we have portable pumps that we would implement and take suction from either the service water reservoir or the North Anna Lake and use that to refill the emergency condensate storage tank for suction to the turbine-driven aux feed pump.

At Surry, we have an additional, we call it another condensate storage tank that we can align and provide additional hours to that makeup until we need to supply it from another source. And at Millstone and --- the two Millstone units you can see at Millstone 2 that's 8.4 hours before you do something. At Millstone 3 actually the tank is bigger so it's 27 hours.

MEMBER SKILLMAN: Okay.

MR. WEBSTER: Twenty-two hours, excuse me.

MEMBER SKILLMAN: Okay. But the strategy in all cases is to provide water supply to the aux feed to continue its operation.

MR. WEBSTER: Initially, yes.

MEMBER STETKAR: At Millstone 2 you go down

to 125?

MR. WEBSTER: Millstone 2 is a different --- is a CE plant that has got --- the SIT tanks are ---

MEMBER STETKAR: Okay, thanks.

MR. WEBSTER: 120 pounds, so you need to get down lower ---

MEMBER STETKAR: That's a cool down.

MR. WEBSTER: So, anyway, so these are the Millstone 2 and 3. Again, the decay heat removal, you can see the differences there. The ADVs, we call them ADVs at Millstone, so local manual operation. And at Millstone 3 we actually installed air bottles so that can facilitate doing the operation remotely or at least outside of the highest temperature around where the manual operation would have to take place. That was the modification that we actually did for Millstone 3.

In the repowering, you can see that at Millstone 2 we have a lot longer battery life. The way we could load shed those and the batteries are a little bit larger, we were able to get more battery life, takes longer before we have to restore that. Millstone 3 it's about 14 hours. The RCS inventory is about --- is, again, 17 hours for those units, and the spent fuel pool, it's similar to the others, 6 hours to boil, then

30 hours for the Millstone 2 case before you reach down to 10-foot above the fuel.

So, FLEX is an underground basis strategy. I think you're familiar with the term, we call Phase 1 the ability to use equipment and onsite resources. Phase 2 is when we transition to some portable, and in some cases they're pre-staged with some portable equipment to facilitate the function. And then Phase 3 is when we bring in the equipment from the National Response Center.

So, the first strategy that we looked at was the electrical repowering strategy where we needed to get back the key instruments. In Phase 1, again, we would load shed, and we have a time critical, or a time sensitive action to get that done within a certain amount of time to get that extension. At North Anna, it's about 30 minutes after the ELAP is declared. We have about 30 minutes to get load shedding accomplished, and that would get us 8 hours. Surry is 14, Millstone 2 is 29, and Millstone 3 is 14.

Phase 2 we're bringing in portable equipment. We have a primary strategy and an alternate strategy as required by NEI-12-06. For the Dominion fleet, we --- our primary strategy was to get back a 120 source so we were repowering our vital AC buses

directly with a 120 source. And then we have an alternate repowering strategy where we bring in a 480 generator that would repower MCVs including the battery chargers, and we would restore instrumentation through repowering the DC bus. In Phase 3 we would be bringing in the 4 kV generator from the National Response Center.

Here's just an example of the 120 connection. You see it's a 120 generator, and then there would be some connections in the plant to repower the vital AC. In the 480 case, again, a 480 generator sitting outside the building, cables that would run into a connection box. And then that would be --- and this is permanently installed cable to a motor control center that repowers the 480 system.

And then the 4 kV connection is from the National Response Center equipment coming in through its distribution panel, and we'd have the --- and then the cables would be into --- would be hooked into one of our 4160 breakers, and that would be a bolted connection inside of a spare breaker.

And these are some pictures of the actual --- this picture at the top there is a typical 480 connection, and you can see that the connections are for a quick-connect. They're color-coded so that we make sure we get on the right phases, and there's a

ground connection. And the blue ones at the bottom are actually the 120 connections that we can deploy the 120 machines, so that's just a typical panel.

There's another example on the right of one of our units. Again, this is the 480 connections. It's actually --- there's two sets of leads there that would go to two separate ---

MEMBER BLEY: Not to be overly picky, but I just noticed recently that my badges here have a little W on them now. They were white. That's to tell somebody who's color blind that there is a white stripe there. Have you considered color blindness? I remember the Navy was finding lots of people coming in are color blind, and I don't know the extent of it. These don't have physical different connectors or feel. It's strictly color?

MR. WEBSTER: They are. Now, there are labels on them so ---

MEMBER BLEY: Okay. So, if you can read you can hook them up.

MR. WEBSTER: Right.

MEMBER BLEY: Okay. The same thing with the cables?

MR. WEBSTER: As far as labels?

MEMBER BLEY: Labels.

MR. WEBSTER: I don't think the cables themselves.

MEMBER BLEY: You might think about it.

MR. WEBSTER: But an analogy, you know, as long as you --- yes, we'd have to --- I'd have to go back ---

(Simultaneous speaking.)

MEMBER STETKAR: Just turn backwards, looking at it, I just blew it up. The little labels do say brown, orange, and yellow in writing.

MEMBER BLEY: That's okay, but that doesn't help you with the other end.

MEMBER STETKAR: No, that's true.

MR. WEBSTER: Right, that's true.

MEMBER BLEY: But it's caused problems in other areas.

MR. AMWAY: I mean, I can at least tell you from, you know, licensed operators, color blindness testing is part of the physical ---

MEMBER BLEY: I did not know that. Is that true?

MR. AMWAY: Yes.

MEMBER BLEY: You have to test not to be color blind.

MR. AMWAY: Yes.

MEMBER STETKAR: That's licensed operators.

MR. AMWAY: That's licensed operators. That may not extend to the plant operators ---

MEMBER BLEY: For the guys out here.

MR. AMWAY: --- that may be involved in there, but at least a portion of the plant staff has been validated to not have color blindness.

MEMBER BLEY: But maybe not the guys who would be hooking this up.

MR. AMWAY: Correct.

MEMBER BLEY: You really ought to think seriously about it.

MR. AMWAY: We can take that back and think about it.

MEMBER BLEY: I mean, if stuff turns backwards mostly that's not a tremendous problem, but it's still not the way you designed it to work. And there are --- at least from my experience in bringing people in through the Navy was in ROTC, my last assignment there, surprisingly a number of people are, in fact, color blind. I don't know if these colors are picked so that they help people who are color blind because some are dark and some are light, and that might work, but it's --- you ought to be sure about that.

MEMBER BALLINGER: With older people, you know what Daltonism is? It's a special kind of color blindness in people like me, and it has to do with differentiating between I think red and green.

(Simultaneous speaking.)

MEMBER BALLINGER: But it happens when you age, among other things.

MR. WEBSTER: Yes, that's something we'll take back and think about. I mean, clearly they are labeled here.

MEMBER STETKAR: Well, this is more generic than just Dominion.

MEMBER BLEY: It's more generic and if the cables aren't labeled that doesn't get you out of the woods. But they might have been designed with that in mind. I mean, those three colors on a gray scale might be significantly enough to distinguish that it's not a problem. I just don't know.

MR. WEBSTER: These are some pictures of the generators. Here's the connections at the generator. These cables, obviously, run to the --- those boxes we just showed you. This is a picture of the 120 machine, and this is the 480 machine being moved to its location by its tow vehicle.

So, for decay heat removal is the next set

of strategies that were developed. Primarily, as we have said turbine-driven aux feed pump supplying steam generators from the emergency condensate storage tank. That's your Phase 1.

Phase 2 is the transition from the plant equipment to onsite portable equipment. In some cases, for instance, at North Anna we would go to the fire protection system and get that aligned. At Surry we would go to the alternate tank, and that's a gravity feed. And if those didn't work, then we're using the high-capacity pump that we have stored on site to supply at least 300 gallons a minute suction to the aux feedwater systems on both units at each site. And also it would be for supplying water to the spent fuel pool.

We also in accordance with 12-06 have a backup to the aux feedwater pump. In our case, it's a backup diesel-driven pump, and there's a primary connection on the aux feedwater pump header that would inject water directly from this pump. And there's an alternate connection, as well, that's generally in the feedwater or blowdown connections. It's another location for injecting water into the steam generators.

MEMBER CORRADINI: And this would be used as a backup to the aux feed on site?

MR. WEBSTER: That's correct. Initially

MEMBER CORRADINI: Because it's housed where the generators are and everything else.

MR. WEBSTER: This is housed in the protected storage with the generators and everything else. Right.

Now, this is an example of a connection that we installed. This happens to be emergency condensate storage hose connection where we could use this to backfill and fill the emergency condensate storage tank. We could also use it to move water from this suction connection to the portable aux feedwater pump. Here's, again, is a fill, an aux feedwater connection on one of our units, and you can see these connections are storage connections, so they're standard connections that we use in the industry. Here's another example of an installed connection for aux feedwater pump header.

MEMBER BROWN: Are valves periodically checked for operation? Do they always close?

MEMBER BLEY: The two valves that isolate the connection ---

MEMBER STETKAR: If you go back to the previous slide. There you go.

MEMBER BROWN: Any of the slides with valves

in series.

MEMBER BLEY: Are they periodically operated to insure they haven't bound up in some way, or haven't frozen in place, or they have not whatever?

MR. WEBSTER: Well, obviously ---

MEMBER BLEY: There for 5 or 10 years, and happy.

MR. WEBSTER: Yes, we do have --- they would be in a preventive maintenance program to have them inspected or cycled at some frequency. I don't remember off the top of my head exactly what that is.

MEMBER BROWN: That's why I asked.

MEMBER STETKAR: Do you actually have any tests where you really feed the steam generators with this stuff to make sure that you can do ---

MR. WEBSTER: Well, most of these connections as you can see are relatively simple. They're going into a normal connection, then we --- because of just the sources of water and the potential contamination to the aux feedwater system, we did not actually flow and we're not required to flow actual ---

MEMBER STETKAR: Thank you.

MEMBER BLEY: Not even once when they were installed.

MEMBER STETKAR: Not even with a big tank of nice clean water that you can take suction from.

MR. WEBSTER: No, we didn't actually flow water into the systems for these new connections.

MEMBER BROWN: Or backflow out? Nothing passed through them.

MR. WEBSTER: That's correct.

MEMBER BLEY: Some of you guys must have been on the startup system units I would assume. If not, things --- I haven't had extensive experience, but I have had a couple --- no, actually, I had several years doing that sort of thing, and there were times when newly installed valves wouldn't work, and sometimes you'd find odd things inside that kept them from working, or something left in between the two, and if you never flowed anything through them either direction, or looked through them, maybe had some kind of inspection, look through and see there's a clear path when they were first installed ---

MR. WEBSTER: There was validation or post-modification work that was done. In some cases we did some hydro testing on the system after it was installed, so there was some indication that the paths were clear. We did verify that the paths were clear, weren't blocked, that the valves in a position that they

were expected to be. On the ECST valves I'm sure, you know, once they installed it they did verify that water would flow out of them. So, there was post-mod testing that was done to validate that the piping was clear to where it was intended to go.

MR. POWELL: I think FME practices back from when we started up the units in the '80s are a lot better today than they were then. We did visuals very similar to what Dominion did. We did not energize systems with the portable generators. We did not move water from the CST using a portable pump. Our challenges were what was the right level of design validation testing. We did have to do pressure testing on some sections of the piping connected to the primary. And we --- including the primary, we didn't hook up the ---

MEMBER BLEY: You did enough that you're convinced you had clear paths. And the only way I can think you could do that is either --- hydro doesn't do it, but either flowing something through it, or if you can do a clear visual look through to see that the path is open.

MR. POWELL: And then after the systems were connected and welded to the primary you do a visual to make sure there's nothing in the pipe, as well.

MEMBER BLEY: Yes, okay.

MR. WEBSTER: So, here's a picture of the high-capacity pump being towed down to where it's going to take suction off of; in this case to North Anna Lake. And this is the backup aux feedwater pump, and this is located in an alleyway during the validation process. This is a picture of that pump.

MEMBER BLEY: Did this stuff have to be designed or was this off-the-shelf stuff that you could find?

MR. WEBSTER: Most of the pumps that we bought were commercial ---

MEMBER BLEY: And you kind of hook up some things.

MR. WEBSTER: Right. These are standard --- a lot of these are standard fire protection ---

MEMBER BLEY: That's what I would have thought, yes.

MR. WEBSTER: This is actually a Hale fire protection pump ---

MEMBER BLEY: Okay.

MR. WEBSTER: --- that we're using for an aux feedwater pump.

MR. AMWAY: We tried to stay away from as much as practical having plant-specific designs for this type of equipment.

MR. POWELL: There were some cases, like we purchased Cummings diesels for our four diesels, and we had to have the diesels modified for the industry standard connectors.

MEMBER BLEY: Okay, sure.

MR. WEBSTER: There were some specifics, but most of it we attempted, again, to get commercial grade equipment that was readily available.

MEMBER BLEY: Okay.

MR. WEBSTER: We have the Phase 3 coming in from the National SAFER Response Center. Again, there's the ability to bring in 4 kV. We can repower equipment, and there's water for purification units that are being brought in. And additional aux feedwater pumps, and both the medium-capacity and high-capacity pumps.

So, for RCS injection the analysis told us when reflux boiling would begin, and our target was to begin RCS injection prior to that point. The time depends highly on the amount of seal leakage that we get. For Dominion, we're replacing all our OEM Westinghouse seals with Flowserve Seals so, therefore, we did calculations, you know, with both of these seal leakages in mind, because before we implemented all the Westinghouse seals weren't installed, so we had to do a combination of seal leakages, and compare that to the

original analysis that was done.

In our case, the 17 hours was the point in time, where if we injected prior to that we would be restoring RCS inventory and verifying that we don't get into the reflux boiling region.

Phase 2 we have two RCS injection pumps that we take suction from the refueling water storage tank, is a borated water source. And the units on Millstone 2, we actually have the capability of repowering the charging pump using the 480-volt generator, again taking suction from the refueling water storage tank or boric acid storage tanks for that unit.

MEMBER STETKAR: They safety-related pumps on Millstone 2?

MR. WEBSTER: Millstone 2, yes, I believe they are safety-related pumps. They are the normal makeup pumps. They're not the SI pumps. They're just normal charging pumps.

MEMBER STETKAR: The reason I'm asking safety-related, I want to know what they're seismically qualified for, so that's ---

MR. WEBSTER: And all the FLEX components and systems that we credit for, we did the seismic evaluation to verify that two times the SSE they would

survive, so if they weren't safety-related and previously evaluated, they'd be evaluated as far as the FLEX equipment was concerned.

MEMBER STETKAR: Two times current SSE, or two times the evaluated --- reevaluated SSE?

MR. WEBSTER: Current SSE is where we went initially.

MEMBER STETKAR: Thank you.

MR. WEBSTER: This is an example of an RCS connection. Again, it's our standard connection point. This is a suction line that comes from --- eventually from the refueling water storage tank, and this is the pump in the alleyway that would --- this pump actually will inject up to 3,000 pounds at 45-50 gallons a minute.

Containment Cooling Strategy, we did an evaluation, an analysis that indicated that the containment integrity is not challenged in a week, and actually the pressure was never challenged. It was --- the temperature went to the limits of the EQ program. So, again, at least within a week the containment integrity is not challenged, and the integrity itself is never challenged.

Dominion went through an extensive procedure development and similar to Gene's

presentation, we developed the FLEX strategy procedures. This is the list of the 15 procedures that we developed that would be implemented from our SBO procedure in this case for the Westinghouse units, ECA-0.0. And that would kick out to each of the FSGs as needed. Any questions on that?

This is the beyond design basis storage building at the Dominion sites. It's a missile protected building is where we house the portable equipment, and we have a single building at each site that would house the equipment.

CHAIRMAN SCHULTZ: What are the other design requirements for the building in terms of seismic or other design features?

MR. WEBSTER: Seismic, it was designed for the design basis seismic event. We did do an evaluation for the new seismic hazards, particularly at North Anna to verify that the building would stay intact. It was more of a margins evaluation, and we verified that would be the case.

And ventilation-wise, we just maintained temperatures within --- you know, the equipment is not going to freeze and it's not going --- is some ventilation. So, tornado protection, seismic, and ventilation essentially is what we ---

CHAIRMAN SCHULTZ: Thank you.

MEMBER SKILLMAN: Bill, is that a concrete dome? Is that what we're looking at?

MR. WEBSTER: This is a pretty unique design. It is a concrete dome. The way they build it is there's a --- they set it up and they --- there's a Mylar sheet that they actually --- they build the foundation and then this Mylar sheet, they actually blow up, and then they fill --- they do shock crete and rebar inside it, and that's how they build the dome. So, it's kind of built from the inside. It's about two-foot of concrete and rebar inside, but what you're looking at here is actually the cover that was originally blown up to do the construction.

MEMBER SKILLMAN: Thank you.

MEMBER CORRADINI: And you said it but just to repeat so I get it right. So, this is tornado, missile protection ---

MR. WEBSTER: Right. And this is --- you know, you see the doors are pretty heavy duty, again, for missile protection.

MEMBER CORRADINI: So, and then just repeat just to make sure I --- so this already included the reevaluation due to external events to get to this design basis? You explained it to Steve and I didn't

completely get it, so I want to make sure I understand it. So, that this is already after you've done the reevaluation relative to seismic, and missiles, et cetera? And that's what went into the design?

MR. WEBSTER: Well, it was designed to design basis standard. That's what 12-06 requires us to do.

MEMBER CORRADINI: Yes.

MR. WEBSTER: And what I said was that ---

MR. AMWAY: Existing design basis.

MR. WEBSTER: Existing design basis, right. So, it's not the reevaluated hazards.

MEMBER CORRADINI: Oh, okay. I misunderstood. I thought you had already finished the reevaluation and it was ---

MEMBER RICCARDELLA: They did a ---

(Simultaneous speaking.)

MEMBER RICCARDELLA: --- to show that it ---

MEMBER CORRADINI: For seismic?

MEMBER RICCARDELLA: For seismic.

MEMBER CORRADINI: Okay. I'll ask him.

MEMBER RICCARDELLA: Okay.

MR. WEBSTER: This is some of our deployment vehicles. Obviously, this tractor, this is, you know,

a front-end loader.

MEMBER STETKAR: These guys live inside the dome?

MR. WEBSTER: Correct.

MEMBER STETKAR: Okay.

MR. WEBSTER: And then we also have smaller vehicles for handling smaller type equipment, and tools, and supplies that we needed for the event.

MEMBER CORRADINI: What's the volume of this thing that was built?

MR. WEBSTER: It's 10,000 square feet.

MEMBER CORRADINI: Okay, footprint.

MR. WEBSTER: Right.

MEMBER CORRADINI: Thank you.

MR. WEBSTER: So, for our FLEX Phase 3, Dan is going to do a presentation that's going to be a little more detailed, so I'm just going to go at it from a plant perspective.

The National SAFER Response Center, here's the general timeline we're going to be making notifications from the control room. They're going to mobilize the SAFER team in approximately two hours, begin to transport equipment to an offsite area. At 20 hours it arrives at that area, and then we're beginning to transport it, and if needed to airlift it to our

onsite storage area or staging area, rather, and with the goal of having the first piece of equipment on site in 24 hours.

And this is an example of a staging area. Here it's at North Anna, it's a parking area here, and the storage building is located up here. So, this is where we would --- helicopters would land on our site, and then deploy down to the plant. Again, this area and the haul routes down to the plant have been evaluated to make sure that they would be --- they would survive after the event, flooding. Obviously, we would be able to use that debris removal equipment from the storage area and clear any debris prior to 24 hours before the equipment actually arrives on site.

The sites did a response plan. It's a documented plan that we have at each of our sites, and the control room staff, and the ERO staff has a copy of this that talks about the --- just a step by step procedure on how we respond to the SAFER Response Team, and the logistics of their teams.

MEMBER STETKAR: Bill, I just --- you train your operators on how to use front-end loaders and ---

MR. WEBSTER: We'd actually had some training. And I'll go over training specifically here in a minute, but yes ---

MEMBER STETKAR: The reason I ask, because I went to a site once where they had a fire truck and nobody --- people forgot to train the operators on how to use the fire truck.

MR. WEBSTER: Actually, that's ---

MEMBER STETKAR: I understand how to drive a golf cart, but front-end loaders are a little different.

MEMBER SKILLMAN: Would you go back a slide, please? The logistics in transportation, would you talk a little bit about that? Here's why I ask. Say, North Anna, it's relatively rural. We've got plants down on the ocean that are actually moated. You've actually got to cross a bridge to get to them. Some plants have close-in interstates, other plants don't. So, for the plants that you're talking about please speak a little bit about the logistics, how you've solved the riddle of big equipment, tractor trailers, remote area, crossing bridges, getting to your site within 24 hours. And I would guess Memphis is a starting place for you.

MR. WEBSTER: Right, so --- and I think Dan is going to speak to a little more detail when he gets here. But generally speaking, what we all assumed was that areas outside the plant approximately 25 miles was inaccessible, so we would have to --- we would not

--- you know, that's one of the things we looked at. And as we get into the response, you know, we will be notifying our local states and the Department --- you know, the Transportation Departments would be involved, and they would actually access areas to the site. And at some point in time they would determine it's inaccessible, you need to airlift equipment in. So, we all had planned on having a local airport or generally it's a local airport that's within the 25 to 35-mile range of the site so that we can have the equipment brought to that area. And all the equipment was designed to be airliftable, less than 8,000 pounds. And we would be airlifting it from that site --- from that location to the site. So, when I was pointing out this area here, that's where the helicopter would land the equipment and we would move it to the site. Now, if the bridges were passable, clearly, they would drive it in, and we wouldn't use that. But that's how we designed the plan.

MR. POWELL: And either National Response Center can --- either can support any plant in the U.S. They're 100 percent redundant to each other, so if Memphis was unavailable, they would go to the Phoenix Center to ship the equipment.

MR. WEBSTER: So, they would fly it into an

airport that could support larger airline. They would get it to this local airport for helicopter transport, and then the helicopters would take it to ---

MEMBER STETKAR: Do you contract separately with that helicopter transport from that local airport, or is that part of the network?

MR. WEBSTER: Again, I think Dan is going to talk a little bit about that, but ---

MEMBER STETKAR: Okay.

MR. POWELL: John, I can address it.

MEMBER STETKAR: We'll hold it.

(Simultaneous speaking.)

MR. BAUER: The other thing is when the SAFER Team came to the site and worked with them to develop this document you're looking at, they actually traveled the alternate routes to the site to look at and identify what would be the primary route to drive the equipment in, if you could. So, they would do an assessment of --- as the stuff was being shipped from the National SAFER Response Center to the staging area, they would already be planning well, which routes are available into the site.

MR. WEBSTER: So, for the sites that we had a single point of contact that would be communicating with the SAFER TEAM, and then we implement our emergency

plan through our emergency facilities, contact state and local, contact federal. And this is --- and through the state, and local, and federal you'll see that's where we also get some helicopter support, if needed.

For the National SAFER Response equipment for Dominion, we're getting 4 kV generators, 480 generators, high and low-pressure pumps, the backup aux feedwater pump, mobile boration units, water treatment, submersibles, portable air compressors, and some suction booster pumps, high flow pumps.

So, as part of the response we had to develop the programmatic elements for things like quality attributes, equipment design storage, procedure guidance, maintenance and testing, training, staffing, configuration control, so I'm going to talk a little bit about some of the program elements that we established.

So, this is basically just, you know, talking about --- we had the engineering technical evaluation which is part of what I had talked about originally, all the analysis and things that were done, the documentation of the strategies, why they work, how they work. So, that was all part of a body of engineering work. We developed programmatic --- a program, procedures, program documents that would point to these

technical evaluations for justifications. We established configuration management so that these FLEX strategies would be maintained. If there was some design change, or some procedure change occurred, there was feedback to verify that the original strategy wasn't affected. And then how to deal with procedures, including how to get the guidelines approved originally, and how to maintain them. And, again, the training.

This is in --- the summary of this is what we're going to respond back to the NRC in a final integrated plan, and then from this information, the safety evaluation would be developed.

Program interface, at Dominion sites we're going to have a corporate program monitor, and there's going to be a station program monitor. And then these other things are the number of departments that are being touched by this program including the Operations Department. Obviously, the Maintenance Department that's going to be responsible for maintaining the equipment, you know, outage and planning, there's some aspect of this during Modes 5 and 6 that they're involved with. The Air Site Services with their vehicle maintenance program, they have an element for maintaining the equipment. Design engineering and

licensing from the station. There's also the emergency planning group, training, supply chain, security. Then the Owners Group is involved, so there's a lot of interface, program interface between all these various groups that are being affected by and implemented through this program.

So, communications is one of the important things that was considered during the development of this program. So, for Dominion our offsite communication strategy was originally between zero and one hours that we would be using satellite phones to contact outside response agencies and the NRC. We deploy within one to three hours an additional --- it's a portable satellite antenna that would allow us to use desk phones from the control room rather than an operator having to go outside to make that communication.

At about six hours, we have a communications trailer that would be deployed that would include the ability to restore repeaters and some radios for communication onsite, and then the offsite teams as they arrive on site.

MEMBER SKILLMAN: For those first two bullets, is that equipment in use now?

MR. WEBSTER: We do have satellite phones.

We bought special satellite phones, additional ones for this response specifically, so the answer is some of these are. The ComLabs Rapid Response equipment was bought specifically for this.

MEMBER SKILLMAN: Okay, thank you.

MR. WEBSTER: Initially, some of the communication is going to be through existing sound-powered phones. We also --- actually, we ordered and have installed more sound-powered phones, but that's going to be used. And then we have 450 megahertz radios from a point-to-point that you can communicate point-to-point. And the repeater that's coming later would be --- would facilitate more use of the radios. But, initially, the operators can either be face-to-face or use the sound-powered phones in the areas that are set up, like the aux feedwater pump house and areas like that.

MEMBER BLEY: You're already wired for sound-powered phones?

MR. WEBSTER: Yes, already wired for sound-powered phones.

MEMBER BROWN: Are all plants wired for sound-powered phones?

MEMBER BLEY: I do not think so. Are they?

MR. WEBSTER: Not all.

MR. AMWAY: I could tell you in my particular instance for Nine Mile Point we are, and we ---

MEMBER BLEY: A lot of the older ones were.

MR. AMWAY: Very similar strategy in terms of point-to-point radio coms, and sound-powered phones. It's almost identical, including the satellite ComLabs is what we're using, as well.

MEMBER BLEY: Okay. I kind of like that they do. I mean, they're pretty reliable.

MR. AMWAY: Yes.

MEMBER STETKAR: I suspect the new ones may not be.

MEMBER BLEY: May not be wired. I know I've seen pads that are not, so ---

MR. WEBSTER: So, these are some pictures of the --- again, this will be stored in the TSC area. And this can be rolled outside and they bring the cables and hook it up inside. And, again, it keeps the operator in the control room where he needs to be rather than having to communicate from outside the control room. And once this satellite antenna is positioned, then it gives him more capability for satellite and for radios.

MEMBER BLEY: I'm sorry to ask, for those of you who do have sound-powered phones, do you use

them, are people used to communicating on them at all? Do you exercise it once in a while?

MR. AMWAY: We actually do, and ours is the --- I mean, because it has both a powered and non-powered mode.

MEMBER BLEY: Oh, okay.

MR. AMWAY: And we have a patch panel that's located right below the control room, and we've used it, you know, to communicate between the control room and the under vessel area during outages, so it is used.

MEMBER BLEY: Okay. The reason I asked, it takes some getting used to to be able to understand anything on the other end.

MR. WEBSTER: Right. And Dominion, at some of our sites we actually have an operator procedure to go and verify that they still work.

MEMBER BLEY: Yes, but my point is if you don't listen to them and practice, you don't hear anything but garbabababa. The frequency response is pretty meager.

MR. WEBSTER: Okay. So, I'm going to talk a little bit about training. So, for all our training we use the systematic approach of training process, various disciplines were trained. There was a phased approach. In our case, since we were implementing

--- the way our fleet --- North Anna has actually implemented on one of their units, we had to do some of the training even prior to some of our equipment arriving on site, so we had to use a phased approach to get as much training as we could done when we needed it. Then had to do a gap analysis and follow-on training after that, so it was a phased approach for us, primarily because of early implementation. Anyway, so we'll talk a little bit about that. And then we did multiple discipline training for all the required disciplines that needed to implement strategies.

So, analysis that we did was based on, obviously, the orders, what's contained in NEI-12-06. There was an IER-13-10 that came out from INPO, that had some training on it. Those were considered. Design changes and engineering technical evaluation affected the training. Owners Group, you know, changes in the Owners Group, the new FLEX guideline procedure. Obviously, you had to do job task analysis to make sure that the right amount of training was done. And then training on the new portable equipment that wasn't --- that the operators and people that are using weren't accustomed to.

So, the disciplines we trained, operators were trained. In our case, some of the security staff

is going to be used particularly for debris removal, so they had to get training on their roles. Maintenance staff we're training --- were trained, emergency response organization, and other disciplines including the station leadership teams.

So, again we used a phased approach as the design changes came out. There was overview training that was developed. Part of that used some of the NANTeL information coming out of INPO, but we had an overview, including site-specific overview training that was provided to many disciplines. Most everybody got this overview training. And then there was more specific training on the FSGs and FLEX equipment for the operators and the ERO organization.

So, we analyzed the common training modules from INPO, as I said. Job task analysis for the Operations, and that was part of their initial and continuing training. And we had to do delta training primarily because of early implementation, some of the equipment and procedures were in development and we had to do training. And then we had to follow-on after we got the training feedback to effect the FSGs, and when they were finally approved. And all of that was successful, fully implemented in North Anna back last month.

MEMBER SKILLMAN: Bill, go back to your Slide 54, please. What special training is given to security?

MR. WEBSTER: Well, in this --- in our case, we are actually using the training staff to remove debris.

MR. AMWAY: Security staff.

MR. WEBSTER: I'm sorry, the security staff to remove debris, so we actually had set up, you know, where they would come over, at least a certain number of the security people that were going to be training for it. We have security as part of our fire brigade at our site, so generally it was those people that was also involved. The fire brigade would get this training. And I forget exactly the number of security personnel that were trained, but there was a number that we would have, I'm sure that we have three or four per shift that would be available. And we actually had them trained on debris removal equipment that we had. We actually moved piles around so they were comfortable with the operation of it, how to drive it, you know, what to do with it.

MEMBER SKILLMAN: So, security is actually operating that equipment?

MR. WEBSTER: That's correct.

MEMBER SKILLMAN: Then who's on watch?

MR. WEBSTER: Well, in --- most of the time from minimum staffing to admin staffing, there's generally more security people. After this event, you know, in beyond design basis, the security posture might be different than, you know, initially, so that was considered. So, it was considered in our staffing analysis how many security personnel would be available to do it and maintain security requirements.

MEMBER SKILLMAN: It was --- I mean, obviously, we can't delve into details here, but that is a real concern because others have talked about opening doors that would normally be security doors, and you need to post people there. You can think about damage to perimeter fences, and things like that that people would need to monitor.

MR. WEBSTER: One of the things going into this work, we did not consider that we had a concurrent security event going on. So, in other words, we wouldn't consider --- there was different parts of the security parts that we --- not to get into a lot of detail there, but ---

MEMBER STETKAR: You don't. But, I mean, there could be breaches like trees falling down on your security fences ---

MR. WEBSTER: Exactly.

MEMBER STETKAR: --- and things that will require ---

MR. WEBSTER: Right.

MEMBER STETKAR: --- a watch, or at least possibly conflicting priorities. And that's ---

MR. WEBSTER: As Mike indicated, or Gene in the response, you know, we may have to enter 50.54(x) and deviate and adjust to the condition on the site. The primary concern ---

MEMBER STETKAR: But certainly among the security staff, it certainly could introduce priority conflicts. You know, do I go jump in the front end loader, or do I go check the fence that's down?

MR. POWELL: You do transition through different levels of your security plan, and I've got to be careful here what we say.

MEMBER STETKAR: No, that's ---

MR. POWELL: But that's why Gene made the tie from 55.73(p) to 50.54(x). And, you know, if you ---

MEMBER STETKAR: But, I mean, he was talking it in the sense of opening doors and things.

MR. POWELL: Yes.

MEMBER STETKAR: We're now talking about

taking those people and having them do non-security functions, debris removal, firefighting, that sort of thing.

MEMBER SKILLMAN: I was going in that direction, but I just want to take a minute and make a comment, then you can understand where I'm coming from. I was the emergency support director at TMI when the man got in the plant. We had over 150 Pennsylvania State Police on the site of TMI. We had a major fraction of those in the protected area. All of them were armed. Our security wasn't sure what to do. And I will simply say that when you get into a situation that begins to have its own dynamics, it's easy to lose sight of what the barriers are that you're supposed to protect.

If security people are being told to drive front loaders, and the tree goes on the fence, who's on watch? It seems to me that this is an area that really needs very delicate handling, because it's easy to lose sight of the goal. Security has a particular function, and security can really be put to the test as the event begins to unravel. That's as much as I'm going to say.

MR. WEBSTER: I'll tell you this, generally speaking, you know, we have enough additional security staff to --- as far as the minimum staffing is concerned to be able to support, but I understand the comment.

MEMBER SKILLMAN: Thank you.

MR. WEBSTER: Okay. So, anyway, so the Operations personnel, they did job task analysis. They identified eight new tasks that they were trained on. They received the overview training, and then they received specific FLEX strategy guidelines, and the BDB equipment training, so operators as well as the security people understand how to use the equipment.

Engineering, the internal population they got continued training, they got the overview training. Those members of the emergency response organization got additional training from the engineering organization. And then we just talked about the security personnel.

We did leadership training from --- through SOER-10-2, and then there's a new INPO course for decision makers, and the leadership will --- that'll be included in our leadership training, as well.

ERO training, we did training on the specific failure modes for the operators, the shift technical advisors, and the engineering technical staff on what modes particular valves can fail in during this event. That's more or less for to understand how the FLEX --- you know, what makes the FLEX successful,

and potentially how to do any troubleshooting that might be needed.

They did BDB FLEX training. They had specific training for each position, and then there's two INPO courses, a basic ERO training module that came out for general staff, and there was advanced training. And these courses were assigned to members of the ERO staff.

The next thing I'm going to talk about is validation. The validation process was going to just give us the confidence that the FLEX strategy procedures worked, that the time sensitive actions could be performed in the right amount of time with the adequate margin.

NEI developed the guideline, and Dominion used that guideline in their validation process. The guideline talks about a graded approach, Level A, B, and C. A is those actions that would be started within the first six hours, and they would be using the minimum staffing on site primarily to use relatively short time frame, minimum staffing would require more rigorous validation than validation after that time in 6 to 24 hours when additional augmented staff can arrive on site, and you have more time to accomplish the action.

Level C was those actions that require some

amount of manual actions that are labor-intensive, but they don't generally have a specific time or their time is in the days after the event where things can be accomplished easily.

So, we considered in the validation process for each of the actions that were validated what equipment was required, the complexity of the event, how complex are the actions, are they simple actions or they require some complexity, what cues and indications that would either tell the operators that I need this function. Then if the function is successful, an example of that would be the control room indications or the local tank indicator that say I need water. Then when we validate it, we would indicate how would we know we're successful. You know, what cues did we have on station from the control room or locally that would tell us that we were successful?

There are special fitness issues that were considered like if something was heavy, how many operators would it take to move this piece of equipment around? Environmental factors, all the five hazards, seismic, flooding, high winds, temperatures, cold temperatures, hot temperatures, those factors, how it affected the implementation, and those things were considered during the validation.

Communication, am I communicating face-to-face, I'm on a sound-powered phone, or do I got a radio was considered in the validation, and then any other special considerations.

MEMBER BLEY: Bill?

MR. WEBSTER: Yes.

MEMBER BLEY: Let me think how to ask this question. When --- in the previous talk we had a point that was all focused on extended loss of offsite power and dealing with that.

MR. WEBSTER: AC power.

MEMBER BLEY: I'm sorry, AC power. I asked if people were going to have, or were going to update their SAMGs to account for this new equipment. And then in your talk they seem to be almost mixing, and I hadn't noticed until somebody just pointed out to me your logo up there is the Beyond Design Basis Project, so you're really looking at everything kind of at one time, or are you at this point just making sure all this stuff works for extended loss of power, but you're getting in your hip pocket what you need to do to look at things beyond the design basis?

MR. WEBSTER: Well, when we say beyond design basis, we're really referring to this whole mitigation strategy order. I mean, it's not --- so,

that's what we mean by that. We will eventually use --- these strategies are specifically designed for EA-12-049 mitigating strategies order.

MEMBER BLEY: Okay.

MR. WEBSTER: And we will eventually get into where these strategies will be used, you know, and developing of our SAMGs that'll be considered for that. And then there's some more talk later even about, you know, reevaluating hazards and things like that. But, generally speaking ---

MEMBER BLEY: But you haven't made up your mind that these will cover you for those beyond design basis --- other design basis events at this point in time?

MR. WEBSTER: Not completely. I mean, we've got ideas where we would go, but not --- we haven't done --- we don't have the information to do another evaluation to say that.

MEMBER BLEY: Okay.

MR. AMWAY: The way to look at it, I mean, it's more tools in the toolbox. You know, I execute my ELAP strategies, I have all this portable equipment I can use. It's designed for that particular purpose. If I get in my SAMGs they're still there. There's nothing --- I'm not going to put something in there that says

this is only for the ELAP. You can't use it ---

MEMBER BLEY: It's designed for what purpose? That's the question.

MR. AMWAY: Well, designed for responding to the ELAP as defined in Order 49.

MEMBER RAY: Well, yes. And it just --- and it says --- it begins to sound like we're talking about everything that we're going to do for beyond design basis, when we thought we were talking about extended loss of AC power. I mean, if you just look at the slides and listen to what you're saying, there isn't any definitive statement about well, this is what we're going to do for extended loss of AC power, and it's available as we address ourselves to beyond design basis events. That's not the way it comes across.

MR. BAUER: Well, we put together the validation document as a way to validate the FLEX strategies for the ELAP condition.

MEMBER RAY: Okay.

MR. BAUER: So, this is what we said we need to go do to basically show once we get these designed installations in place that we could actually meet the time frames of deploying that. So, that's what he's talking about here, is the validation process we put in place to validate that so the plants could go live

and say I'm implemented.

MEMBER RAY: But there's a lot of discussion about other stuff than extended loss of AC power.

MR. BAUER: Right. And we may very well take and use the same validation process for other mitigating strategies for reevaluated hazards at some point in the future when we ---

MEMBER RAY: Okay. Well, that makes it clear, but I'm just pointing out it's not clear if you just listen to what's being presented. You'd think we were talking about everything, I would claim. Just start with the logo up on the top corner there.

CHAIRMAN SCHULTZ: Well, you have to give some consideration to what got you to the extended loss of offsite power.

MEMBER RAY: Well, that's another discussion. I don't want to get off on that ---

CHAIRMAN SCHULTZ: Right.

MEMBER RAY: --- sidetrack, Steve. But as long as we know we're talking about extended loss of AC power, fine, no problem.

MR. BAUER: I think the point that Steve makes is very good, because one of the things, you know, the FLEX strategies were very consequence-based. We basically said what is the outcome of a beyond design

basis external event, and it is an extended loss of AC power with loss of the ultimate heat sync. So, that was the initial conditions we had. We had no specified event that caused that. You know, it could have been seismic, could have been flooding, it could have been tornado, whatever, so we didn't specify what that is. When we actually get reevaluated flooding results, we may go back and say well, now I know the conditions, so now can my mitigating strategies still work under those conditions, or do I have to modify them, or can I modify them to make them work, or do I need to come up with a different mitigating strategy? So, that's C-the next step in this is after we ---

MEMBER RAY: But just to reiterate, it's not that clear that we're talking just about the first step here, and you're making it clear now, so that's fine.

MR. BAUER: Yes. So, this is only what we put together for FLEX. It's an appendix in Rev 1 of 12-06 to say how we would do the validation of FLEX right now. We may morph it to encompass more stuff as we go down the road.

MEMBER BLEY: I come to back to where I --- I was asking it more as a question, but I think it's good that if you're putting in thinking of, but if we just design to something fixed and then next year we find

out that it isn't going to work at all, that would not be very good. So, I'm glad that there is some more attention ---

MR. WEBSTER: Yes. Even in the mention that we did with the seismic evaluation, and we did consider, you know, that beyond design basis, and making sure in your margins analysis that what we were putting in will still survive that. You know, obviously, we put our buildings in places on site, you know, we would put it in the highest possible place so any flooding, additional flooding --- I mean, so there were considerations when we made these strategies for, you know, built in margin. We tried to build in margin. Now, in some places that's not possible, but in places where it could be, that's what we did.

MEMBER RAY: That's great and appropriate. I just want to be clear what we're reviewing here now doesn't extend to these other things that are mentioned.

MR. BAUER: That's correct. It's just FLEX we're talking about here.

MEMBER STETKAR: As an example, if you go up --- well, you haven't gotten it yet, your Slide 67 where you actually show the hook-ups. It doesn't look like you're next to a seismically qualified building

there, for example, so it's not at all clear in a very big earthquake that you could make the hook-up from that position. Location, for example. That building on the left doesn't look like it's a robust building.

MEMBER RAY: But it isn't our intent to get into that discussion, or reach any conclusions now.

MEMBER STETKAR: Yes, okay. Right.

MR. WEBSTER: I mean, so if something were to happen --- what we did was we did --- in all our strategies we would look at that. So, we would --- we may not be able to park it exactly there. We may have to remove some debris and have it park further out in the alleyway and then bring the cables in. So, we know that after the event there's going to be some amount of work that may have to get done to implement it.

Now, what we did do is where these cables run to inside that building, that building is, you know, generally a safety-related --- or at least one of the alternates would be a safety-related structure that you would expect to survive and wouldn't expect to have that stuff. So, we kind of took that in consideration when we designed the strategies to be flexible enough to be able to either remove the debris, or relocate the equipment and run the cables a little bit longer.

MEMBER STETKAR: Thanks.

MR. WEBSTER: Okay. So, we talked about the time sensitive actions, and Gene had given a pretty good timeline. And for Dominion, this is North Anna specifically, you know, just similar actions. You can see that we're realigning aux feedwater in a specified time, prior to 50 minutes when we get dry out or overfill of one of our generators, and that's a time that was validated. We have to declare the ELAP event in 60 minutes. That was validated on a simulator that all the Ops teams would be successful or would follow the procedure and implement prior to 60 minutes. We talked about load stripping that had to occur within 30 minutes to make sure that we had at least 8 hours of battery life. We talked about having to --- prior to 4.2 hours where the ECST was empty, we had to implement some aux feedwater resupply, and in this case that's the diesel-driven fire pump, they're talking about starting that. And we do also have some service water that can gravity drain to give additional time, as well, for that strategy. And then we wanted to make sure that we had our instrumentation repowered within --- prior to the batteries depleting to maintain the instrumentation within the control room.

So, this is how we selected which things needed to be validated through a timeline very much like

this. So, this is the timeline for the first several hours. All these would be clearly the Type A or Category A validation times because they're less than six hours. So, this is just some of the pictures from their validation, and we actually, you know, again, put hoses into the lake, and there's a strainer there, and there's the pumps. And we actually ran through the whole evolution in a stepwise fashion to make sure that the activities would be done in the right amount of time, and that the connections and equipment actually fit, and would be able to be hooked up.

MEMBER BLEY: Did you go to those kind of self-cleaning strainers like the firemen use in case you pick up a bunch of junk, so you can flush it out easily?

MR. WEBSTER: Well, we do have several types of strainers that we have. I'm not exactly sure what you're talking about, but we do have strainers that can be cleaned in our system.

MEMBER BLEY: Okay. Well, I was talking about the kind that you only interrupt for just a second and you're dumping the stuff right back out. You know, flushes it, changes the flow path through it so it flushes the gunk out on the ground, and then you throw it right back where you're going, because you can pick

up anything out of that.

MR. WEBSTER: Right. Yes, but this is --- obviously, the strainer here is just to keep the big stuff out. There are inline strainers, and I have to go back and look. I believe that they are --- they do have the ability to be flushed, so I don't know if those are exactly the ones you're referring to, but they do have the ability to ---

MEMBER BLEY: You don't have to tear everything apart to get them.

MR. WEBSTER: Right. No.

MEMBER BLEY: Okay.

MR. WEBSTER: This is just a part of the validation, example of the DC load stripping, and we had a success criteria. We wanted to make sure we would get it done within 25 minutes, and all the operators' teams, you know, they were at --- we just validated that we would be successful with some amount of margin. And really for all these validation examples, you know, margin is the key. I mean, we want to make sure that because there is some amount of uncertainty, as you spoke about, as far as how much debris is going to be in the way, so all these strategies we wanted to make sure we had adequate margin that we would be successful even under adverse environmental conditions. Because

clearly when we did our validation, you know, we didn't do it at night, we didn't do it in the rain, you know, so we had to make sure that we had plenty of margin, and that they would be successful.

Here's just the guys in the field doing some of the validation work that we'd already looked at. And that's the end of my presentation.

CHAIRMAN SCHULTZ: Thank you, Bill. Questions from the Committee for Bill before we move on to the next presentation?

MEMBER BLEY: Just a comment from me. I know you have to have some ground rule for doing this work. The ground rule that nothing else is going on and it's just the power went away gives you a place to start from. But it's really unlikely the power is just going to go away unless something else really significant is going on. You know, you're not going to have all the offsite power and all your onsite power fail randomly.

MEMBER STETKAR: Cleanly.

MEMBER BLEY: Cleanly, so it's just --- it's a little worrisome that that was the criteria. I think what you've got probably works well in lots of other cases, but it's just not the most likely way you're going to see --- you know, we don't expect to ever see that. If we see it, there's something strange

going to be going on, like in Japan we had a big earthquake and tsunami. Now, something is going to link all these things together and take out our redundancy.

MEMBER CORRADINI: I guess I'd ask Dennis' question differently. Given the assumptions of the analysis, what are some of the extraneous things that are covered by the assumptions? In other words ---

MEMBER BLEY: I'll give an example then.

MEMBER CORRADINI: You know what I'm asking? In other words, I would do ---

(Simultaneous speaking.)

MEMBER BLEY: Given you designed it to these rules, how confident are you they can survive under other ---

MEMBER BALLINGER: That was the root of my question about the box off to the right in the Palo Verde presentation where now you're --- I forget what the title was of the box. Functional Recovery, where something else is happening at the same time.

MEMBER RAY: Look, I know Mike wants to ask a question, but this --- like Scott said, this is just the first step. You've got to take one step maybe before you take the second step. I agree completely with ---

MEMBER BLEY: Costs a lot of money though.

MEMBER RAY: I agree completely with

Dennis' point. I think we're getting into a debate that many people have had already about whether it should be two steps or one big leap.

MEMBER CORRADINI: Well, no, I wasn't even --- I guess I wasn't going there. I was saying I understand that they're stepping through a logical sequence. That I understand and I accept. I'm asking in developing the first step, somebody must have done an analysis that said what are the encompassed extraneous things does that first set of assumptionsC-

MEMBER RAY: That's not my impression. I think it's a challenging job just to deal with what we're dealing with here, which is the extended loss of all AC power. Now, the next step, which is well, what simultaneous or causative factors might we now also be able to deal with using this step, is the second step, like Scott said. And I would expect that the answer would be well, something, but not everything. But, you know, I think we're --- it is a recognized limitation of what we're doing now. That's why I asked the question earlier, are we really limiting ourselves, or are we trying to go further? But I think we're limiting ourselves right now just to the question, what does it take to deal with an extended loss of all AC power? And are we confident that we can do that reliably, but

that's not the end of the road by any means.

MR. WEBSTER: I would say, you know, and even when we built this thing, there's a primary and an alternate way of doing the strategies. I mean, there is some redundancy, or things that we built into it in case some of the unforeseen things would or might occur. Another example would be we do --- even though it's not, you know --- we talk about the batteries. We do have alternate ways of getting indications that we --- and we have, you know, what exactly do we have to go monitor to get that indication. So, if the DC failed, for example, we would have something in place that the operators could use to instruct somebody to go get an instrument reading locally, or from the containment ---

MEMBER RAY: But at the end of the day we are going to look at flooding, for example. So, it might well be that what you've done could have been done differently in a way that would be better for flooding, but that's the path we're on ---

MR. WEBSTER: We may have to modify it in order to encompass ---

MEMBER RAY: The path we're on doesn't take that into account, and that's the reality.

MR. BAUER: So, clearly up front we said,

you know, it's important to the industry that we implement mitigating strategies, so we can wait for the reevaluations to happen and do that, and still be waiting, or we could go ahead and put something in place that gives us a flexible and diverse capability to deal with an out of the normal event that has got some flexibility to it. I know we highly stylized it to ELAP and loss of ultimate heat sync, but it really gives us tools to deal with probably a variety of things that could happen because, you know, the chance of that exact event happening is probably zero. I mean, so something like it, or some subset of it could be there, but it gives us the ability to put power in place, to put water in to cool the core. You know, it gives us a lot of capabilities that we now could use to --- now we have to go back and now we're going to get the reevaluations. We did it somewhat with the ESEP for seismic. We basically went back and looked at the ---

MEMBER STETKAR: ESEP is?

MR. WEBSTER: Expedited Seismic Evaluation ---

MEMBER STETKAR: Okay, thanks.

MR. BAUER: So, we basically looked at the GMRS results and said hey, what can we use from that to basically give us a greater seismic capability? So,

we went back to those plants that I screened in, and we looked at the stuff that is needed for FLEX to work, and we said let's look at it for a higher seismic capability.

Now when the flooding results come back we're going to say what does that tell us, and what do we do with that? Can we still make FLEX strategies work, do we need to modify them, or do we need to come up with some other strategy?

MEMBER RAY: Here just today we're not even dealing with the seismic.

MR. BAUER: Well, we are. The seismic --- for those of you having to do it, it has to be done by the end of this year.

MR. AMWAY: By the end of this year we have to have ---

MEMBER RAY: I understand, but we're not at the end of this year, and we're just here now looking at extended loss of all AC power.

MEMBER RICCARDELLA: You know, but in the seismic area I think I heard you say that you designed your equipment to two times the current SSE. That's an example, right, of building in some margin. You designed this new FLEX equipment to not just SSE, but two times SSE. So, I went back and I looked at the CS

study, and most of the plants, the new GRMS is less than two times the current SSE ---

MR. AMWAY: And if you look at the guidance for doing the ESEP, the maximum you would have to design to regardless of whether you're reevaluated hazard is, is two times SSE.

MEMBER RICCARDELLA: But there are some plants, North Anna is one of them, that it's more than two times SSE.

MR. WEBSTER: We looked at --- you know, in the buildings it isn't that, but we did a margin evaluation using it, and we verified them, because you had movement but there's no --- there's nothing around it that would interfere with it.

MEMBER RICCARDELLA: I understand that.

MR. WEBSTER: So, we got some confidence ---

MEMBER RICCARDELLA: Yes, that wasn't really the question. I assume you're ultimately going to do a seismic margins analysis of all this equipment.

MR. WEBSTER: Right.

MEMBER RICCARDELLA: So, it wasn't necessarily designed to the new GMRS.

MR. WEBSTER: And I think to be clear, I think we more --- we didn't actually put the two times

SSE in the design inputs and using all the codes and standards with that. It was more of a margins --- everything we did was more of a margin than actually saying I designed it for two times the SSE.

MR. POWELL: And in the case of Palo Verde, we're designed at .25 G, so two times SSE would be difficult for us. We're also a Western plant, so we're heavy in the middle of the SSHAC, our Senior Seismic Hazards Advisory Committee, so we included some margin for seismic. We had some preliminary information knowing from a Level 2 seismic PRA that where we had some exceedances at lower frequencies. Well, we're really working hard with our SSHAC and our Participatory Peer Review Panel to reduce those uncertainties, but we won't have our results until after the first of the year; yet, we had to be fully implemented in Unit 1 this fall.

(Simultaneous speaking.)

MEMBER RICCARDELLA: You can either do them in parallel or do them in series.

MR. AMWAY: And if I could go back to the comment, because I'm still not sure we really nailed this down with FLEX equipment and its relation to the SAGs, because ideally if you implement FLEX and you do it the way it's all supposed to be out and planned, you

never get to a point where you should enter our SAGs. You should always stay in your EOP levels. But at the same time, I don't want my operators to think everything this building is only for an ELAP. You know, if I get into a condition where things are worse, they don't go according to plan, I want to give my operators the freedom to know that hey, if you're in some other event and it would really be good to have this portable pump to do something with, or the portable generator, or anything else they have in there, that they at least have that freedom that when they're implementing the SAG strategies they know it's there, they can go get it and use it. It's not like they can tell you I'm going to specifically use this portable pump for this SAG strategy. That's not the way they're even written, or symptom-based. But, you know, putting water on the fuel is going to be a priority in the SAGs just as it is in EOP. It's just later in the event sequence, and if that portable pump can do the job, I want him to be able to use it.

CHAIRMAN SCHULTZ: Other questions related to Bill's presentation? Okay, Scott, we'll move forward.

MR. BAUER: Okay. So, we have several things we haven't done here, so my intent was at this point

to skip forward to the National SAFER Response Center presentation, and not go through a similar presentation what Bill just did for BWR. And then we also have two short videos, one that shows a kind of a validation --- the one that shows an ELAP event from a control room response standpoint.

MEMBER CORRADINI: So, can I ask a question about the skipping of the BWR part? So, what sorts of things are obviously different that we should be aware of in the BWR? The one that I guess I think I'm correct about is the condensate storage tank and whether it's seismically qualified as a source of water for RCIC. Is that a true statement, or am I wrong?

MR. AMWAY: I think in general that's true. There are some boilers that have seismically qualified CSTs and if they're powerable they'll use them for RCIC. In most cases you'll find that they're probably not. In my specific example with Nine Mile 2 it's not, so RCIC will --- I mean, our procedures are flexible enough that if the CST survives the event, it's non-seismic, it was caused by something else and the CSTs are still there, I would use it.

MEMBER CORRADINI: Right.

MR. AMWAY: But for my FLEX strategies I'm not counting on it, and I will take suction from the

suppression pool, and I'll do the anticipatory venting to preserve RCIC operation as long as possible.

MEMBER CORRADINI: The reason I asked that specific one is that that changes the timeline based on essentially what's happening in the plant heat up internal to the drywell, or into the wetwell.

MR. AMWAY: Right.

MEMBER CORRADINI: And so the timing would be qualitatively --- or the timing might be the same. I don't even know what the timing would be, but ---

(Simultaneous speaking.)

MEMBER CORRADINI: --- qualitatively different. It's driven by different events, or behaviors, I should say.

MR. AMWAY: Yes. To actually implement our FLEX strategies, I mean, we just did the analysis assuming CST is not available because it's not qualified for all hazards.

MEMBER CORRADINI: Right. Right.

MR. AMWAY: Now, we've done some sensitivities in terms of if it was available and we used it, and we injected, you know, does it buy us more time, less time? And when you really get to the end of it, it's really not that much different in terms of the overall containment heat up.

MEMBER CORRADINI: So, is that just --- that's the one that I'm focused on. Are there are others that are significant to at least let the Members know about?

MR. AMWAY: I would say yes, another good example, and that's the good thing about doing Nine Mile Point because Nine Mile 2 is a BWR-5 with a Mark-II hazard RCIC system. Nine Mile 1 doesn't have RCIC or HPCI, and they use the isolation condensers, so there is no --- unless we hook it up in FLEX, there is no injection. And we are relying on a strategy where the ECs remove containment heat. It's actually discharged directly out to the atmosphere so as long as the ECs remain available and we take actions in FLEX to maintain those available, that we don't have --- you know, we're not approaching any limits inside our primary containment. To do that, you're relying on your seal leakage analysis and the rate at which level is going to go, and to the time that you have to hook up a FLEX pump. And we've done that analysis based on --- we've actually done testing for the recirc seals, and there's five of them in Nine Mile 1. They have five recirc loops, so five sets of seals. The maximum leakage as tested is 4 gallons a minute, so you're looking at 20 gallons a minute there, plus our maximum tech spec allowable

leakage of 25, so we assume very conservatively 45 gallons per minute leakage is the loss term now at the reactor pressure vessel which gives us 5.7 hours until we approach top of active fuel. So, our FLEX timelines are a little bit different in terms of it's of priority importance to get the FLEX pump hooked up, put it in place, get it ready to inject so that when we do get near top of active fuel that we're actually ready to inject with that pump. So, that's a pretty significant difference in that strategy there.

MEMBER RAY: And what pressure will you be injecting at then?

MR. AMWAY: For the ECs in service, our plan is to put the EC in service which brings pressure down fairly rapidly, such that by the time that we need to inject it should be well within the shut off head of the FLEX pump, because the way the EC works, the pressure is going to come down rapidly and then tail off. And then it will maintain the reactor coolant system somewhere between about 230 and 250 degrees, and it will --- you know, it works on the driving head from the RCS back to the RCS loop, so once you get down to like 20-30 pounds, you don't have that driving head and it will, essentially, stall. But if it stalls you're no longer removing heat, pressure comes back up, and

the flow will reinitiate, so it'll sit there and it will cycle at about a 20-30 pound band that's somewhere below 50 pounds in the RCS.

MEMBER RAY: Okay, thank you.

MR. AMWAY: You're welcome.

CHAIRMAN SCHULTZ: Scott, how many presentations do we have left? We have --- if we wanted to do them all, we have Phil's presentation, and the presentation associated with SAFER?

MR. BAUER: SAFER, that's it. We've talked about the reevaluated hazard and I think that --- that was a slide presentation again.

CHAIRMAN SCHULTZ: I'd like to do Phil's presentation. I know he's --- I went through it and I didn't see a lot of repetitive information. And I know that ---

MR. BAUER: We just going to eliminate the repetitive stuff.

CHAIRMAN SCHULTZ: I know you have, and that's why I wanted to have Phil present it. Boldly step forward with it, Phil, please. We're going to break for lunch and we're going to figure out how we're going to coordinate the SAFER Response. I think we're going to break for lunch, depends how fast Phil goes.

MR. AMWAY: It depends on how many questions

I get. Okay. So, as far as presentation topics we've got today, I'll just give you an update where we're at with the BWR at Nine Mile Point. I do have a short video on the control room station blackout response that was actually done by Southern Company for me. It's not Nine Mile Point, but if you look at the standard response across the BWR fleet it's very similar.

The FLEX mitigation strategies overview for each unit, the FLEX storage and deployment. I do have a few slides on our spent fuel pool level instrumentation installation, and then just one summary slide which goes into our NRC audit summary results. I know that's a topic for this afternoon.

Our project status right now, we implement Nine Mile 1 in April of 2015, that's spring of next year. Nine Mile 2 isn't until 2016. And because they are very dissimilar units, the strategies are really quite different. So, we are certainly much closer, we've done all the design work for Nine Mile 1. The design work for Nine Mile 2 is still in progress. There are still some evaluations and calculations not complete for that unit.

For the spent fuel pool level indication, we are installing that now. We should complete Nine Mile 1, Nine Mile 2 installations before the end of the year.

And we will do our communications enhancements under the 50.54(f) letter by spring of next year.

Procedures that support that implementation of FLEX for Nine Mile 1 are about 70 percent complete. And the training for FLEX for Nine Mile 1 should be completed by early next year. It's in progress right now.

Operations training for spent fuel pool level instrumentation has already been complete. We'll have that done ahead of schedule, and our robust structure will be completed by February of this year. You'll see some slides on where we're at with that.

I just wanted to go in this slide before I go into some of the details, just a high level --- this is our initial event response to a station blackout. I think as we've had discussions with the PWR side, that initially when you get --- I mean, you don't know an ELAP is going to be an ELAP until you're in it for a little while, but we're structured our procedures so that it's transparent in terms of whether this is going to be an SBO under 50.63, the current 4-hour coping that both of our plants are in, or the extended loss of AC power. Those initial set of actions you want to be at the same as either condition so you're not trying to have to back up and then re-go down another path. So,

the initiation of the event is going to be triggered. There's going to be multiple annunciators in the control room. You're going to see that the control room lighting shuts from its normal power source to emergency power lighting. The SRL in the control room is going to recognize the event. He's going to update the crew, let them know of the station blackout condition. And the way we generally do that is a loss of power to all 4160 buses, and none of the emergency diesel generators start and load their respective buses. That's the entry conditions that say you're in the SBO condition.

Then the SRO is going to enter the emergency operating procedures, first going to confirm that the reactor is shut down with all control rods inserted, actions to stabilize reactor pressure that's going to be on the SRVs in this particular event. And then RCIC will help out with pressure control once it's started and injecting.

Then reactor water level stabilization will be initial void collapse in the BWR. It'll trigger RCIC to start on double low level, and then RCIC will recover level back to the normal operating band.

The same operator that initially does the power control actions confirms reactor shutdown,

reports that out, will then be assigned to perform the steps of the station blackout procedure which will branch out and do all the things to preserve RCIC, enhanced ventilation in the control room, the RCIC room, you know, look at power restoration. It has steps in there to direct operators out to do some initial checks with the diesel generator. Maybe this is something that they can rapidly turn around, repower the respective buses, and exit the station blackout.

So, I want to go through this first with you before I showed you the video, because the first time you see it, you know, it's helpful to have the sequence of events. This is exactly the way that you'll see it play out on the video.

(Video played)

MR. AMWAY: Okay. So, I mean, in that video you saw this whole scripted exercise play out. You know, what's really critical is you're looking at that from the perspective of that's the minimum staffing you would normally have in the control room, two reactor operators to respond to the event, one SRO having the oversight function in the control room. And that's the initial actions that they would take. Now, the additional actions will broaden out once --- you saw the transition between when the SRO gave the operator

the direction to confirm reactor shutdown. That's a fairly short-term action. There's checks he does, makes that confirmation, and then he was assigned the action to enter the station blackout procedure. That's where you start getting into the differences between, you know, the longer term. We've stabilized the plant, level and pressure are under control, and then we branch out into the actions where we're going to preserve the RCIC operation. We're going to do things like load shedding to preserve DC power, and look at power restoration.

We'll go through Nine Mile 1 first. Nine Mile 1 is a boiling water reactor 2 with a Mark-I containment, 1850 megawatts thermal. It's been in commercial operation since 1970, and it does have license renewal in effect so its license expires in 2069.

The picture that I showed here, this is a piping instrumentation diagram, the emergency condensers. I'll describe them a little bit more in subsequent slides, but that's a --- you know, most of the BWRs have RCIC and there are strategies involved using RCIC. This is where Nine Mile 1 is different. They do not have a RCIC system. And then we put the ECs in service, the emergency condensers in service right

away.

I used the term "emergency condenser", "isolation condenser" interchangeably. They are the same thing. At Nine Mile Point for whatever reason it's always been called an emergency condenser.

This is a picture of what it looks like when the emergency condenser is in service. We do test these on a periodic basis to confirm their functionality and heat removal capability. You can see just the one in service. There's a set of vents out the side of the building. You can see the steam discharge from boil off in the tube as the heat is exchanged. It's also quite noisy when it's in service. You can definitely tell when it is in service.

MEMBER SKILLMAN: Hey, Phil, previous slide. You said 2069.

MR. AMWAY: 2029, sorry.

MEMBER SKILLMAN: Sixty years.

MR. AMWAY: Yes, it's a 60-year, but it's 29, not 69.

MEMBER SKILLMAN: Thank you. All right.

(Off the record comment)

MEMBER BLEY: I think you told us one of the last times you were here that you made sure you don't have any of the logic glitches in the emergency

condenser that showed up in the Fukushima report described in there. That's true, right?

MR. AMWAY: That is true. Our emergency condensers are a little bit forgiving in terms of that they fail, you know, with the loss of power, loss of air, it fails in a condition that you'd want it to be in, which is essentially in service. We do have to send an operator out locally to control -- our ECs makeup tanks. Not every plant that has ECs have makeup tanks, as well, but that valve for the makeup tank fails open, so to conserve those we want to send an operator back to manually throttle that back and control the level; otherwise, you're just wasting it, and instead of the eight hours, you're going to be significantly shorter.

As far as the Phase 1 core cooling strategies at Nine Mile 1 using the emergency condensers, they go into service automatically on loss of power. We are planning to take actions manually to put those in service even sooner because until we do, we could be cycling on the ERVs and that's just wasting inventory. So, we want to get these isolation condensers in service as soon as possible and minimize that inventory loss.

Pressure lowers quite rapidly with the ECs in service, and as I stated earlier, we expect that to

come down and actually stabilize at somewhere around 50 pounds reactor coolant system pressure. It will cycle because they'll stall and come back in service as the driving head is reduced and then regained.

Our analysis shows that with their maximum reactor coolant pump seal leakage and maximum tech spec leakage that we have 5.7 hours before we reach the top of active fuel. And with our load shedding strategies in place, our DC batteries are good for at least eight hours.

MEMBER BLEY: Something in your training make sure people don't get overly concerned about over-cooling and turn the darned things off.

MR. AMWAY: Yes. We have intentionally made our strategy to put the EC in service and leave it in.

MEMBER BLEY: Let it run.

MR. AMWAY: We know that it will exceed 100 degrees and hour, and we are stressing that in training, but when we looked at the tradeoffs between --- you know, the EC is either in service or it's not, so your only option is you put it in and you leave it in, or you're going to try to control 100 degrees an hour by putting it in service and taking it back out. For a variety of reasons it's much better to put it in and leave it in.

MEMBER REMPE: Is that a change or it was always that way?

MR. AMWAY: That's a change. I mean, in tech spec land you maintain less than 100 degrees an hour, so under normal situation design basis events you wouldn't do that. But in the ELAP condition, the way we're structuring it, we're going to put it in, leaving it.

MEMBER REMPE: Okay.

MR. AMWAY: In terms of containment cooling, Phase 2, we provide that to the RPV using a diesel-driven portable pump. There are a number of modifications listed here which I'll describe on the next slide which shows it pictorially.

We are actually tying into the CRD return line as a method of RPV makeup. And you'll see, you know, these pumps here will be without power. The normal flow path, you see these two valves closed, and that separates the system, CRD systems have a charging header, and to be able to move the rods, and the exhaust header comes back and returns to the reactor pressure vessel this way. So, these valves will already be open, and the only one that the operator would have to do inside the reactor building is this one right here, which is this first isolation of the system.

To connect the portable pump, you know, we'll have a suction hose that goes into the intake structure. We run it inside this reactor building vestibule. This is protected from all hazards, and they'll be able to connect up to a valve manifold. One of those tie-off, tap-offs will be to this injection point.

In terms of distance, what you're looking at is if I stand in this entryway and look over, I can actually see that connection point from this point right here, so it's not that great a distance. It's on the same grade level elevation.

That same pump and manifold is used to also supply the EC shells. As I said, this makeup tank here provides up to 8 hours of makeup capability. This is the valve we'd have to take manual control of so we don't flood out the EC. If you did flood out the EC, it's not going to stop it from working, but you're just essentially wasting the water, wasting the inventory here so that is a manual operator action to go out and do that.

For spent fuel pool cooling, we have 8 hours to go from 140 degrees which is maximum design temperature up to 212 degrees.

MEMBER BLEY: That's the calculation if

your pool were completely filling. You just ---

MR. AMWAY: That is for our design base heat load full core offload. We have significantly more time than that under other conditions. I will note that we don't normally maintain our pool anywhere near 140 degrees. It normally ranges between 90 and 100, so there's additional margin there.

Once we get to boiling we have 45 hours to reach level 2, which is 10 feet above the fuel. And our makeup needs, assuming worst case heat load in the pool is about 43 gallons a minute.

For the strategy in Phase 2, the diesel-driven pump into that manifold is able to make up to the spent fuel pool, run a hose up to the level below the refuel floor ---

MEMBER BLEY: Just a question on that last one.

MR. AMWAY: Yes?

MEMBER BLEY: It was a surprise for me, I'm not sure if it was for everybody in the NRC's spent fuel pool study that was recently done, that changing your fuel pool loading such that you load --- where you have empty spaces and where you have old fuel and new fuel could really make a big difference in heat up times and the like, because of using effectively, because the

older fuel could act as a heat sync for the newer fuel, and you didn't get local areas where you could get steam and other things going on.

MR. AMWAY: Yes.

MEMBER BLEY: Did you look at that at all?

MR. AMWAY: We didn't do that as a method to try to ---

MEMBER BLEY: You have plenty of time.

MR. AMWAY: We have more time. We just said C-we just looked at it from the total if you discharge this whole pod of fuel into the vessel it's this amount of heat.

MEMBER BLEY: Okay.

MR. AMWAY: We also didn't credit anything in that analysis for conduction through the walls or evaporative cooling, or anything else like that either.

MEMBER BLEY: Okay.

MR. AMWAY: So, the hose actually runs from the manifold on the reactor building grade elevation up to Reactor Building 318. Like I said, that's one level below the refuel floor, and then it's hard-piped over up to the next level into the spent fuel pool.

For alternate makeup capabilities for RPV makeup, this shows a picture, and we've actually tied this in with NFPA-805 modifications. This is our

firewater header. This is the feedwater header. We used to have a spool piece in here an operator would have to put into place. Under NFPA-805, we removed the spool piece, made it hard pipe, and we also put in this tie-in for the FLEX. So, the FLEX portable pump can be hooked directly into this connection, open the isolation valve directly into the feedwater system and there's no spool piece any more to have to put in place.

MEMBER BLEY: Are you one --- no, you're two valves away from the fire main. Okay.

MR. AMWAY: Actually, yes, two valves, right here.

MEMBER BLEY: And then one more in the feed line. Yes, okay.

MEMBER BALLINGER: Can we back up one slide?

MR. AMWAY: Sure.

MEMBER BALLINGER: I know that's a schematic, but that room appeared in three different slides for three different operations. That room you say is built first out. I mean, it's ---

MR. AMWAY: Oh, yes.

MEMBER BALLINGER: I mean, that's a single point of ---

MR. AMWAY: Yes. It's fully robust inside this area. And if the manifold is in there, like I said,

I mean this part here from each of the pictures is the same. What's different is the manifolds that you tie off of to run to the different areas. So, you know, most places you just have an RPV and a spent fuel pool makeup. Because we have the emergency condensers, you know, the boil off is really coming to the emergency condensers, the seal leakage is going to the RPV, so it's just split.

MEMBER BLEY: On the previous slide, you don't have to get it for me. Not the sky is falling or anything, but once --- if we get everybody hooked up, are piped into the fire main while it was in place what do you think the chance is somebody is going to get chlorides into their primary system one of these days? That's why the spool piece was there.

MR. AMWAY: That's why the spool piece was there. I agree, and it's tradeoffs. I mean, we have the administrative control, we have the multiple valve isolations, the fire --- the only way it could get there is if your RCS is at reduced pressure because the fire main is only good for 150 pounds. So, you know, we think we've taken a look at the appropriate level of risk and ---

MEMBER BLEY: When you shut down for maintenance and depressurize, you don't have a drain valve or something to drain out between the valves?

MR. AMWAY: No, I don't --- I didn't look at the picture, but I don't ---

MEMBER BLEY: There might be one down there.

MR. AMWAY: Yes, it might be a drain valve down there. I don't know. I can't tell. But as far as I know, I mean ---

(Simultaneous speaking.)

MEMBER BLEY: Still it's something to think about.

MR. AMWAY: Right. Let's see, alternative to EC makeup. Again, this goes instead of going directly into the EC shell, there's an alternate location that we connect to with a hose. And with the spent fuel pool makeup we can run the hose up an alternate path and directly onto the refuel floor into the pool.

As far as electrical power, safety-related batteries are calculated to last at least 8 hours. That does count on us doing a load shedding occurring within 30 minutes. The load shedding procedure for Nine Mile 1 is a very simple --- it's, you know, a couple of pages, and it's in a localized area. And we actually did this in a walk down, validated it works, and when the NRC audit came to Nine Mile Point we actually demonstrated that for the auditors that we could do it successfully in that time frame.

Phase 2 electrical power, we have a portable diesel generator. It'll connect to the AC side of installed battery chargers. We do have a backup plan that if we can't use the installed battery chargers, we have portable static battery chargers that can go directly into the battery boards 11 or 12.

Schematic layout of what this looks like. These are the battery chargers, our portable diesel generator here, and we have a tie-in connection point that goes right through the battery chargers and supplies all DC loads. This is the alternative strategy where we have portable static battery chargers brought in and connect directly into the battery board.

In either case, you're supplying the same set of loads. It's just whether you're using the installed equipment or portable equipment to do it. We preferentially choose the 12 side, what's in yellow here. If we re-energize this side, we also regain a substantial portion of our emergency lighting, but alternatively we can make the strategy work if we go to the 11 side.

In terms of Phase 3 at Nine Mile Point, we have our strategies in place where our Phase 2 equipment provides the indefinite coping, and we can demonstrate that we can maintain the key safety functions for at

least 72 hours. Anything that we receive from the National Response Center would be as a backup to the Phase 2 equipment, and we made sure that our connection points are compatible with that supplied by the Regional Response Center. So, anything we get for the National SAFER Response Center is a backup and a spare to our Phase 2 strategy that we continue to implement. And that's really the same philosophy that we have both at Nine Mile 1 and 2.

Nine Mile 2 is a little bit different. It's a BWR 5 with a Mark II containment, much higher power rating. It is an uprated core at 3988 megawatts thermal. Initial operation 1988, and we have license renewal in place at 2046, and not 2066.

Our Phase 1 strategy is accomplished by using reactor core isolation cooling, safety relief valves for pressure control, so this is much different for Nine Mile 1. Nine Mile 1 you're ejecting decay heat directly to atmosphere. Nine Mile 2 it's going into the containment like most BWRs.

Our initial analysis says that the containment parameters will remain sufficient to maintain RCIC operation for at least six hours. I don't want to confuse this with the containment design parameters. At the end of six hours, we still have

plenty of margin in terms of pressure and temperature in the containment. This is particularly for RCIC, and I'll describe that in the slide coming up.

Deployment of the portable pump is planned for four hours. We'll be doing validation to make sure we can meet that time frame. And the electrical power for critical instrumentation and control is calculated to last at least 12 hours at Nine Mile 2. That's using safety-related batteries.

So, our Phase 1 strategy, we'll cycle SRVs to maintain pressure under control, and to maintain pressure sufficiently high that we can keep reactor core isolation cooling in service. We do plan to implement the hardened containment vent order Phase 1 concurrent with the FLEX implementation outage, so we will use that vent path to extend RCIC operation beyond six hours. So, the six hours assumes no venting. If we do the anticipatory venting, we will be able to extend RCIC out for an extended period beyond that as we maintain pool temperature below 240 degrees Fahrenheit. Reduces the challenge to the primary containment by being able to use that vent path. And as I stated, we'll install that spring of '16 concurrent with FLEX.

This is a picture of what our hardened

containment vent will look like. The reason why I show this valve in red is currently we are in conformance with general design criteria in 56 where the inboard valve is inside containment, the outboard valve is located right off the penetration outside. For the hardened vent order we do plan to relocate the valve from inside containment to outside. To do that, we have already filed a GDC-56 exemption. It's already been through the acceptance review with the Staff, and they are now in with the detailed technical review of that exemption.

It does tie in and share the same flow path that our gas treatment train would take, but before the gas treatment train we tie off and go to a separate chimney to vent from the containment. All of these valves here at the GTS system, are normally closed, fail closed so that if we did have an ELAP condition the GTS system is isolated from the containment vent path.

Core Cooling Phase 2, once we transition off of RCIC, we'll utilize the diesel-driven pump. The modifications include a dry hydrant that will be installed in the service water tempering line. The tempering line has --- you know, it's a long section of pipe that's underneath the water level in the intake structure, and it has a series of one-inch holes which

would help with making sure we don't suck up large debris, but it is of sufficient length that even if some of the holes became clogged that we would still be able to draw water from that side. And then we'll connect from the discharge of the portable pump to the RHR system.

This shows it pictorially. This is the pump taking suction, discharging into a valve manifold that's very similar to what we have with Nine Mile 1. It's just larger capacity. And then we'll connect off of that manifold directly into RHR.

We have three --- actually, three loops of RHR, our primary and alternate strategies, one goes into RHR A, the other goes into RHR B, but the systems are functionally equivalent.

In terms of spent fuel pool for Phase 1, we use the initial inventory that's in the pool. We have 5.4 hours to go from 140 to 212 degrees. And once we start boiling, we have 32 hours to reach Level 2, which is 10 feet above the fuel. And then our makeup requirements for spent fuel pool at Nine Mile 2 is 73 gallons a minute.

Spent fuel pool cooling Phase 2, we will make up with the portable diesel-driven pump. It uses the same pump because it's going to the manifold, and

then the --- we will tie into RHR. RHR has the distinction of being able to go to many different places, one of those is alternate spent fuel pool cooling, and it provides a path that we could provide makeup, as well.

Our alternative makeup strategies, our normal path connection paths through RHR A, the backup is through B, it's very similar but it's an alternate injection path. And for the spent fuel pool, if we're not able to do it with RHR, we can run hoses up to the refuel floor directly into the pool.

In terms of our safety-related batteries, as I said, the batteries will last, assuming we do the appropriate load shedding in 12 hours. The Nine Mile 2 load shedding procedure is a little bit more complicated than Nine Mile 1, but it's structured so that you don't have to do it, you know, all by one given time. There are certain portions of it you do by 30 minutes, certain portions of it that you do in 60 minutes, and other portions that you can go out to 2 hours before you do it. Those time frames are spelled out specifically on our station blackout procedure as far as when you have to do these time sensitive actions, and the procedures are set up to be able to dot hem in a stepwise fashion to be able to meet all the time

frames.

The analysis works out to be the same for both divisional batteries. Div 1 is a little bit more important to us because Div 1 also supplies the DC logic for reactor core isolation cooling. So, as a priority we would want to protect Div 1 and restore Div 1.

In terms of Phase 2 for electrical power, we'll use a diesel generator connected to the Division 1 600-volt switchgear with a breaker connection device. I'll show you what that looks like in a minute. As I said, Division 1 is preferred because of the RCIC system DC power is powered off of Division 1. If we're unable to connect it to Division 1, we have similar connection points in Division 2.

This is a representation of what the Divisional switchgear looks like. You'll see that we tie in priority is Division 1, and then their alternate strategy is to go in Division 2. This will go directly into the switch gear so we would have the ability to regain all 600-volt loads which steps down and supplies our battery chargers and our DC supply, which is where all of our instrumentation and control comes from.

This is a picture, and this isn't ours because we don't have ours yet, but it's going to look very similar. This is a bus connection device. It's

essentially a 600-volt breaker that has all the internals removed, and it's just a means to get your connection point which is the bus at the back out to these connectors. They have the same color codes, the same sizes that you saw in the earlier presentations, and it's also very consistent. It's the same as what we would get from the Regional Response Center. So, the covers you see on here, if you take these covers off you actually have --- you could actually see the conductor is right there. When you slide over the other connection and turn it then it's locked in place and that provides the power to the switch gear.

We have yet to decide whether we're going to actually put these in erectile position actually in the switch gear, or have them staged, pre-staged locally at the switch gear. Either way we do it it's going to be acceptable. It's really --- you know, we're working between Ops and Engineering because if you actually put it in the switch gear, it impacts the seismic analysis and the safety-related function. If you put on the floor, put it in after the event, it's a reasonable action to take. They don't weigh that much because the internals have been all removed, so that's something we're working out, whether it will actually be in there, or just rack in, or if you pick it up off

the floor and put it in the switch gear.

We'll be using 4/0 cable. It's sufficiently sized for the amp carrying capability through the breaker into the switch gear to supply our needs. The size that we have is a 480-volt --- 450 kW 600-volt generator. Nine Mile 1 and Nine Mile 2 are a little bit different from the rest of the industry. Our low-voltage switch gear is 600-volt as opposed to 480.

Our Phase 3 strategies are a continuation of Phase 2. Similarly to Nine Mile 1, we'll use SAFER Response Center equipment as a backup to our Phase 2 equipment.

MEMBER SKILLMAN: Does that suggest that SAFER has unique 600-volt equipment for Nine Mile, and independent from that 480-volt for the bulk of the rest of the industry?

MR. AMWAY: What we'll get is the same 480-volt generator that everybody else gets, but we are also in a Site-Specific Equipment Committee that will deliver a 480 to 600-volt step-up transformer so that we'll be able to use it in our plant.

MEMBER SKILLMAN: Thank you.

MR. AMWAY: You're welcome. We have evaluated our strategies for all modes and verified they're workable. But keeping in mind that refueling

outages present many unique challenges and opportunities for different configurations, we are taking that into consideration in our Outage Risk Management Procedures to make sure we address the FLEX capabilities during refueling outages. And for those activities that are determined to be high-risk, that we have appropriate contingency plans in place for those conditions.

Our deployment paths and equipment locations will be marked with signs and postings similar to how we've done with past experience with SBO, and also for the EOPs. That's purely from a human performance perspective.

In terms of our relation to the National SAFER Response Center, we do have the necessary Memorandums of Understanding in place to take care of our Staging Areas A, B, and C. We will be doing a site-specific response plan. That's currently ongoing, to make sure that our engineers understand the equipment that's being received from the National SAFER Response Center, and that's factored into our plant-specific designs to make sure there's compatibility between the equipment we're going to use in connection points, and what we'll be provided from the National SAFER Response Center.

Even though the National SAFER Response Center is contractually obligated to have our first equipment on site in 24 hours, we have validated that we could cope indefinitely and beyond without the equipment. It's purely as a backup to our onsite Phase 2, so if we fail the pump, or we fail the generator, we'd be able to have a backup and put it in place.

For the specific equipment we're looking at getting, this is where I talked about in that specific instance where a 600-volt plant, and to be able to use the 480-volt generator, we have the site-specific equipment of the step up transformer. That's actually kept at the Regional Response Center, would be delivered with the generator so we could hook it up and use it.

In terms of FLEX storage and deployment, we have our primary and alternate paths established. This is an overview of the Nine Mile site. This is our robust building. It's protected for all the hazards applicable to the site per NEI-12-06. This is --- we will store all N equipment for both units in this, as well as our debris removal equipment. This building over here will be constructed to ASCE-7-10 standards. This is where we'll keep +1 equipment.

The primary path was selected to go along

the lakeside to avoid the potential for downed power lines. You'll note that our alternate path does run underneath power lines. For Nine Mile 1 we have the advantage that our switch yard is accessible to us. We can easily see whether the breaker sticks are up or down to know whether the lines that we're going to pass over are energized or de-energized. If we do have to manually operate disconnect switches, that capability is available in our switch yard.

These are some shots, you saw a completed view of what it looks like at Dominion. We are building a fully robust structure, it's 60 X 140 dimensions. It's rectangular. This show what it looks like in the state it was about a month ago with the foundation poured, and getting ready to pour the floating slab.

You'll note these items in here. These are our seismic tie-downs. They look raised simply because we've got them covered over with duct tape filled with sand to make sure that when we pour the concrete they don't fill up with concrete.

Just a couple of pictures of what it looks like. This is the later slide showing the foundation, or the slab being poured. And I only included this picture to show that clear days at Nine Mile Point are in our design basis for the plant.

As I said, fully protected FLEX storage building sufficient to store N. And we have completed the onsite staffing study Phase 2 for Nine Mile 1. It's yet to be completed for Nine Mile 2 because of the later implementation date. We have allotted a three-hour time frame with operators specifically dedicated to start debris removal actions, and we are providing training to qualify all of our operators to be able to operate the pay loader. That's our largest piece of debris removal equipment. The other pieces that we have, we do have multiple trucks that will also be stored in the N building that's fully protected. At least one of those will have a snow plow attached to the front end for snow removal. If we had to, we can also use the pay loader for snow removal. It's certainly robust and capable.

The tractor that we have, generators are very heavy, so a normal pickup truck wouldn't pull it, but the tractor certainly has the capability to be able to hook up and attach to the portable generator and move it into location.

This is a picture of one piece of debris removal equipment, our pay loader that we'll have stored in the fully protected building. And as I said, at least one of the other vehicles will be snow removal capable.

In terms of refueling, we have to be able to refuel all of our equipment. Both of our trucks will be equipped with 500-gallon storage tanks. Those tanks will have integral DC powered fuel transfer pumps capable of 20 gallons per minute. We have onsite storage capability of 140,000 gallons of diesel fuel that normally supplies our safety-related diesels which will not be operable during this event, so we would go ahead and use that fuel to power onsite equipment. Our fuel usage calculations show that we have enough for at least 20-days supply. We have sufficient time to be able to arrange with our local fuel suppliers to provide us additional capability out beyond the 20 days.

We did actually validate. The way this works is we hook up a transfer pump to our sounding tube of the underground fuel storage tanks to make sure that that was sufficient, capable of working in terms of the fit-up and the delivery. We actually did a test and confirmed that those transfer pumps in that configuration will pump up to 30 gallons per minute of diesel fuel.

All of our onsite portable equipment is the Tier 3 engines. There's a --- I don't know if you're aware of it, but there's diesel engines that are designed on ultra low sulfur versus low sulfur,

difference being 15 ppm compared to 500. Some of our storage tanks on site are below the 15 ppm threshold, others are not, so we have --- you know, the Tier 4 engine you're pretty much limited to ultra low sulfur. We have Tier 2 or Tier 3 that can burn either. All the National SAFER Response Center equipment is the same in terms of it's designed to run on either low or ultra low sulfur fuel.

Spent fuel pool, I know this isn't really a specific topic to hear. This is Order 51, but we do monitor the level indication to know when it's time under the FLEX strategies to be able to make up to the spent fuel pool. Level 1 supports normal cooling system operation, Level 2 makes sure that you have substantial shielding so that you can get to the refuel floor. We are the default value of 10 feet above irradiated fuel. There were two choices. You could do 10 feet without analysis, or you could select a lower level with analysis. We went with the default value. And then Level 3 is the level at which the fuel just remains covered with water, so essentially doesn't provide much radiation shielding.

We chose the through-air technology. It's fairly simple in terms of there's a radar horn. This is actually installed right over the spent fuel pool.

There's a wave guide which is essentially one-inch Schedule 40 pipe. This is the only portion that is on the refuel floor. Our wave guide pipe as soon as possible goes off the refuel floor to the next level down so there's no electronic equipment that will be on the refuel floor.

The sensor is actually what directs the wave guide, or the radar pulse to measure the level. That's on our next level down, and then it's electrical connections to get into the location where the operator actually reads it.

This display here has an internal battery that should the normal AC power be lost, it automatically converts over to DC internal. You see the power usage for each channel is very low, it's a half a watt. The advertised design of these internal batteries, it'll supply seven days worth of power.

The backup, when we put in our FLEX generator, the normal AC power that was lost would be regained when we hook up the FLEX generator so we would have ongoing capability to monitor level.

There's two per spent fuel pool. Nine Mile 1 and 2 have completely separate pools so they have to have their own separate level indicators. Each one has two channels per the FLEX order --- per the spent fuel

pool level instrumentation order. The required accuracy is plus or minus a foot. Our actual installation, the specification is plus or minus 3-inches in a steam environment. As I said, normal AC power, once that's lost it has the battery backup and will repower the FLEX generator as part of our FLEX strategy.

Temperature limitations, the sensor qualification is 176 degrees. To stay within that, that's why we took it off the refueling floor and put it the next level down. We have similar strategies to everybody else where we open reactor building doors low and high, sets up the chimney effect. Our analysis show that we maintain below the qualification temperature of 176 degrees.

Power availability, the AC power that normally feeds both channels is independent power supplies, and the rest of this is pretty redundant to what I covered already. The FLEX generator provides the backup power and the internal batteries.

To maintain separation on the refuel floor, we install these in the corners which provides some inherent protection. And then we install them with a maximum length between separation that we could get. Instead we connected to the spent fuel pool, and the

wave guide portion that's actually on the refuel floor, that separation is maintained until it goes down to the next level down.

My final slide here is just a summary of the NRC audit results. We recently had our Staff audit of our FLEX strategies. We started with 55 open items at Nine Mile 1. During the audit we got three more questions, and we've closed 50 of the original, and two of the new, leaving us with six remaining open items. Two of those responses have been supplied, we're just waiting for closure of those, leaving us with four. The way we plan to close those is as the analysis or whatever information it was that we need to close those will initially post that to the ePortal and it will eventually be docketed to close out the open items as part of the audit.

For spent fuel pool level, we successfully closed all 18 items so there are no open items for spent fuel pool level instrumentation. Nine Mile 2 it's a little bit different. We started off with 56, we added three, closed 36 of the original, plus two of the new, leaving 21 open. The reason for the high number is because, as I said, our strategies for both units are very different. The implementation time for Nine Mile 2 isn't for another year, so some of the analysis and

calculations aren't yet complete, so you can't really close the open item until that's done. So if you look at the majority of the open items, if it wasn't for that we'd be down closer to the number of Nine Mile 1.

Nothing in there rose to the level of significant open items. They are just open, and I didn't see any of those open items that are going to be a significant challenge to any of our strategies.

That's the end of my presentation pending any questions.

MEMBER BLEY: Yes, one. You may have told us this, and it might have slipped by. You told us back in the beginning when you were talking about the emergency condenser, do you have alternative or backup sources of water for that, or do you use any of the FLEX equipment to pour water into that if you need it?

MR. AMWAY: Yes, our FLEX --- we have the 40,000 gallon makeup tanks which provide the initial eight hours.

MEMBER BLEY: Right.

MR. AMWAY: We do use our pump to make up to those makeup tanks.

MEMBER BLEY: To the tanks. Okay.

MR. AMWAY: Yes. And we have primary and alternate strategies of getting that water to the

makeup tanks.

MEMBER BLEY: Thank you. I missed that, if you told us before.

MR. AMWAY: Yes.

CHAIRMAN SCHULTZ: Other questions, comments by the Committee? Phil, thank you for your presentation. Since you talked about spent fuel pool, I just want to come back to Dennis' comment earlier about loading of the spent fuel pool. I know you focused on loading for this purpose to develop a conservative evaluation of the decay heat load and impact were you to lose level. But if your reactor engineering team hasn't looked at alternative loadings of the spent fuel pool, they certainly may have, it would be worth their while. Other licensees have found beneficial loadings to provide additional margin in the spent fuel pool.

MEMBER CORRADINI: In fact, wasn't there a recent --- there was a recent notice that just came out on that.

CHAIRMAN SCHULTZ: That's right.

MR. AMWAY: There is, and we will certainly take that back and look at it. I will say that there's already some restrictions on what we can do for the B5B strategy, and also because the pools are so full and we offload campaigns, so that limits our ability to do

that. We'll certainly take a look at it.

CHAIRMAN SCHULTZ: You can look at it. Some of that is complimentary.

MR. AMWAY: Yes.

CHAIRMAN SCHULTZ: Any other questions, comments? All right, I'm going to break for lunch now and ask people to return at 1:15. I know that's a short lunch break but I do want to come back with this panel and have the presentation related to the SAFER, and then move into the NRC's presentation just after that. So, short lunch period, but that will get us out of here earlier this evening, I believe. Recess now until 1:15.

(Whereupon, the above-entitled matter went off the record at 12:46 p.m., and resumed at 1:18 p.m.)

CHAIRMAN SCHULTZ: We're coming back on the record after the lunch recess and we're going to come back to the industry presentations. Scott Bauer will introduce the next speaker and we're going to talk about the National SAFER Response Center and the U.S. nuclear industry.

MR. BAUER: The National SAFER Response Centers, obviously we're enlisted to basically support the Phase III of the FLEX strategies. I'm going to have Dan -- Dan Brush is from Exelon. He's going to speak

to this topic. He is currently the chairman of the SAFER Steering Committee and the Management Committee. It's highly industry-run even though we selected SAFER organization as the contractor. So Dan will explain a little bit about that and then how we got to the point of going live with these response centers.

So, Dan?

MR. BRUSH: So, good afternoon. Welcome back from lunch. I'm Dan Brush. As Scott mentioned, I do work for Exelon. Have for the last nine year. I was fortunate enough to do 28 years in the Marine Corps prior to that, both as a combat engineer and as a logistician, so some of this ties in pretty well to that.

As Scott mentioned, when the requirement for the Phase II was initiated we did a competitive bid and selected a new company, SAFER, to put these response centers together for us, purchased the equipment, established the specs for the equipment and then maintain them throughout the life of the nuclear industry.

We did in the beginning elect a steering committee and then the rest of the industry participated in a larger committee, a larger Equipment Committee. When we elected the steering committee, we

asked for volunteers. Everybody took a step back and Mike and I were left standing out front. So we led the steering committee.

MEMBER BROWN: You didn't learn much in the Marines then, did you?

(Laughter)

MR. BRUSH: -- charge forward and --

MEMBER BROWN: As a Navy guy, I knew how to step back.

(Laughter)

MR. BRUSH: I should have spent more time on boats.

(Laughter)

MR. BRUSH: Absolutely.

MR. BAUER: There's actually a little bit more to the story because Mike Pacilio is the chief nuclear officer and was overseeing this, so it made it natural to have somebody from Exelon be the person in the trenches making it happen.

MEMBER BROWN: There's no humor in that statement.

(Laughter)

MR. BRUSH: So again, we were fortunate. This was a very good effort. We've done a lot in a very short amount of time as far as getting the industry

together, and we'll talk through some of those points as we go through the slides.

So this is a depiction of where the two response centers are, one in Phoenix and one in Memphis, and the range that we can get by truck, by 18-wheeler in 20 hours, roughly 50 miles an hour average speed.

Why Phoenix? Phoenix is kind of out by itself in the West with not a whole lot of nuclear sites near it, but does become a great all-weather hub or good-weather hub for FedEx for moving equipment and it made sense. Not lot of issues with beyond-design-basis events typically in Phoenix.

Memphis happened to be the home of PECO. PECO was one of the members of the SAFER company. The other is AREVA. PECO for the last 30 years has done maintenance of capital spares, large capital spares for the nuclear industry. Warehouse them, maintain them, store them, test them, make sure that they're up to speed. And then if anybody needs something, get them to the site that needs that piece of equipment rapidly so we can get it in place and get back online, go back to producing electricity.

Okay. So this is a timeline. I think you all have hard copies, right?

PARTICIPANT: We do.

MR. BRUSH: Okay. So this is a timeline. You saw this in one of the presentations earlier. It's a 24-hour timeline. T-0 notification is not necessarily T-0 of the event occurring. Rather, it's when the site decides they need to make a call for the equipment. That begins T-0 for the SAFER team to begin to get their organization together, call FedEx and start moving equipment. So we could be at T-1, T-2 for the actual event, but T-0 for the SAFER team and this 24-hour clock.

So as was talked before, we begin mobilization. We get trucks to the response centers and begin to move equipment. First piece of equipment as identified by the site could be any of the equipment in the response center. Is on site in 24 hours. And the remaining equipment closes on the off-site staging area typically in 24 hours.

As you heard, the industry looked hard at can we go longer than 24 hours before we actually need to put this equipment in? This is redundant equipment. We don't look at it as recovery. We don't look at it as primary in almost every case, but it is redundant equipment to replace the Phase II equipment that's on-site portable equipment. And it's typically plug and play. You unplug the Phase II equipment. You plug

in the Phase III equipment and you continue down that path.

MEMBER SKILLMAN: Dan, let me ask this question.

MR. BRUSH: Yes, sir.

MEMBER SKILLMAN: Just a curiosity question. When a call comes for help for this equipment, that's a serious event. People aren't doing this frivolously. But what I experienced is, particularly after TMI we would ask for help, and we had truckers come and bring stuff that were inebriated. Others were fitness for duty. Some of the equipment was shabby. on an 18-wheeler 6 of the tires were falling apart, rims were bent. Other equipment was brand spanking new. Sometimes the tractor was pristine and the trailer was -- looked like it had been pulled out of the ocean.

So my question is when you make the call and get the truck, how do you know the truck, the vehicle and the driver, or drivers are fitness for duty?

MR. BRUSH: That's a great, great question, and one of the reasons that we teamed with FedEx. The response centers, the SAFER team has procured new trailers for all the equipment. So each equipment is trailered so it can move around a site,

but we also have them pre-loaded on 18-wheeler trailers. So all FedEx has to give us is the tractor to hook up to a trailer and drive it off. FedEx maintains very strict, very high standards for their drivers and their equipment. They are very quick. If a driver team or a driver does not continue to meet their standards, they will fire that driver and take on other drivers.

MEMBER SKILLMAN: Thank you.

MR. BRUSH: Okay. This is a depiction of -- a pictorial, if you will, on how we get equipment from the response centers to the sites. So we get a call. We activate the SAFER Control Center and they in turn activate the people responsible to run the response center. We call FedEx at the same time. FedEx begins to move tractors into the response center to hook up to trailers. And depending on the conditions at the site -- if a site is physically isolated or weather conditions or conditions from the event would preclude us from getting to the off-site staging area in the timelines that we need to, we may move equipment by fixed air to a FedEx hub close to the nuclear site. Otherwise, we're going to try and drive it to the greatest extent possible just to get it to that off-site staging area.

So across the top, you hook up to a tractor, you go to the local. In Memphis there's a large FedEx hub and in Phoenix there's a large FedEx hub. Load aboard the FedEx planes. We are pre-loading the majority of the equipment not only onto trailers, but also onto pallets, heavy-duty pallets that can be pulled off of the trailers and loaded right onto the planes. We do have load plans for all of the equipment for the planes to facilitate a rapid ingress and egress getting onto the plane and coming off as we're loading and off-loading.

CHAIRMAN SCHULTZ: Dan, who makes the decision and what is the process for making the decision about whether you're going to move by truck or through the air? I mean, obviously there's some request that comes, but who's responsible for making the decision on --

(Simultaneous speaking)

MR. BRUSH: So the site in conjunction with the local law enforcement would give us some indication if they're isolated. So if in the case of a bridge being down and we couldn't get to the plant, or the primary and secondary routes were washed out, or something like that.

CHAIRMAN SCHULTZ: Who makes the decision

about the route in between the response center and the site?

MR. BRUSH: The SAFER Control Center, their folks running that in addition to FedEx. So FedEx is getting reports all the time from their drivers. And again, we're working with the state and local folks to get updates. We've got about four hours getting the tractors to the response center, briefing the drivers on the routes they're going to drive or if we make a decision to fly. Again, because of weather conditions in between the response center and the site, we may go right to the airport and just go ahead and fly.

MEMBER STETKAR: But FedEx makes the call on the long haul, or you guys make the call on the long haul?

MR. BRUSH: We make the call.

MEMBER STETKAR: Okay.

MEMBER REMPE: Could you talk a little bit about what happens when the equipment gets to the site? In some of the background information we were given to review apparently that was a bit of an issue on how the equipment is turned over to the site personnel and the division of duties in that turnover.

MR. BRUSH: Sure. All the equipment goes

to normally an off-site staging area. And that was described as an area about 25 miles from the site.

MEMBER REMPE: Yes.

MR. BRUSH: Some place that has the capability to not only harbor all that equipment for some length of time, but also to facilitate helicopter operations if required so we can get the equipment onto the site, not via road networks, but through the air.

The SAFER team provides equipment operators to the staging area. The equipment operators accompany the equipment to the site. When the equipment and the operator get to the on-site staging area, there is a training session, if you will, just-in-time training, between the SAFER operator and the site operator. And we go through an operator aid card that comes with a piece of equipment. And then the SAFER operator stays with that equipment until it is hooked up to the plant and running hot and normal. And then the site at their discretion lets the SAFER operator go back to the off-site staging area to accompany the next piece of equipment.

MEMBER REMPE: Okay. Thanks.

MR. BRUSH: Yes, sir?

MEMBER BROWN: I'm talking about driving versus flying. And looking back at your chart, the

map, 20 hours by truck to a 30,000 mile radius, 50 miles an hour.

MR. BRUSH: Aggressive.

MEMBER BROWN: Aggressive? And there are rules in terms of how -- how many drivers does FedEx have on one of these long hauls? At least two?

MR. BRUSH: Yes.

MEMBER BROWN: Maybe three? Because there are limits on how long they can drive.

MR. BRUSH: Yes, there will be a pair of drivers coming with each tractor.

MEMBER BROWN: Still 50 miles an hour, 1,000 miles. Just looking from Phoenix up to Washington, and saying that's averaging 50, that's --

MEMBER BLEY: It's humping.

MEMBER BROWN: That's more than humping.

(Laughter)

MR. BRUSH: It is. It is. It's very aggressive. And for the Northeast in all likelihood we would probably just immediately go to fly.

MEMBER BALLINGER: It's like they've written it off, yes. Seabrook and Pilgrim.

MEMBER BROWN: Yes, I don't know what it's like on the western side. I would imagine it's a little bit easier to boogie on the western side than it is on

the northeastern side.

MR. BRUSH: But even there trying to cross the Rockies with all the --

MEMBER BROWN: Exactly.

MR. BRUSH: -- trucks and traffic.

MEMBER BROWN: Okay. That was just information. Thank you.

MEMBER BLEY: Before you go on, you didn't talk about the helos. And I remember -- I don't know if it was you or somebody else who was here; maybe it was INPO, talking about during Fukushima heavy equipment got shipped from around the world to Tokyo, and they didn't have any capability of large enough helos to move it out to the site. Where are the helos coming from?

MR. BRUSH: Helos can come from basically three different places. The SAFER team has contracted with commercial helicopter companies, commercial helicopter companies who typically do logging operations, do fire fighting, do construction with helicopter support offshore, drilling rigs.

MEMBER BLEY: The heavy stuff?

MR. BRUSH: So heavier helicopters that have about an 85 to 9,000-pound external load capability. And I believe I mentioned earlier, all of

our equipment has been spec'd out to be 8,500 pounds or less.

MEMBER BLEY: Okay.

MR. BRUSH: So the large generators, the large pumps. In some cases we have to pull them apart, separate them from the trailer and get two loads going in. Or we'll get a fuel tank in as a separate load. But we can get everything under a helicopter and to the site.

The secondary helicopter source would be the Air National Guard in a certain state or in an adjoining state. We already have -- the industry has agreements with the states and their emergency response folks to support moving people around, moving small amounts of equipment around with light helicopters. In Illinois for Exelon, when I talked to those guys, they said we'll give you one of the governor's helicopters if you need it. Now, he doesn't have any capability other than personnel or some boxes of stuff, but they're very serious about supporting us.

And then the third leg of the helicopter support would be to turn to the NRC rep in the EOF. And at the same time we're looking for commercial or state assets. Ask them to contact DoD and begin to mobilize DoD assets.

MEMBER BLEY: You're not the one to speak to that, but do they have some agreements with DoD, or is that just something that would be handled through the higher levels of government?

MR. BRUSH: We have actually gone out and we have briefed FEMA, the FAA and OSD just a couple months ago on the potential for us coming to them for support. And like the military always says, if they're not out fighting a war, they're all over wanting to help.

(Laughter)

MR. BRUSH: So I mean, when Fukushima went down, we had Marines off shore on boats offering to help. We had --

MEMBER BLEY: Had an aircraft carrier out --

(Simultaneous speaking)

MR. BRUSH: -- the Air Force. Yes, the Navy was there. The Air Force just off the coast was offering to fly down and help support operations. Military gets engaged quickly typically.

MR. POWELL: We have found that the agencies are very easy to work with. In fact, the Air National Guard went to the Phoenix facility and looked at the slings and gave us feedback on the quality of

the slings saying we had purchased very high-quality slings to lift. In one case they recommended how to change the lift points on a piece of equipment and they've even started bringing some of their personnel in to start developing load lift plans.

MEMBER BLEY: Ah, okay.

MR. POWELL: So it's working a lot better than any of us I think would have imagined. And when we've had the meetings with DoD, DoE, FEMA and the FAA, they've been, you know, hey, there's ways we can work this and we need to put these things into play.

MR. BRUSH: Does that answer the question?

MEMBER BLEY: Yes.

MR. BRUSH: Okay. So we mentioned the SAFER Control Center. The SAFER team works out of the control center. And the primary is in Lynchburg and orchestrates the entire response to the site similar to an outage control center. The alternate is in Birmingham.

And then we have the response centers. Response centers store and maintain five sets of generic equipment and then a number of sets of site-specific equipment, some of which was mentioned today. The 600-volt transformer would be a piece of site-specific equipment, or an extra lift pump.

All of it again is loaded on commercial trailers. Some of it is pre-palletized for fixed-wing movement to facilitate loading an aircraft. And the response centers do the testing and certification of equipment as they're doing the maintenance. We do use the SAFER operators to go to the staging areas to assist us with maintenance and some of that testing as they're training for making sure they're familiar with the equipment. So that will be an ongoing process over the next four years.

CHAIRMAN SCHULTZ: What is the expected staffing for those operators?

MR. BRUSH: At a staging area?

CHAIRMAN SCHULTZ: Yes.

MR. BRUSH: Yes, we'll typically have four or five operators and then a staging area lead.

CHAIRMAN SCHULTZ: Okay.

MEMBER CORRADINI: So let me ask a different question.

MR. BRUSH: Yes, sir.

MEMBER CORRADINI: These are in operation now or soon to be?

MR. BRUSH: The response centers are in operation. We went in operation at the end of September in support of those sites coming out of their

outages this fall.

MEMBER CORRADINI: So has there been, for lack of a better word, a training exercise that actually brought a piece of equipment to a plant?

MR. BRUSH: There have been a couple of demonstrations, yes, sir.

MEMBER CORRADINI: Okay.

MR. BRUSH: One at Three Mile Island and one at Surry.

MEMBER CORRADINI: Okay. Thank you.

MR. BRUSH: So this again is just a pictorial that talks to the initial request. The initial request goes to a 24/7 contact at AREVA. AREVA does the dialogics call out of the entire SAFER organization. They get redundant response then both for the command center as well as for the response centers. And we call out both response centers until we make a determination which one we're going to utilize to respond to this event. And you can see the people in the control center there. A coordinator, a staging area coordinator, a logistics guy, an equipment coordinator, and then a response center coordinator.

MEMBER BLEY: The management and operating groups are all from the contracting organizations, or are there some of you folks from the

licensees or --

MR. BRUSH: They're all from AREVA.

MEMBER BLEY: All from AREVA?

MR. BRUSH: AREVA and PECO.

MEMBER BLEY: Okay.

MR. BRUSH: Correct. So here's the staging area organization. Again, we have a staging area lead. We have a number of operators that go into the staging area and they're working with the command center to get updates on equipment as they're coming in. AREVA does have access to short-haul planes, jets, that they can move their people around in response to this event to get them to an organization or to an area quickly. And then we'll rent vehicles from that area to support them while they're supporting the site.

MR. BAUER: So to answer the question about the technicians that go with the equipment, since AREVA does a lot of site support throughout the nation, they have people all over the country that they will be training. So when an event occurs, they'll contact the people and those people will arrive at the staging area simultaneously with the equipment arriving there.

CHAIRMAN SCHULTZ: They won't have far to go because they're associated with their site support team already?

MR. BAUER: Right, they could come from any place in the country.

CHAIRMAN SCHULTZ: Right.

MR. BAUER: Whoever they have available.

MR. BRUSH: Which is another great point. All these people are instrumental in supporting nuclear outages every year, so they're familiar with our sites. Maybe not all the sites, but they're familiar with how we operate in the nuclear industry. They're comfortable with going to a site and supporting sites.

This is the SAFER play book. I think you saw a picture of this earlier. It does have a number of chapters. And the play book is established to make sure that everybody is working from the same plan. So it's developed by the site in conjunction with the SAFER team. The SAFER team holds a copy. INPO will hold a copy. NRC will hold a copy. The EOFs at the nuclear utilities will hold copies. The 1-800 number is in this book, so when the site determines that they need to make a call, they'll look in the book. The number will be right there. There will be a sheet that they'll walk down to talk to that provides specific information. So it comes across the same way every time.

MEMBER SKILLMAN: What is the

administrative link that gives a shift manager or a shift foreman or the emergency director the confidence that his senior nuclear executives bought into this so that that person who's --

MR. BRUSH: So when he makes the call to move all this equipment --

MEMBER SKILLMAN: He knows he's on solid ground with his chief nuclear officer?

MR. BRUSH: We have built that requirement into the EP plans for each utility, or for each site. We do train down that path. As Scott mentioned, Mike Pacilio was the industry lead for this effort, the Phase III effort for off-site equipment. We did brief the CNOs at every stage of development of the response centers and their capabilities.

MR. BAUER: Early on we also -- there was an NEI initiative that the CNOs voted on to say we would all contract with SAFER. So we've all signed an individual contract with SAFER to be a part of their --

MEMBER SKILLMAN: Okay. Thank you. Thanks.

CHAIRMAN SCHULTZ: Was your question, Dick, who is the utility authority? Is that a designated individual --

(Simultaneous speaking)

MR. BRUSH: It's different for each utility. Some go right to the NDO and have the NDO make the call, but the site truly holds the responsibility for saying I'm in a world of hurt and I need extra equipment.

MR. POWELL: In the case of Palo Verde the shift manager will be in communication with the EC early on in the event. He makes the call. And in fact, he or she wants to make the call early enough in the event to get the logistics moving. That's when T-0 starts. And we're keeping that communications -- launch my play book. Hang up the phone. So he goes back to focusing on classification and assisting the CRS managing the event.

MEMBER SKILLMAN: That's why I asked the question, because it's command and control at the point at which the individuals in the control room determine I need help and I need it now. And I was really processing in my mind what does it look like if that person is saying, gee, I don't know if I've got to call the CNO right now to get permission to do this. I presume through all of the agreements that have been signed that link has already been closed, but you've confirmed it on the record. So that's what I wanted --

MR. BRUSH: Yes, exactly.

MEMBER STETKAR: But I was going to ask is that -- Mike said that's the way it is at Palo Verde. Is that uniform across the industry that the shift supervisor, whatever his title is, in the control room makes the call? Because Dan said EP, which tends to be corporate executives and those folks who live distant and --

MR. BRUSH: Well, it's in the EP procedure for the site.

MEMBER STETKAR: Well, that's not -- you have to be a little bit careful because that's not the procedure that Mike was alluding to.

MR. LLEWELLYN: This is David Llewellyn from Duke. At Duke the contract is already signed, so it's up to the duty engineer to make that call in the control room. So we don't have to get any executive approval to do that.

MR. BRUSH: So I think it's similar across the entire industry, but Bill can speak for Dominion.

MR. WEBSTER: At Dominion the control room has the authority to make that call as well.

MEMBER STETKAR: Okay.

MR. WEBSTER: It's already been pre-established.

MR. AMWAY: The same for Nine Mile Point.

MEMBER STETKAR: Thank you.

MR. GIDDENS: The same for Southern Nuclear.

MEMBER STETKAR: Could you give your name, please.

MR. GIDDENS: Yes, John Giddens, Southern Nuclear.

MEMBER STETKAR: Thanks, John. Thank you.

MR. BRUSH: So again, you see that we have willed that responsibility down to make that call.

MEMBER STETKAR: That's encouraging because we've heard alternating things about who makes the judgment call in these situations. And at times we've heard, well, that would be a corporate responsibility at the emergency response center or --

MR. BAUER: Now, once the shift manager makes the call, they'll probably turn the logistics over to the logistics coordinator in the EOF to basically say now you follow up with SAFER and make sure they get here where you need them.

MR. BRUSH: But as Mike said, then the site can go back to focusing on responding to their issues and everything else is happening independent of them.

MR. POWELL: And that's exactly what will happen. Once the EOF is mobilized, the logistics coordinator and the EOF will take over that interface with SAFER.

CHAIRMAN SCHULTZ: They don't get a chance to intervene and negate the call, do they?

MR. POWELL: No.

MEMBER STETKAR: Okay.

MR. BRUSH: But they do have an opportunity to interface and re-prioritize equipment. They're deploying their Phase II equipment. If something rolls down a hill and they lose a pump, they can re-prioritize the first piece of equipment to the site as that replacement pump. Or if a generator goes back, they can call and get that re-prioritized. So they're getting what they need up front in the delivery.

MR. POWELL: Or, using the example presentation from Gene this morning, if they were to recover off-site power and get some diesels back, they would say, all right, hey, tell SAFER to hold off on the equipment. I've recovered off-site power. Right now maybe get it half way here and we'll talk about it, or you can turn the shipment around. I mean, it depends on the extent of the event and what they're dealing with, but once that phone call is made, every plant

wants that equipment rolling whether it's on a plane or on a truck.

MEMBER RYAN: Just a quick question about your work force. Do you draw on European countries for workers on any of these projects, or is it strictly a U.S.-based work force?

MR. BRUSH: It's typically a U.S.-based work force.

MEMBER RYAN: The reason I ask is because they have different dose limits and it would be kind of a harder thing to integrate. Two versus five rem is the limit. So just curious.

MR. BAUER: Sure. On the issue of sharing personnel, the reason INPO has a copy of this book; and INPO would be contacted initially, they're going to help with logistics of people. So if a plant needs extra RP techs or certain skill sets, INPO is going to go and find those folks for us and direct them to the site.

MR. BRUSH: Okay. Just one last thing on the play book here, this is accomplished with a site visit from the SAFER team. They sit down with the leadership team at the site and talk through what the impacts of calling equipment out and delivering equipment, what Phase III really means. They do

walkdowns of the site. They drive primary and alternate routes into the site. They look at bridges. And then they go and walk down the staging areas and make sure the staging areas are adequate to support what we need, the lay-down areas. And as was mentioned this morning, typically it's a local air field that has enough tarmac to support parking trucks and equipment and also good enough to support helicopter operations, if in fact we have to do that. Okay.

Response center equipment. I already talked about five sets of generic equipment. Four sets are always available at each response center to be deployed.

One set nominally is in maintenance at any given time and we rotate equipment through.

The sites have identified beyond the generic equipment -- and "generic" is defined as more than 70-percent of the sites needed a specific piece of equipment. So all the pumps are for the most part generic. The two generators are generic. We have extra generators that are site-specific, since the site called for more than a couple generators that would normally come as part of the generic site.

The equipment is maintained by the response center staff, the staging area operators and

contractors as necessary.

We talked about the weight limit.

The helicopters, commercial helicopters have about a 70-mile round trip capability with this 8,000 to 8,500 load underneath it. The military helicopters have a lot more robust capability. Obviously depending on the helicopters you get it's a much better lift capability with much longer legs. The military comes with night vision capability and all-weather flying capability. So that's a very attractive alternative for what could be a bad weather situation.

All the equipment will run on diesel. And as was mentioned, it's all tier 2 or tier 3 diesel engines, so we're not having to deal with ultra-low sulfur fuel.

And as you've seen, we do have industry standard electrical and mechanical connections to ensure that when a piece of equipment shows up it truly is a plug and play to replace the Phase II equipment.

This is the current list of equipment, both generic and site-specific. We tried to do as much commercial off-the-shelf equipment as we could, and we were pretty successful with that. We had to do some tweaking to get under the 8,500-pound weight limit with

the equipment. We did three industry surveys to determine what equipment was going to be required. One at the very beginning before the sites had produced their integrated plan for the FLEX response, one survey in March after they had produced their integrated plan, and then one in July of '13 to verify the equipment that we had selected, the types of equipment we had selected were in fact going to satisfy everybody's plan.

MEMBER STETKAR: I look at that stuff and the only thing that strikes me is that's a pretty wimpy high-pressure pump. I mean, I look at the other low-pressure pumps -- and I'm assuming that came out of the industry specifications. I'm curious. Why? I mean, why not 300, 400, 500 gpm at high pressure?

MR. BRUSH: It met the requirements of the industry for their coping requirements.

MEMBER STETKAR: Under whatever presumptions they --

(Simultaneous speaking)

MR. BRUSH: It didn't make sense to over-buy. It made -- go ahead, Phil.

MR. AMWAY: This is Phil Amway. Just to talk to that, the high-pressure pump with a 60-gallon- per-minute flow is primarily for the pressurized water reactors that are just dealing with

the seal leakage. And it's not accounting for boil off. It's just leakage from the RCS while they're at high pressure. And that's all they should need is up to 60 gpm.

MEMBER STETKAR: I understand that assumed event trajectory. What I'm asking is that if I look at the other makeup requirements and think of reactors and the amount to refill reactors and the amount to take away heat, 60 gpm at high pressure doesn't do much except make up for seal leakage, which is fine if that's the event scenario. You're on a trajectory. If you're at a larger leakage rate at high pressure, you're not going to make it. In other words, I see a lot of margin in all of those low, medium steam generator makeup pumps compared to the way plants really work. I don't see a lot of margin in the high pressure.

MR. FORD: Bryan Ford with Entergy. I actually had asked a similar question when I saw it. What I was told was that as you go to the higher flow rates, it just becomes so hard to deploy. For the high-pressure hoses and stuff you have to deploy, the weight gets so much. They were trying to optimize deployment also.

MEMBER STETKAR: Okay. So there are

things we can mitigate and things maybe we can't mitigate.

MEMBER BALLINGER: Now when you say "turbine generator," you mean that?

MR. BRUSH: Yes, it actually has a turbine engine that drives the generator.

MR. POWELL: It runs on diesel.

MR. BRUSH: I'm sorry?

MR. POWELL: It runs on any type of fuel.

MR. BRUSH: It runs on any fuel. It's a multi-fuel turbine.

MEMBER BALLINGER: Okay.

MR. POWELL: Kerosene, mineral oil, vegetable oil. If it burns, it will run it.

MR. BRUSH: And the turbines we're using are all rebuilt. They've been in the industry for years. Have, I don't know, 15 to 17 million hours of operating time.

MR. POWELL: It's a T-53 helicopter turbine.

MEMBER SKILLMAN: I have a curiosity question. I understand the equipment. in my experience one thing that took everybody by surprise was the need for more shielding. And I guess the presumption is this is simply equipment to take care

of an extended loss of AC power, but I'm sure --

MR. BRUSH: And/or the loss of the ultimate heat sink, yes, sir.

MEMBER SKILLMAN: And the loss of the ultimate heat sink. But more shielding is better than less shielding. And I know at TMI we got our shielding from Admiral Rickover. He sent a C-5A filled with it -- is how we took care of it. Different issue, but there will be times when to get to where you want to get to you probably need to build yourself protection. Was there any consideration given to needing shielding?

MR. POWELL: Our philosophy going in we're preventing core damage, not mitigating core damage. We're preventing core damage. So shielding was something that would be needed if we failed in that mission.

MEMBER SKILLMAN: So the presumption is you really don't need any because you have prevented a radiological event?

MR. POWELL: That's right.

MEMBER SKILLMAN: Fair enough.

MR. BRUSH: And most of this equipment is hooked up outside the plant proper --

MEMBER SKILLMAN: Yes, fair enough.

MR. BRUSH: -- and it doesn't have to go

inside the plant.

MEMBER SKILLMAN: Okay. Thanks.

MR. POWELL: Now if additional shielding was needed, we would rely on going to INPO to contact other utilities to get those resources for us.

MR. BRUSH: And there is an agreement between all the CNOs that say if you're in a bad situation, we will support you.

MEMBER RYAN: Have you defined that break point technically in terms of these issues of how much of a release is more than you can handle? I would want to know where that bar is before I start saying I'm going to cover that. How do you --

(Simultaneous speaking)

MR. BRUSH: As far as --

MEMBER RYAN: Well, you said you can handle events up to certain sizes or certain release rates or certain parameters of some kind. How do you know when you get to that point what's above that? I mean, how do you decide, no, we can't handle this one? It's not within our wheel house or it is.

MR. POWELL: I think from our perspective we're deploying the equipment and connecting it to a plant long before a release rate happens.

MEMBER RYAN: So the amount of

radiological release that you would tolerate in order to have you deploy would be fairly low? Is that what you're saying?

MR. POWELL: Yes, we're keeping sufficient water inventories in the core to prevent core damage, and the timelines are based on that.

MEMBER STETKAR: This is not severe accident mitigation. It's core damage prevention.

MR. POWELL: It'd core damage prevention, yes, sir.

MEMBER RYAN: Okay. Fair enough.

MEMBER SKILLMAN: It's EA-12-049, which is really --

MR. BAUER: So the one thing I would say to that is all the U.S. CNOs went over to Japan and then they just recently had all the Japanese CNOs in Phoenix for a week And basically one of the messages that our CNOs are trying to send is we meet four times a year, we're a tight-knit group, we basically -- if a problems happens at one of our plants, it's at all of our plants, and therefore we're all in line to help you. So I think we would have plenty of help offered up at a --

(Simultaneous speaking)

MEMBER RYAN: Oh, help is not the problem. What I'm trying to understand a little bit is where are

the go and no-go criteria of what you're going to do and how you're going to do it, and when do you ask?

MR. BAUER: I think the sequence is you're going to move from your FLEX Support Guidelines, like Gene was talking about, and if things start going worse, you move to your SAMGs and you're going to activate other levels of --

MEMBER RYAN: All right. Fair enough. I've got a better picture. Thank you. That's helpful.

MR. BRUSH: So just the last comment on this slide. This isn't necessarily the end-all for the equipment. If a site decides three years from now they need to modify their coping strategy and need a different piece of equipment, then we'll form an Equipment Committee and go out and purchase that piece of equipment. Or if a technology changes and there's a better technology to satisfy a requirement we'll go after a different technology.

MEMBER STETKAR: On the site-specific stuff they just pay the rent and maintenance costs for their own --

MR. BRUSH: They do buy a certain amount of pieces of the equipment to satisfy their requirement. And whoever else joins that Equipment

Committee --

MEMBER STETKAR: Yes, okay.

MR. BRUSH: And then, yes, they pay an annual cost for maintenance and storage.

Okay. Talk briefly about transportation. We have teamed with FedEx Custom Critical for the ground and the fixed-wing movement of the equipment. Custom Critical already delivers to nuclear sites. FedEx does deliveries every day just about in some way, shape or form to a nuclear site. They also had airplanes in the air within hours after 9/11 flying. So they are used to flying in extremis and used to driving onto nuclear sites. So pushback from drivers would be minimal in this situation.

We talked about the three-tiered helicopter availability. Again, the first level is to contract out or call commercial helicopters and determine their availability to support a requirement. And that's driven by a couple of things: They're obviously in the business to employ their helicopters full time, make as much money as they can and probably not going to stop a money-paying contract to support us unless there's some national declaration.

The other thing is the legs. Typically commercial helicopters don't fly at night and they

don't fly in all weather, so they're fair weather daylight operations. And most of them are located in the northwest, so getting a commercial helicopter from the northwest to Florida doesn't happen inside of 24 hours. Rather, it's 48 or 72 hours to get that helicopter to self-deploy. So again, going out to the states and getting Air National Guard assets or turning to DoD to mobilize their assets becomes a very attractive proposition for us.

MR. POWELL: And he one thing I forgot to mention earlier when I talked about this, I left out the Nuclear Regulatory Commission has been involved in all these meetings as well when we've met with the FAA. So it's been a total integrated approach.

MR. BRUSH: So for the helicopters it's a simultaneous call out: commercial, Air National Guard and DoD through the NRC and FEMA. We are preparing congested area flight plans for all the sites. Typically when you do external loads you don't like flying over houses or other areas where people congregate, so we look for roads where there won't be a lot of traffic or rivers to fly down in case something happens and we have to drop a load.

MEMBER STETKAR: Dan, just something I thought. As Dennis mentioned earlier this morning,

these events in practice that are going to mobilize these things are not your plain vanilla clean losses of electric power. It's going to be a mess around the site and most of the folks are going to be headed away from the site and trying to get away from the mess. Have you coordinated the fact that you're going opposite perhaps a large flow of traffic coming at you for -- the populace trying to get away from where the mess occurred?

MR. BRUSH: Sure.

MEMBER STETKAR: And it isn't necessarily just the nuclear mess. It's perhaps seismic destruction. It could be very, very heavy storm-related destruction. It could be -- you know, you name it.

MR. BRUSH: We'll have to work with the state police and the local support agencies to clear paths or hold paths open for us so that we --

MEMBER STETKAR: I mean, this does get involved with not only the site emergency plans but the general --

MR. BRUSH: Correct.

MEMBER STETKAR: -- emergency plans with those agencies. You haven't done that yet?

MR. BRUSH: We have MOUs with the local

facilities and authorities, and we have MOUs with the states.

MR. BAUER: Yes, the plants have met with their state and county officials to basically talk this through and talk through what assistance they would need.

MR. BRUSH: They ask for escorts and for clearing paths into the site --

(Simultaneous speaking)

MEMBER STETKAR: No, I understand. I'm thinking of that last; pick a number, 20, 25 miles from the staging area --

MR. BRUSH: Exactly.

MEMBER STETKAR: -- until the time you put it in a place where it can get connected. And I guess I'm having a little less confidence in the helicopters because I don't hear really strong-knit agreements for availability necessarily, so now I'm starting to think about trucks and roads and that sort of thing.

MR. BRUSH: Well, we've got 24 hours --

MEMBER STETKAR: Yes.

MR. BRUSH: -- to coordinate with the state officials to isolate routes so that -- and again, we've already pre-identified primary and secondary routes into the sites and those are coordinated with

the state and local agencies to make sure that they know that the paths we want to take to get equipment in.

MEMBER RYAN: Dan, have you all done a live drill of any of that?

MR. BRUSH: We --

MEMBER RYAN: A real-life drill where you shut the roads off and the crews come through with the equipment and all that and everybody else can't go on those roads?

MR. BRUSH: We have not.

MEMBER RYAN: What?

MR. BRUSH: We have not.

MEMBER RYAN: Because I think those exercises, in my experience, if you actually do the real thing, or as close to it as you can get, they're are very instructive on whether it will work or -- I think that's kind of what --

(Simultaneous speaking)

MR. BRUSH: Well, we did a couple of demonstrations and we did have state and local --

MEMBER RYAN: A demonstration is not a drill.

MR. BRUSH: Correct.

MEMBER RYAN: Big difference. A demonstration is you take the shiny one and show it off

and it's working good and everything is great. A drill is everybody is doing what they normally would do and nobody's watching. So it's a big difference.

MR. BRUSH: Understand.

MEMBER RYAN: Okay.

MEMBER BALLINGER: It seems to me that the most likely bad path would be the roads because of all the things that John was talking about and that the sure path is with the helicopters, but it also --

MEMBER STETKAR: Why?

MEMBER BALLINGER: -- seems to me that the -- well, because that sidesteps everything, right? In other words --

(Simultaneous speaking)

MEMBER STETKAR: It depends on the weather.

MEMBER BALLINGER: Okay. All right. Okay.

MR. BRUSH: So it really is situation-dependent.

MEMBER BLEY: Since you brought this up, I haven't thought much about it, but as far as I know all the counties and states around the plants have emergency plans. And is this getting worked into their plans or is --

MR. BRUSH: Yes, we're doing that now. In fact, we have standing Memorandums of Understanding and Agreement with the state and locals already.

MEMBER BLEY: Right.

MR. BRUSH: So all we're doing is building on those existing plans and making sure that --

MEMBER STETKAR: The only key is though if you tell the state organizations that I have a problem in isolation at the nuclear facility and I want a plan to get equipment there, that's one way that they think. If you say that I've had the biggest earthquake that's ever occurred in this area, or a line of the worst tornadoes that have come through and devastated a city, and now how do I coordinate getting things to the nuclear plant, you might get a different answer. Follow me? When you say I've coordinated it with the local emergency response organizations, have you done a clean coordination? In other words, this is the only concern that we have today.

MR. BRUSH: It's a primary concern that the state and local organizations understand that they could be in a massive response to an event. The last thing they want is for a nuclear site to have a bad day on top of that massive event. And everybody I've talked to anyway has voiced a very high concern about

we're not going to be the only people holding our hand up asking for help, but they understand that if they don't support us, it could go into a bad situation very quickly.

MR. POWELL: I can tell you for the State of Arizona; and I think you'll hear similar stories from the fall '14 implementing plants, we've met with the state agencies, the local police and then cascading out with the state police, all the emergency response areas. We've talked through the response planner. Dan referred to it as the play book. We talked about the three-tiered approach to helicopters.

In the case of Arizona it was all very positive. And we talked about how we would reroute traffic and whose responsibility? And there's an incident command structure that the states will implement. And there's a clear hierarchy. And then that person is in charge of routing traffic through the state and getting the equipment around. So that group would determine whether a truck comes in on Interstate 10 or through Interstate 40, or maybe it has to go around and come in a different direction.

They've reviewed all their emergency response plans in the State of Arizona and in fact the state found that in one case they needed to add two words

to the plan to clarify use of helicopters for people and equipment. They identified the change on a Thursday -- or a Friday afternoon and the change was effective on Tuesday morning. And I think you'll hear similar stories from the other states that have implemented.

Going back, we haven't drilled this on this level, particularly in the states, but they're all aware of what their roles are and their need to support. In fact, we are scheduled to have another series of meetings to go through this, through the response plan again. And it's all been very positive. We've had all members of horizontal local law enforcement, the National Guard, the governor's office all involved, the site emergency, the -- I mean, the state, the county emergency directors. And I think Dan's got similar stories for the meetings he's had with his states.

MR. BRUSH: So in fact, the states want to start incorporating some of these into their exercises voiced by Illinois, Tennessee, Arizona, those meetings that I've sat in. We've got language in Pennsylvania and Maryland. We missed the opportunity in New Jersey. They've got our requirements. They'll change the language in their emergency plans next year when it comes around. So we are working through just about all

the states.

MEMBER BLEY: I think we've crossed a little threshold here as we're talking about this, from what we talked about earlier. What we, at least a couple of us over here, were worried about this morning is the most likely thing to get you into this ELAP is some severe common cause event, some big storm, some big earthquake. But the things that might activate the center are much more broad than that. TMI would have probably gone to this place. And so there's a whole range of situations beyond the ELAP kind of thing where this will be very helpful where you don't have that confounding problem of the local damage.

MR. POWELL: You know, hypothetically a company, or a coastal, if they know a hurricane is coming, might elect to say I'm not happy with the equipment being this far away. Move it half way here --

MEMBER BLEY: Half way here, yes.

MR. POWELL: -- and find a safe place. And they might have that dialogue and do that and reduce that risk to their plant.

MR. BAUER: One of the other things is that every plant has least 100 percent margin on the 24-hours. So they don't need it for 48. So we have

quite a bit of margin to work with on the delivery time frame.

MEMBER SKILLMAN: So we've talked about tractor-trailer. We've talked about helicopter. Soon we're going to be talking about flooding, maybe subsequently dam failure. Some plants are fairly close to their design-basis in terms of flooding. Is there any consideration to having to bring equipment in by barge? I think folks from Fort Calhoun might have said, gee, it really would have been nice if somebody brought a medium-sized barge with a couple of backup pumps or something just in case we needed them.

MR. BRUSH: Yes, when we met with DoD we talked about using air-cushioned landing craft --

MEMBER SKILLMAN: Oh, yes. Watercraft?

MR. BRUSH: -- where they're available. They're not available all over, but there are situations where that would be very attractive. We have talked about using barges for a site that was isolated at Salem-Hope Creek. It was isolated by water. And we would like to do it by helicopter. It seems to be the fastest approach. There's a lot of things you have to do with barges to make sure that you've got a place where you can land the barge and safely off-load the equipment.

MEMBER SKILLMAN: And you need a tow boat or something, a pusher to get it there.

MR. BRUSH: Or use a ferry or something. Yes, sir.

MEMBER SKILLMAN: So is it fair to communicate that when and if necessary access by watercraft will be considered, or is that a stretch at this point?

MR. BRUSH: I don't think that's in our plans right now. I think we have discussed that, discussed the requirement for a water-born isolation. And if we couldn't get in by helicopter what we would have to do.

MEMBER SKILLMAN: Fair enough. Thank you.

MR. POWELL: I'd like to real quickly build on something Scott said going back to Gene's presentation of Palo Verde this morning. The need for a piece of Phase III equipment, what would have to happen is if he powered up the 480-volt bus, the Alpha bus, that gives us access to the Alpha or Echo charging pump. I would have to have both pieces of permanent plant equipment fail, then the end pump and the plus one pump before I even needed the first piece of Phase III equipment. So it truly is the Phase III

defense-in-depth equipment.

MR. BAUER: There are a few plants however that do have equipment coming from the National SAFER Response Center that is required for them to cope. There are a few.

MR. BRUSH: Okay. This is a depiction of a checklist that is done to declare a site operational and be able to be supported by the response center. This checklist is done trading documents between the site and the response center personnel. So you run down the list here of we have a lot of generic equipment required. It's all under into maintenance. And we've got non-generic or site-specific equipment. What's required. We've got a team that's trained up. We have the response plan or the play book developed. Congested area flight plan is completed. Training in place. All those have to be accepted by both entities to declare it operational. This checklist is held at the SAFER centers and reviewed every year.

Okay. That's all the primary stuff.

CHAIRMAN SCHULTZ: Any questions that might get us into the additional materials from the Committee?

(No audible response)

CHAIRMAN SCHULTZ: Okay. Scott, that

completes your set of presentations.

MEMBER BLEY: Yes, I guess I do have one.

CHAIRMAN SCHULTZ: Go ahead, Dennis, then.

MEMBER BLEY: I think what you said, Dan, was you went operational in September for the plants who have just come out of outages.

MR. BRUSH: And the plants that were going into outages in the fall and needed to have the response center to support the Phase III portion of their FLEX strategy, their coping strategy. Yes, sir.

MEMBER BLEY: When will it be operational for everybody?

MR. BRUSH: At the end of 2016.

MEMBER BLEY: '16?

MR. BRUSH: Yes, so we're working right now on spring of '15 plants --

MEMBER BLEY: Okay.

MR. BRUSH: -- to make sure that their play books are completed and signed off. We already know the equipment is in place. We know we have the training completed. We'll have congested area flight plans by the end of this year for all sites. So we're out ahead of that game, but the play book development is really the thing that takes the time, to visit the site, to

walk down all the areas, drive all the roads.

MEMBER BLEY: Rather than me make an assumption, I will ask you what if a plant who doesn't have their play book yet has the bad event tomorrow and says, hey, I need help? Is there a way to handle that?

MR. BRUSH: It would be a generic deployment, yes. They'd call up the 1-800 number and --

(Simultaneous speaking)

MEMBER BLEY: -- everybody now in some fashion?

MR. BRUSH: Yes, almost every site has identified at least one staging area off site, and in most cases two.

MEMBER BLEY: Is all the equipment at the --

(Simultaneous speaking)

MR. BRUSH: All the equipment is at the response centers now. We have slings for the equipment. Again, it's mobile loaded on trailers. So we're able to go if a site, a 2016 site were to have an incident, we could deploy to support that site.

MEMBER BLEY: It might take a little bit longer, but it would still be --

MR. BRUSH: Well, it would just --

MR. BAUER: Whether they have the connections to put the equipment --

(Simultaneous speaking)

MEMBER BLEY: Yes, that's right.

MR. BAUER: I mean, they not even have their Phase II equipment on site yet, but they personally are buying for their site. So we could get there with a set of equipment.

MEMBER BLEY: Stuff they couldn't use.

(Laughter)

CHAIRMAN SCHULTZ: It would be coordinated appropriately, for sure.

MR. BAUER: Right. Yes. When we opened those Phoenix response center, FEMA came and was part of the opening ceremonies and they were very interested in the capability that was demonstrated there.

CHAIRMAN SCHULTZ: Bill Shack, do you have any questions of this group at this point?

(No audible response)

CHAIRMAN SCHULTZ: Hearing none --

CONSULTANT SHACK: No, I don't.

CHAIRMAN SCHULTZ: Okay, Bill. Thank you.

(Simultaneous speaking)

CONSULTANT SHACK: -- presentation

though.

CHAIRMAN SCHULTZ: Thank you.

MR. BRUSH: Thank you.

CHAIRMAN SCHULTZ: Any other comments or questions by the Committee at this point?

(No audible response)

CHAIRMAN SCHULTZ: All right. We're going to change out the industry presenters with the NRC staff.

PARTICIPANT: Does the gentleman have --

(Simultaneous speaking)

CHAIRMAN SCHULTZ: Oh, excuse me. A comment.

MR. GIDDENS: That's okay. This is John Giddens with Southern Nuclear.

Dan, I was going to tell you that since the ACRS has already said they're going to be in Phoenix in May, that you might extend an invitation to them where we could facilitate a -- if they'd like to go to the --

MR. BRUSH: Response center?

MR. GIDDENS: -- response center.

MEMBER STETKAR: I told you they hadn't heard of it.

MR. BRUSH: I think we already have that

in the works.

MR. GIDDENS: Okay. Thank you.

MR. POWELL: Actually, the staff through Jeremy Bowen has been in contact with APS and we've got dates. And we've already contacted the response center to make those arrangements. So great idea, John.

(Laughter)

CHAIRMAN SCHULTZ: To expand that, our visit will be to the site, to the center and also to the region.

So thank you very much. We appreciate it. Very good presentations.

While the NRC staff is coming to the front of the room, I'm going to ask if there are any public comments. And we have a short time here just while we make the transition. If there are any members of the public in the room who would like to make a comment based on what we've heard so far, now would be the time to do so. If we can get the phone line open, we'll also ask on the bridge line.

(No audible response)

CHAIRMAN SCHULTZ: I'm not seeing anyone coming to the microphone in the room here. We'll have another opportunity later on today.

I believe the phone line is open. And for our purposes we need to identify that someone is out on the phone line. Could someone please indicate that they are there just by saying words, and then we'll know the phone line is open.

MR. JACKSON: Yes, Tom Jackson with Rizzo Associates.

CHAIRMAN SCHULTZ: Tom, thank you.

Now, if anyone would like to make a comment, please state your name and provide the comment to us.

(No audible response)

CHAIRMAN SCHULTZ: I'm not hearing any at this time, so we'll go ahead and close the phone line on public comments and it will, as I mentioned, be opened later today.

And as that is closing, Jack, I believe you've got to coordinate the presentation here.

MR. DAVIS: I am.

CHAIRMAN SCHULTZ: Is that correct?

MR. DAVIS: Yes, I am.

CHAIRMAN SCHULTZ: So welcome and we look forward to your presentation. You're going to be telling us what you've learned from the industry's overall program and the reviews that you have done.

MR. DAVIS: Yes, correct. So I'm Jack Davis. I'm director of the Division of Japan Lessons Learned, just doing this for NRR and a lot of it for the Agency. I apologize I wasn't here this morning's session because I had a couple of conflicting meetings, but I heard it was a very fruitful discussion.

So for this afternoon's discussion we're going to spend a good amount of time talking about NRC's review of the order and our methodology, how we're going through that. And then we also have some staff here that's going to talk to you about specific issues that the Committee had told us they were interested in related to this area.

Following the previous discussion, I think it's important to reemphasize that the mitigation strategy order is on the prevention of core damage. It's not about post-core-damage-type of issues, and it's for beyond-design-basis-type of natural phenomenon. And you're going to see that theme throughout all of our discussions and out methodologies that we're talking about here today.

If I can have the next slide? Thanks, Jeremy.

This slide demonstrates the Tier 1. I know it's very busy and it's not meant to be looked at

in great detail. It displays the activities that are going on in Tier 1 for Fukushima. There are a number of parallel activities. The real point of this is that we got that it's an integrated-type of an approach and that all of these pieces have to fit together so that you have at the end of the day a logical consistent and robust regulatory framework. And we're trying to achieve that in a lot of the things particularly related to flooding and some of the other activities. We're doing a parallel activity and then they're going to fit into the mitigation strategies.

One last item I'm going to mention before I turn it over to Jeremy to go through the presentation is that we're here today to talk about operating reactors, but we recognize that in NRO they're also looking at new reactors and what goes on there. So we maintain very close coordination with them. There are some differences between what they do and what we do, but we understand why there are differences or in some cases similarities. And there are reps here from NRO that can help us answer any of the questions you have that might cross over those boundaries.

So with that, I'm going to turn it over to Jeremy who's going to walk us through it in more detail.

MR. BOWEN: Okay. Good afternoon. Like

Jack said, I'm Jeremy Bowen. So I'm currently one of the associate directors in the Japan Lessons Learned Division. I've been involved with this for about a year-and-a-half. I got involved as the branch chief for the management of the overall project for how we were conducting the reviews. So I'm going to start with this kind of walk-through at a high level, how we've reviewed once the licensee has submitted their integrated plans how we conducted their reviews and how we got to where we are today, and our plans for final close-out of the order.

So to start with, again, just a quick overview of the order. We've talked about this on the edges so far today, but the order is a performance-based order. It's trying to prevent core damage for undefined beyond-design-basis external events. The order talks about -- you see the terminology that's used there: initial, transition and final. And what that basically means is the licensee is using installed plant equipment, portable on-site equipment and then resources from off site.

And this is a cartoon diagram that we've put on our public Web site to kind of communicate to all of our external stakeholders exactly that sort of wording in a pictorial format, if you will.

So some milestones. The first responses were due in February of 2013. Licensees submitted their integrated plans, and it basically laid out how they were going to comply with the order. The compliance for the order is two refueling cycle outages after the submittal of that integrated plan with a final compliance date no later than December 31st, 2016.

I will note here that some licensees have requested some schedule relaxation, and the Agency has granted some relaxations. Those have varied for one reason or another. For the most part it's to make some modifications to the plants to enhance their capability to respond to any such event. And the relaxations kind of fall into three different categories: One is for an additional outage prior to December 2016. That grants them three refueling cycles instead of two.

The second category has been the plants that are decommissioning. There obviously wouldn't have to be concern about the core cooling since they would have no fuel in the core.

And then third has been an alignment with the Severe Accident and Capable Hardened Vent Order. And the reason for that is that certain plants need the venting capability that that order requires in order to implement the strategies to comply with this order,

Order 049. However, in all of those cases the plants that have been granted that extension, the additional modifications minus the vent modification, additional modifications and the portable on-site equipment will all be available and completed on our normal timeline, the original timeline identified for the Mitigating Strategies Order.

CHAIRMAN SCHULTZ: Jeremy, can you give a rough number of plants that are affected in that way besides the decommissioning facilities?

MR. BOWEN: Sure. For the additional outage prior to 2016 there are 10 units that were granted a third outage. And to align with the Hardened Vents Order it was six sites, so in that case 10 units as well.

CHAIRMAN SCHULTZ: All right. Thank you.

MR. BOWEN: Okay. So as I mentioned, the goal of the order is prevention of core damage, and it's to prevent that in a beyond-design-basis external event. And it's an undefined event. It's a very performance-based order. And so to try and; for lack of a better way of saying it, define the undefinable, industry proposed to use what they call their flexible -- FLEX as we now refer to it, the Diverse and Flexible Coping Strategies. And they provided an

Industry Guidance document, NEI-12-06. That defined the undefinable by establishing the initial parameters that were discussed this morning, the extended loss of AC power and the loss of access to the ultimate heat sink.

To be honest, that has been a challenge for the staff's review. How far down do we go with this review? How do we try and bound this undefinable event? How do we bound our review? As you all have noted, there's been many of the questions that this Committee has asked that we were asking ourselves during the review. And there was lots of questions about, well, there's recognition that some event happened that got you into these initial conditions, so you have to consider, well, what equipment would be available? What equipment would be impacted if you had this sort of event vice this sort of event? And every time we asked the question, there was a lot of because of the performance-based nature of the order, we had to define or try and figure out what's the right threshold for how many times to ask a question to get to a level of comfort?

To do our review we've had staff that are experts in many different technical areas specific to containment and ventilation, electrical,

instrumentation and controls, but at the same time we also focused on having a lot of staff with a lot of operational background and a lot of operational experience. We really focused our review on paying significant attention to the integrative plant response, trying to figure out from the broad sense of this undefined external event. Is a strategy feasible and can it logically be executed given the unknowns that are likely to be facing the plant.

And in the case, if I will, the flexibility and the diversity that industry proposed, as we've gone through our review over the past year-and-a-half I think we've come to see that that really is the key to success.

Jim Wiggins, the director of NSIR, has mentioned a couple of times that after TMI we went to a symptom-based approach for the emergency operating procedures and that he views this as the equivalent symptom-based approach from a mechanical standpoint post-Fukushima. That really is the case that we're seeing is there isn't one specific you're going to do this strategy because you have an extended loss of AC power and loss of access to the ultimate heat sink.

It's there are multiple different ways to inject water into the core now. There are multiple

different pathways to cool down the core now. There are multiple different ways to get fuel and additional equipment on site. So there's a strategy that's developed from some initial basis conditions, the ELAP and the loss of access to the ultimate heat sink, but it really is more than that. It's a more collective review that the staff has been doing as well.

CHAIRMAN SCHULTZ: Jeremy, if I could just ask at this point, you talk about this in terms of review, and that's where we are in the process, but could you talk a bit about the process that was used to come to the formulation of the approach?

And what I'm getting to is that you had a number of experts that were participating in this from the beginning, as did the industry. And then in addition there were public meetings that were held in order to thrash out or discuss, or whatever words you want to use to begin to identify the concept and then move forward to the solution that we're seeing today.

MR. BOWEN: Right, so if --

CHAIRMAN SCHULTZ: I'm sorry, I don't want to move forward in your slides, but --

MR. BOWEN: No, I was going to say if I go back to this --

CHAIRMAN SCHULTZ: Okay. Good.

MR. BOWEN: -- slide, the development of the industry guidance, the -- so as the Committee is well aware, the Near-Term Task Force proposed some recommendations. The staff took those recommendations, kind of prioritized them and sent a proposal to the Commission. The Commission came back with direction to the staff and to issue the three orders and the 50.54(f) letter.

Once the orders were issued, there were multiple public interactions with industry. Industry actually came in proposing the FLEX strategy. There was some dialogue back and forth as to whether the Agency would find that acceptable at a high level first. Eric Bowman down here to right was actually intimately involved in those discussions from the beginning.

In the end the guidance that industry provided was -- I don't know remember the exact date. I think it was sometime early 2012.

MR. BOWMAN: August 2012 was when they got the final version.

MR. BOWEN: Yes. But before that final version was sent in and approved -- endorsed by the staff, there was several interactions on what's appropriate. There was an Interim Staff Guidance document that was developed. It was published in the

Federal Register for public comment. It was actually brought before the Committee in July of 2012 for discussion with all for review. And like Eric said, that was finally endorsed by the Agency in August 2012.

From that document the industry went off and developed their plans and then submitted their plans in February of 2013. And then from that point I like to say we moved from the lessons learned phase into the implementation phase. And once the industry sent in their proposals, we got a look at it and started to review it against the industry guidance and found that it was much more challenging that just kind of picking up two pieces of paper and comparing them back and forth.

And that's actually what I was going to cover in the next few slides is how do we move from reviewing a for the most part 70-page industry submittal against a 100-page guidance document and a 15-page NRC endorsement?

MR. DAVIS: I think what you're getting to though really is a lot of -- it's beyond-design-basis. The staff is very used to doing design-basis review. It's well thought out. This was a lot harder to do, right? So you're really getting to how do we know this is the right thing? And you're right, even as we move

along now we have meetings with the industry. We call it the Fukushima Leads Meeting where we talk about different interpretations or what is the right level for something? How much additional pieces of the hoses do you need, right? Do you need double the hoses, for instance? Where we say n plus 1 on the equipment. So it's those types of things.

I don't think there's any good answer other than we keep having an open dialogue. Committees like yourselves give good insights and say, yes, that makes sense to do something like that or it doesn't. So it's been difficult and it's been challenging.

MEMBER RAY: Well, let me suggest something though that is related to what Jeremy said before the last question was asked. He said rightly; and I think we all should be very glad of this, that now we have multiple ways of doing things. But they're not all equal. And the question then is, well, how do you retain that reality in what you say about them instead of just saying, well, now we've got three ways to do something when we only had one way before? Well, but they're not all three the same.

MR. BOWEN: True.

MR. DAVIS: I think what he was talking about before plants are going to go down their EOPs.

They're going to go symptom-based and they're going to try to recover like they normally would. Once they finally realize, no, this is way worse than it is, then they're going to enter their FSGs. They're always trying to get back though to a recovery mode, so they're going to go down their own prioritized list. For instance, water sources on site. They have their own prioritized list. They'll say if that tank, if the CST is available, I'm going there first and I'm going to do the following things to get myself back. If that's not available, I go to the next priority water source.

MEMBER RAY: I think that's understood. I just mean when you're communicating about what we've done it's not as simple as saying, well, now we've got multiple ways to do --

MR. DAVIS: Sure.

MEMBER RAY: -- what we used to only have one way to do.

MR. DAVIS: Yes.

MEMBER RAY: There's still only one way that meets the design-basis.

MR. DAVIS: Yes. Very true.

MEMBER RAY: Okay.

MR. DAVIS: I appreciate the comment because that's actually why we ended up taking the

review path that we did, because it was such a challenge to figure out what is -- they are all different. What's good enough? What's better? What's not slightly good enough?

MEMBER RAY: Yes, it's very hard to decide is it better, better enough and so on? I mean, we're all struggling with that here. Okay.

MR. BOWMAN: Jeremy, if there's one thing I could add, you had asked how we came about to what we thought was good enough to accept for the guidance. One major input to that is the recognition that we had the other areas of work going on.

For example, one significant one, the direction to proceed with the rulemaking that includes the Severe Accident Management Guidelines. That drove us to look at the mitigating strategies as being intended to prevent core damage rather than -- we could have looked at the wording of the order and said it doesn't say stop at core damage. But recognizing that we've got the Severe Accident Management Guidelines as a specific directed activity by the Commission to look at and consider whether they should be actually required led us to not include those in the guidance for this order or in the review process for this order.

And similarly, with the initial set of

directions from the Commission on pursuing Recommendation 1 and the potential for an extended beyond-design-basis limit separately from the remainder of the activities, that's where you get the limitation of what we're looking at for the protection area in the external events as being essentially equivalent to the design-basis because we were told pursue the idea of an extended beyond-design-basis limit outside of this process.

MR. DAVIS: The other thing that adds to this -- and again, you're right, at the end of the day it still comes down to a judgment call. But there's a monthly JSC, Joint Steering Committee meeting that's done at the CNO level to EDO level. And we're there usually and we bring up certain issues that we're struggling with to say what's the right level that the Agency should feel comfortable with? And so you get a lot of those types of discussions. And sometimes they go on for -- it's on the agenda each time because they can't make a decision because there are so many different things that you're talking about that play into making the right call. So these are hard decisions.

CHAIRMAN SCHULTZ: I appreciate the perspective. Thank you. That's been very helpful.

MR. BOWEN: So along those lines and about the performance-based and complicated order, the other aspect is there was a lot of interest in what was going on agency action-wise, industry actions after the orders were issued. So typically when the Agency issues an order, it issues the order. It's a licensing action. And then it follows up on that licensing action in inspection space. We recognized that that was not sufficient agency engagement for what we were doing. It wasn't going to be enough to issue the order, wait five years and then inspect to make sure everything was done.

So in order to provide some regulatory certainty for the industry moving forward, they're spending a lot of money making these changes. We want to make sure that they're done in the right manner, make sure that what was being done when -- in five years there was a legitimate improvement in safety to the plants.

And so to provide that regulatory certainty and public confidence we implemented a review process that we've tried to outline here in this diagram. And I recognize it's a bit confusing at first, but if I could step through it.

Along the top there are the licensee products in blue. IN the middle how we conducted our

review in the yellow or orange. And then the NRC product is down at the bottom in the green. As you can see, as you move from left to right there are some dotted lines and move into the more solid lines to the right. The reason for that is as we started some of this was again industry proposing some plans for what they were going to do, but as you heard earlier, depending on the time that they had to comply there was a lot of calculations that needed to be done, a lot of strategies yet to be fully developed.

So in some cases the initial integrated plans that were submitted were, for lack of a better way of putting it, plans for plans. So we needed to review that and provide some feedback to the industry and have some certainty that they were heading in the right path. So we decided to develop what we called an Interim Staff Evaluation, that document you see down there on the bottom left. And we developed some additional guidance to go along with the NEI-12-06 guidance and the NRC endorsement through the Interim Staff Guidance.

That ISE guidance was an internal memo that was made publically available of guidance basically that Jack directed the technical staff and the project managers to use to kind of evaluate to figure out just

what we were talking about a few minutes ago. What's right? What's the threshold? Where do you adjust that bar?

That initial review was done through some electronic audits. We had an electronic reading room where licensees were putting literally hundreds of documents on these electronic reading rooms. We had dozens to in some cases hundreds of questions that we provided to the licensee. Then we had telephone calls with them, three to four-hour phone calls where we asked the licensee just to go through their strategy with us, provide us an overview.

And then we would engage in a two-way discussion about, okay, help us understand this. Your strategy says X. Why did you make that decision? And it was a lot of really -- it was helping us understand what their strategy was and our feedback helping them refine and understand, oh, this is what the regulator is concerned about. So that first piece, the Interim Staff Evaluation, those were all issued between November 2013 and February this past year. And I'll come back to this slide in a minute. But again, that was the purpose of those.

In those Interim Staff Evaluations we identified a couple categories of issues. One was an

open item. This is for something where the staff -- where significant action needed to be taken by the licensee in order to develop their strategy or where the regulator decided that what was being proposed by the licensee was not going to be sufficient in our mind to meet compliance with the order.

The second category, if you will, was a confirmatory item. This was where we conceptually agreed with what the licensee was proposing in their plan, but there was more work to be done; i.e., they had run a calculation and said that we need a pump with this capacity. We just haven't decided which level capacity we're going to have and which pump it's going to be. We just need to pick that pump and purchase it. So we said, okay, conceptually we agree with that, but we're going to leave it open. Once the licensee is done with it, report back to us, let us know and we'll find that acceptable.

And then the third one there you see is acceptable or complete. That was where enough work had been done, what the licensee was proposing, that if they implemented it as they described the Agency would find it acceptable and sufficient for meeting the requirements of the order.

So again, those were all issued by February

this past year. And then what would happen is went into that second phase and the electronic audits continued. We continued to have phone calls with the licensees. But in addition to that we decided that we would go out to each plant and physically visit the site, walk down the strategies that they had on site and evaluate the progress the licensees had been making.

After that on-site audit -- that on-site audit is done between issuance of the ISEs this past February and prior to the first unit at a site being in compliance. So all the sites that came into compliance in the past couple months this fall have all had an on-site audit.

CHAIRMAN SCHULTZ: How did you determine when you were ready or when the site was ready for the on-site audit?

MR. BOWEN: It was really based on, as I mentioned, the time that the licensee had to be in compliance. And then so if they were a fall of '14 plant, we needed to do an audit between February and September.

CHAIRMAN SCHULTZ: Okay. That's relative to the schedule, but then there was a decision point somewhere along the lines in terms of readiness?

MR. BOWEN: Right. And the challenges

have been -- and you'll see it in the next couple slides, the challenges is that every licensee would have liked us to come as late as possible so that they could close as many items as possible. But the vast majority of plants have a spring of 2015 compliance or a fall of 2015 compliance. It was physically impossible for the staff to out to that many sites in a one or two-month period, so we had to work with the licensees to identify.

There were some that felt they were further along than others and it was a lot of working with the licensees, the regions and our own personal staff within NRR to identify when do we have the resources? When is the licensee ready for us to come to the site? And what's the appropriate time?

I will say that despite all those challenges we have managed to schedule over 40 audits in less than a 12-month period. Seventeen have been completed to date. There has been a lot of positive feedback from licensees, from the regions, from senior NRC leadership about the information that's contained and reviewed during those audits. We feel like we have confidence that the licensees are implementing the order as we intended, that they will be in compliance by the time they come to their compliance outage. So

there's been very positive feedback and we think it was a good choice to go down this route despite all the challenges that were associated with it.

MR. DAVIS: Let me just add one point there, too. We identified if there were any sites that had concern on one of those open items that they wanted earlier. If they wanted NRC involvement in that, they should identify that to us and then we would schedule that appropriately. And we've done that in a few cases.

CHAIRMAN SCHULTZ: That's a good plan because this morning we've heard of the site-specific, the unit-specific --

MR. DAVIS: Yes.

CHAIRMAN SCHULTZ: -- evaluations or presentations and implementation that needs to be done here. And of course you needed to focus on that. It wasn't as simple as an owner's group activity that was going to address several different items on behalf of a number of plants.

MR. BOWEN: The other value we found is that, as I mentioned at the very beginning, licensees develop these plans in some cases three years in advance of when they needed to be in compliance. And then as they went back and started to refine the plans and

develop the more specifics, they realized, well, what we had planned on doing won't work, so we need to revise the plan.

So by us waiting -- we issued the Interim Staff Evaluation, but if we do these additional audits as they get closer to compliance; they've changed their strategy, it provides us another opportunity to review them. It's kind of following the licensees along the way. It provides them some regulatory certainty before they come into compliance. It provides us regulatory certainty that the licensees will be in compliance and the confidence to the public that the decisions the regulator made and that the industry is having to implement are the right decisions.

CHAIRMAN SCHULTZ: Thank you.

MR. BOWEN: Then the last piece of this, again, as I mentioned, we don't typically do this for an order, but we felt that it was appropriate to at the very end when the licensees got full compliance that they issue this final integrated plan that completely documents what they're going to do for these beyond-design-basis events, how they're going to implement their FLEX strategies. We're going to review that document and then issue a safety evaluation.

That safety evaluation is going to be our paperwork review of the licensee's strategies to say, okay, if the licensee implements this plan as it's described here on paper, based on our collective review over the past however many years, it meets the requirements of the order. Taking that safety evaluation, we will then go into a post-compliance inspection and then go out and verify -- as we would with any other order, verify that the licensee has implemented the order as they were required to using the safety evaluation in the final integrated plan as guidance to make sure that the licensee is in compliance with the order.

MEMBER SKILLMAN: Jeremy, if in the year or two or five years that follow that activity the licensee finds it's necessary to change the plan; perhaps they've had a hardware change, they've had construction changes on site, whatever it might be, are they able then to change that through their 50.59 process, or will they have to come back to the Agency?

MR. BOWEN: So it depends on the timing of when the change is. It's prior to compliance, they're just changing their plan and informing us prior to our audits and everything. If it's after compliance, there is actually change process that's currently

outlined in the Industry Guidance, NEI-12-06, that talks about how they would evaluate the change in their strategy and whether they should come into the Agency for prior approval or whether they can self-implement that change. It's very similar to a 50.59 process.

50.59 in this case doesn't apply because of the beyond-design-basis nature of the event. However, it's a very similar process. The draft rulemaking language that you'll hear tomorrow actually takes that language and incorporates it directly into the regulation itself.

MEMBER SKILLMAN: Okay. Thank you. Thanks.

MEMBER RYAN: Jeremy, just a follow-up question. I noticed on slide 11 it says to be performed within one year of the safety evaluation being issued.

MR. BOWEN: Yes.

MEMBER RYAN: That's a lot of work in one year.

MR. BOWEN: Yes, it is.

MEMBER RYAN: No, I mean, is that a doable schedule?

MR. BOWEN: Yes, this is something that we've been working with the regions closely on. We have a draft temporary instruction. In fact, it's on

the very next slide.

MEMBER RYAN: Okay. There we go.

MR. BOWEN: So we have a draft temporary instruction. And as I said, it will verify compliance with the orders. It covers mitigating strategies, the spent fuel pool instrumentation. And as you heard referenced this morning, as part of the 50.54(f) letter licensees had to do a staffing and communications assessment to make sure that they actually had adequate staff and adequate communications on site to implement these strategies. They provided a response to that letter this past spring. We issue staff assessments on those and then they provide an update on that. That has to be done prior to compliance with the order.

MEMBER RYAN: So it sounds like some of the heavy lifting has already been done.

MR. BOWEN: Yes.

MEMBER RYAN: Yes, okay.

MR. BOWEN: So this inspection itself is going to go out and look at -- the safety evaluation is going to document again on paper what should the site be doing. And the regions are going to out, implement this temporary instruction to verify that the licensees really have done what they've committed to do.

MEMBER RYAN: Thanks. That's helpful.

MR. BOWEN: So the TI, we did have a public meeting on this this past July. We don't typically do that when we develop new inspection procedures, but in this case we thought that it was appropriate considering this was a new thing, a completely different process. So we had the public meeting. It was very well attended by members of the industry and members of the public.

The TI, to give you a little bit more information, it'll be about a three-person team on site for a week. Again, it will be conducted by the regions. And the pilot for that, the first plant that will be inspected is Watts Bar. They're the first unit to send us their -- or first plant to send us their final integrated plan. That just occurred at the end of October. We're writing the safety evaluation of that for now to be issued by the middle of December. We'll be conducting training on the temporary instruction and then the pilot will be conducted in January, mid-January.

MEMBER RAY: And that will be for a dual-unit plant?

MR. BOWEN: Yes. So based on that pilot at Watts Bar we're going to go back and take any lessons learned from that, revise the TI as necessary and as

appropriate. And then the temporary instruction will be ready to go once the remaining sites, if you will, start coming into compliance, and that will be late summer to early fall of next year.

So this slide kind of lays out everything I just told you in graphical form as far as the schedule. We've used this to communicate many times in the Joint Steering Committee meetings that Jack mentioned. It talks about all the key different activities we're doing, the Interim Staff Evaluations, the audits, when plants come into compliance and when the inspections will be done. The color coding was there to kind of reference workload balancing. As you can see, there are some peaks and valleys. And like I said, we've got over 40 audits scheduled in less than a 12-month period. So there are 17 completed so far and we're on track.

MEMBER BLEY: These are being done by the normal inspection teams in the regions?

MR. BOWEN: No, these are actually being done out of headquarters. The same NRR staff that completed the Interim Staff Evaluations is the same staff that are doing the on-site audits.

That being said, we do have members of the regions participating in the audits as well. That's one to gain some fresh perspective. The folks in the

regions have the most direct interactions with the sites, the most understanding of the plants themselves when it comes to where equipment is and stuff like that. But it's also to kind of help transition the whole work product, if you will, from an NRR licensing type of product into a post-compliance inspection type of product.

And as we talked about multiple times already, this is a different mind set. This is a different way of thinking about how do we evaluate beyond-design-basis? What's good? Where is that threshold? What's good enough? When do you push an issue? When do you say, okay, that makes sense? So that's part of the regional involvement, too, is to help with that education and understanding.

MEMBER CORRADINI: So in post-compliance inspections does that include determining some sort of maintenance of check schedule for the on-site equipment and drills for the off-site regional?

MR. BOWEN: Yes, so as part of the licensees' submittals there was a couple of generic issues, if you will, that were discussed. Maintenance and testing was one of those. And so industry collectively got together and presented a white paper of how they plan to develop their maintenance and

testing schedule in coordination with EPRI guidelines. That proposal supplemented the NEI-12-06 guidance and the staff basically endorsed that.

That plan is being rolled into the next revision to NEI-12-06 and all licensees are planning to do that. It's actually going to be written into our safety evaluation. It's going to be written into all the licensees' plans and it will be written in our safety evaluation that that's the expectation. As part of the post-compliance inspection the TI has a section that checks to verify that that maintenance and testing program is in place.

Now to the second piece of your question about the drills and exercises, that's actually part of the ongoing -- the rulemaking discussion. What's the appropriate time frame for the drills and exercises? And that's still being debated amongst the staff. The last interaction I understand was --

MR. BOWMAN: This Eric Bowman. At present in NEI-12-06 in Section 11 it has discussions of training including the use of drills and exercises, and it sets it at an eight-year cycle. An eight-year cycle is what's currently in the preliminary proposed rule language for the rulemaking that we'll be discussing tomorrow.

MEMBER CORRADINI: Okay. Thank you.

CHAIRMAN SCHULTZ: Jeremy, on the previous slide, on the scope of the inspection you've got emergency preparedness, staffing and communication. Is that fairly narrowly defined? Are you going to for example be looking at -- when you say "staffing," is that going to be qualifications of staff as it relates to the mitigating strategies?

MR. BOWEN: Yes, it's the staffing and everything that's necessary to implement the FLEX strategies.

CHAIRMAN SCHULTZ: Okay.

MR. BOWEN: So it's all the aspects of that, but it's narrowly focused on just that.

CHAIRMAN SCHULTZ: A subset of mitigating strategies. And then spent fuel pool instrumentation, is that just, well, we're going to be there anyway and the timing is about right, so we'll look at spent fuel pool also?

MR. BOWEN: Yes. Without going into all the details to why, the decision was made to write one safety evaluation encompassing both the Mitigating Strategies Order and the Spent Fuel Pool instrumentation Order. So because we're going to write one safety evaluation, we're going to do one

inspection to cover both orders.

CHAIRMAN SCHULTZ: And in that area the inspection will be --

MR. BOWEN: That portion of the inspection is very limited.

CHAIRMAN SCHULTZ: It's a validation that what was said would be done is complete?

MR. BOWEN: The instrument is in place and you can read it.

CHAIRMAN SCHULTZ: Yes.

MR. BOWEN: It's literally -- I think it's a two-hour, three-hour portion of the inspection so it's not much.

CHAIRMAN SCHULTZ: That's good. Well, you've got plenty to do in that time frame, so that's fine.

MR. BOWEN: Yes.

CHAIRMAN SCHULTZ: That's good.

MR. BOWEN: The inspection is in no way intended to reopening the engineering evaluation that was done here at headquarters. It is simply to verify that what is on paper is in place at the plant and that it can be --

CHAIRMAN SCHULTZ: Now it's making sense?

MR. BOWEN: Right.

CHAIRMAN SCHULTZ: Yes.

MR. BOWEN: Please show me that you have this building and that you have this pump.

MEMBER RYAN: So it really boils down to an implementation inspection rather than a activities you're going to do inspection, or that the licensee is going to do?

MR. BOWEN: Yes.

MEMBER RYAN: Okay. That's fair enough.

CHAIRMAN SCHULTZ: It's done and it's in place.

MR. BOWEN: Yes. So that kind of outlines the review strategy as a whole at a high level. Now what we want to do is go into a couple select topics that we know that the Committee is interested in hearing about. So the first one we're going to cover is the response centers, and then we'll go into the others.

I'm not going to go into a lot of detail on the background. Dan Brush covered this already. I do want to draw your attention to --

CHAIRMAN SCHULTZ: Jeremy before you do that, I'm looking at the schedule for the remainder of the day, and although we took a late lunch, it was a short lunch. And this is a good break point for us and I'm going to go ahead and call a recess and ask everyone

to be back at 3:15.

(Whereupon, the above-entitled matter went off the record at 3:02 p.m. and resumed at 3:19 p.m.)

CHAIRMAN SCHULTZ: All right, we've come out of recess and back in session. And Jeremy, I'll turn this back over to you.

MR. BOWEN: So as I was mentioning before the break, since Dan Brush went through a lot of this, I wasn't going to go through it in depth.

So I'm going to talk about how we reviewed the response centers and everything, but I do want to just show on this one, I didn't see a picture in Dan's presentation. Sorry to call you out, Dan.

This is a typical load for one site. It's not everything on there, but you can see the four pumps, the turbine generator there in red. The blue one to the right of the picture is the 4160 generator. The red one is the 480. So that's basically six tractor trailers for one site is the generic equipment.

So the way we conducted our review, again many of the questions the committee members were asking during the presentation or earlier several questions we asked, we did observe --

CHAIRMAN SCHULTZ: We want to know what

you heard when you asked your questions.

MR. BOWEN: The response centers we visited, several times the ribbon cuttings were this past May and June. We started probably in February starting, getting much more in depth in our review. We went to a couple of sites and observed the SAFER team come out to the site, visit the site to develop the play books, watch them interact with the site for the day and how they determined well, what's the equipment that's needed? How do you plan on contacting SAFER? What's your off-site staging areas? What are your deployment routes? That sort of stuff. Like I said, at a couple of the sites, went to the response centers themselves. We've taken all the regional administrators out to the response centers and look forward to being able to go with the committee to the Phoenix response center in May.

The two proof of concept exercises that were conducted at Three Mile Island and Surry, we observed those and we had staff members at each of the locations taking notes, observing both the response of the industry and SAFER, but also as we would any other activity, seen how the licensees and SAFER were observing their own folks and identifying issues to make sure that they had a robust program that they were

identifying issues and correcting those issues. So we had some observations from those proof of concepts.

One of the biggest things that we came away with, and I think it was mentioned earlier, was the distinction between which organization was responsible for which activity at the time. The proof of concept observations were really, I think, eye opening to industry as well to see just -- on paper, it sounded real straight forward, real clear that this is how we go down, but once they actually went through it there was some points that just wouldn't have revealed themselves had they not gone through the exercise.

So they clarified a lot of those responsibilities. The documentation -- the training plan, the documentation wasn't all complete at the time. Since that time all that was complete. We reviewed all that information.

The helicopter resources was some extensive discussions we had. That probably started in earnest around the July time frame. As Dan and Mile Powell mentioned, there was some interactions with SAFER, NEI, FEMA, Department of Homeland Security, and DoD. We participated in all of those discussions. We brought Office of Nuclear Security and its response into the discussions. They participated in their

reviews as well from an emergency planning perspective, that background. We made sure that we had the right staff from our side to kind of make sure that this was a viable option.

But long story short, we're confident -- well, one other thing I'd like to mention. We visited the Custom Critical facility, the FedEx Custom Critical facility in Akron, Ohio, as well, to understand exactly how does that leg of FedEx work. When we heard FedEx was delivering all the equipment, everybody thinks of the driver pulling up to your driveway and dropping off a box.

MEMBER REMPE: I wanted to ask that question.

MR. BOWEN: So we went out there and we got a full run down of exactly what FedEx Custom Critical is and they started the presentation with "We deliver the big, the ugly, and the unwanted." They gave us a lot of examples of previous activities that they had done, anything from flying immediately after 9/11 to delivering vaccinations for an entire country's population and they gave us a lot of confidence that despite the fact that 24 hours is identified that there is some margin inherently built into that 24 hours. Couple that with the fact that as you heard Scott Bauer

mention, there are a few sites that actually don't need -- that need equipment within 48, but the vast majority don't even need that for 72. And then most of the equipment in that case becomes a backup to a backup on site.

So all that combined with the multiple tiered assets, the response centers became another version, a microscopic version of the whole FLEX concept in and of itself. It's not one specific way of doing something. It's multiple different mechanisms and that tiered and flexible, diverse strategy gave us the confidence that what industry proposed with these response center really does meet the third phase of the order requirements.

We issued our staff assessment at the end of September on those response centers. And we think -- we declared they are operational. So licensees when they're coming in and sending their final integrative plans, what we expect them to do is to reference the industry letter that provided all of the information to us on the response centers and in turn, in our safety evaluation back to the licensees we plan to issue, to reference our endorsement as well.

MR. DAVIS: I would just add that the Custom Care, Custom Critical facility is quite

impressive. And we got a full demonstration of how they can track real time. Any of their drivers, they can tell you if they've stopped. They can tell you what kind of training they have, if they have HAZMAT, if they have nuclear training and so on. They can tell you who the drivers are, a whole bunch of information and can contact them at any point during that transit.

MEMBER REMPE: But since you're depending on a commercial company, are you going to continue doing some sort of audit, sort of inspections to continue having confidence that they're going to maintain it if something happens with their company? How do we ensure that confidence?

MR. BOWEN: So as we've gotten through this process, this initial review, and like I said, we've set up the next post-compliance, the implementation inspections, if you will, the next piece that we've just started looking at now is the long-term oversight, how do we continually make sure that the licensees and the response centers are continually viable. We've just started that process, but short answer to your question is yes. We do plan on a long-term oversight of this in some fashion. The details have yet to be worked out.

MEMBER BALLINGER: A number of times

people have mentioned what happens if -- usually these events occur in parallel to other events. What happens if Custom Critical is not so Custom Critical? Is there another backup?

MR. BOWEN: There is no -- as far as air and fixed wing and ground transportation, Custom Critical is it. But the information that we receive from them is sufficient. They gave us confidence that a backup in that respect wasn't necessary.

MR. DAVIS: I think industry is probably the better one to answer this question, but I can tell you from our visit up there they work around the clock to figure out if they don't have a piece of equipment available, they find a piece of equipment available, even if it's another carrier or if they have to start shipping the stuff first and to get to the next airport so they can get it on an aircraft, they will. They will unload other people's products and put this one on if they need to. But Dan, you're probably best to answer that.

MR. BRUSH: Dan Brush, Exelon. Just a thought, PECO who manages the industry capital assets is very experienced at going into trucking companies and picking a truck out, a method of delivering a large piece of equipment roughly overnight. So within a

matter of hours they have contracts with other companies. So if FedEx were to fail, we do have experience in going out and getting other trucking companies. The fixed wing portion might be a little tougher, but if we had an idea that FedEx was going to fail, we certainly would start looking at that.

MR. BOWMAN: This is Eric Bowman. One of the things that FedEx Custom Critical does, it's a subdivision of FedEx and they were implemented as an expediter for freight, not necessarily using their own trucks or the FedEx fleet of aircraft. They also go out and survey the industry, the freight industry and contract for additional airline or airframe assets or trucks on the open market.

MR. BOWEN: That's a good point. The example that came up earlier about having a plane in the air after 9/11, they told us that that was actually a private contracted plane out of California that they had flown to Detroit. It wasn't a FedEx plane, but they had contracted the plane, had gotten approval through the FAA and had it in the air within hours.

MEMBER BROWN: Were they subject to strikes, worker walkouts?

CHAIRMAN SCHULTZ: Charlie, microphone, Charlie.

MEMBER BROWN: Were they subject to strikes?

MR. BOWEN: That was a question we asked as well and again, because they have the ability to contract with multiple different entities, they're not relying just on, if something were to happen with the FedEx workforce, they're not relying on just them. They have multiple areas that they can touch.

MR. BOWMAN: The other piece of it is that FedEx Custom Critical does have about 1400 directly contracted tractor trucks available. They are not direct employees of FedEx Custom Critical. They're independent contractors. So there isn't really a mechanism for the independent contractors to go on strike.

MEMBER BROWN: I knew that some of them were, the local ones, but I didn't know about this larger entity. That's why I asked the question.

MR. BOWMAN: Right.

MR. DAVIS: And there was a comment that was made in the previous discussion about trucks not being up to par and so on. That was one of the things that we also asked the Custom Critical facility. And there's like a minimum standard that they have for the people that they're going to contract with because they

put FedEx name on the side and so. When those people are no longer meeting that standard and they're going to cut their ties with them, they go out and verify that the truck has been basically, you know, you take all of their equipment back off of it and they want to ensure that you're not representing FedEx any more. There's a standard of quality by their own corporation above what we're asking.

MR. BOWEN: Maybe a level of detail that -- just to give you some -- a bit of example, when Jack and I were out and observed, we happened to be in Phoenix for the response center proof of concept that was out there. And they had a guy come up, a FedEx truck, Custom Critical truck, drove out, picked up a single box to represent the deployment of equipment. We followed him to the airport. He got to the area where he was supposed to go, walked up to the door and it was locked. So he went over to the 24 hour security section. He walked in, before he could even say who he was, the person saw the FedEx Custom Critical on his shirt and he said, "Oh, we're expecting you. Go to Bay 24."

So the communications capacity and the interactions at the facilities that they have, it was impressive to see how far in advance they can plan and

they can interact and make sure that they've got the right people in the right places where they need to go. And they've set up their organization to be successful, recognizing that there's going to be road blocks.

MEMBER BROWN: I hope they checked who he really was as opposed to the patch on his shirt.

MR. BOWEN: I think with that, we're going to move on to some of the other conflicts.

MR. BAILEY: So the next topic we were asked to talk about really is alternative approaches. I'm Stewart Bailey. I'm one of the branch chiefs in the JLD. I have the containment and balance of plant. And previously, I also had the electrical reviewers.

In terms of the alternate approaches, what we're talking about here is we went through a little bit the development of NEI-12-06 and its history. That was basically developed as the ground rules before anyone started developing their integrated plans. And that does represent one approach for meeting the order that is acceptable to the NRC. But of course, as licensees started developing their plans and optimizing it for any unique features on their plant, they came up with either better ways to do it or the need to do something a little bit different than what was being presented in NEI-12-06. And so

that's what we mean when we're talking about the alternative approaches. We end up reviewing those on a case-by-case basis based on the plant itself. We're looking for the level of redundancy, the level of diversity that it needs, the capacity of the alternatives that they have.

We've talked about some things earlier today that probably could have been considered an alternative. If you think back to the Palo Verde presentation, they talked about the use of installed charging pumps whereas NEI-12-06 talks really about the use of portables. They're doing this, of course, because they're installed. They meet the definition of robust and it allows them to get to the best water sources in a short period of time.

Thinking back, I'm not sure whether we identified that as an alternative. They do have the backup capability to install a portable pump, so we might not have called that one out, but it's these backups and it's the overall redundancy of the systems that we would look at when we went into reviewing something like that.

MR. SNODDERLY: Excuse me, Stu.

MR. BAILEY: Sure.

MR. SNODDERLY: This is Mike Snodderly.

You provided Rev. 0 of 12-06 to the committee to review. I understand there's a Rev. 1, they're working on Rev. 1.

MR. BAILEY: Sure, so that was at the end of mine. I'll jump to that -- that's okay, that's okay. They're all revising NEI-12-06, just like what led them to have alternatives in the first place. We're learning as we're going through this process and they're looking to incorporate the lessons learned into NEI-12-06. Part of that is if there are widespread, if you will, or generically acceptable alternative approaches, the attempt is to write those into the next revision of 12-06. And that would become some of the guidance document that would support the rulemaking that we'll be discussing tomorrow.

MR. SNODDERLY: And what's your plan for revising then your interim staff guidance?

MR. BOWMAN: It will be a topic of conversation tomorrow, but briefly, we had our first public meeting on the draft version of Revision 1 to NEI-12-06 yesterday. The document, it's premature to provide it to the committee to take a look at it. It still needs some editorial changes and there are some items that we need to discuss further with industry and with other stakeholders to come to alignment on whether

or not it should be included in the way it's written in there.

I anticipate that we'll have interactions with the committee in the not too distant term. The intention is we're developing a draft guide to be available at about the same time as the proposed rule package goes up to the Commission and we will, of course, interact with the committee on the draft guide and ultimately on the regulatory guide when the time comes.

MR. BAILEY: So that's essentially what we're talking about and they get reviewed in the plant-specific basis. So another item we were asked to talk about was reactor coolant pumps seal leakage. Obviously, this has been a significant focus area and mitigating strategies for reasons that were already discussed today. This is one of the primary drivers in terms of the sequence of events on the RCS protection aspect of the rule.

The licensees with low leakage seals, qualified low leakage seals, you could essentially just sit there, stay hot and not depressurize. It allows you a lot of time. But if that is not the case, like you see licensees cooling down in order to reduce the seal leakage and prevent further damage to the seals,

this introduces all the considerations that we talked about earlier today. Not only the loss of inventory, but if you've got a cooldown, you're shrinking, you're cooling down and worrying about criticality concerns and it basically drives the overall RCS response.

Really, what we're looking at is the ELAP causes a destruction of the coolant, the reactor coolant pump seals which generally increases their leakage.

Actually, this continues to be a point of interest. If you look at the seals that are there, they're in various conditions right now in terms of the stage of review. For the Westinghouse shield seal, that is their low leakage seal. They have provided a white paper and we have accepted the use of that seal for the purposes of ELAP. They have a little bit more work to do to qualify that to the extent that they would like under NFPA-805 and get the risk reduction that they're looking for, but we've already approved that for the ELAP.

The other seal that was discussed earlier today is the N-9000, the Flowserve N-9000. That one is still under review. AREVA has a seal model that we're still waiting for information, so I would call that one under review, but I would say that the biggest

time consumer right now deals with the Westinghouse standard seal, so if we go to the next slide.

CHAIRMAN SCHULTZ: Stu, before you go there, I wanted to understand. You said the Westinghouse improved seal was acceptable for ELAP, but not still under review for other purposes. Did I get that right and if so, what's the differentiation between what you would find acceptable for this purpose and not for others? They're still under review for others.

MR. BAILEY: Okay, well, I can point to some differences. As part of the overall review of that seal, Westinghouse came up with an integrated test plan that we find acceptable to show that there is beyond a preponderance of evidence that these seals will operate as required for us.

For the purpose of NFPA-805, there is a little bit more work that they would need to do. One, to demonstrate that the testing supports the risk values that they would like to use. Also, they have an additional focus there on issues such as failure of seal cooling without tripping the reactor coolant pumps, something that we don't really have to deal with in the ELAP realm.

There are a few considerations there, a few

differences.

CHAIRMAN SCHULTZ: I got it. Thank you.

MR. BAILEY: Okay. So in the Westinghouse standard seal, initially, the plants for the generic, I'll call it the generic analysis that was performed by Westinghouse for the different configurations of the Westinghouse reactors. That assumed a 21 gpm leak rate. Earlier this year, they put out a Nuclear Safety Advisory Letter, NSAL-14-1 which indicated that there were some errors associated with that 21 gpm or potentially some errors. That 21 gpm was based on a configuration of the leakoff line and as it turned out that leakoff line was not as they assumed for all of the plants. And so what they're doing now is they're going back -- I guess they've already developed new models for the leakage from that seal and we are looking at benchmarking that against some EDF data to make sure that that is clear.

Some licensees currently have higher or are projected to have higher than 21 gpm leakoff. They can either reflect that in their analysis or a lot of them are doing modifications to restore the 21 gpm to putting in an orifice in the leakoff line and as this notes and at that point if it had not been looked at before, we're looking at what's the effect of

pressurization of that leakoff line at that time.

So this ends up, once again being a plant-specific evaluation. For some plants, they are taking conservative action times, if you will, to restore makeup to the reactor plant system to borate early as necessary or stay out of the reflux cooling mode.

So on equipment functionality post event, I think we've had a little bit of discussion about this already, too. In general, we're looking to prevent fuel damage. The going in assumption is that we are going to prevent a fuel damage. The stylized event, if you will, is ELAP and a loss of ultimate heat sink and then what we do essentially is superimpose upon that the various external events that the plant is determined to be susceptible to. And the guidance for that, of course, is all in NEI-12-06.

MEMBER RAY: You know, you say terminology thing. The slide I thought was quite good earlier they called minimal access to element heat sink. We keep calling it loss of the element heat sink. That's not --

MR. BAILEY: You are correct. And it is --

MEMBER RAY: The air, the atmosphere is the element heat sink regardless of how you get there.

But minimal access to element heat sink just sounds better.

MR. BAILEY: And typically what we're talking about here is normal access to what the plant defines as ultimate heat sink which is usually their water source.

MEMBER RAY: Yes, right.

MR. BAILEY: It's a protected water source.

MEMBER RAY: We're talking sometimes to broader audiences. Normal access I think is the right way to say it.

MR. BAILEY: It's the motive force. It's the power to the pumps. Water is still available.

MR. BOWMAN: The requirement is subtly different for new reactors with the AP1000 design. For them, it was the loss of normal access to the normal heat sink because as you mentioned, the atmosphere is the ultimate heat sink.

MEMBER RAY: I always thought atmospheric steam dumps from the PWR and went to the ultimate heat sink, just a different way than normal.

MR. BAILEY: I think in the purest engineering definition, you're absolutely right. I think for plants we've called it the water source,

although the heat is actually bound up --

MEMBER RAY: I just want to note the slide earlier, I think, gives the right terminology.

MR. BOWMAN: The vacuum is the ultimately heat sink because the atmosphere radiates.

MR. BAILEY: We'll stop a couple short of that one if we can though. So --

CONSULTANT SHACK: I'd like to make a comment.

CHAIRMAN SCHULTZ: Yes, Bill.

CONSULTANT SHACK: NEI-12-06 always seemed to me a little bizarre that it's in response to an order that discusses beyond design basis external events. Now I'll agree certainly that all those -- besides the design -- beyond a design basis event. It really doesn't have very much to do with beyond design basis external events. The equipment is required to be robust, but robust in 12-06, it says it meets design basis.

All the requirements for storage are design basis. That's actually fine, you know, it's a useful beyond defense-in-depth measure. I think it does point to the need to go through the 2.1 assessment, as Harold points out, to make sure that we can at least meet the design basis with the design basis. So that's

your comment on robustness.

MR. BOWEN: This is Jeremy Bowen and I think to start with it goes back to what we originally mentioned at the beginning of the presentation is it was trying to NEI-12-06 tries to define the undefinable event and sets some parameters at which to start with.

Everyone recognizes that the orders for beyond design basis events, the question is what is that? How far does that go? How do you try and say whether something is acceptable or not when you don't know what you're comparing it against?

CONSULTANT SHACK: Well, we do that with seismic when we talk about seismic origin. I admit it's harder to do for flooding because we don't really have as good a characterization of design basis floods as we do with design basis seismic event. For seismic, we do it for Part 52.

MR. DAVIS: This is Jack Davis. Yes, it's a good point you're making. In fact, you're probably aware that we've been working on a paper that's going to go up to the Commission to talk about the reevaluated flood hazard from 2.1 and how that integrates with mitigation strategies approach and that the idea would be that licensees would need to be able to demonstrate that they have a viable strategy even given those higher

elevated floods.

MR. BOWMAN: This is Eric Bowman, if I could just add one other thing. Bill, in the process of putting together EA-12-049, we did have a great deal of interaction with internal and external stakeholders and one of the things that we took into account and the reason why you see the phrase beyond design basis external events is because we were not seeking to address things like random failures that result in internal flooding or events like that, but the idea being that we were looking to the consequences of events that were external to the plant due to natural phenomena.

MR. BAILEY: So that probably took a lot of the last bullet on this slide which talked about what's going on for the reevaluated hazards. The thought at this point is that when there's further information on the reevaluated hazard that the mitigating strategies would be revisited, if you will, for their ability to address the new hazard information.

MR. BOWEN: I'd also note that earlier this morning there was some discussion about the building configuration, the storage buildings for the portable on-site equipment and the reevaluated seismic

hazards and how that was being factored in. I'll note that if the buildings are new construction and they're built to ASCE-7-10 standards, the version of ASCE-7-10 that's used to construct those buildings includes the 2008 catalog of data that was used with the same catalog of data that was used to develop the Central and Eastern U.S., the latest GMRS curve. In that respect, the building itself has already accounted for that reevaluated hazard information from a seismic standpoint.

MR. BAILEY: So I don't want to spend too much more time on robust here, but the equipment that is being -- going up a couple of bullets, the equipment that is being relied upon is required to be robust. What you'll see in a lot of plants is they end up with multiple strategies depending on what equipment is robust at their plant, that typically, it will end up being a separate strategy for the flooding events if something is not available or in some cases even for the seismic if the water sources are not seismically qualified.

CHAIRMAN SCHULTZ: Stu, here when you say the equipment, we're talking about equipment that's on site that's going to be brought in to be used? We're not talking about the installed equipment that is

already there in combination with? In other words, we're talking about the system is required to be robust.

MR. BAILEY: Well, I guess it falls into three categories here. The category that I was just referring to there, or the examples that I was given right there, deals with the water sources, the sources of the consummables, okay? So there are a few things that you need to look at. Am I looking at the Phase 1 equipment, the Phase 2 equipment, or where am I getting my consummables such as water and fuel.

The Phase 1 equipment, of course, is installed, so it is designed to address the design basis event. But of course, during the ELAP, it has generally lost all of its support equipment. So we go and look at the ability to operate that equipment or the survivability of that equipment with the loss of support equipment that can include sealed cooling, direct sealed cooling, overall room ventilation, things of that nature that we go through.

Now most of your heat losses or heat sources are gone if they are electrically-driven heat sources like the large pumps in a room. We end up focusing on the main control room and the switch gear room where I still have loads driven off the batteries. We look at the conditions that house the steam-driven

pumps, the RCIC pump rooms, the turbine aux. feedwater pump rooms. So usually the main steam penetration rooms where if there are operations there for the atmosphere dump valves, etcetera. So we have the focus areas that we zoom in on, but the licensees have generally done a full evaluation and they've taken actions that are built into their procedures in order to maintain the equipment in a habitable condition. Some of those were discussed earlier where they prop open doors. And for many of the plants in the control rooms they go and they open the back of the panels, the control panels in order to keep the instrumentation cool.

So we go through on a plant-specific basis and look at the survivability of the Phase 1 equipment. The Phase 2 equipment and even the Phase 3 equipment, this is where the order requires reasonable protection. I think we just talked a little bit about the buildings. We also go through the deployment routes and the deployment locations. I guess there were discussions on that earlier this morning also about what happens if it's next to a non-seismic building. We do look at those considerations and where they're going to store them and their ability to deploy that equipment in a different location if that should become necessary.

MR. BOWMAN: One good example for the Phase 1 equipment would be the discussion that Mr. Amway had with you this morning about the condensate storage tanks at Nine Mile Point. They are not seismic tanks, but if they're there they're going to use them. What we've seen at some licensees, they'll have specific strategies to address specific hazards and if it was a flooding hazard for which the condensate storage tank that had the fault of being non-seismic, but was above the flood level, they rely on the water in there, whereas for a seismic hazard, they may rely on water from a different tank.

CHAIRMAN SCHULTZ: Going through the preference of water source listed --

MR. BOWMAN: Yes, typically, what we've seen is going down the priority list and with the response not obtained that day and the condensate storage tank is no longer existent, then they switch to a different water source or whatever the structure system or component in question is.

CHAIRMAN SCHULTZ: The title of the slide is the functionality post event and what we don't hear a lot about is putting the equipment in service. In other words, the equipment is in the shed and it's going to connect here, but demonstrates that when you get to

that point with everything else that's going on, and it's installed, that it will function for the time frame that is required in order to do what we've asked this project to do.

MR. BAILEY: That's fair. I guess we just haven't shared that level of detail. We do look at the hydraulic calcs --

CHAIRMAN SCHULTZ: Not the calcs. The calcs are important. I'm talking about the ability to set up that equipment on the one time event and it works.

MR. BOWEN: I think what you're getting to -- some of this discussion goes to what we started with is yes, there's the entry conditions, if you will, of the standard loss of A/C power and loss of access to the ultimate heat sink. But we're looking at it more broadly of something caused that. What are the things that could have potentially caused that and how long could that something last? Could you still be in a high-wind event six hours into this ELAP and you're having to hook up equipment? Would you be able to do that in those conditions? How long do you have margin available such that if you didn't hook -- first of all, is the equipment protected from the initial event itself? Then to what degree is it protected and that gets into the what's good enough?

Again 12-06 talks about the design basis of the initial conditions, but we do ask a lot of questions, oh, well, have you built in some margin there, like I mentioned with the building? Yes, the buildings are built to design basis, but there's some margin already established in that.

Same sort of thing with the protection of the equipment and the ability to put it in place where it's needed to go, when it's needed to be there. Okay, the strategy might say have that pump in place in six hours, but when we look at what we're getting to with the calcs, we look at the calcs as well to see well, there may be some margin. It says, the strategy says put it in place in six hours, but it may be that they don't need it for 12 hours. So based on the kind of a conglomeration of all these different factors, we may look at and say okay, you can have less protection of the deployment pathway and a longer deployment strategy if you have longer margin. If you have a shorter margin, we're going to ask a lot more questions about well, how long does it take to get that equipment there? What's the protection for that equipment? How do you validate that you've actually put it in the conditions it may exist, i.e., a high wind?

The main concern we're seeing with plants

for flooding is not necessarily river or ocean flooding. It's local, intense precipitation. So there's ponding at the site. You're protecting the equipment. It's above the flood level. Where you're deploying it is above the flood level, but how long does the ponding last? And is it in your deployment route and can you actually get it from Point A to Point B? Or does the water recede in enough time such that you can get it there when you need to get it there.

I hope that's getting to some of your questions. We are looking into that, but it's very much a site specific, situational based sort of line of questioning. It very much depends on how much -- what's the strategy being proposed? How much margin is available? How time sensitive and how critical is that piece of equipment or that action?

MR. DAVIS: The n+1 takes into account the failure to operate kind of mentality that you're talking about. I get it there and I go to turn it on and something happens, it doesn't work.

MR. BOWMAN: The other thing and I'll cover this in a few slides once Stu is done discussing his portions, but the validation process that Mr. Webster brought up, it addresses some of your concerns, you know, can you actually bolt the discharge of the

pump to the hose to a place where it's supposed to be delivering the flow? That's a validation process that industry has put together and that they've embedded in NEI-12-06 Revision 1. And a draft form currently has them go through and do a physical check to see and also walk down the paths, dragging the equipment with them to ensure that yes, indeed, the trailer will fit between those two buildings and that kind of thing.

What we were talking to here about --

CHAIRMAN SCHULTZ: Like personnel at 2 in the morning.

MR. BOWMAN: It's the personnel that are intended to be performing --

CHAIRMAN SCHULTZ: But there's 24 hours there, so I guess there's an opportunity to do it during the day.

MR. BOWEN: We also look at as we're going out to the sites and we're actually seeing, interacting more closely with the licensees and understanding a little bit more the nuances that aren't written in the guidance and in their plans, there's a lot more of -- there is consideration for okay, the operator aids, they have stuff that glows in the dark. They thought about lighting. They thought about protection of the operator while they're in the situation they'd

be in. What's the most optimal pathway of getting them there safely? What's the simplest operator action we can give them to do? So those sort of things I think Eric is going to get into it in a few minutes.

CHAIRMAN SCHULTZ: That will be good to hear. Thank you, Jeremy. I appreciate that.

MR. BAILEY: Let's go on to instrumentation, I guess. Instrumentation of this focus area -- instrumentation we treat very similarly, by and large, to the rest of the equipment in terms of the environmental conditions that it sees, so I don't want to spend much time on that. The guidance has them determine the minimum amount of instrumentation that is required for them to really control the systems and conduct their strategies. The reason that focuses on the minimum, of course, is so that they can do the greatest extent of battery shed that makes sense, load sense that makes sense to preserve that battery. That is one of the primary resources that they have available.

The qualification guidance that is put out there, the NEI-12-06 essentially points to the SBO guidance. When you look at what's actually being implemented at the plants, by and large, this is the post-accident monitoring instrumentation which is

governed by Reg. Guide 1.974 which meets the Reg. Guide 1.97.

When we're talking about the backup, the backup is usually if there's some failure along the circuit and they're typically identifying multiple locations where they can get an indication of, for example, a fluke meter and then having a table of conversions that they can determine what is the actual parameter in the plant. And the final backup for that usually is they've done analysis of the timelines and the sequence of events. That analysis includes what are the required flow rates versus time, often with corrections for different time power if there's a concern about overfill. So the ultimate backup is controlling the portable equipment and getting a flow rate based on the analysis.

So the spent fuel pool instrumentation qualification, without going into much detail due to the lack of time here, I would just summarize all of this to say that the order directs that the instrumentation is designed to withstand the conditions that are likely to be seen if you have the loss of all spent fuel pool cooling and boil down. It's looking at the environmental conditions of temperature and humidity from a boiling pool and typically they're

doing a seven day integrated dose assuming that the pool water level is that the top of the racks, that is the Level 3. And all the licensees, all the vendors have tested the sender and the associated electronics to that dose rate, actually probably conservatively determined dose rate and determined that instrumentation to be okay.

The bottom line here you'll say it says to look at the impact of the FLEX implementation strategies. That is part of the guidance. If you look at what's going on in the FLEX implementation strategies, there really is not anything I've seen yet that is going to impact this instrumentation. Regarding the spent fuel pool, the presentation earlier showed a plant with hard pipe. Generally speaking though, what plants are doing early in the ELP sequence, they're going out and they are pre-staging hoses over the side of the pool. They are pre-staging spray nozzles to protect the fuel assembly should the water get that low. And they're setting themselves up so that any actions that need to be taken long term can be done from a habitable location usually further below. They're opening doors. They're opening louvers, things of that nature to support ventilation in that area in anticipation of the boiling.

MEMBER REMPE: Stu, if you go back to 21. I'm not fast enough sometimes.

MR. BAILEY: Okay.

MEMBER REMPE: But I see a lot of differences in the different submittals from the licensees on what they identify as critical instrumentation. And do you attribute it to just the way the plants are configured or how do you deal with some of those things? Because like McGuire did identify water level in the RWST and different sources of water where other plants didn't. How do you deal with that? And are all methods of submittals acceptable?

MR. BAILEY: Well, by the time we're finished, they're all acceptable. I'll put it that way.

MEMBER REMPE: By definition, yes. How are you dealing with that?

MR. BAILEY: Well, what we're doing is we're bouncing that against the strategy that they're implementing and what kind of controls are they trying to take? What are the really sensitive -- what are the critical parameters that they need to think about?

For the example that you heard this morning, it's important for them to understand the

safety injection tank level and to monitor how that trends, so that they can take actions to prevent nitrogen injection into the reactor coolant system. A plant with low leakage seals that doesn't drain down similarly may not have that same limitation.

You're right. For some plants, they're looking at RWST indications or condensate storage tank indications. There are plants that leave that to a local indication. Given the slim nature, given the volumes associated with that and the slow drain down, we would probably take a local indication of that to be acceptable. We would bounce that against the procedures to see whether they're getting out there as necessary to monitor the levels and take appropriate actions.

We look at the survivability of the instruments. I didn't go into it in detail. We look at the survivability of them for the events also in terms of the tanks and the level indication. Is it reliant upon a reference leg, a filled reference leg that could be damaged by say a tornado missile. So we view a wide range to see that the instrumentation that's necessary to support their action is going to be usable during the event.

MEMBER REMPE: What do you do for water

levels that rely on a reference leg? What do you use as a backup?

MR. BAILEY: So this has been a focus area and for the important water levels, I haven't seen it. It is typically a pressure sensor instead down in the vault under the tank. So I was looking for reference levels assuming that's what it was, but if there is one, there's at least always a backup that's just off pure pressure.

MEMBER REMPE: Okay.

MR. BOWEN: I think in some respects this also goes to the discussion we had a few minutes ago and that air is going to get through it. This is another one of those where we may ask a level of detailed questions depending on the strategy, depending on the equipment that's being used. If it's more, for lack of a better way of saying it, if it's more critical, we're going to ask a lot more about that piece of equipment and the instrumentation to make sure that that equipment is functional. If it's less critical, larger volume, larger time frame, redundancy, the level of review, the level -- not the level of review, but the amount of questions and the amount of in-depth discussion we may have might be a little bit less.

MR. BAILEY: For an example of that, I'm

looking at a plant, a plant out there had some critical action, short-term actions in the main steam penetration room. And so like many plants, if they have to do operations in those rooms, their procedures are to get out there early, open doors, open louvers, provide some ventilation for this room.

So again, this is a critical area, so we walked that down in some detail and essentially identified that there were issues with the GOTHIC analysis that had been done. We talked about the chimney effect in this particular room. The steam pipes are at a relatively high elevation and they were relying on an open door about a story up and -- but if you walk down the outside of the building, there's a missile shield there that comes down to just about that same elevation. So the chimney effect would be much less than assumed. So that one is still under revision and review, I think. This is just an example of where things are important when we're on site, we're getting into that level of detail.

MR. BOWMAN: Okay, this is Eric Bowman, special advisor in the Japan Lessons Learned Division. I had been before the committee a few times in 2012 and 2013 discussing the rulemaking, the then station blackout mitigating strategies rulemaking, as well as

the guidance that we put together for the EA 12-049.

In June of 2013, the committee provided us with a number of recommendations including the one on this slide regarding our need to provide more guidance on evaluating the feasibility and reliability of manual actions. I believe that the committee reiterated this recommendation in a subsequent letter, so we realized you were really kind of serious about this.

CHAIRMAN SCHULTZ: And it's been repeated today. So go ahead.

MR. BOWMAN: I'm starting to get the message. What we have in NEI-12-06 currently, there's the quote right here from Section 3.2.1.7, that's item 6 in that section. The licensees were supposed to identify time constraints for which an action has to be taken in order for those strategies to be successful and provide a basis that they can reasonably meet that. The way that was addressed in 12-06 and Section 11.4, I believe it was, it was pointing to licensees would validate that the strategies and the procedures that they have developed to support the strategies can meet what they needed to meet.

The time constraints were all identified following the thermohydraulic analyses that the licensees did to put together their integrated plans.

And they're all listed in the integrated plans in the sequence of events.

You heard this morning discussion from Mr. Webster from Dominion regarding validation that they did at North Anna of using a process that NEI had put together in conjunction with a number of representatives from the industry. I had the opportunity to take a look at the procedure they had put together for that and observed the piloting of it at North Anna in order to get a sense of what they were looking at for that.

The validation process which has now been included as Appendix E to the draft revision for NEI-12-06, it's a supplement to a licensee's normal procedure for verification of procedures and the development of procedures. What it's looking at is figuring out the time that's necessary to accomplish an action so they can compare it to the time that it has to be done within and determine whether or not there's sufficient time margin to believe that they can actually accomplish the action in the time that's available.

After discussions with the working group that was putting together the process, and their own look at what was put together for the integrated

assessments for the flooding hazard reevaluation, and your recommendations in the prior letters that we discussed earlier, they've incorporated a number of the performance-shaping factors from NUREG-1852 on the determination and feasibility of actions for fire protection as well as those that are in the interim staff guidance for the flooding integrated assessment.

They're being looked at at a fairly qualitative level, not a strict identification that individual performance shaping factors are either nominal or degraded. And that is really a result of the situation we're in with we don't have an identified hazard that leads to the loss of all alternating current power and the loss of normal access to the ultimate heat sink.

Walking through the procedures with the operators at North Anna, however, they were conducting pre-job briefs regarding what are the external hazards that are applicable to the site, what kinds of things should the operators be looking for to see. I think it was either Stewart or Jeremy mentioned local intense precipitation can lead to water levels so high and they have determined, they have a sense of how high the flooding hazard reevaluation is going to show a potential for local intense precipitation. And they

can get a qualitative estimate of would it be possible to actually drag this pump across this particular towpath if there were to have been a local intense precipitation event there.

MR. BOWEN: I'll give you a perfect example. We were just down at St. Lucie late last week. That is their flooding of concern is from local intense precipitation. They have ponding on the site, storm surges and everything else from hurricanes. It actually dissipates rather quickly. The local intense precipitation, they get ponding. Where they put their FLEX storage building, they put in some margin about a foot and a half above their flood level, if you will.

And we asked questions about getting that equipment from the storage building to the location that would be used on site and going through any ponding and everything. And the fact that it's on trailer, they've already validated or done some analysis and they're going to validate that the trailer provides another two feet of pipe, if you will, to get through and they're only expecting a couple of inches of ponding. So they could get through that local ponding that would occur because of the local intense precipitation.

So it's one of those -- there's multiple

ways to deal with it. It's going to be site specific. In some cases, it may be time based. In some cases, it may be okay, there's other ways to deal with that.

MR. BOWMAN: The other types of hazards that they looked at, the high wind hazard and the potential --

CHAIRMAN SCHULTZ: How is all this captured? You talked about where we went and we talked and you said qualitative and there's some sort of guidance --

MEMBER STETKAR: Right, is that captured in the audit report or the licensee document what they've determined?

MR. BAILEY: The licensees are documenting it typically in a technical report that provides the basis for them submitting to us the letter saying that I'm in compliance now.

MEMBER STETKAR: But I mean do they perform what I would call a feasibility assessment, document it, and then document the margins that are available? Will they have to submit that it's available for audit?

MR. BOWMAN: Yes, that's the result. I believe that Bill had in his presentation -- one example, a page that was excerpted from it. I've taken

a look at it. The technical document is 150 some odd pages and it's got the time margins as well as allowances that they added for things like clearing debris, walking through the procedures with the operators and maintenance personnel that were accomplishing them. They thought of things such as a high wind event could have blown the concertina wire off of the fence that's nearby and they would have needed to bring over debris-clearance equipment and move it out of the way in order to move a pump in place. Things like that. And identified non-seismic walls that they were then considering would it be better to just have that non-seismic wall that's no longer really necessary removed so that it could not cause a debris hazard in a seismic event.

MR. BOWEN: I think to get to your question, almost universally, in every interim staff evaluation we did, there was a confirmatory item about licensees' validation activities. And as they're being completed, depending on the timing of the audit, and whether you're looking at it on site or licensees are putting that sort of information on the e-portal and we're looking at it as it is available there. So it's being captured in the audit reports and if it's still not 100 percent complete by the time of the audit

report, then it's carried as an item through to their safety evaluation.

MR. BOWMAN: And it may be -- it will be available for us to look at during the confirmatory inspections, as well as compliance.

The final portion of the validation process is a rollup of the resources and personnel to ensure that they've got -- they haven't double counted the availability of the tow vehicle or the number of staff that are available to accomplish the tasks.

As Mr. Webster mentioned, they have it set up for Level A, Level B, Level C type of approach with Level A being time-sensitive actions in the first six hours before additional staffing gets on site. And after that, there's a slightly less rigorous Level B validations that have a variety of different methods that are available for accomplishment.

MEMBER STETKAR: At the moment, are they doing that on a per unit or a per site basis?

MR. BOWMAN: They're doing it on a per unit basis because it's including dragging the hoses out, seeing how many links of hose it takes to go from where the pump is going to be put to where it's supposed to be connected, and actually ensuring that the hoses, the connectors will meet up.

MEMBER STETKAR: I was asking more in terms of the staffing availability.

MR. BOWMAN: I've discussed with some licensees. They're actually doing resource load time schedule site wide and some of them are using spreadsheets, but it's all on a site-wide basis. It may be done, for example, at North Anna, only one of the units is in compliance now. They don't necessarily have to have the staffing available for both units until the second unit comes into compliance. So --

MEMBER STETKAR: The only concern is double counting for people.

MR. BOWMAN: No double counting.

MR. BAILEY: No, we're not seeing a double counting. The staffing associate -- it looks at the entire site and the actions on each unit. And then shared which would be things like debris removal.

MR. BOWEN: The only unique aspects where that might go to a unit is the units are two different technologies and they need different staffing requirements.

MR. BOWMAN: But then it would be with staffing they're drawing from and they would also be needing to point to site-wide staffing similar to, as Mr. Eimar discussed, the Area 9 operator.

MEMBER STETKAR: Area 9 is one, but I've seen staffing plans and we've questioned on some new plant applications where you might have two units at the site and you're allowed, by the rules, to share a technical advisor between the two of them. So you have one for two units, for example. And if you're relying on that shift technical advisor for active involvement, as we heard this morning, you can't take a chain saw to them. I was just curious whether they were looking at that.

MR. BOWMAN: They are.

MEMBER STETKAR: Okay.

MR. BOWMAN: They have made a lot of good observations. North Anna identified incompatible fittings that they hadn't expected to come up with as well as they had some gasket issues. They corrected them. The nice thing about the validation process is there's a natural feedback loop. If they're talking about a procedure and they come across a problem like this, they have to fix it before they can actually finish implementing the procedure. And as I discussed, the potential source of debris.

Right now, as I mentioned, it's a qualitative look at the performance-shaping factors. Depending on the outcome of the draft COMSECY and the

way we address the reevaluated flooding hazards or any other hazards for that sake, we may need to go to look more towards feasibility and reliability rather than merely feasibility. And we'll have further discussions with industry and no doubt come back and interact with the committee on how we do that.

MEMBER STETKAR: Some guidance in terms of assessing, you know, available time margin is a surrogate for reliability.

MR. BOWMAN: Right, and there is a feedback in the process as it's written right now when they are short of available time margins, they look at doing a more rigorous look to be sure that that time margin actually exists by doing repeated performance or performance with other individuals.

MR. BOWEN: If I could tie this back to the discussion we were having about 15 minutes ago, I think a key aspect is that the validation activities, licensees are going as far as possible with actually implementing the processes or strategies, hooking up, making connections as far as possible without actually introducing an unsafe condition for the plant; physically hooking up hoses, running hoses, physically making the connections, obviously not running the water, that sort of stuff. Same thing for the perfect

concepts -- that was done at the response centers. They put a pump on a trailer. They physically drove it from Memphis to Three Mile Island at Surrey. They took it off. They actually opened it up, went through the process of how they would start up the pump, that sort of stuff. There's a recognition in all of that. You gain some insights. You gain some understanding and then also tying that into well, it's a sunny day, ideal conditions operating. So you factor that in with how much margin was there, what other factors do we need to consider that first stuff.

So back to the discussion from a few minutes ago, it's all a part of a larger evaluation the staff is doing. It's not -- I can't say we point to one thing and that's how we make our determination on that one thing. It's a collective review of the whole strategy.

MR. BAILEY: I think you can say also it's understood that it's an undefined event and it could be a very stressful event. There really is an effort out there to make the actions that need to be taken as simple as possible to make operation of the equipment as simple as possible. When you saw Mr. Webster's presentation, they've got the glow in the dark beyond design basis, little reflectors, I guess. It reflects

and glows in the dark on all the equipment locations so that it will be easier to find at the time. Most plants are putting basically highlighting what needs to be tripped on a load shed. So they're not actually going through and doing the load shed, but they're putting in all the operator aids to make this as -- to make this as easy as possible, understanding that the event will be stressful.

MR. BOWMAN: And Dominion went as far as to -- for the flexible hoses they chose to use the storage connectors which are the standard industry connectors, but they specifically sought the ones with the latches which is not necessarily a feature of a typical storage connector below five inches because that gives the operators a positive feedback for the cues and indications that they've successfully made up the connector because it quakes and it can't be backed off. And that's the kind of thing that they're documenting in their validation. They've also in addition to the external hazards that's screened in for this site, they looked at how they could accomplish the actions in a low-light environment, testing the light packages that were installed on the tractors, they're using for towing the equipment around, and things like that, just to show -- to provide a greater

degree of confidence in the feasibility, if not the reliability, of the action. And the only reason I can't call it reliable is because I don't have defined hazard and they can't go through and say with certainty, yes, this is a nominal capability as opposed to a degraded capability.

CHAIRMAN SCHULTZ: Eric, the phrase "this is an expected part of the process" leads me to think that one usually gets what you expect to get or where you set your expectations. Therefore, there's a piece of that that's a disappointment, given what one would think this would be in terms of importance and in terms of investment in compatible fitness. You know, you hope in the industry that you had that covered if you were going to buy one thing to fit another. And that's what I was getting to before in terms of making sure, making sure, that what we're setting out to do is going to be effective when it's implemented.

One would expect this is not going to happen very many times. And if it happens one time and it's not successful, you have to start all over. It's a bad, bad day.

(Simultaneous Speaking.)

MR. BOWMAN: -- but bear in mind there's also the phrase that you can expect what you inspect

and we've got confirmatory inspections coming up at the end of this when we can take a look at how thorough a job did they do with the validations.

MEMBER CORRADINI: But you had said, I think, that you had said that currently the thinking process was about every eight years to exercises in the drill mode. Maybe I misheard you.

MR. BOWMAN: Right now, the guidance in NEI-12-06 says they'll do a driller exercise every eight years. It lines up well with the emergency preparedness exercises although they aren't required to be done as part of the emergency preparedness exercises.

MEMBER CORRADINI: Is that the frequency for regional emergency preparedness or national?

MR. BOWMAN: That's the frequency in which the EP exercises require licensees to go through and demonstrate individual elements of the emergency preparedness plan that includes -- currently, it includes the B5B strategies.

With the mitigation of beyond design basis external event, rulemaking, we're looking at is that still the appropriate place to put it. We're considering moving it to a different section but retaining the eight-year period as a demonstration of

the capabilities.

MEMBER CORRADINI: I guess I'm not familiar with all the details, but I guess given that kind of where Steve was going if it really is in a really bad day, that means other agencies will be involved and this other governmental -- so I think you've rolled it into some sort of drill which involves other agencies. So what is the frequency of those emergency planning exercises?

MR. BOWMAN: I'm not sure exactly what it is for the EP exercises. I don't anticipate that -- I believe he had discussed actually going through an actual evacuation to see if it would work during an evacuation. We aren't going to go that deep. But we will do some of the command and control aspects of it. The mitigating strategies and the delivery of equipment from the National Safety Response Centers, I believe, is going to be a portion of the exercise Southern Exposure next year. So it's not going to be every licensee is going to go through and --

MEMBER CORRADINI: I understand that. I understand that.

MR. BOWMAN: Some of them, it's on the horizon it's something that we're doing. It's being included in the nuclear sector, national response

capability.

MR. BOWEN: And although we may not do a soup to nuts exercise of the frequency that's being determined, there may be a different frequency that's shorter which we're going to inspect and certain aspects of this will be -- licensees will have to demonstrate that as part of the inspection process, actually, show me the pump, show me that -- show me -- walk down the battery of load shift procedures, that sort of stuff. That's part of the temporary instruction now that's likely part of the on-going inspection procedure that we will develop.

MR. BOWMAN: Yes, I'm not sure if you're familiar with it, but the way the B5B mitigating strategies are being inspected is they've been incorporated in one of the triennial inspections and inspectors typically go out, select an auxiliary operator, hand them the procedure and say okay, show me you can do this. And that gives us a level of confidence that the random individual who is on shift when the event happens is capable of following the procedure and doing the actions that he's supposed to be able to do.

MEMBER BLEY: How long have we been doing that?

MR. BOWMAN: Since 2009.

MEMBER BALLINGER: This type of event would be a site-wide event, obviously. How does the frequency of doing the drill or whatever you're doing square with the refresh rate of the staff? Is it likely that eight years from X, there ain't nobody that worked there?

MR. BOWMAN: I'd point to the individuals that were here from industry --

CHAIRMAN SCHULTZ: They're coming back up, so we'll put that on their punch list.

MR. BOWMAN: Gene Eimar was at Palo Verde since 1985.

MEMBER BALLINGER: I've been at MIT since 1982, but that doesn't mean that everybody else has been there, all right?

MR. BOWMAN: I understand.

MEMBER CORRADINI: Do you remember what you're supposed to do?

MEMBER BALLINGER: Correct --

(Laughter.)

MR. BOWMAN: Part of it is that there's supposed to be, in fact, the NEI-12-06 sequence to the systematic approach to training and the use of the systematic approach to training for the personnel that

are assigned to implement the strategies. Similarly, where it is pointing to the systems approach training as defined in 55.4 are in the preliminary proposed rule language.

MR. BOWEN: In some respects that gets a little bit into the normal regulatory processes of how the NRC oversees the licensees' continual training, learning program and yes, Eric mentioned we're trying to figure out the appropriate time for the regulatory required drills and exercise, but if we go do an inspection and find that if the licensee can't demonstrate a strategy, then that's an issue with their training program that that may identify a larger issue. That's part of our normal oversight process. We start to kind of -- we're talking a little bit apples and oranges here, two different topics. but I think there's aspects to both that need to be worked out, but --

MR. BOWMAN: And the other thing that we do recognize that there has to be a balance between the periodicity at which licensees do these drills and exercises and beyond design basis nature of the events that we're talking about we don't want to displace to too great an extent the amount of time that licensees have available to train on the use of emergency operating procedures and so forth for things that we

actually expect to happen a lot more frequently than this.

CHAIRMAN SCHULTZ: Those are both good points, but as I said the licensees are going to come back up and one of the things that I would like them to address is what I would consider to be the expectation that since the review process on a site-specific basis might be every eight years, well, how -- and I know the industry has practices like this, so how the findings from Site A are translated to the rest of the industry. I think this is, of course, an opportunity to be sure that the communication about what was the experience, what are the lessons learned and how are they applied throughout all this as a result of one site's experience would be very important.

I saw that you've gotten to the final slide, the thank you slide. The acronyms are less, so you don't have any additional slides.

I'll ask members of the committee, any other questions of the staff?

MEMBER STETKAR: I actually have one off-the-wall one. I was trying to do some homework in real time. Have you seen, and I know you haven't looked at all of them, have you seen any plants where the time constants and I'll just characterize it that way

are -- depend on things other than reactor coolant pump seal leakage. I'm talking about pressurized water reactors. You flash a slide up there saying everybody knows the reactor coolant pump seal leakage is the big issue. It may or it may not depending on a particular plant design.

MR. BAILEY: For reactor coolant make up, no, that's been the primary driver. Now obviously, that's a little bit different for each type of plant and the plants with the shortest time are the B&Ws, trying to make sure that they do not get any voids in the U bend.

MEMBER STETKAR: Have you seen any plants with only motor operated isolation valves on their normal let-down lines with relief valves that go back to other places upstream of the next available isolation valve in the auxiliary building and have you looked for that to be specific?

MEMBER CORRADINI: To be specific.

MR. BAILEY: I have not seen that.

MEMBER STETKAR: I mean it can go to a drain tank some place. Some of them put them back in the containment, you know. They don't put them on the floor.

MR. BAILEY: Well, I haven't seen all

that. Now usually this relief valve is going to relieve that RCS pressure or greater, but generally, we're looking at a depressurizing trend.

MEMBER STETKAR: You are, but the rate at which you depressurize and the amount of time you have available to depressurize before you get steam out into the hot legs depends on how much water is going out.

MR. BOWEN: That is true. So there could be a relief path there.

MEMBER STETKAR: That's why I asked you the time line. I was just curious, whether anybody is coming in and said if we don't isolate -- we have to manually isolate the let-down line out here some place.

MR. BAILEY: I have not seen anybody have to take an action to isolate.

MEMBER STETKAR: Because I have seen plants in my life that have only motor-operated valves only located inside the containment.

MR. BAILEY: Now whether that's because under the guidance that would be an additional failure that is not typically looked at.

MEMBER STETKAR: It is not an additional failure. Remember, I said motor-operated valves that would require AC power. Now under normal station blackout, your standard regulatory station blackout,

that's not an issue because they get the station blackout diesel running and they get power to one of those two valves.

MR. BAILEY: I have not seen --

MEMBER STETKAR: -- under an extended --

MR. BAILEY: -- I have not seen --

(Simultaneous Speaking.)

MEMBER STETKAR: -- that's why I was asking whether anybody --

MR. BAILEY: I've seen people take actions to go and isolate. I've not seen anybody that has --

MEMBER STETKAR: It depends where the relief valves are. I've seen different designs. This is not necessarily, by the way, in the U.S. I'm asking this as an honest question, but raise it -- I haven't seen every one.

MEMBER CORRADINI: I thought you were setting it up.

MEMBER STETKAR: No, no.

MR. BOWEN: I can't say for certainty where no plants have that situation, but it's such an unusual circumstance that there's been a lot of different strategies that have been presented. I feel that that's -- something like that would have --

MEMBER STETKAR: You would hope, wouldn't you, that somebody --

(Simultaneous Speaking.)

MR. BOWEN: -- by now.

MEMBER STETKAR: I was just curious. I was kind of trying poll you all, because the folks coming back up, I'm going to ask them the same question.

MEMBER RAY: Are we done?

CHAIRMAN SCHULTZ: No, John is done. I think.

MEMBER RAY: I just think Eric made an important point that I wanted to underscore which is all of this in most cases, I won't say all, is competing with for time and attention, training. The stuff that we count on to avoid getting into this situation that we're talking about often, at least with regard to internally. And that has to be something we're cognizant of because the emphasis that you can -- and Jerry put in this area, is almost without limit by definition. And it has to be constrained somehow by some notion of how much is enough because we could sit here and do this forever. And yet, on the other hand, you can't underplay or fail to provide enough emphasis to it. So one of the things -- at least I'm trying to get a feel for is how that balance should be struck

between making sure you operate the plant properly in accordance with normal and emergency operating procedures and how skillful you are in connecting up these FLEX devices under circumstances that we hope will never exist. That's all. I appreciate it. Because he made that comment and I thought it was a good one.

CHAIRMAN SCHULTZ: And certainly worthy of emphasis. Others for the staff? I'm going to have a -- I'm going to suggest we have a five-minute recess just to stand up as the industry changes out there. We'll be off the record for five minutes and we'll come back at quarter of.

(Whereupon, the above-entitled matter went off the record at 4:40 p.m. and resumed at 4:46 p.m.)

CHAIRMAN SCHULTZ: We'll bring the meeting back in from recess and this is the opportunity as we've provided on the agenda for industry to respond to what we heard from the staff and provide any added comments that you'd like to bring forward.

There were a couple of issues that came up during our discussion with the staff that we kind of put in a reserve box for you to respond to and so, we might just start with those and I'm sure members of the

committee will have a few other questions.

But, do you have comments first that you'd like to present based on what the staff has been doing with regard to the inspections and reviews?

MR. BAUER: Well, I asked these guys to come back up here because they've all experienced -- they've been, you know, through this audit process, obviously, to the culmination point of it. So, I was just going to ask them to share their remarks in that regard.

Now, what I would start with is, you know, originally, we were going down the process of RAI questions coming out and formally on the docket going back and forth and responding to all this stuff.

And my personal feeling is, have you stayed that course? We would have been hard pressed to implement the full 14 plants this year.

So, the audit process is significantly benefitted the speed with which we had to do all the work we had to do. But, I also -- and to its credit, I believe there's been a very effective process for, you know, airing all the issues. The licensees originally sent in their integrated plans, overall integrated plans.

They got back this huge, as you know, they

were alluding to this, huge matrix of how do I compare what the licensee said with what the requirement is?

And so, we spent marathon phone calls basically going through those lists to try to parse out each of the issues.

A lot of issues got resolved that way because there was, you know, just more clarity was needed to be provided by what the licensee was doing. So then that weeded -- then the ISE came out, the Interim Staff Evaluation, which basically gave them the first docketed set of opening confirmatory items.

So, then the plants began to post answers to those to the e-portal and basically worked systematically through resolving those issues leading up to the audit and then they tried to, you know, clearly close the issues in the audit. And then subsequently, the audit moving toward implementation they were working at closing their remaining items.

So, it was a very effective process. It clearly put out on the table what the issues were. It was quite clear what needed to be done.

So, I think overall, it was very effective. A lot of people trying to do a lot of work, so trying to get resources sometimes, you know, get attention of resources was challenging but we worked through that

pretty much.

And so, again, I would just say that, you know, had we not used that process, I don't think we'd have six plants right now that have basically been implemented.

MR. AMWAY: I guess I'll start off. I think I'm probably one of the most recent ones to go through an audit and I was a little skeptical at first because, you know, most of the time when they come to a site, they're looking at, even though it's a dual unit site, it's similar technologies. And so, what they look at for one unit pretty much applies to the other unit even though the implementation time frame's different.

For us, it was different technologies, so it was almost like two separate audits in terms of the questions that were asked. Obviously, there's some generic ones that fit across units but there was definitely a lot of plant specific.

And the process that we were able to get the audit questions two to three weeks ahead of the audit, gave us time as licensee's to prepare responses to those questions, gather together the necessary documentation. So, it gave it us time to get everything together in both hard copy format and

electronically. The staff certainly did their homework ensuring that they had they questions outlined before they came.

You know, the slide I showed at the end of my presentation, they came with somewhere in the mid-50s throughout the whole audit week, there was only three additional ones that were asked.

And we can see it through the Exelon fleet, our first one was a Byron and we developed a process and we've been able to make consistent improvements because of the consistency of the audits from site to site. So, we know what to expect before they come, we can get everything ready and I was certainly pleasantly pleased to get at the end of the audit that we had covered everything that they wanted to see, that we got as far as we could with the existing open items to get as many closed as possible before they left then we had a clear picture of what we had to do between the end of the audit and implementation.

CHAIRMAN SCHULTZ: Is the documentation process that the electronic bulletin board and all of this, not only with the audits, but also in the processes, is that capturing enough information so that other licensees are learning what they need to do? Those that haven't been through the process yet?

You mentioned RAIs and that was cumbersome, but it also, in other cases, provides licensees with, oh, that's what I need to do, I see what the RAIs and the responses are and that's what I'm going to do. I'm going to make sure I've got those covered.

MR. AMWAY: I think in terms of two ways, you know, being within a large fleet where we have 20 some --

CHAIRMAN SCHULTZ: Well, the fleet, I understand, but you're going to be communicating, but --

MR. AMWAY: But also within the industry, we have routine forums where we can share with each other, you know, what we got on our audit, we share with other plants.

CHAIRMAN SCHULTZ: Good.

MR. AMWAY: Scott, you may have some more --

MR. BAUER: Yes, there's --

MR. AMWAY: -- from your end there.

MR. BAUER: -- two weekly industry calls where, you know 80 to 100 people are on the phone and so people share what's going on. Typically, we'll share the things that were unexpected. So, a lot of times they'll say, well, they raised this issue, we

don't understand the issue or we don't think it's a right issue.

So, they'll raise it at the forum. Typically, we all see those emails and then if I see something that I think is a generic issue that warrants a generic response, I'll pull our taskforce together, we'll talk about the issue and then we'll give feedback to the staff.

So, there's been a couple, we're working on one right now. But there's been a couple of issues where we're working through those audit issues and I'm not sure where we've been as good at sharing all of the audit information within the industry as we might be. But I think plants, you know, and Mike and Bill can speak to this too, I think the plants are getting enough information that they are well prepared for the audits when they come to their site.

MR. POWELL: There is, on these industry phone calls, there's quite a bit of sharing of information. In fact, I was asked to participate in a call with the USA Alliance on the audit both on our preparation for the audit and how they -- what were the findings from the audit -- the preliminary findings because I had this call before we got our formal audit report.

People are wanting to learn, they're wanting to, hey, what can I do different? How can I prepare? How many man hours did it take you to prepare for the audit? What size teams did you have? What kind of questions did the NRC go into?

And a lot of strong dialogue, in fact, there's actually a third phone call that's hosted by Chuck Behrend from Exelon at the director level where we share this kind of information and we talk about what we can do to prepare.

MR. BOWEN: If I could, this is Jeremy Bowen from the staff.

We actually just got a request from one of the licensees not represented here earlier this week and they actually asked us if we could start putting the audit reports in a centrally located public website.

So, that's actually something I hadn't shared with these folks yet, but we're taking that back and we're working on doing that as well. So, the audit reports, ISEs and all of that information will be in a central location going forward as well. So, hopefully also provides some information as well.

CHAIRMAN SCHULTZ: Good, thank you.

MR. POWELL: There's also a biweekly phone

call hosted by a gentleman from Southern Nuclear, David Hall. And we started out only discussing the fall '14 plants and that call has now transitioned to the spring of 2015 and the fall of 2015, not only talking about the audits, but lessons learned from implementation, what level of training did we do.

And he's actually started a SharePoint website as well where public information and audit reports and presentations that the utilities have given and providing that information or making it available to everyone who has access to that SharePoint site.

And if people don't have access, he will get them access and get them a pass code to get there.

MR. WEBSTER: The only thing I would add to that is even, you know, like I went to the Palo Verde audit before the North Anna audit and people came to North Anna. So we also, in addition to that, actually visited the audit and watched the audit and collect things during that process so we share information in the industry that was as well.

MR. POWELL: One of the things we did at Palo Verde is we invited the NEI taskforce from FLEX and a lot of the core team members to come observe the audit but also give us feedback. Give us feedback on if they thought our strategies were in the wrong

direction, if they saw some gaps and we wanted to get feedback not only from the staff but also from the industry, we're one of the -- we are the second audit to be conducted.

I thought the audits were very challenging, very rigorous. We spent about a thousand man hours preparing. We walked down our strategies.

One of the goals of our audit was we wanted to minimize the number of open items and confirmatory items when the team left. But we also wanted to demonstrate that we were horizontally and vertically integrated, that it wasn't just the Fukushima response team that understood the strategies, it was the fire department, it was the auxiliary operators as well as the SROs like Gene Eimar who gave the presentation today.

MEMBER RAY: This is taking place in regulatory space, so it's appropriate for NEI to be the industry facilitator.

Can anybody comment on what INPO's rule long term is? In other words, will they see this as just an extension of the operating domain that they are interested in following on behalf of the industry or do they have any different view? Does anybody know?

I realize they're not here, you can't speak

for them, but I'm --

MR. POWELL: I don't think they have a different view, but they have been helpful in other ways by forming industry teams. And I'll use an example, there was a team called the Emergency Response Training Development Working Group and it's made up of industry people. Both the owners groups have reps and there's a mixture of FLEX professionals, training managers, EP personnel and then an INPO team manager from the training area on there.

That team was developed, the writer's guide for how to write the operating aids, we even used a pilot plant and picked -- and went through several different types of color pages and font sizes to pick the right color and font size to use.

That team was developed, the NANTel training, open basic FLEX and advanced FLEX and they're currently working on a training module called Decision Making Under Stress to add to the toolbox.

And that training is -- I sat through a pilot at INPO and they're piloting through one of the senior nuclear plant manager classes this month.

MEMBER RAY: Will it be part of accreditation? Do you have any idea?

MR. POWELL: I don't have any idea on that.

MR. BAUER: The other thing that INPO's been doing is they're doing emergency response review visits at the sites basically to check their implementation of one of the IERs and it's highly congruous with what the audit does. They're really looking at a lot of the FLEX stuff.

So, we've been trying to populate their ERRV teams with people from our core taskforce to basically make sure that we're asking the right questions and we're not diverging in what we're trying to do there.

So, I went to the -- I was on the team for the Robinson ERRV visit and I was able to look at the Robinson strategies and give them some direction as to how to --

MEMBER RAY: So, it's basically from what you're saying, I would infer it's just an extension of emergency response from an operational standpoint, from INPO's standpoint? It's larger.

MR. BAUER: Yes, INPO, I mean they modified their emergency response center down there at INPO, so they're more aligned and ready to be an assistant to the industry during an emergency response event.

There's also now a requirement in

the -- that INPO be notified within the first hour of an event.

MEMBER RAY: Okay, that answers the question.

MR. BAUER: Actually, hold on. They have people on shift with pagers similar to utility personnel at any plant. So, there's a call out roster assigned and a duty week so that they can man that center.

MEMBER RAY: Yes, but that may or may not include the kind of things we've been talking about today.

MR. BAUER: Well, let me give you one FLEX example that's very, very specific to FLEX. So, one of the comments we got on the two National SAFER Response Centers was, well can two really, you know, meet the needs of the United States in total?

So, one of the things that the chief nuclear officers decided to do was say, well, we really have 64 sites that can all serve as, you know, response centers. So, what INPO has done is they've inventoried all of the equipment that the plants have bought and they have that in their system and the plants are required to keep that up to date.

And in an event, they're going to call, you

know, if Palo Verde has a problem, they're going to call Diablo Canyon and say, hey, shut two pumps over while the response centers are also doing their thing.

So, they're going to basically activate the other response centers over to the other sites so they can help.

MR. WEBSTER: Yes, I think INPO was also involved early on because I mentioned in my response that when we were responding to 11-4 even before the order was, it gave us the -- some of the background work that was done prior to the order and, you know, the mitigating strategies that we developed.

So, they've been kind of working sometimes in advance, you know, in conjunction with the process.

CHAIRMAN SCHULTZ: I was expecting that INPO would be the response organization that would help with those lessons learned from the emergency preparedness exercise and drills and so forth that could incorporate this. The lessons learned would be shared going forward long term within that program.

MR. BAUER: You know, there is a subcommittee of the Fukushima Response Steering Committee which are the chief nuclear officers called the Emergency Response Steering Committee and basically, that involves INPO, chief nuclear officers

and NEI to basically say, hey, let's make sure we're consistent with what we're doing in the emergency response arena.

So, they're trying to, you know, make sure everything there is done, nothing is done in conflict with something somebody else is doing.

MR. POWELL: Yes, the other thing we've done is we've had workshops. So as we started out with FLEX in its infancy and as we took conceptual ideas and finalized them, we've shared that with the industry through NEI industry workshops.

We're scheduling another workshop the first week of February which will be our fourth one to talk about lessons learned from the fall plants and we're going to be talking about ERRV visits, audits, how to prepare for the audits and we're even contemplating right now in the planning, having some breakout sessions.

CHAIRMAN SCHULTZ: I guess we're in questions now.

Bill, I don't know if this came in through your presentation but I wanted to ask someone on the panel, what's the -- we talked about calculations that are done to support the timing and so forth, GOTHIC evaluations were mentioned in terms of environmental

conditions within spaces and so forth.

What's the -- are the pedigree of those calculations the same as one would expect for licensing calculations?

MR. WEBSTER: Well, they -- I can speak for Dominion. The requirements of --

CHAIRMAN SCHULTZ: That's what I wanted you to do.

MR. WEBSTER: Okay. 12-06 for the calculations they are required to be engineered in evaluations. It didn't specifically require them to be Appendix B calculations and evaluations. But at the level it would at least have, you know, an independent review and that type of thing was an expectation of the type of calculations.

At Dominion, by and large, you know, if we don't do -- if it's an engineering typical evaluation it's a little different. But if it's a calculation, we've used similar -- it's non-safety related but we used the calculation process that we would use for any other calculation that we did.

Now, we do distinguish between non-safety and safety but as far as the peer review, independent review, some of the differences, and I think Mike alluded to this, is, you know, we're not talking about

design bases. Then a lot of times we were in the best estimate trying to get a clear picture of what that time line really looks like.

Not -- you're not, you know, if you have this time line and if it's overly conservative it might be in conflict with our real priority in another area. So, we tried to use best estimate inputs through those calculations and the K heat calculations, we tried not to use. You know, our design basis type of information.

But the way we did the calculation at Dominion was following a non-safety calculation route.

CHAIRMAN SCHULTZ: Right. I think the staff -- I mean your staff would be encouraged to do it both best estimate as well as conservative evaluation. We heard conservative evaluations were done in his, that was appropriate for the application but also you kind of like to know what the real answer is.

MR. POWELL: We're very similar. In some cases we have done safety related calculations particularly when we used our NSSS vendor from a documentation standpoint. When we've asked to finalize their results like you heard Mr. Eimar talk about use of the CENTS code, C-E-N-T-S.

CHAIRMAN SCHULTZ: Yes.

MR. POWELL: That's a thermal hydraulic code that's used for combustion engineering system 80 plants or combustion engineering plants. So, we've had Westinghouse document those as safety related or QA calcs.

But we've done engineering studies. We've done nonlinear analysis to look at the non-seismic pieces of equipment to show whether or not they'd be available. We've done high competence and low probability of failure analysis on some of our non-safety tanks to see if they'd be available post-seismic event. So, there's a spectrum of how we document it.

I will say that our biggest challenge is that our staff is preconditioned for traditional design basis waves and you have to think differently when we start talking about the ground rules for a beyond design basis event, the ground rules in NEI-12-06 and people struggle with that. It takes some time to work through that process.

Some of our vendors have had the same struggle because they've been supplying products for years traditionally at design basis approach. So, when you start talking to them about using best estimate

methods, they're outside their comfort zone.

CHAIRMAN SCHULTZ: That's a very interesting comment.

MEMBER RAY: A nonlinear analysis can comply with Appendix B but we'll leave it.

MR. POWELL: Oh, it can.

MEMBER RAY: I'm just kidding you.

MR. POWELL: Well, I think it's more about the inputs than, you know, the way you have to assume the inputs going into it.

MR. AMWAY: And I agree, I mean the example slide that I had, I mean we did our spent fuel pool counts based on the maximum design of a 140 degrees, but know 90 to 100 is our normal.

But, in that particular example, we're not overly challenged by the makeup strategy. Whereas, in my containment heat up analysis for RCIC preservation, six hours, I start to get concerned of whether I'm going to be able to take action in time and that's where it might be appropriate to say, yes, my tech spec limit for suppression pool temperature is 90 degrees, but I never operate there. I'm always, you know, 75 to 80 degrees. So, how much margin is there between 75 to 80 degrees versus starting at 90 degrees?

MR. POWELL: Yes, some of the challenges

we've had is particularly when you take and you want to modify and create and RCS injection point and now you are having to design hangers for that section of pipe where you have to add some amount of margin to account for seismic when you're not through with your seismic.

So, we had to create boundaries essentially beyond design basis boundary flags on our drawings that says from this point to the left is traditional design basis and this point to the right is beyond design basis just to say the rules are different.

CHAIRMAN SCHULTZ: The other question I have on -- maybe comment or asking you to comment upon it, the staff indicated that, well, it's very difficult to run through this is a formal way because we don't have the reevaluated flood hazards and we haven't finished some of the external event evaluations.

But then they also said that when they came to the sites and were involved in the discussions of how the challenges of implementing the equipment insulation process and so forth, there was a lot of discussion or had been a lot of discussion as to well, what are we really going to be faced with in terms of what could have caused the loss of off site power?

MR. POWELL: ELAP.

CHAIRMAN SCHULTZ: The ELAP.

MEMBER RAY: Not loss of off site, but loss of AC.

CHAIRMAN SCHULTZ: Yes, the ELAP. And so my question was just to get the industry perspective on that discussion. That is, I would have expected that within the site environment, there must have been a lot of discussion about different opinions, different views, different expectations as to what that challenge might be.

Are we going to move the equipment? What are we going to be faced with? What are we going to have to move to get the equipment from point A to point B? Will it be snow? Will it be missiles? Debris? And so forth.

So I guess my impression is there ought to have been a lot of work done independent of what we're doing formally in terms of reevaluation of hazards. A lot of work done at least in terms of developing the challenges that are going to be faced in any event.

MR. POWELL: There was. If we take deployment, for example, you know, you walk around the site and say what kind of event would I have? If I had a tornado, what's my possible debris field and how would

I prevent it from getting to the units to deploy the equipment?

If I had a seismic event, do I have non-seismic tanks that may create an issue with flooding out an area so I can't deploy through that area?

So, so much of this is visualization. We're walking around and coming up with not only a primary deployment path, but maybe a secondary or tertiary. And you can't do that sitting at a desk and you can't really explain to somebody to give them an appreciation until you go on a walk down and walk them through that whole process and say, you know, we're taught in design basis space that the turbine building doesn't exist after a seismic event. But what if it's still there? Or how would it fail? Would it fail to the north or the south, you know?

You know, if we have to transverse under power lines that may be down, how would we deal with that situation?

And you know, the staff was so much interested in that as well because it's one thing to say, yes, I can deploy the equipment, but can you really? And the staff in the audits would actually go to the -- where your proposed FLEX building was or is

and they'd walk the deployment routes down to gain a degree of confidence. Are you going to be able to accomplish what you said?

You know, if you routing hose up six flights of stairs, are you using devices to keep the bend radiuses right? Do you have the right amount -- length of hose? What, you know, is it really feasible and then do you have another 1,000 foot run of hose to get to make your connection? Is it really feasible?

Because FLEX is -- there's a lot of different ways to accomplish the mission in the end.

MR. WEBSTER: And we, too, would -- looked at and would agree that, you know, if you go to a haul route evaluation and, again, I think Bill talked about it this morning, you'd run in to a power line situation, we would certainly say, okay, if that line was down, you know, let me find another way around it so I don't have to deal with it. And if I did have to deal with it, what would it look like?

So, I think we did, you know, because of making sure we had alternate paths, you know, if it bridges or whatever, you know, if that were to happen, what actually would I do? And actually think through that process and, you know, what I would do.

Now, sometimes it was a little bit, you know, if I got a front end loader and I said, you know, I'll, you know, I'll make my path in essence. And we would look at our time line and say, well, do I really have time to do that? Is there enough margin here if something were to happen that I could really do it? And in large cases, you know, most of the time, the time lines were very, you know, they were hours with margins, so you get a comfortable feeling that that could be accomplished even with some of the uncertainties that you might face.

MR. AMWAY: And we took a very similar strategy and approach. We did our flooding hazard reevaluation in March 2012 and so when we built our FLEX building, our robust building, we put that at a grade elevation that's not below the flood level of the reevaluated hazard.

And similarly, it was pointed out, okay, what about the transport path from that building to the site location? And we're doing the same thing where that's trailer mounted and they're, you know, they're relatively high vehicles and trailers. It's a ponding issue, we're not talking about four feet of water, we're talking about somewhere between a flood of 18 inches, you know, wet event and we'll be able to get to that.

Now, having said that, you know, one of things that was pointed out on our audit is our strategy for taking fuel out of the storage tanks as a sounding tube.

Well, you look at it and you're thinking, okay, the sounding tube is, you know, this high off the ground but it's in a recessed because of the, you know, it's also a fuel offload so you recess it down in there so if you spill fuel, it doesn't run into the environment.

So, if you account for the drop plus the height of the sounding tube, is it still below the lip level? And you find it it's not. So, I mean we're going to look at one of two ways is you look at your flooding hazard reevaluation and it has a rise and a peak and then an ebb and do you really need a fuel connection at that point? Or can you use what you have in your 500 gallon tanks in the vehicles or do I have to add 18 inches or a foot on to the sounding tube to make it work?

So that's one of the things, you know, it's a practical application of things you might run into that you look at an you evaluate ahead of time.

CHAIRMAN SCHULTZ: Other questions by members of the committee?

MEMBER SKILLMAN: I would just observe on when I think of maybe a two year fuel cycle, how many -- you have an E&A, you have a mid-cycle review, you've got your NSRB meetings, you have your Board meetings or your on site meetings. You have your biannual exercise, you're probably drilling four times a year. You're doing call-outs.

When do you say -- when's enough, the things that you're talking about are complex, they take your very best people, your very precious limited resources, get them focused. What isn't getting done? This is a tremendous amount of work.

Normally, this is a zero sum game in this environment, this economic environment for these plants. Something's got to give. What's not getting done? Excuse me, go ahead.

MR. BAUER: I don't want these guys to start up.

MR. WEBSTER: I think we've just got to be cautious --

MEMBER SKILLMAN: I'm raising the flag because I can understand this.

MR. WEBSTER: -- to look at that to make sure that we don't affect, you know, the --

MEMBER SKILLMAN: What's important?

MR. WEBSTER: Right. And we do focus on what's important. So, for, you know, operator training, for example. We just want to make sure that we don't envelop so much training into the operator staff that, you know, things they really need to get trained on or even the things that may be more frequent or more important or a design basis type things don't get watered down with type of training.

So, it's really a balancing act and the stations are challenged, I'd say, to find that balance and implement it because one of the things that we found was that -- I mean there's, you know, there's even the maintenance and testing of this equipment, it's a lot of equipment.

If you look at the buildings, the size of the buildings and equipment and things inside, there's not a small amount of equipment here. There's a lot of equipment. So the maintenance and testing that has to be done and all that, it has to be -- we do have to be cautious that we're not -- because there's a limited amount of resources, as you said.

MR. POWELL: I will tell you for Palo Verde, we had to make choices on reliability improvement mods. In some cases, there were some systems that were yellow windows that ideally we had

mods and deferred them a cycle.

We were challenged with -- we submitted overall integrated plan. This isn't a complaint. We submitted our overall integrated plan in February of 2013 and our Unit 1 outage was a month later and that outage counted. So, that meant everything became a fast track. And, you know, when you have fast track mods, you're susceptible there and so we had to put a lot of energy into making sure we didn't have a lot of errors in implementation.

It also meant we had to go into an outage and do both electrical trains and both mechanical trains whereas, in one of the other units we had the luxury of doing one train each outage.

But we had deferred some plant improvements and some reliability improvements until later on in 2017, 2018, 2019 because there isn't an endless supply of money and, in fact, we had to go to our owners and our owners had been very gracious and we've gotten some additional funding to support the budget.

So, I will tell you, at least to my plant, that's been our challenge, trying to balance that.

MR. BAUER: But it's not just a money issue. You can only push so much stuff out into outages

and into the plant. There's only so much they can take on at one time and still do it successful.

MEMBER SKILLMAN: You can change the risk profile pretty significantly when you start doing electrical and mechanical and different trains. You can create a problem that you really don't want to create.

MR. BAUER: Yes. An important question that is a continuous agenda item for the -- in sIEC meetings when they meet with the NRC, the cumulative effects of what we're doing to ourselves.

MEMBER SKILLMAN: Mr. Chairman, thank you.

MR. AMWAY: If I can just go back and talk to the training a little bit, too. Because, you know, we talked about eight year frequencies for doing drills and exercises. But the advantage of the SAT process, it could look at portions of our strategies and let's take the load shed, for instance.

It's a time sensitive action, it supports not only ELAP but, you know, station black out. It supports some other things. So that particular aspect would be in the operator training evaluation or in the operator training program, most likely as a job performance measure where they'll actually have to go

out and do that on a periodic frequency to validate that they could actually do it and do it in the time that we need it done.

So, even though we're not doing an integrated drill or exercise for FLEX, there's bits and pieces that get trained along the way in between that eight year frequency to make sure that operators can do specific tasks.

MR. WEBSTER: On a win-win.

MR. AMWAY: Yes, and it is an important balance. I mean we have, you know, we're talking about design basis events and beyond design basis events. We need our operators to perform day to day, you know, respond to a feedwater pump threat, but they need to do it 40 and, you know, we need -- those things are going to get trained on a lot more frequently.

MR. POWELL: I would propose that we need to start thinking in terms of proficiency versus training, maintaining some level of proficiency versus formal classroom training, more simulator time on these type of events because the operators only have so much time to spend in the classroom. They have to maintain so many hours on shift to maintain their proficiency in the control room.

And what we don't want to do, and this is

where the balance becomes very tough, is take away the good training they get and the mandatory training and give them some other training maybe that isn't as high of value.

MR. AMWAY: I think we've offset that to some degree by having strategies and equipment connection points that are relatively simple and it's a balance between, okay, how much can I put in a procedure and expect an operator to go out and do and what's it look like when he gets out there? Is it simple things to do or is he unbolting things, lifting leads, things like that?

Well, in the majority of cases for the FLEX equipment, you've heard the term plug-n-play, it's, you know, it's standard connections, things that, you know, okay, maybe it's not for a design basis event he's doing but maybe it's the same type of threat it can actually be used in the fire work, you know, just typical fire hose type connections.

So, it's that type of thing, it's a balance. It's not going to be all training, it's not going to be all procedures and it's not all going to be in the design. It's a combination of those things.

CHAIRMAN SCHULTZ: Other comments? Questions? All right.

MEMBER STETKAR: I promised I'd, you know, come off the wall. I promised you guys I'd ask the same thing.

Any of you PWR guys have only motor operated isolation valves in your let down line inside the containment and have you looked at those?

MR. POWELL: Error operated and check valves.

MEMBER STETKAR: Okay.

MR. WEBSTER: And we have error operated as well.

MEMBER STETKAR: You're not this one then?

MR. POWELL: I'm afraid to ask who that was?

MEMBER STETKAR: No, no, I've got a diagram.

CHAIRMAN SCHULTZ: All right, at this point, I would like to ask and provide an opportunity for public comments and first, as the phone line is open, I'll ask if there's any members of the public or personnel in the room who would like to make a comment for the record.

Okay, state your name for the record and --

MR. FLAIG: Kurt Flaig from Dominion. I'm also the Chairman of the Analysis Subcommittee of

the PWR OG.

And I guess what I wanted to say was, it's been a real challenge going through the process, doing the analysis work, trying to meet the needs of the NRC staff and their review of the information that we've provided to our members.

I do think that one of the concerns that I'd like to hear is -- and I think the NRC staff feels it too, is that we started out with not knowing where the sweet spot was with regards to coming to a conclusion on what was good enough. And I think we still struggle with that to some extent.

You mentioned the RCP seal issue that is still ongoing and that's part of the struggle with trying to find the sweet spot with how much is enough.

And that's just like the -- it is a struggle, we'll get through this process, but that has been an extreme challenge for us.

CHAIRMAN SCHULTZ: Thank you. Other comments from the room?

At this point, I'd like to ask for comments from the phone lines. So, if people are out there listening in, could someone please make some noise so we can know the phone line is open?

MR. JACKSON: Yes, Tom Jackson from Rizzo

Associates. It's been very interesting. I don't have any specific comments.

CHAIRMAN SCHULTZ: All right. I'll ask if anyone would like to make a comment for the benefit of the committee to state your name and make your comment.

Hearing none at this time, then we'll close the bridge line and close the public comment period.

At this point, I'd like to -- we do have this meeting continuing tomorrow morning. I certainly want to take the opportunity to thank the panel from industry who has made their presentations today. We've learned a lot and discussed a lot of information about the process.

And also thank the staff for their presentations as well.

I'd like to go around the room just to provide the members of the committee an opportunity to make comments if they would like to at this time, knowing that we also have tomorrow to have that opportunity as well.

MEMBER RICCARDELLA: I have no additional comments at this time.

CHAIRMAN SCHULTZ: Ron?

MEMBER BALLINGER: I have no additional

comments.

CHAIRMAN SCHULTZ: Dick?

MEMBER SKILLMAN: No additional.

CHAIRMAN SCHULTZ: Thank you. Harold?

MEMBER RAY: No.

CHAIRMAN SCHULTZ: Dennis?

MEMBER BLEY: Yes, I may as well do it now instead of tomorrow.

I really appreciate today's presentations and see a lot of benefit in what we've heard about.

One part of it nags at me a little so I'll just put that on the table. Thirty years ago a mid-80s client, we're just doing a PRA for asked should I fix anything? You know, I said well, things look pretty good. He said, well, if I were going to put more money in, what should we do? What's the next big thing?

And what he decided was if you run after one specific thing, you can make it really reliable and really solid.

But what's going to get is something somehow that we didn't of and something like this system, something you can put water and you can put electricity anywhere would be really nice. And he actually went ahead and designed something like that.

The one thing it did that was quite

different than the current version is they found some quick coupling devices, so instead of having these nice connections that are going to be real easy and you'll do much better if you need water where you thought, it'll be real easy to hook up.

They found stuff you can cut out a few feet of pipe and you could hook up these couplings on to the butt end of the pipe and they could hold fairly high pressure. So, that gave you flexibility, essentially, to put water anywhere through the six inch pipe, something like that.

And John raised this earlier, if what the real world gives us is something we just haven't thought of and it wants water somewhere we haven't put those connections or it wants water at high pressure at a little higher flow rate than we've got, you kind of put off some of the flexibility in FLEX.

On the other hand, you've made it much more reliable for where we're most likely going to need it and a little loss of flexibility is something I wonder about that trade off. But we've got something that's taken us along way now for most things that are outside of the realm of what we thought and so you've got water to the key places and you've got power to the key places and that'll do us well in the long run, I think.

CHAIRMAN SCHULTZ: John?

MEMBER STETKAR: No, I don't have anything more after Dennis.

CHAIRMAN SCHULTZ: Thank you. Joy?

MEMBER REMPE: No comments.

CHAIRMAN SCHULTZ: Mike?

MEMBER CORRADINI: Nothing. I just wanted to thank particularly the utility panel. I learned a lot in terms of how they implement. I think to me that's important. I'm not as familiar with that and that was quite helpful.

CHAIRMAN SCHULTZ: All right. I'm going to recess the meeting then until tomorrow morning and certainly invite everyone back to be with us tomorrow.

(Whereupon, the above-entitled matter went off the record at 5:29 p.m.)

Palo Verde FLEX Strategies

Gene Eimar, Shift Manager
Palo Verde Fukushima Initiative
November 20, 2014

Presentation Topics:

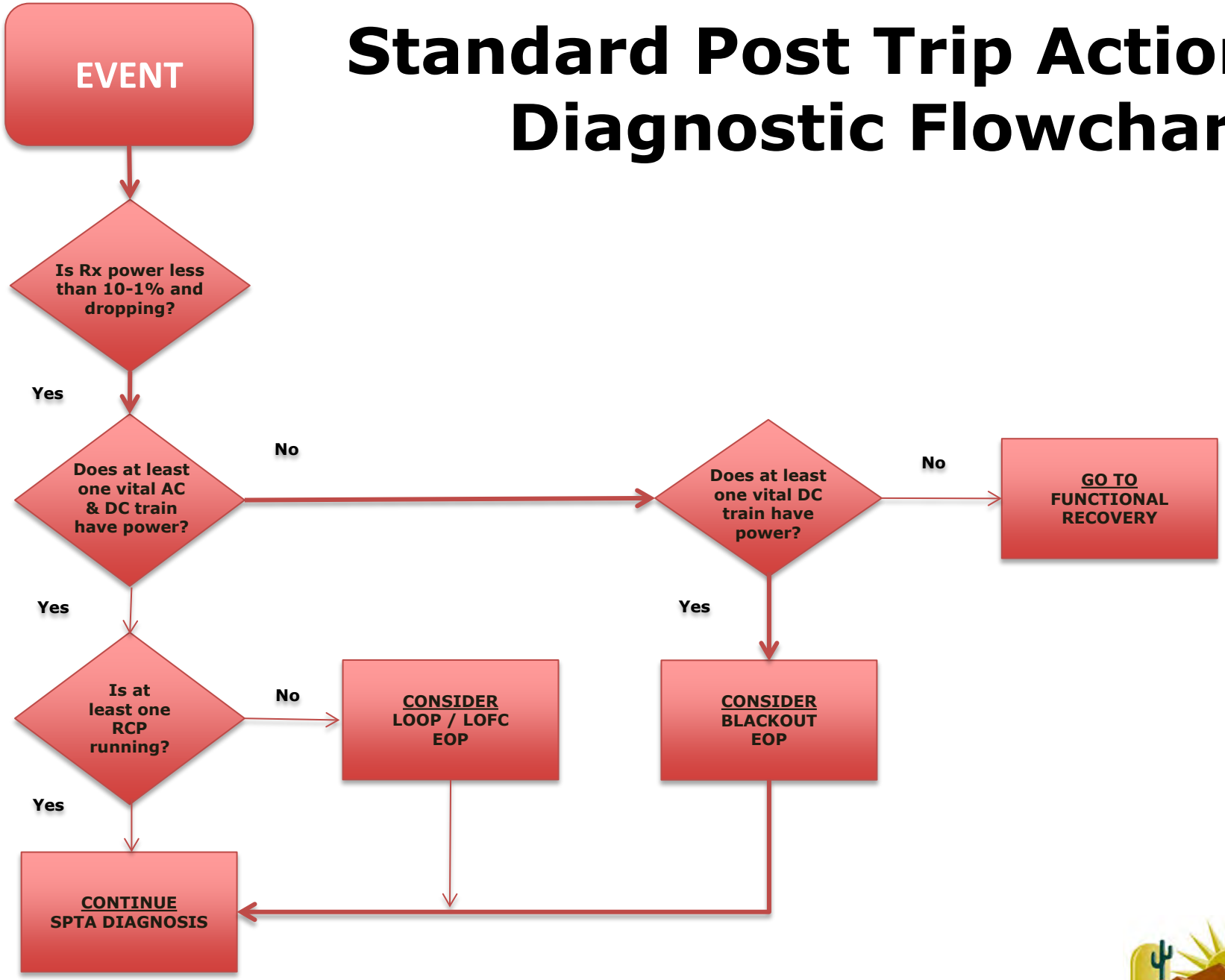
- FLEX Support Guideline Implementation
- Extended Loss of All Site AC Guideline
- Extended Loss of All Site AC Guideline Appendices

Palo Verde FLEX Support Guideline Implementation

The Event

- Undefined external event occurs
- Loss of Off-Site power
- Reactor trip
  - All Control Element Assemblies insert
- Failure of all on-site AC sources to function
  - Diesel Generators
  - Station Blackout Generators
- No other equipment failures
- No other event in progress
- No security event

Standard Post Trip Action Diagnostic Flowchart



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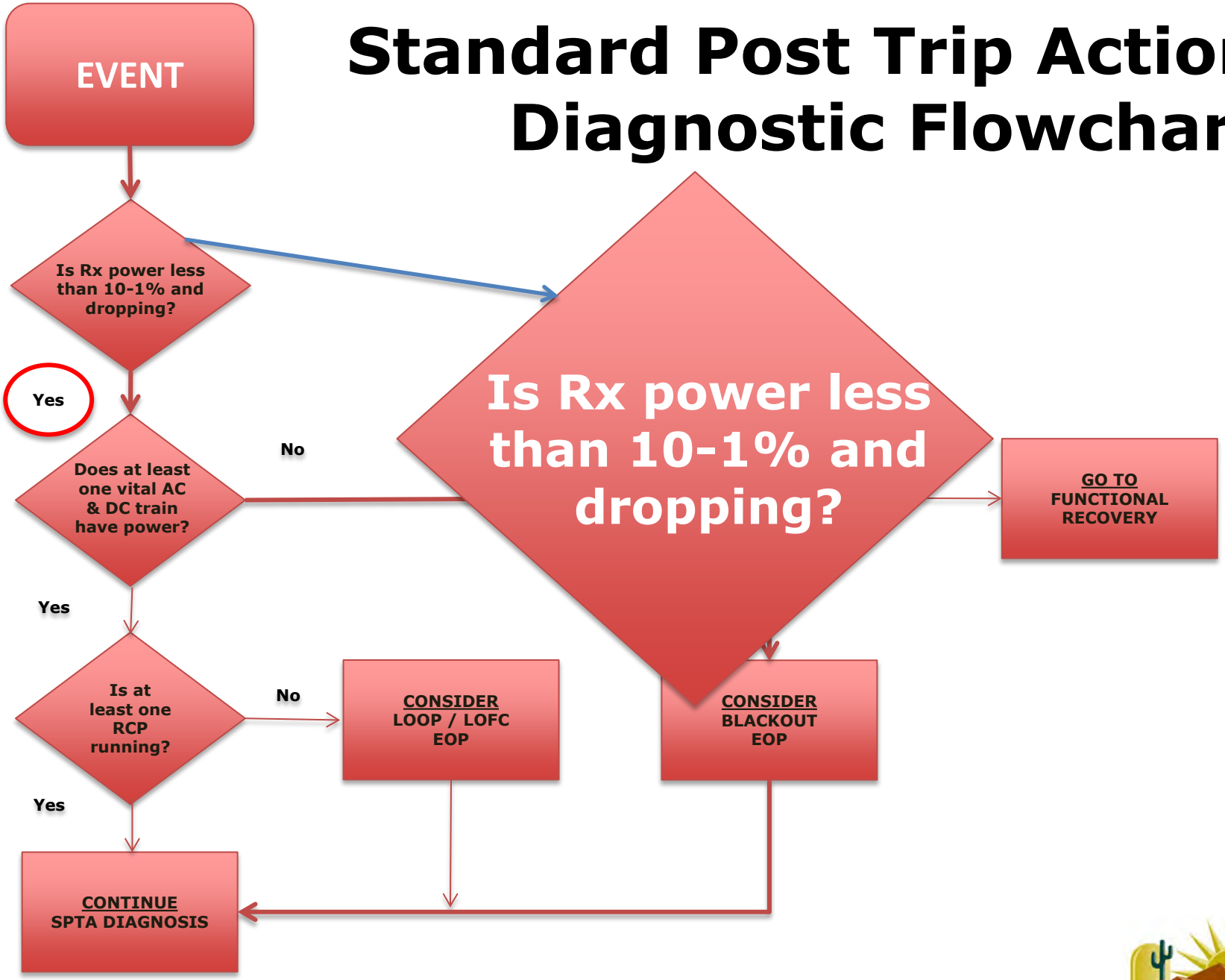

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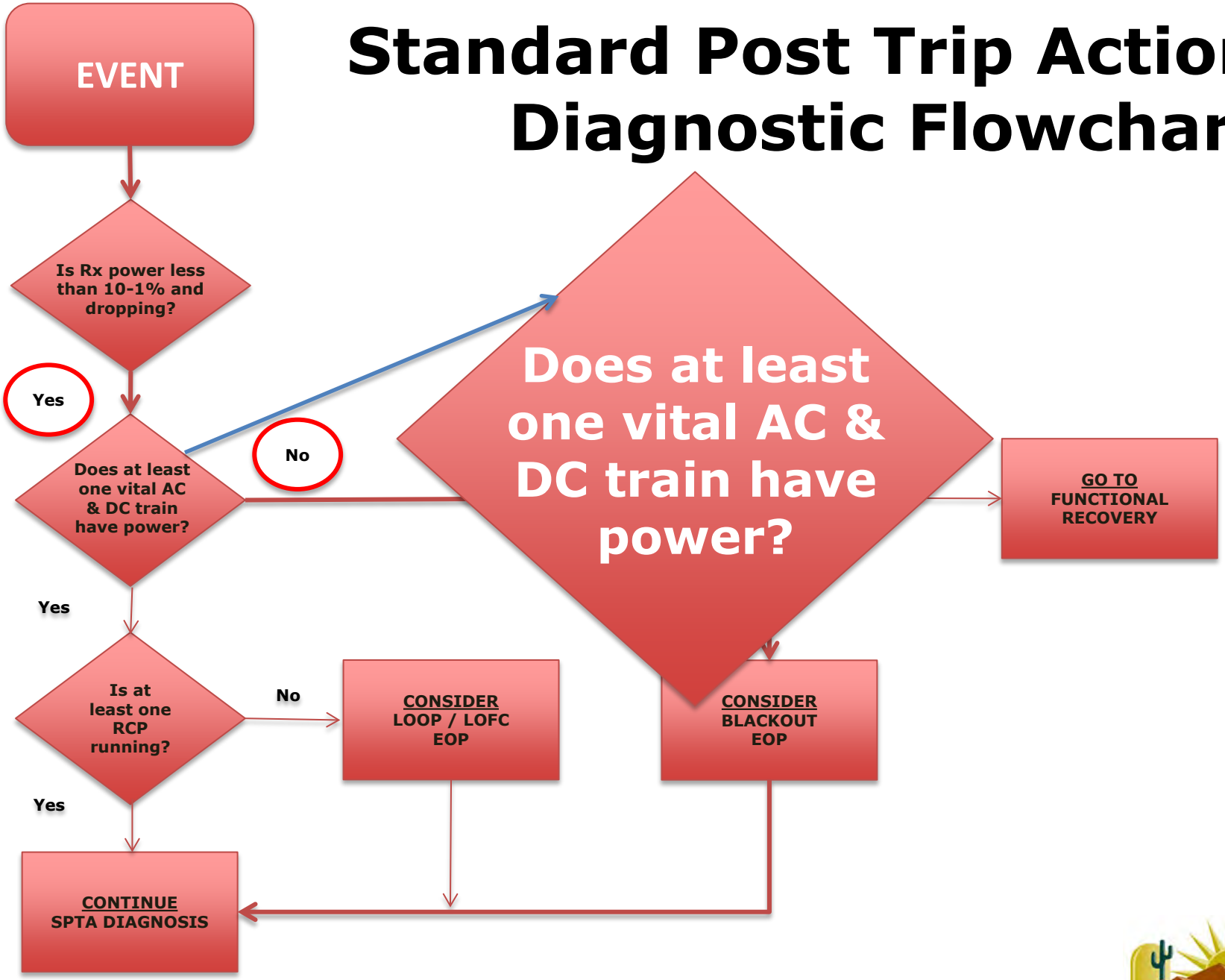

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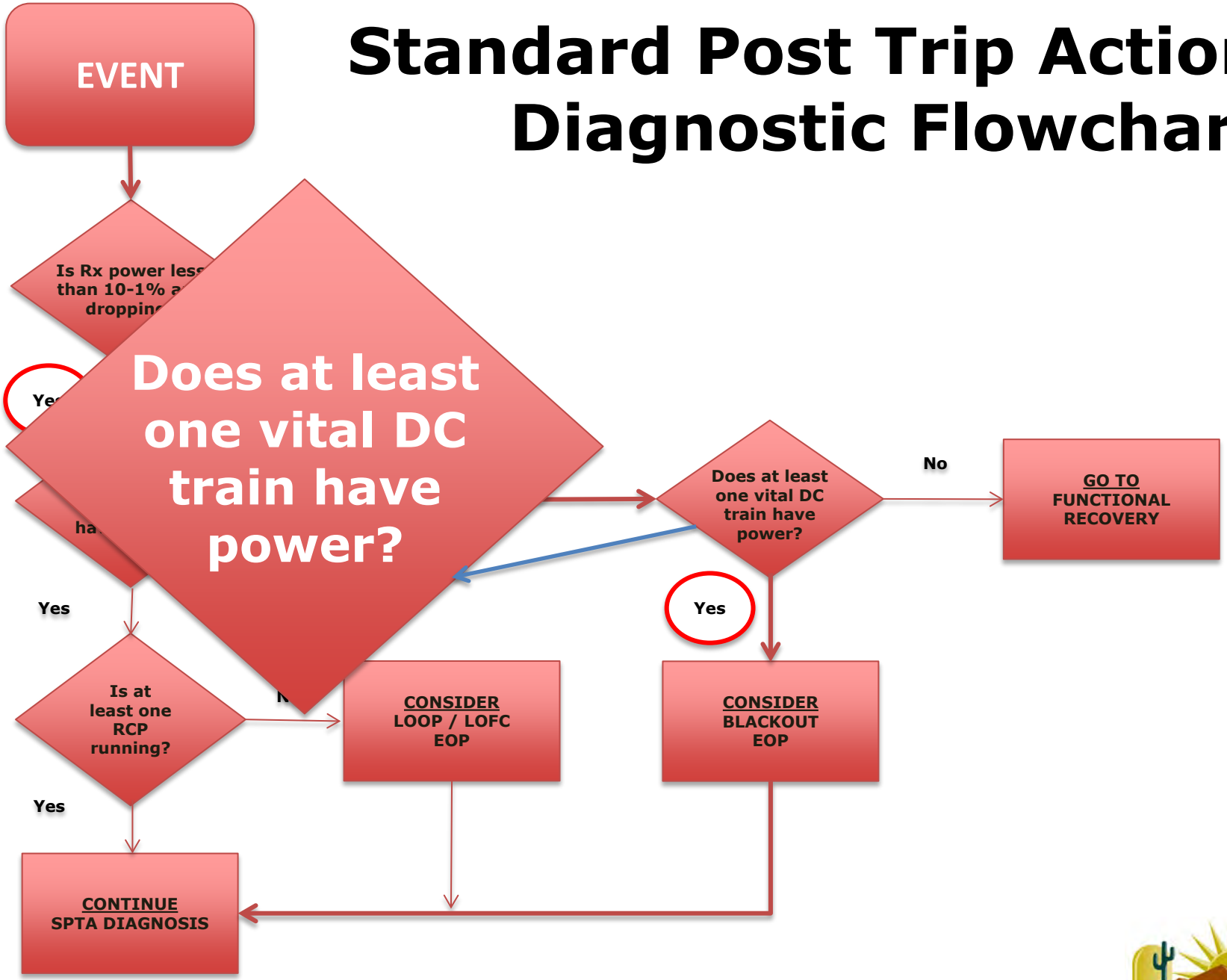
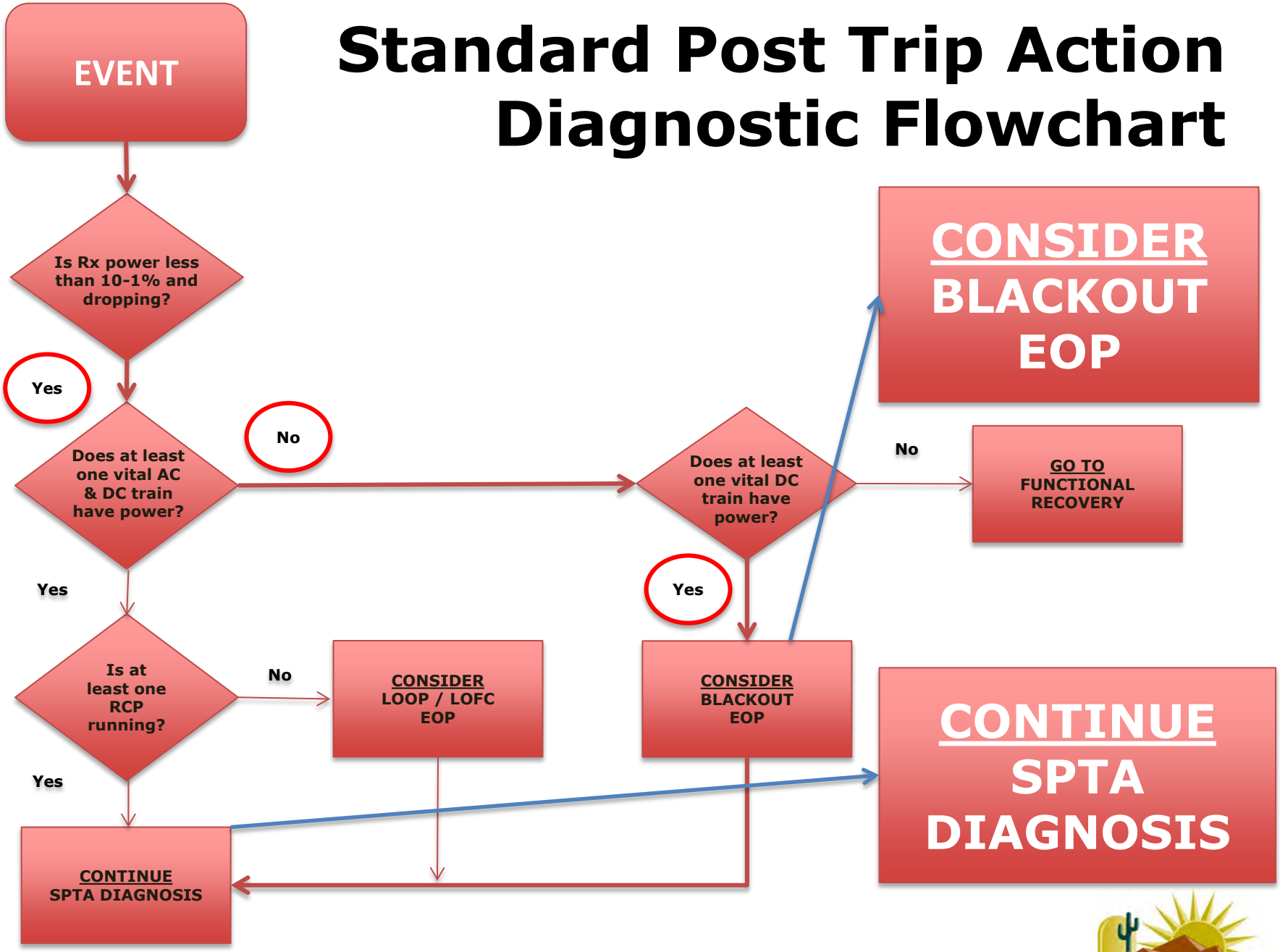
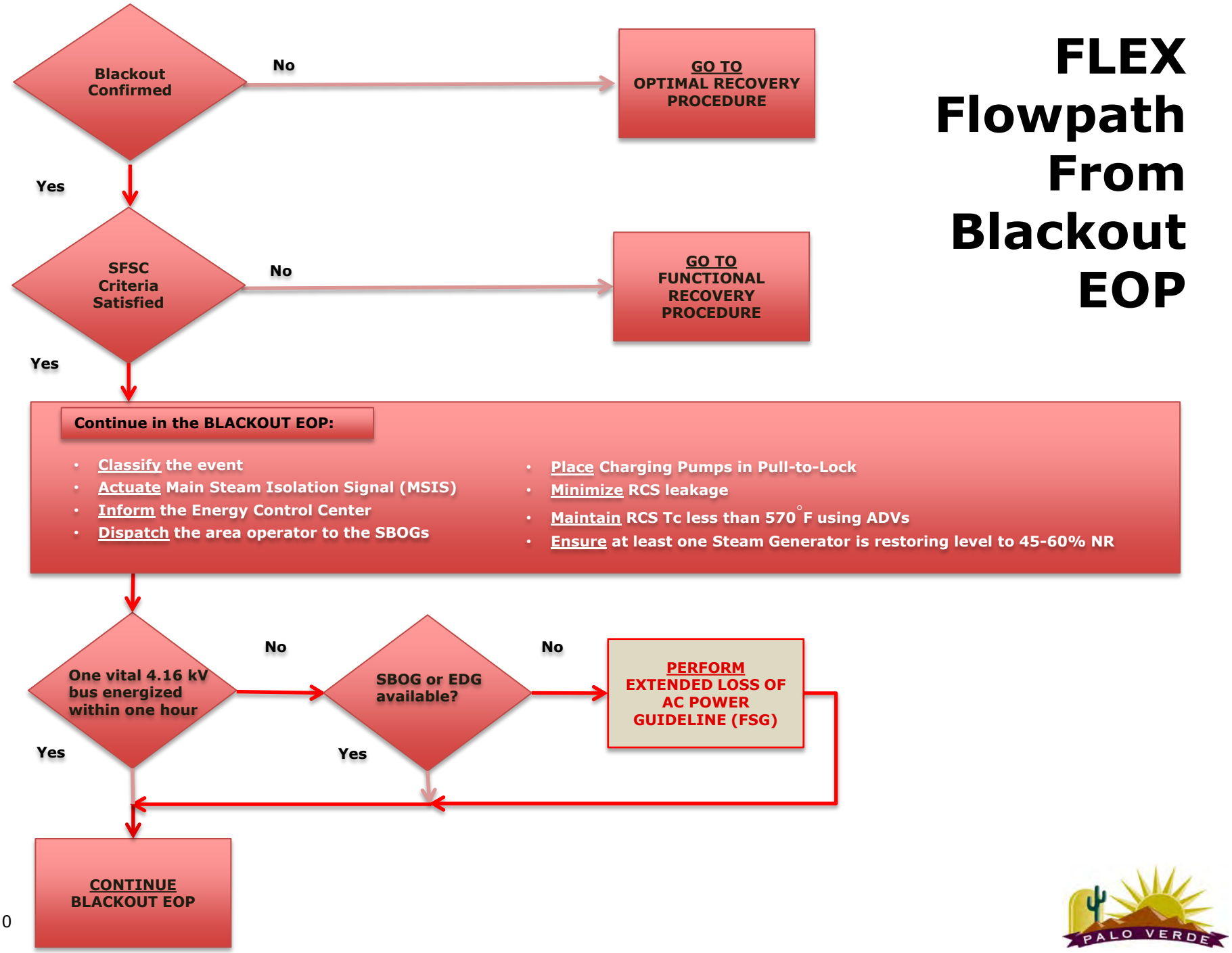


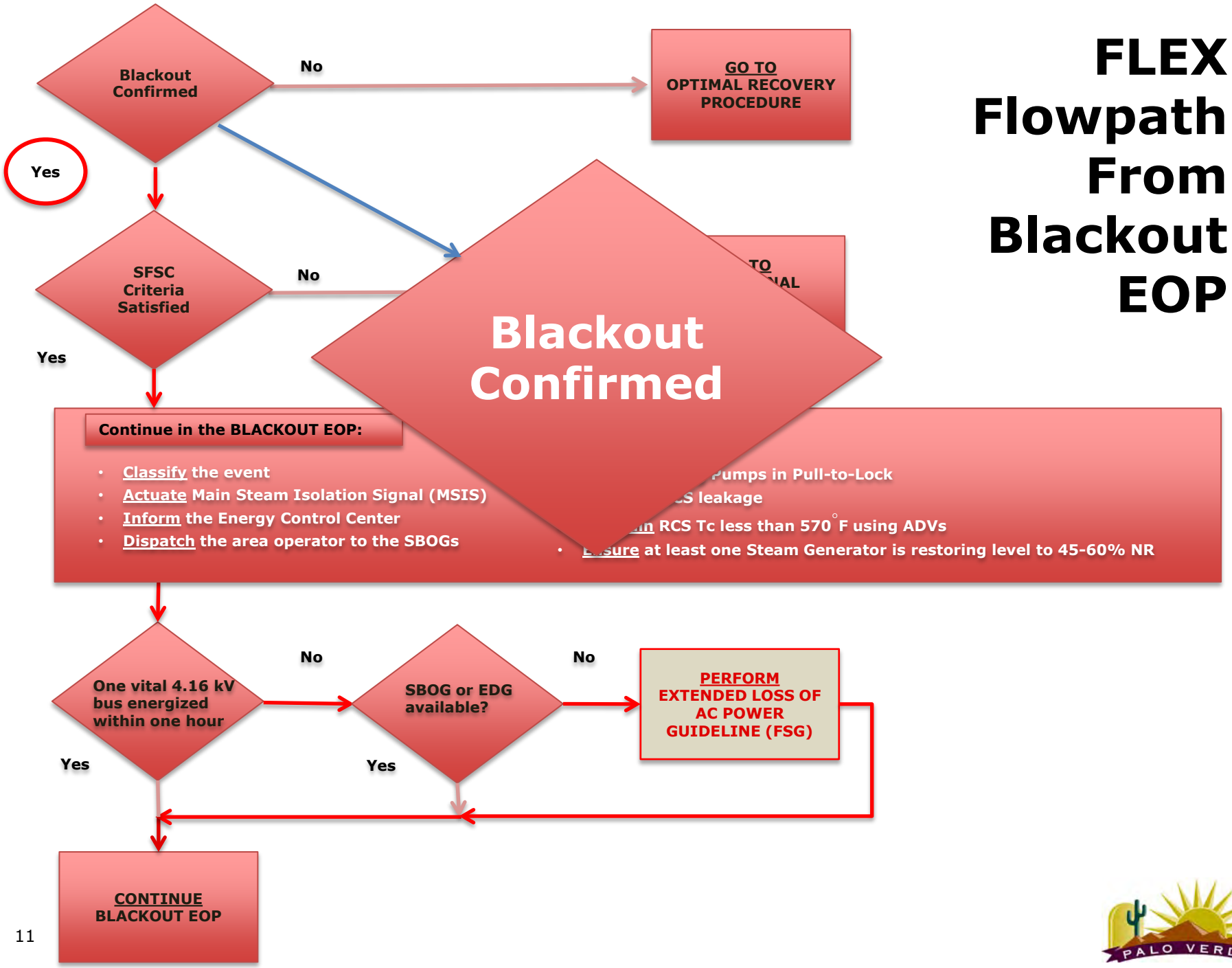
Standard Post Trip Action Diagnostic Flowchart



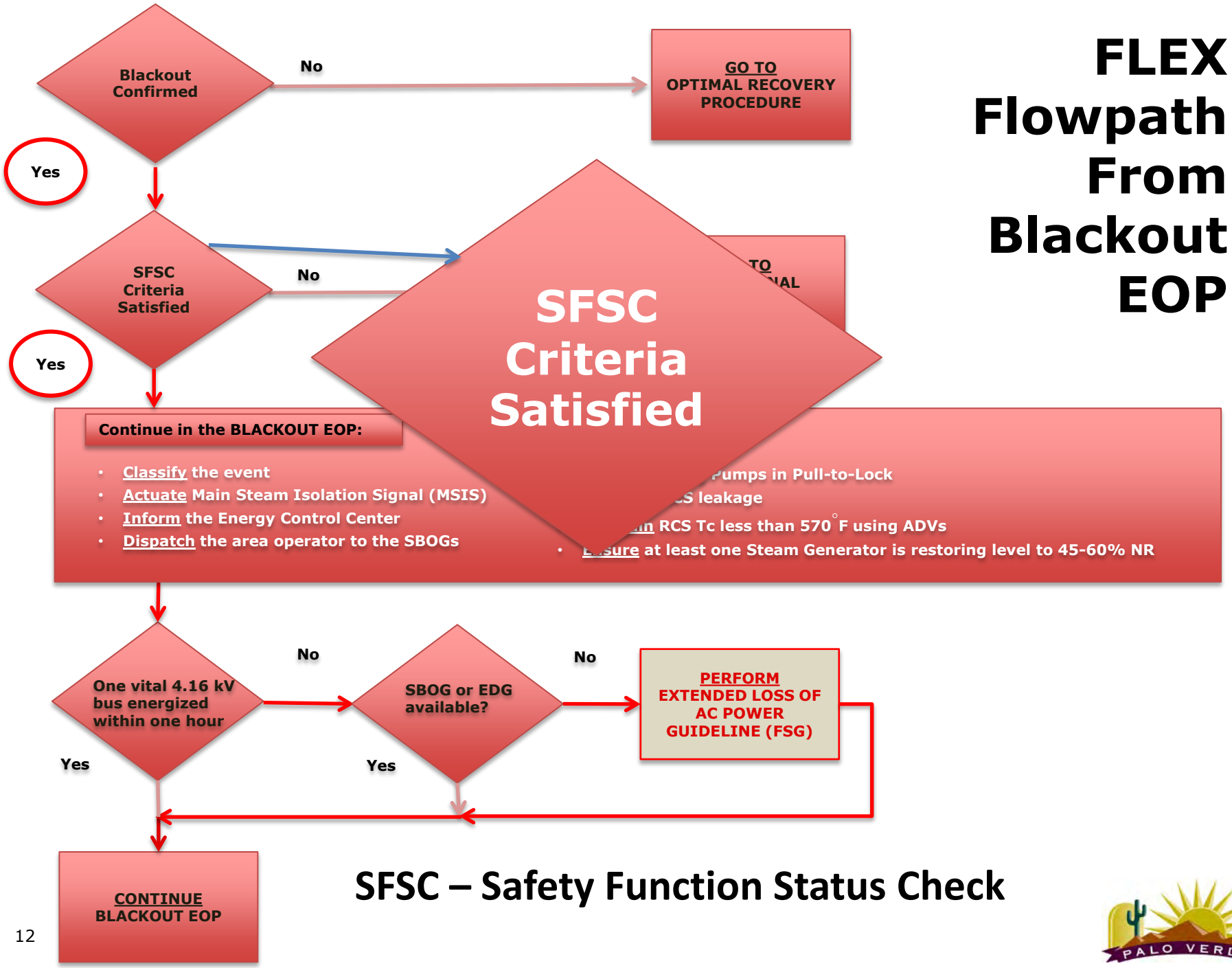
FLEX Flowpath From Blackout EOP



FLEX Flowpath From Blackout EOP

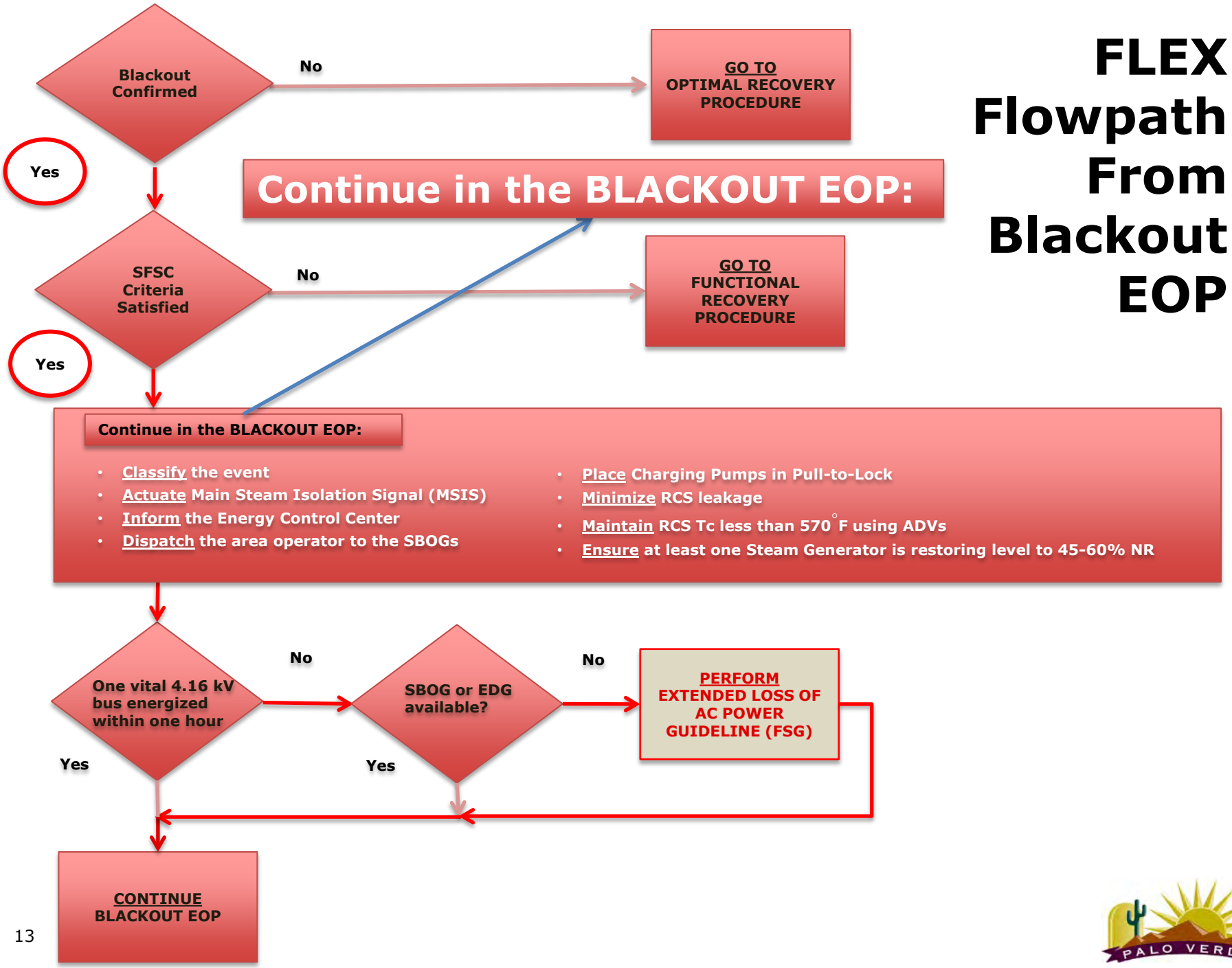


FLEX Flowpath From Blackout EOP



SFSC – Safety Function Status Check

FLEX Flowpath From Blackout EOP



Emergency Plan Impact

- Event initiation:
  - Loss of offsite and onsite AC power for > 15 minutes

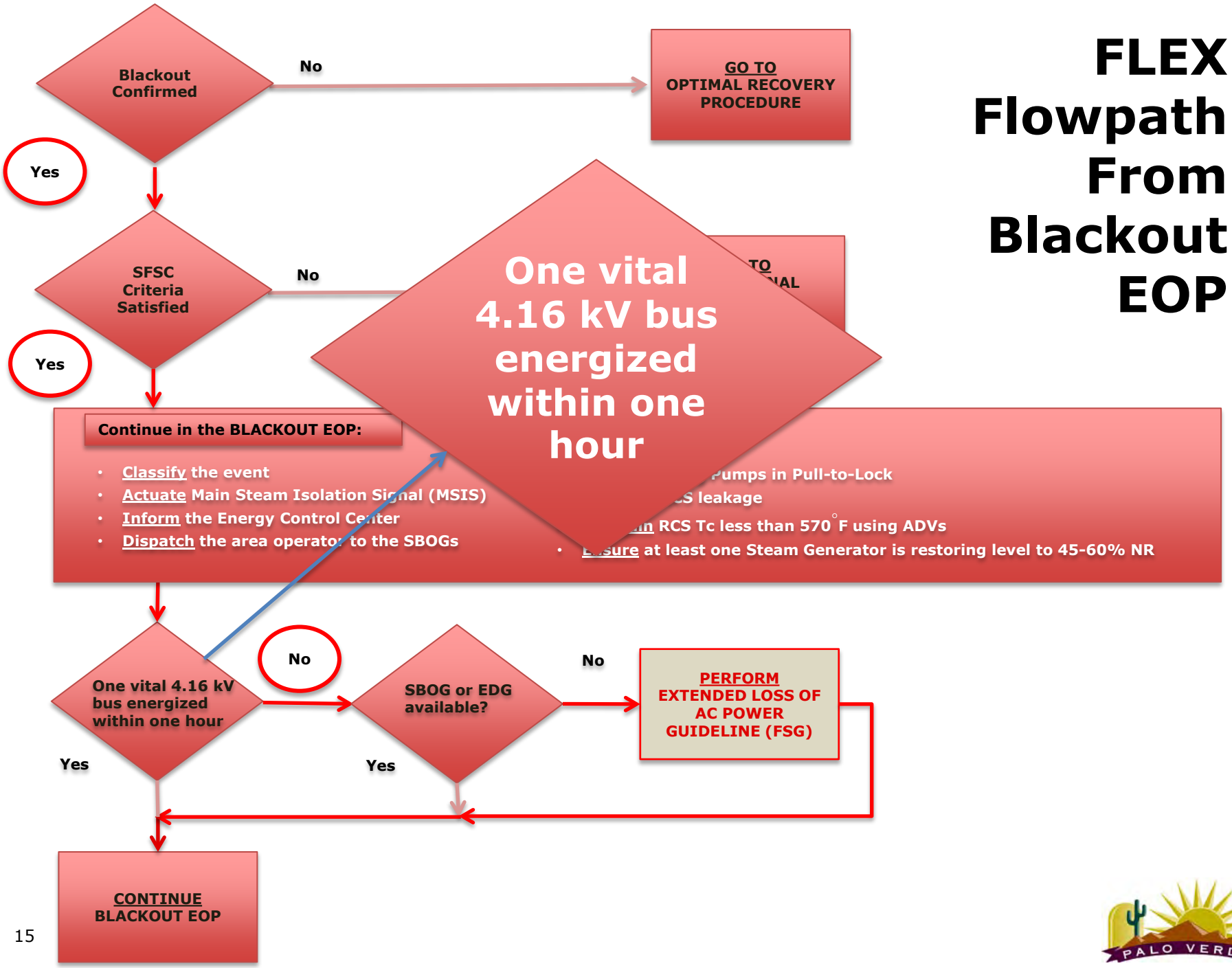
Site Area Emergency (SAE)

- Upon determination of prolonged or extended loss of AC power (ELAP):
  - Loss of offsite and onsite AC power for > 15 minutes

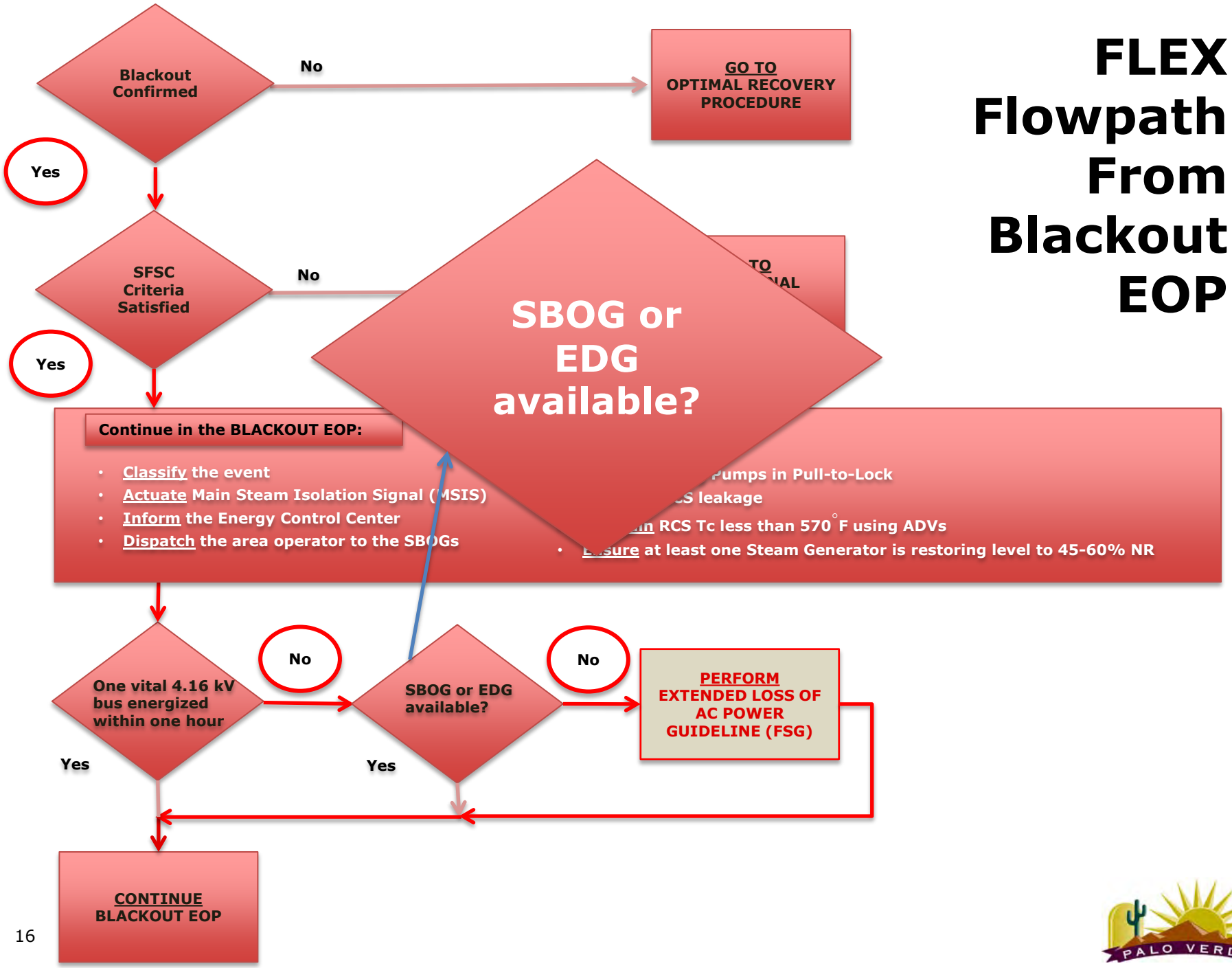
  And
  - Restoration of at least one emergency bus in less than 4 hours is not likely

General Emergency (GE)

FLEX Flowpath From Blackout EOP



FLEX Flowpath From Blackout EOP



Blackout EOP Interface with the FLEX Support Guideline (FSG)

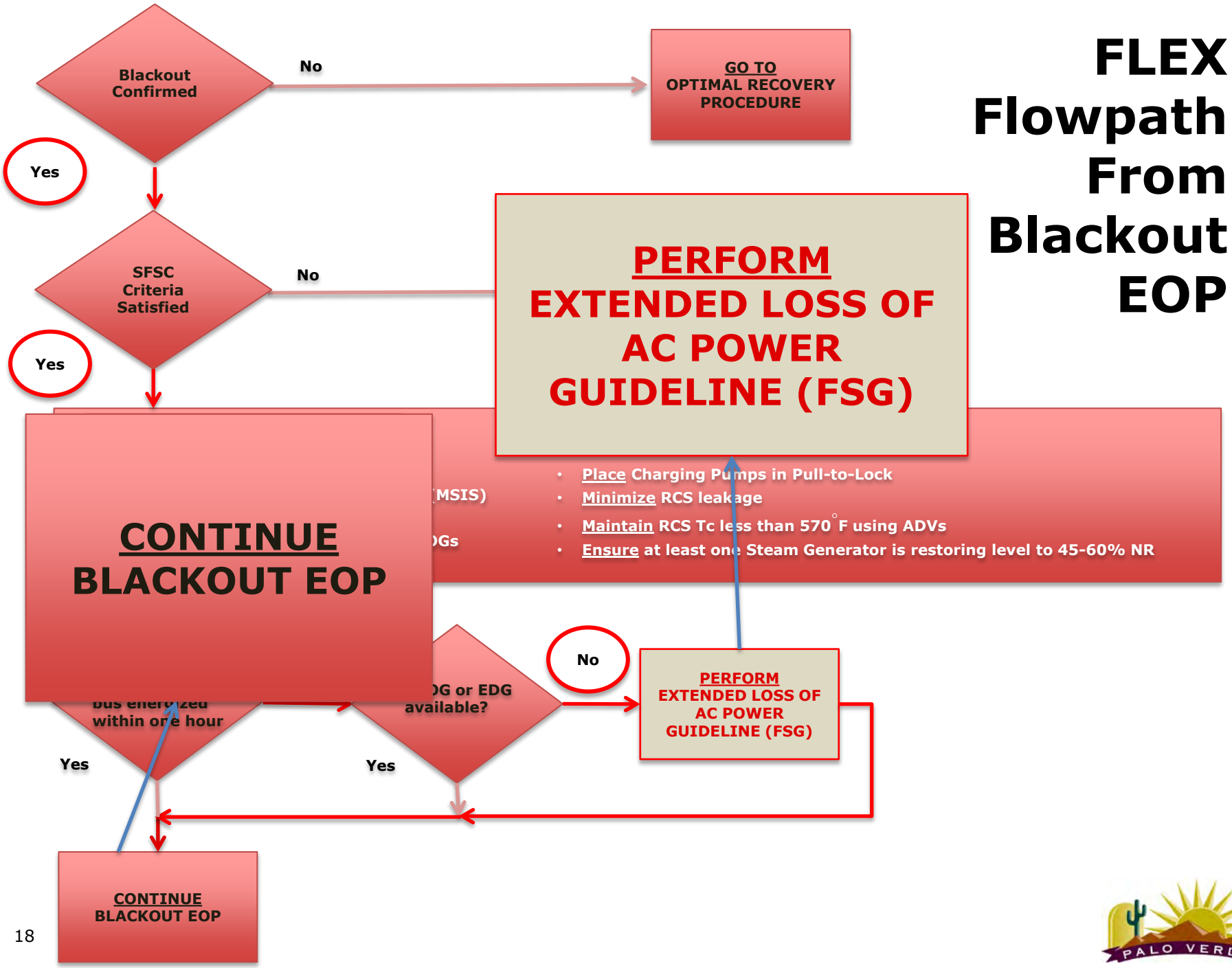
- **IF** at least one vital 4.16 kV AC bus is **NOT** expected to be energized within one hour, **THEN** align SBOG to the "A" Train bus

- Use contingency step if SBOGs are not available

- Contingency step would direct the Control Room to **perform** the FSG and go the SBO procedure

COMMAND AND CONTROL REMAINS WITH THE EOP IN USE

FLEX Flowpath From Blackout EOP



Palo Verde Extended Loss of All Site AC Guideline

FSG/ELAP Purpose

This guideline provides strategies to cope with an extended loss of all site AC power.

The initial focus is to cool the Reactor Coolant System and maintain Spent Fuel Pool inventory/cooling.

RCS Cooldown Logic

Cooling down and depressurizing the Reactor Coolant System reduces the inventory loss.

- Allows Safety Injection Tank (SIT) injection
- RCP seal leakage decreases

Stable T_{cold} Logic

An elevated stable T_{cold} temperature:

- high enough – to allow the Steam Generators (SGs) to supply sufficient steam to the Turbine Driven Auxiliary Feed Water (TDAFW) Pump
- low enough – such that one charging pump capacity is greater than Reactor Coolant Pump (RCP) seal leakage

FLEX Support Guideline (FSG) Entry Conditions

The Emergency Coordinator or Shift Manager may direct entering the FSG when all the following conditions exist in a unit:

- Loss of off-site power
- Loss of emergency diesel generators
- Loss of both station blackout generators
- Any doubt exists that 4160 VAC power can be restored in a timely manner

Event Initiation Timeline

T+0	• Event occurs
T+0 + <5 minutes	• Turbine driven auxiliary feedwater pump starts
T+0 + 15 minutes	• Completion of standard post trip actions
T+0 + 15 minutes	• Enter blackout EOP
< T+1	• Determine if station blackout generators have failed
T+1 (or sooner)	• Enter FSG – Extended Loss of AC Guideline (ELAP)
T+1	• Start battery load shed to extend battery life • Start reactor coolant system cooldown

Battery Load Shed

- Load shed activity takes < 1 hour (using 1 AO)
  - Walk downs performed by Auxiliary Operators
- Selected loads are de-energized
- RCS cooldown accomplished with:
  - "A" Train Auxiliary Feedwater Pump
  - "B" Train Atmospheric Dump Valves (ADVs)
- Selected instrumentation remains energized to monitor the plant
- Load shed lists provide equipment name and breaker number
  - Allows Control Room Supervisor and/or Shift Manager to energize selected loads, as needed

Selected Instruments

- Core Exit Thermocouples (CET)
- Reactor Vessel Water Level
- Steam Generator (SG) Level (Wide Range - WR) and Pressure
- Reactor Coolant System (RCS) T_{hot} , T_{cold} and Pressure
- Subcooling and Saturation Margin – RCS and CET
- Pressurizer Level
- Safety Injection Tanks (SITs) 2A and 2B Level (WR) and Pressure
- Containment Pressure
- Atmospheric Dump Valve (ADV) Position
- Auxiliary Feedwater flow to each SG

Cooldown

- Commence a symmetrical cooldown of the Reactor Coolant System (RCS) at $\geq 70^{\circ}$F per hour – do not exceed 100 $^{\circ}$F per hour
  - Stabilize RCS temperature at 360 $^{\circ}$F T_{cold}
  - Steam Generator (SG) pressure of 155 psia
- Feed the SGs using TDAFW pump to maintain 80 – 85% narrow range (NR) level

Event Timeline

T+2	• Complete battery load shed • Open doors to the Turbine-Driven Auxiliary Feedwater Pump (TDAFW) room to provide additional cooling
T+3	• Safety injection tanks begin to inject
T+4	• Cooldown complete
T+16	• Nitrogen to atmospheric dump valves depleted - manual operation, as required
T+34	• 800kW / 480 volts alternating current (VAC) generators installed to supply: o Battery exhaust fans o Battery charger o Charging pump o Control room fans o Pressurizer heaters • Establish SFP makeup

Event Timeline (continued)

T+36	• Install alternate RCS makeup pump
T+38	• Safety Injection Tanks (SIT) empty (10% WR) • Vent SITs • Alternate secondary makeup pump installed
T+42	• Condensate Storage Tank empty • Swap to Reactor Makeup Water Tank or makeup from the Refueling Water Tank
T+72	• Portable 4.16 KV generator (from National SAFER Response Center) installed • Lowest shutdown margin condition reached o Keff = 0.93 • Water from Water Reclamation Facility (WRF) available at the units
T+75	• FLEX alternate secondary makeup pump placed in service and auxiliary feed pump secured

Safety Injection Tank (SIT) Control

WHEN RCS T_{hot} reaches 500°F,

THEN monitor Safety Injection Tank Wide Range Levels for nitrogen injection

IF Safety Injection Tank(s) level lowers to 10% Wide Range Level,

THEN vent the Safety Injection Tanks to the Containment atmosphere

FLEX Support Guideline (FSG) Exit Conditions

The Unit has restored at least one class 4.16 KV bus and is able to return to the appropriate Emergency Operating Procedure

OR

The Emergency Coordinator directs the Unit to enter a procedure determined or developed by the Technical Support Center.

OR

Plant conditions have degraded to a point that entry into the SAMG/EDMG is necessary

Palo Verde Extended Loss of All Site AC Guideline

APPENDICES

Appendix "A" – DC Load Shed

- Extend the life of the class batteries, as long a possible
  - Use "A" Auxiliary Feedwater Pump
  - Use "B" Train ADVs
- Allows for continued operation of the ADVs and TDAFW Pump from the Control Room
- Accomplished as soon as possible ($\leq$ 2 hours after the event)
  - For every minute after required time – battery life is shortened
- Appendix lists breaker number and equipment being supplied

Appendix "B" – Primary Side Walkdown

- Align Spent Fuel Pool (SFP) gate seals
- Deploy portable SFP level and temperature instruments
- Open the Fuel Building roll-up door
- Record the status of primary side equipment
  - Auxiliary Building
  - Containment integrity actions
  - Fuel Building
    - SFP status
  - Outside areas
    - Reactor Makeup Water Tank (RMWT) status
- Verify Dry Cask Storage operations are in a safe condition

Appendix "C" – Secondary Side Walkdown

- Condensate Storage Tank (CST) status
  - isolate CST (lines to condenser) to preserve available water
- Main Turbine Generator actions
  - vent hydrogen from the generator
  - break condenser vacuum
- Isolate the EDG starting air receivers
  - maintain starting air available for recovery of EDGs

Appendix "C" – Secondary Side Walkdown (continued)

Record the status of secondary side equipment

- Turbine Building
  - Nitrogen system
  - Instrument Air system
  - Fire Protection systems
- Main Steam Support Structure
  - TDAFW Pump status
- Outside areas
  - Transformers
  - Spray Ponds

Appendix "D" – Control Room Status of Walkdowns

- Track the information gathered by the Area Operators performing the Primary (Appendix "B") and Secondary Side (Appendix "C") Walkdowns
- Track the status of the station class batteries
- Direct Main Turbine Generator Hydrogen venting
- Track the status of the Diesel Generator Air Start Receivers
- Coordinate with Water Reclamation Facility and Fire Department for providing water to the units
- Track nitrogen usage at the ADVs

Ranking of Makeup Water

COOLANT SOURCE	RANKING
Condensate Storage Tank	1
Demineralizer Water Tank	1
Surge Rinse Tank	1
Reactor Makeup Water Tank	1
Refueling Water Tank	3.7
Raw Well	4
Palo Verde Deep Well	4
Fire Protection Water	4
Domestic Water	5.2
45 – Acre Makeup	6.1
85 – Acre Makeup	6.1
First Stage Clarifier	6.1
Second Stage Clarifier	6.1
Cooling Water Canal	9.1
Evaporator Ponds	9.1

Appendix "K" – Open Door List

- Provide a list of doors which will be opened to implement this guideline
- Notifies Security of which doors are planned to be open
- Doors to be opened:
  - Fuel Building roll-up door
  - TDAFW Pump room doors
  - Control Building doors for:
    - CR ventilation
    - Supply 480 VAC power to the class load centers

Consider implementation of 10CFR 73.55(p) which would result in declaration of 10CFR 50.54(x)

Appendix "T" – FLEX Deployment

- This appendix consists of 3 major attachments:
  - Attachment T-1 – Package 1
    - Communication vehicles
    - 10kW generators
  - Attachment T-2 – Package 2
    - 480 VAC generator
    - RCS makeup pump
  - Attachment T-3 – Package 3
    - 480 VAC generator
    - SFP makeup pump
    - SG makeup pump

Questions?

ACRS Presentation Dominion Implementation

Bill Webster

November 19, 2014

Agenda

- FLEX Strategies and Modifications
- BDB Storage Facility
- Phase 3
- FLEX Program
- Communications
- Training
- Validation

FLEX STRATEGIES AND MODIFICATIONS

Dominion Fleet

- Millstone Station 2 Operating Units
  - MP2 – CE PWR
  - MP3 – Westinghouse 4 loop PWR
- North Anna – 2 Units
  - Westinghouse 3 loop PWR
- Surry – 2 Units
  - Westinghouse 3 loop PWR

Strategy Development

- IER 11-4 development provided initial inputs for strategy development
- Strategy developed by multi-discipline team including engineering and operations

Strategy Development cont.

- Strategy included detailed analysis including
  - Battery analysis following load shedding
  - Secondary Auxiliary Feedwater sources analysis
  - Primary calculations in conjunction with Westinghouse PWROG
  - Reactivity analysis to ensure Keff<.99
  - Hydraulic Analysis
  - Ventilation Analysis
  - Electrical Analysis
- Strategies (proposed) documented in Overall Integrated Plan response Feb 2013

Strategy Differences

	North Anna	Surry
STRATEGY	PARAMETERS	
Decay Heat Removal	4 Hours to ECST Depletion Cooldown to 290 psig	4 Hrs to ECST Depletion Cooldown to 300 psig
Decay Heat Removal	Local Manual Operation of PORVs	Local Air Bottle Operation of PORVs
Repowering Instrumentation	8 Hour Battery Life	14 Hour Battery Life
RCS Inventory	17 Hrs Before Make-up Required	17 Hrs Before Make-Up Required
Spent Fuel Pool Make-Up	9 Hrs to Boil 43 Hrs to 10 Ft Above Fuel	12 Hrs to Boil 57 Hrs to 10 Ft Above Fuel

Strategy Differences

	MPS2	MPS3
STRATEGY	PARAMETERS	
Decay Heat Removal	8.4 Hours to CST Depletion Cooldown to 125 psig	22.7 Hrs to DWST Depletion Cooldown to 290 psig
Decay Heat Removal	Local Manual Operation of ADVs	Local Air Bottle Operation of ADVs
Repowering Instrumentation	29 Hour Battery Life	14 Hour Battery Life
RCS Inventory	17 Hrs Before Make-up Required	17 Hrs Before Make-Up Required
Spent Fuel Pool Make-Up	6 Hrs to Boil 30 Hrs to 10 Ft Above Fuel	10 Hrs to Boil 50 Hrs to 10 Ft Above Fuel

BDB Phases

- Strategies used for a BDB Event are divided into 3 Phases
  - **Phase 1** – Cope using installed plant equipment and on-site resources
  - **Phase 2** – Transition from installed plant equipment to on-site portable FLEX equipment
  - **Phase 3** – Additional capability from off-site equipment and resources

Electrical Re-powering Strategy

- Focus on minimum set of key instruments
  - **Phase 1**: Cope using installed plant equipment and on-site resources
    - Operators identify ELAP condition within first 45 minutes
    - Operators shed non-essential loads from battery in next 30 minutes (breakers/fuses in 125V DC distribution cabinets)

	NAPS	SPS	MPS2	MPS3
Battery Extension	8	14	29	14

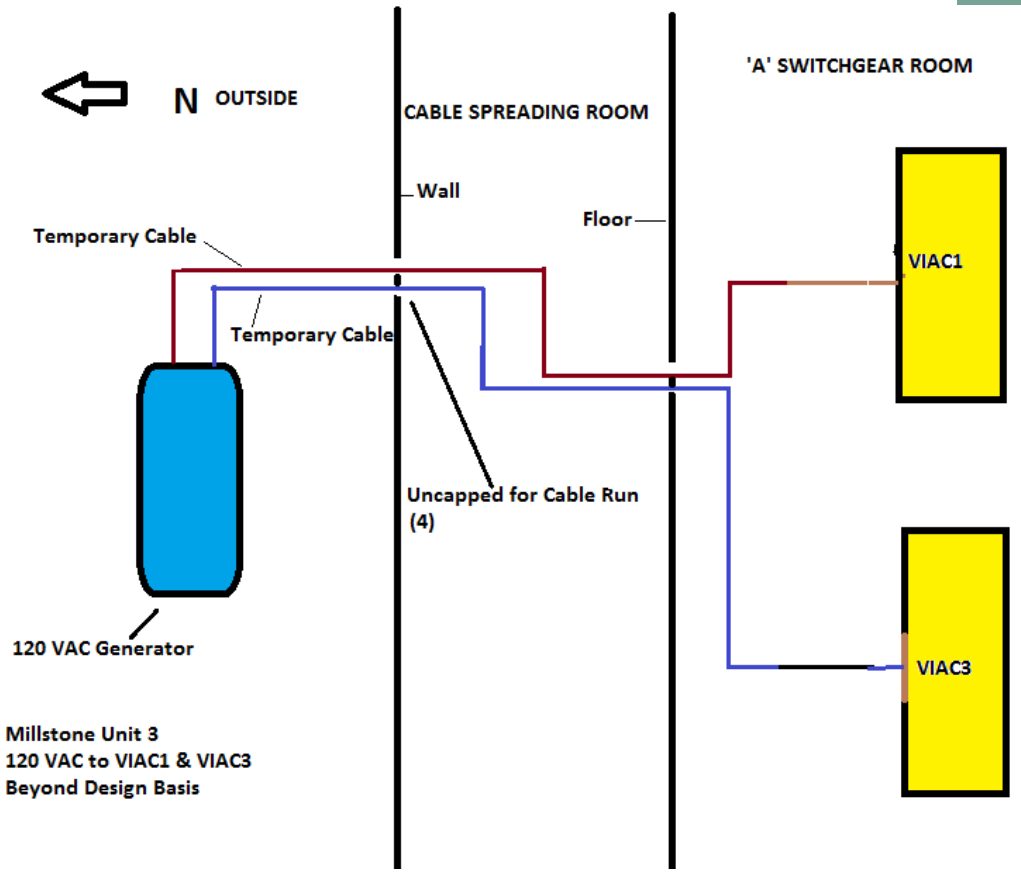
Electrical Re-powering Strategy

- **Phase 2:** Transition from installed plant equipment to on-site portable FLEX equipment
  - Primary - Re-power essential vital AC loads (Instrumentation) from 120 VAC portable EDGs
  - Alternate - Re-power essential vital AC loads (Instrumentation) from 480 VAC portable EDGs

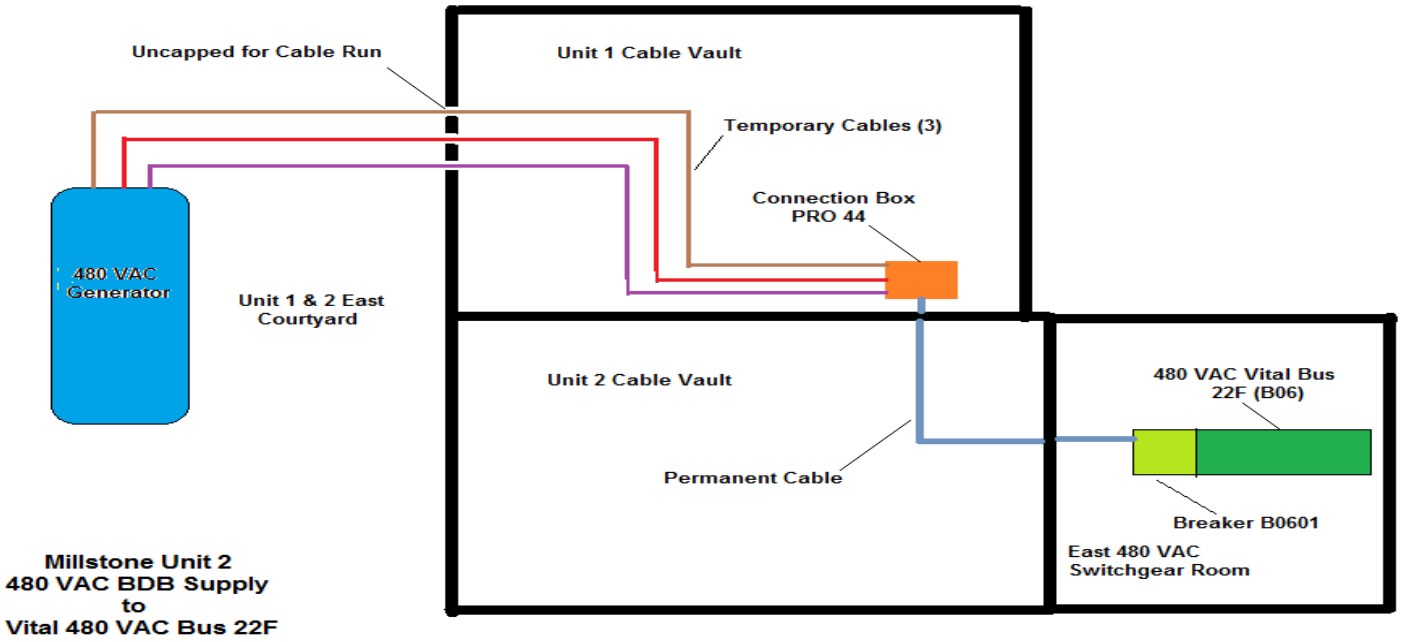
Electrical Re-powering Strategy

- **Phase 3:** Additional capability from off-site equipment and resources
  - 4160 VAC generator from off-site Regional Response Center
    - Includes cabling, connectors and necessary distribution panels

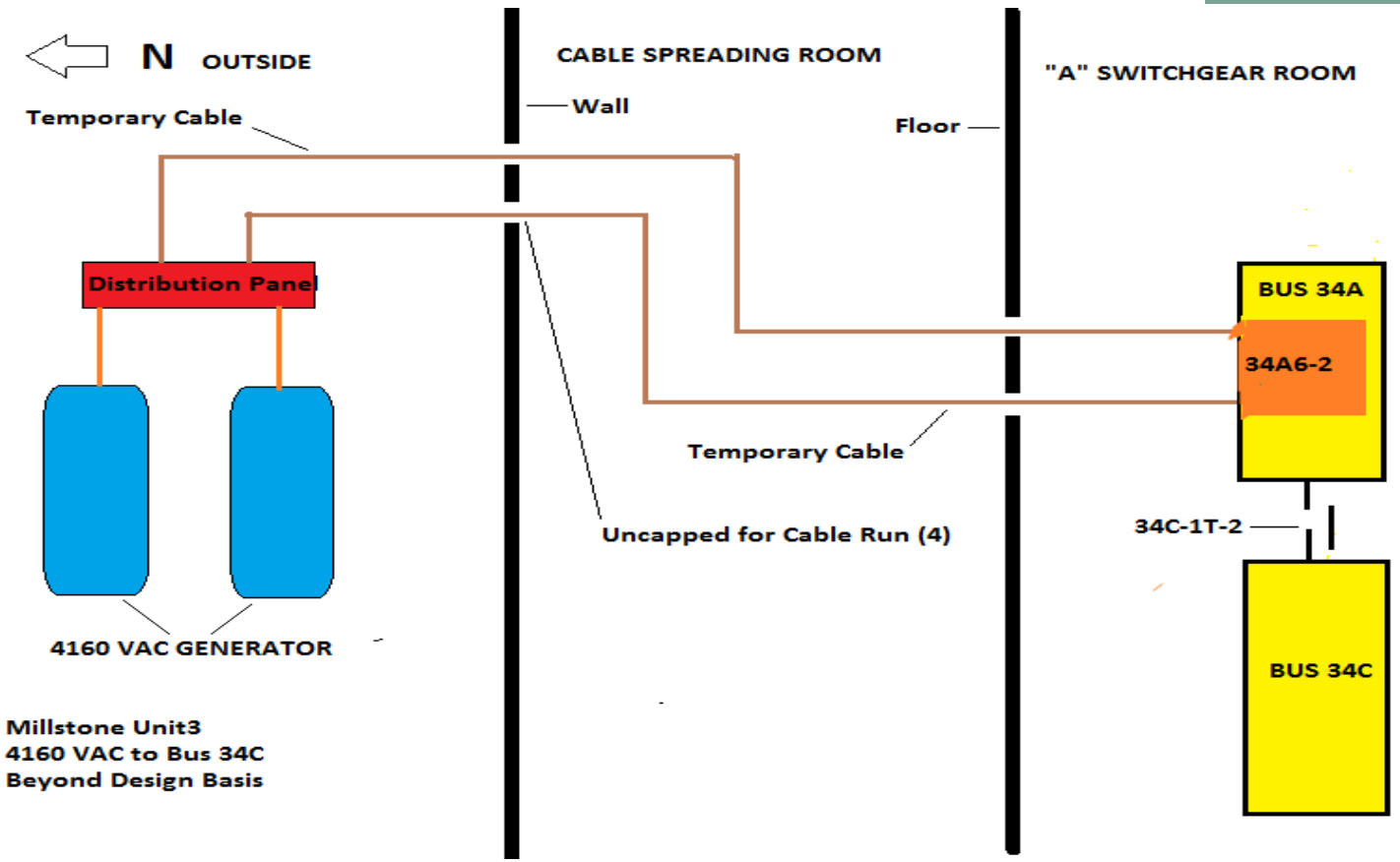
120 VAC Connection



480 VAC Connection

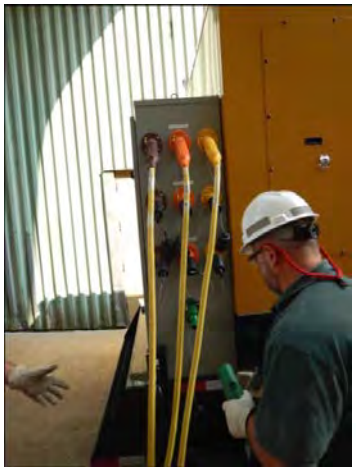


4160 VAC Connection



480 & 120 VAC Connections

Diesel Generators



Decay Heat Removal Strategy

- **Phase 1:** Cope using installed plant equipment and on-site resources
  - TDAFW supplying SGs from Emergency Condensate Storage Tank

Decay Heat Removal Strategy

- **Phase 2:** Transition from installed plant equipment to on-site portable FLEX equipment
  - Portable BDB High Capacity pump from long term water supply to AFW supply
    - ECST re-fill connection
    - 300 gpm for suction supply for AFW (each unit) to 300 psig SG
  - Also provides capability to supply SFP

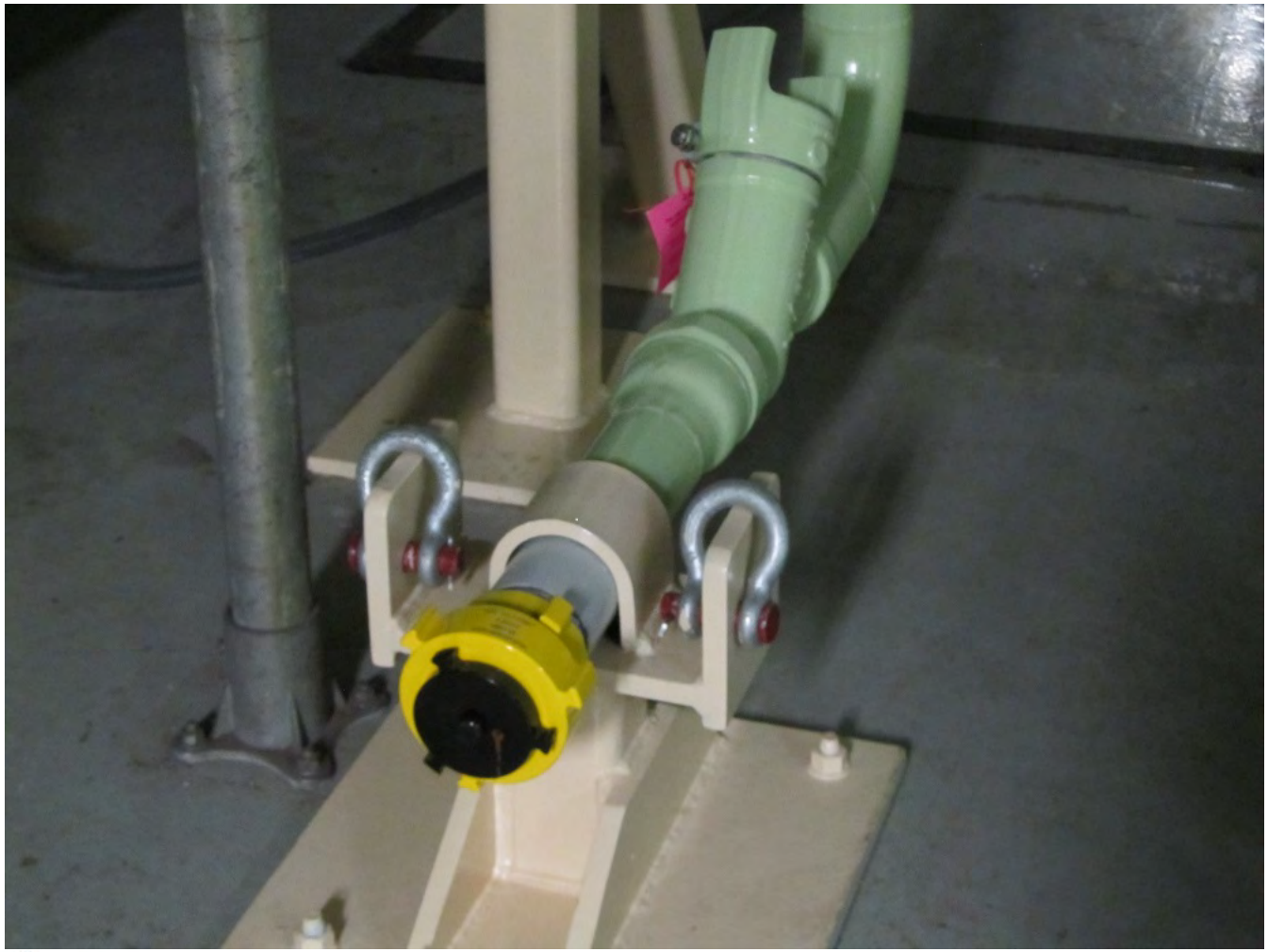
Decay Heat Removal Strategy

- **Phase 2:** (Continued)
  - Portable BDB AFW Pump
    - Primary Connection: Transition from TDAFW pump to portable BDB AFW pump injecting into AFW header
    - Alternate Connection: Transition from TDAFW pump to portable BDB AFW pump into Feedwater or Blowdown connections

AFW ECST Hose Connection

ECST Fill & AFW PP Supply

BDB AFW Pump Discharge to AFW Header



BDB High Capacity Pump

BDB AFW Pump

Decay Heat Removal Strategy

- **Phase 3:** Additional capability from off-site equipment and resources
  - 4160 VAC and additional 480 VAC generators brought on-site beginning at 26+ hours to provide additional support
  - Access to additional diesel-powered AFW pumps, hoses, fittings etc.
  - Water Purification Units

RCS Injection Strategy

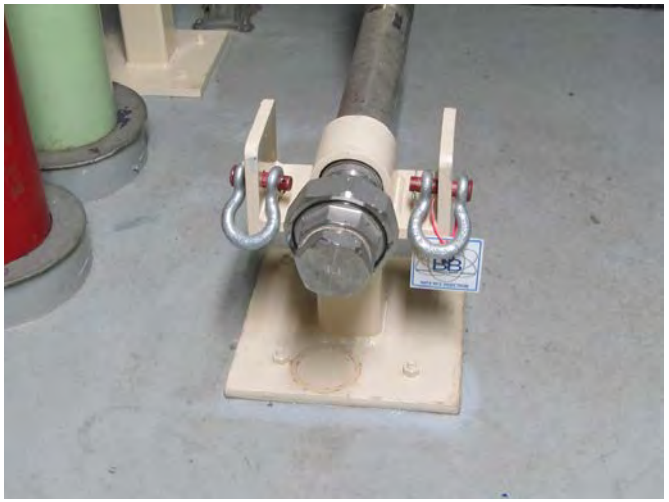
- **Phase 1:** Cope using installed plant equipment and on-site resources
  - RCS cooldown to target Steam Generator Pressure (beginning at 2 hours)
  - Times dependant upon integrated seal leakage following loss of seal cooling
    - Dominion is replacing all Westinghouse seals with Flowserve Seals. Calculations include partial replacements at time of compliance

Time to Inject prior to Reflux Boiling and to ensure Keff<.99	**17 hours**

RCS Injection Strategy

- **Phase 2:** Transition from installed plant equipment to on-site portable FLEX equipment
  - Two BDB RCS Injection pumps on each site taking suction from RWST
  - Primary MP2: Repower Charging Pump from BDB 480 VAC Generator with suction from RWST or Boric Acid Storage Tanks

BDB RCS Injection Pump Discharge to SI/RCS



Containment Cooling Strategy

- **Phase 1:** Cope using installed plant equipment and on-site resources
  - Verification of containment integrity during ECA-0.0 (EOP2530)
  - Analysis indicates containment integrity is not challenged at 1 week

Procedure Development

FSG-1: Long Term RCS Inventory Control	FSG-9: Low Decay Heat Temperature Cont.
FSG-2: Alternate AFW Source	FSG-10: SI Accumulator(SIT) Isolation
FSG-3: Alternate Low Pressure Feedwater	FSG-11: Alternate SFP Makeup and Cooling
FSG-4: ELAP DC Bus Load Shed/Mgmt	FSG-12: Alternate Containment Cooling
FSG-5: Initial Assessment & Equip Staging	FSG-13: Transition from FLEX Equipment
FSG-6: Alternate DWST (CST) Makeup	FSG-14: Modes 5/6 Response
FSG-7: Loss of Vital Inst or Control Power	FSG-15: 4160 VAC Repowering
FSG-8: Alternate RCS Boration	

BDB Storage Building

BDB Storage Building

Deployment Vehicles

Deployment Vehicles

Deployment Vehicles

FLEX PHASE 3

National Safer Response Center

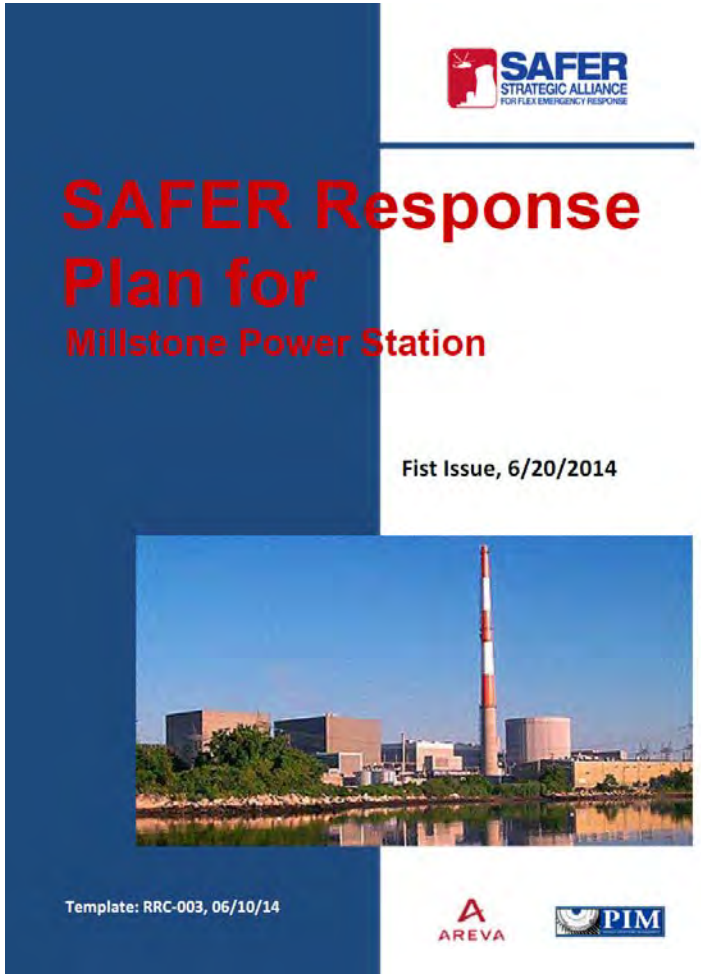
- T-0 – Notification by Main Control Room
- T-2 – Mobilization (SAFER Team)
- T-4 – Begin transportation to off-site staging area (SA)
- T-20 – Equipment arrives at SA; begin preparation
- T-22 – Transportation to on-site staging area
- T-24 – First equipment on-site

RRC Staging Area B

SAFER Response Plan

1. Introduction
2. SAFER Control Center
3. Regional Response Center
4. Logistics & Transportation
5. Staging Area
6. Site Interface
7. Equipment Listing

Each site has an individualized, specific Response Plan used by all organizations during the response



Site Single Point of Contact

- Coordinate and Communicate with SAFER Team
- Emergency Plan Integration
  - Contact with State and Local
  - Contact with Federal through NRC
  - Includes request for helicopter assets if required

NSRC Equipment For Dominion

- 4kV turbine generators
- 480VAC turbine generators
- High Pressure Pump (60 GPM)
- Low Press/Med Flow Pump (2500 GPM)
- Low Pressure/High Flow (5000 GPM)
- SG/RPV Makeup Pump (500 GPM)

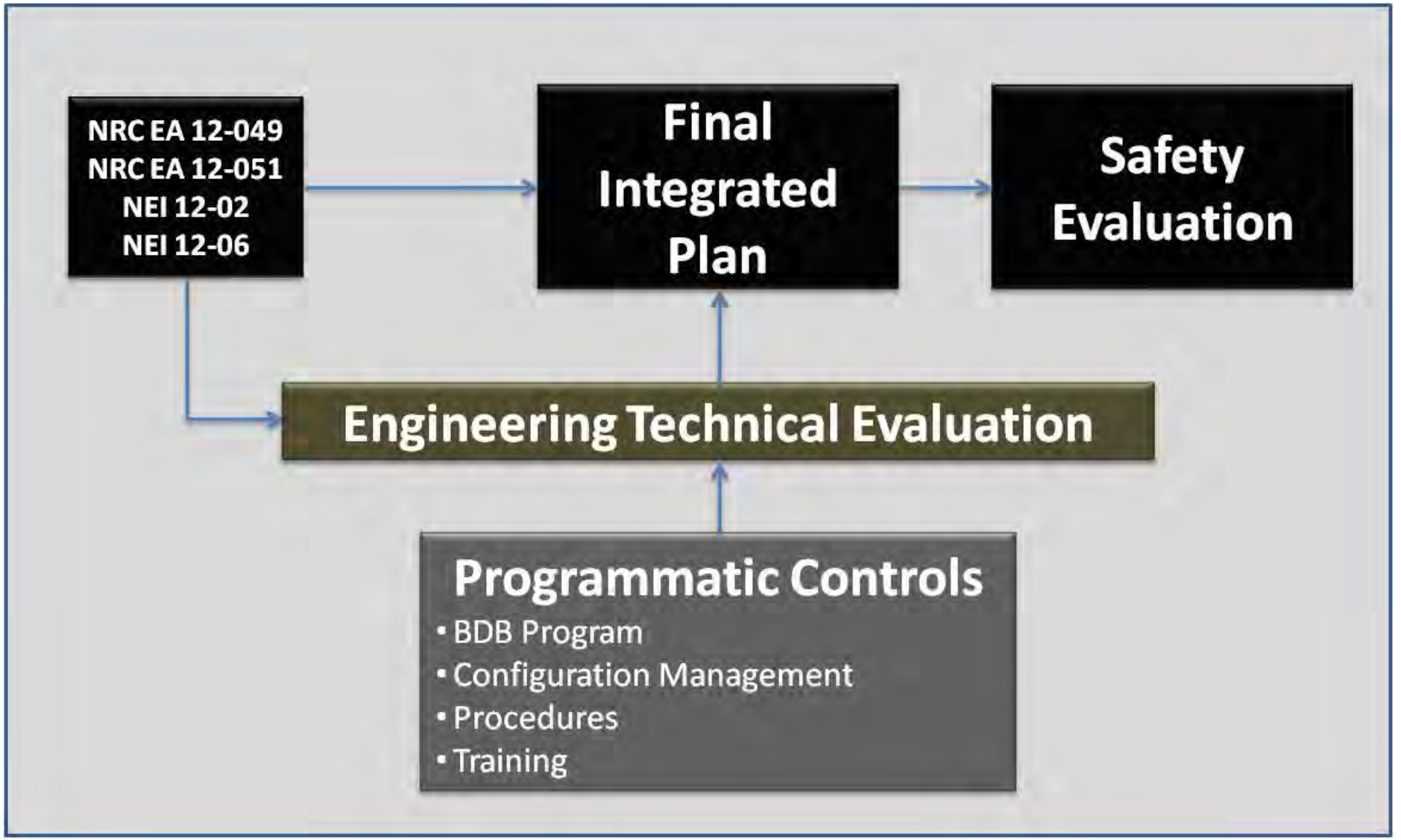
- Mobile Boration Unit (9000 GAL)
- Water Treatment
- Submersible Pump(s) (75 PSI / 1000 GPM)
- Portable Air Compressors (600 SCFM / 150 PSI)
- Suction Booster Lift Pumps for High Flow Pumps

BDB Program Elements

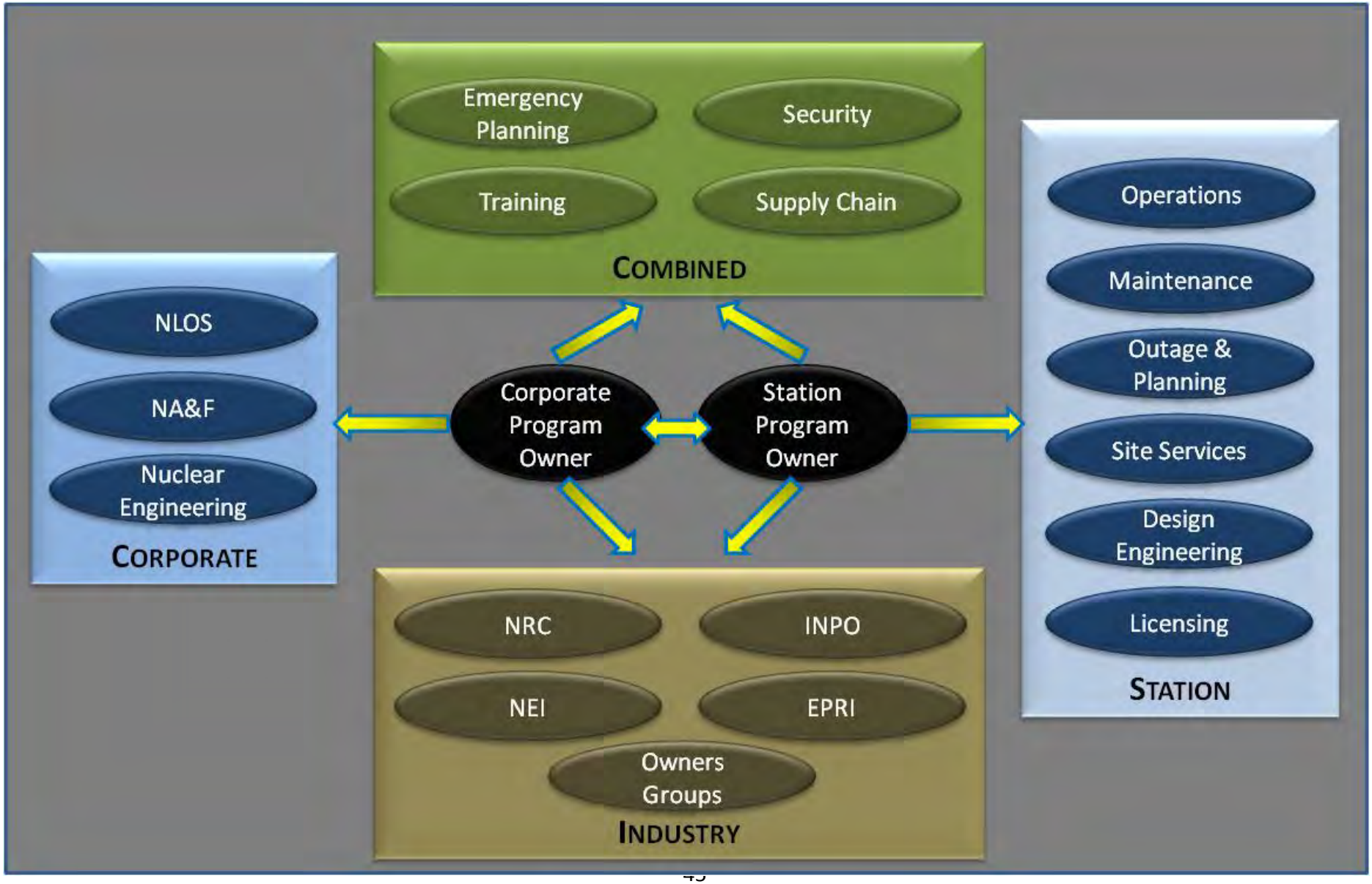
- Quality attributes
- Equipment design
- Equipment storage
- Procedure guidance
- Maintenance and testing
- Training
- Staffing
- Configuration control

Dominion

Program Basis Interface



Program Interface



COMMUNICATIONS

Off-site Communication Strategy

- At T= 0 – 1 hrs, portable Iridium satellite phones used for initial emergency notification of Offsite Response Organization (OROs), NRC, and internal emergency response facilities
- At T=1 – 3 hrs, ComLabs Rapidcase and Satellite Antenna deployed and connected to switch in U3 Control Room Computer Room. Desk set phones will be used in Control Room
- At T > 6 hrs, ComLabs RapidCom portable communications trailer will be deployed – long term off-site communications

Onsite Communication Strategy

- Sound Powered phones or point to point 450 MHz portable radios
- Intra-Control Room Communications – No communications between control rooms initially. Military sound-powered phones will be deployed by two individuals < 1 hr from T = 0

BDB Communications Components

- Commlabs Rapid-case and satellite antenna dish will be stored in the TSC Ventilation Equipment Room

Satellite antenna and positioner:

Rapidcase:

BDB Communications Components (Cont.)

- ComLabs RapidCom portable communications trailer will be stored in the FLEX Storage Building
- Long-term communications strategy

TRAINING

Introduction

- SAT Process
- Training Disciplines
- Phased Approach
- Multiple Discipline Training

SAT Process

- Analysis based on:
  - NRC Orders
  - NEI 12-06 – Diverse and Flexible Coping Strategies (FLEX) Implementation Guide
  - IER 13-10 – Nuclear Accident at the Fukushima Daiichi Nuclear Power Station
  - Design changes & engineering technical evaluations
  - PWR Owner Group documents, new FLEX support guidelines, & ECA-0.0 changes
  - New BDB portable equipment

Training Disciplines

- Operations
- Security
- Maintenance
- Emergency Response Organization
- Other Disciplines

Phased Approach

- Design changes for mechanical & electrical connections
- BDB Overview Training across program disciplines
- FSGs & FLEX equipment based on training analysis results for each training discipline and the ERO

Phased Approach

- Analyze the common training modules developed by INPO Emergency Response Training & Development (ERTD) industry working group for implementation
- JTA results integrated into Operations initial and continuing training task lists
- Evaluate any delta training needs based on the approved FSGs & equipment

Operations Training

- Operations
  - JTA completed with the additional of 8 new BDB tasks
  - BDB Overview Training
  - FSG & BDB Equipment Training

Engineering and Security Training

- Engineering
  - BDB Overview Training
- Security
  - BDB Overview Training
  - Training analysis for debris removal and equipment hauling

Leadership Training

- Station Leadership
  - SOER 10-2 Engaged Thinking Organization-IER 13-10 Fukushima case study
  - Evaluation of new INPO course for decision makers in Leadership Training

ERO Training

- ERO Training
  - Failure Mode Training for operators, STAs, and ERO (engineering/technical) staff
  - BDB/FLEX Training position specific training
  - INPO course for Basic ERO Training module or equivalent for general plant staff
  - INPO course for Advanced ERO Training module for ERO decision makers

VALIDATION

Validation Process

- Guideline developed by NEI
- A graded approach for validation is used in order to apply a higher level of detail and rigor to validations for TSAs that occur shortly after the event.
  - Level A: Used for TSAs started within the first 6 hours
  - Level B: Used for TSAs started between 6 and 24 hours after the event
  - Level C: Other tasks or manual actions in the OIP/FIP that are labor intensive or

Validation Process

- Consideration of the following Performance Attributes
  - Special Equipment
  - Complexity
  - Cues and Indications
  - Special Fitness Issues
  - Environmental Factors and Accessibility
  - Communications
  - Special Considerations

Validation Time Sensitive Actions

	Activity	*Start*	*Duration*	Time Constraint	*Requirement*
	Event Starts				*Plant @ 100% power*
	TDAFW pump starts. Verify flow to “A” SG.			N	*Original design basis for SBO event. 50 min to “A” SG dryout.*
	Loss of All Power Procedure is entered			N	*SBO event required response* [1]
	Verify RCS Isolation	*15 min*		N	*Establishes long term inventory in the RCS*
	Re-Align AFW to all SGs	20 min	10 min	Y	50 min (to “B” and “C” SG dryout, 1 hr to “A” SG overfill)
	ELAP declared	60 min		Y	
	Initiate Load Stripping	60 min	30 min	Y	90 min (will give you an 8 hour battery life)
	Start DDFP and/or align SW	90 min	60 min	Y	4.2 hrs (prior to min. ECST level)
	Re-power 120 VAC Vital Buses	60 min	4 hr	Y	8 hrs (battery depleted)

Validation

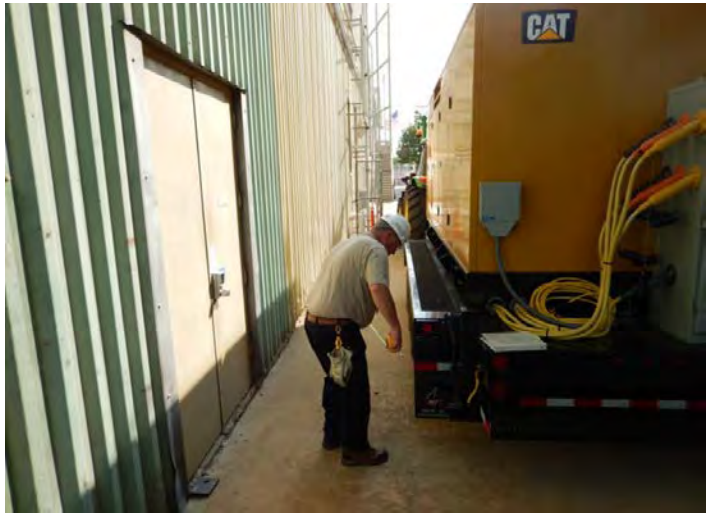
Example Battery Load Stripping

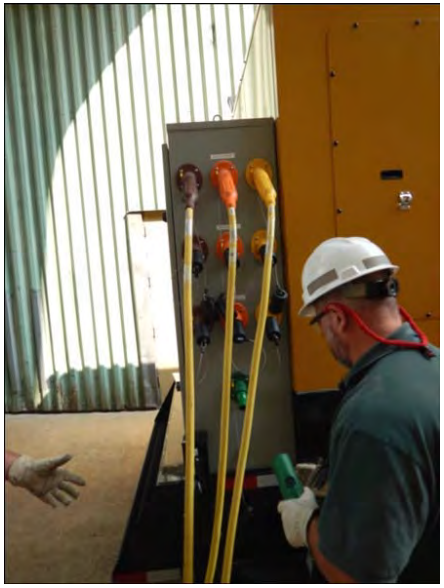
FLEX (BEYOND DESIGN BASIS)
NORTH ANNA POWER STATION VALIDATION PROCESS

Validation Plan # N1-8B

A. Validated Item Results					
Item: Unit 1 Vital 120 VAC Bus load stripping. (TSA)		Level: ☒A ☐B ☐C		Time Constraint: ≤ 90 minutes from the start of the event	
ACTION ITEM # FROM OIP ATTACHMENT 1A	TASK	START TIME	TIME CONSTRAINT	SUCCESS CRITERIA (TIME CONSTRAINT MINUS START TIME)	RESULTS (SUM OF TIMES MEASURED DURING VALIDATION PROCESS)
8	Unit 1 DC load stripping completed (TSA)	65 MINUTES	90 MINUTES	25 MINUTES	17 MINUTES
Margin = 25 minutes – 17 minutes = 8 minutes					

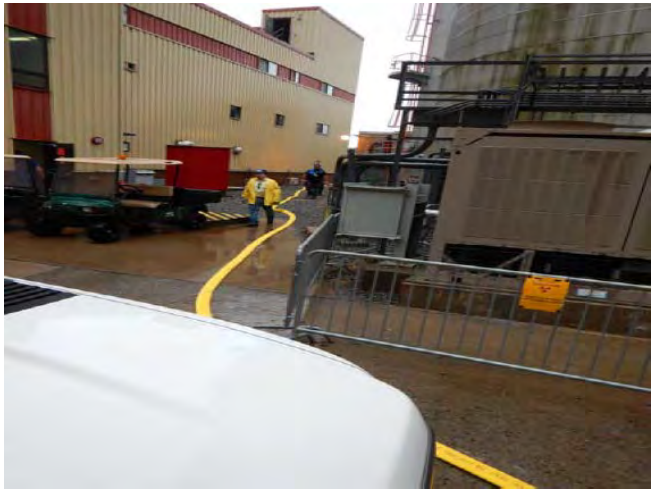
Validation





Validation


UNIT 1 AFW PUMP DISCHARGE HEADER
BEYOND DESIGN BASIS
2.5" NH ROCKER LUG – YELLOW



Nine Mile Point Nuclear Station
FLEX Implementation
November 20, 2014

Presentation Topics

- Overall Project Status
- Initial Control Room Response to Station Blackout (DVD)
- FLEX Mitigation Strategies Overview
- FLEX Storage and Deployment
- Reliable Spent Fuel Level Instrumentation
- NRC Audit Summary of FLEX/SFPLI Implementation Plan

Overall Project Status

- NMP1 implements FLEX – April 2015
- NMP2 implements FLEX – April/May 2016
- NMP1 and NMP2 implements SFPLI – April 2015
- Communications improvements – April 2015
- FLEX Support Guideline development is approximately 70% complete
- Operations Training for FLEX has started and is scheduled to complete by 1/2/15
- Operations Training for SFPLI has been completed
- Robust Structure construction will complete in February 2015

Initial Control Room Response to Station Blackout

- Event Initiation
  - Multiple annunciators and indications for loss of power
  - Control Room lighting shifts from normal to emergency power
- Event Recognition
  - SRO updates crew on plant status, loss of offsite power and no diesel start
  - SRO enters Emergency Operating Procedures (EOPs)
- Plant Stabilization
  - Reactor power control – confirm reactor shutdown
  - Reactor pressure control – stabilize pressure on SRVs, 900 PSIG
  - Reactor level control – Reactor Core Isolation Cooling (RCIC) auto start, monitor level response. Initially out of desired band due to plant automatic shutdown, void collapse and RCIC start time. Water level recovers to band directed by EOPs with continued RCIC operation
- Enter Station Blackout procedure
  - Load shedding to preserve DC power
  - Power restoration
  - FLEX portable equipment deployment / notify National SAFER Response Center
  - Plant environmental condition actions/RCIC preservation actions

FLEX Mitigation Strategies Overview – NMP1

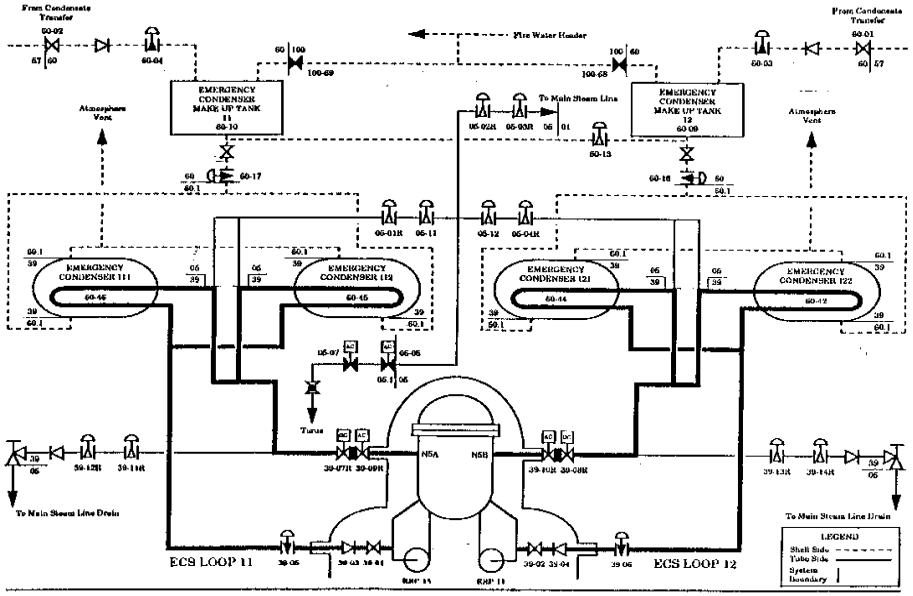
NMP1 Design

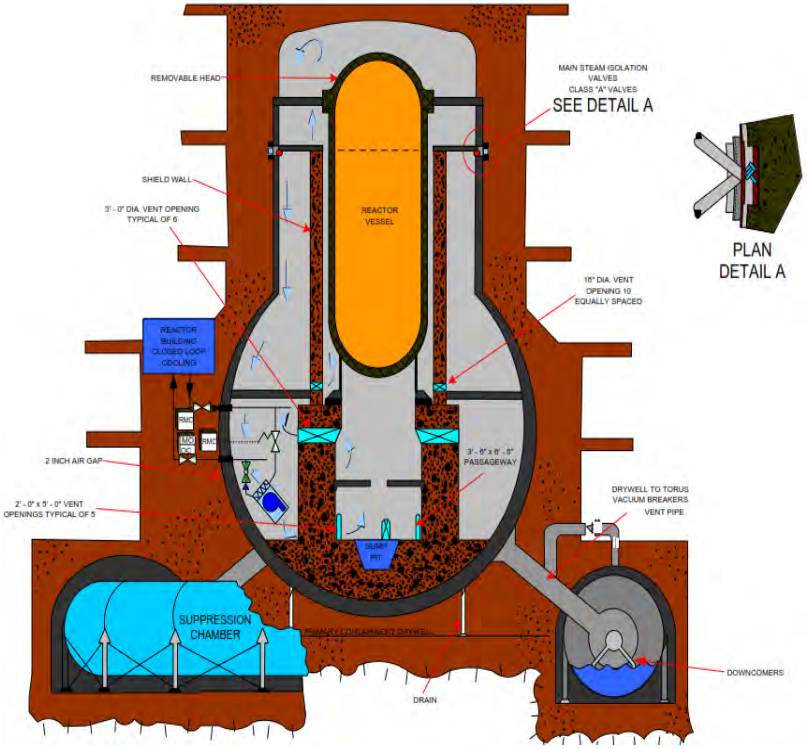
BWR 2 – Mark I Containment

1850 MWth

Commercial operation in 1970

Licensed to operate until 2029





Emergency Condenser Testing

NMP1 Core and Containment Cooling – Phase 1

Phase 1 Core Cooling at NMP1 is accomplished utilizing the Emergency Condensers (EC) (i.e. Isolation Condensers) to remove heat and discharge the heat directly to the atmosphere (versus into the containment)

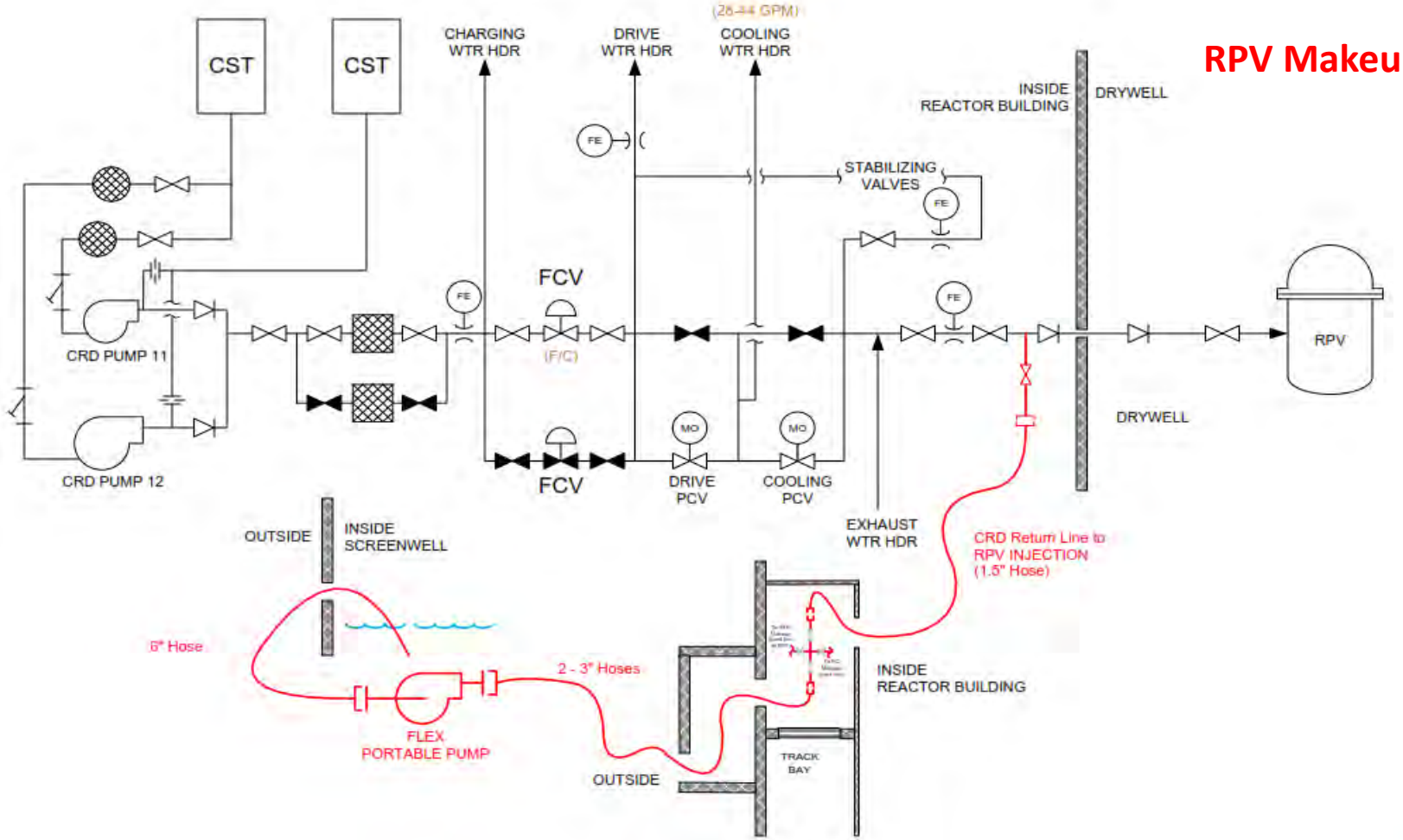
- ECs will go into service automatically on loss of power
- Planned manual action will further reduce RPV inventory loss
- RPV pressure lowers as a result of the ECs in service
- RPV level will remain above TAF for 5.7 hours after event initiation
  - Deployment of portable pump for RPV injection in 4 hours
- Electrical power for critical parameter monitoring is maintained for at least 8 hours on the station battery
  - Deployment of portable generator for DC power in 6 hours

NMP1 Core and Containment Cooling – Phase 2

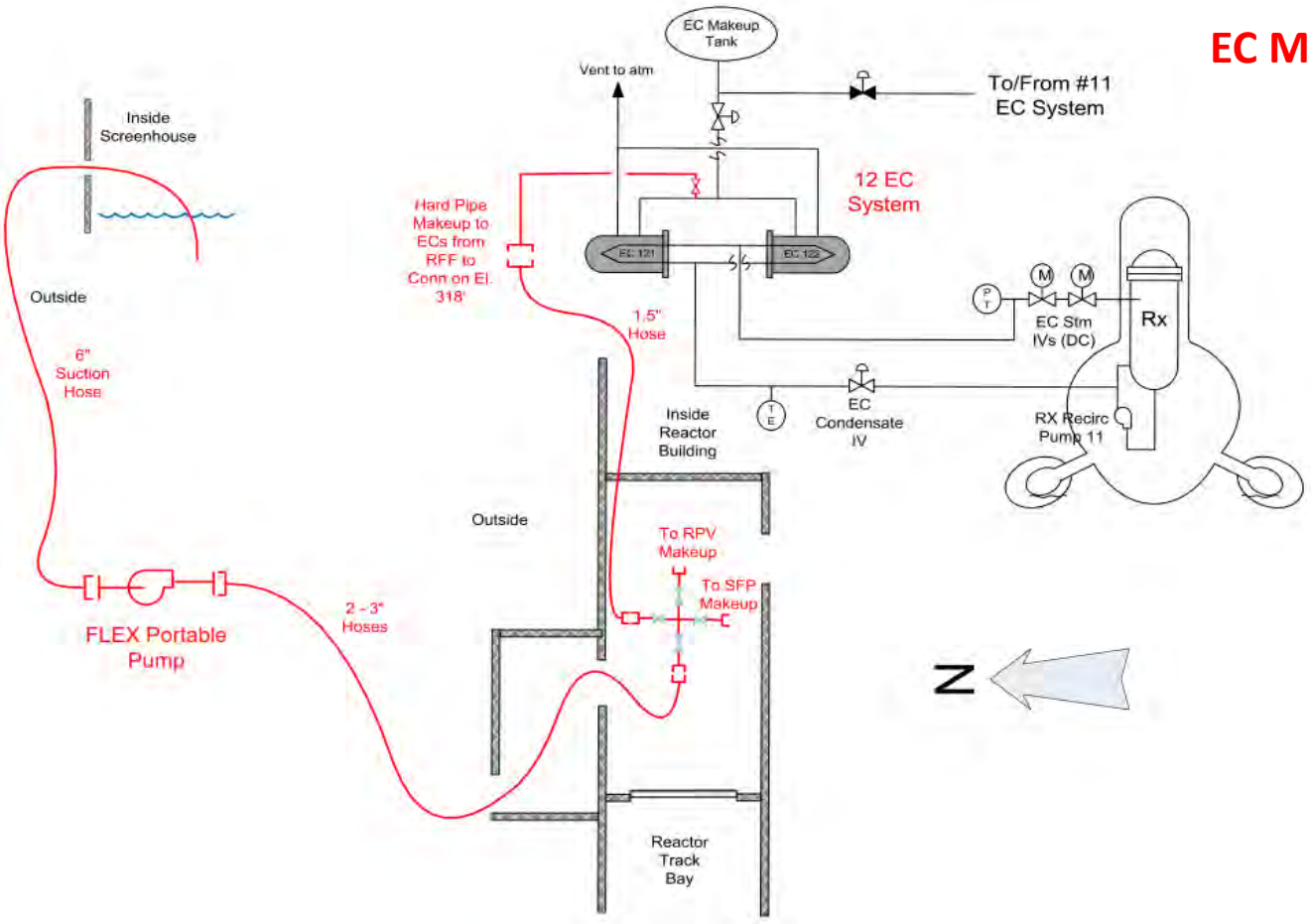
- Provide RPV and EC makeup capability utilizing a diesel driven portable pump
- Modifications
  - Screen House wall openings and hinged intake covers in order to provide access for suction hoses
  - Connection and valve for portable pump hose to RPV injection point (RB EL. 261’)
  - Connection and valve for portable pump hose to EC #12 shell side (RB EL. 318’)

NMP1 Core and Containment Cooling – Phase 2 (cont'd)

RPV Makeup



NMP1 Core and Containment Cooling – Phase 2 (cont'd)



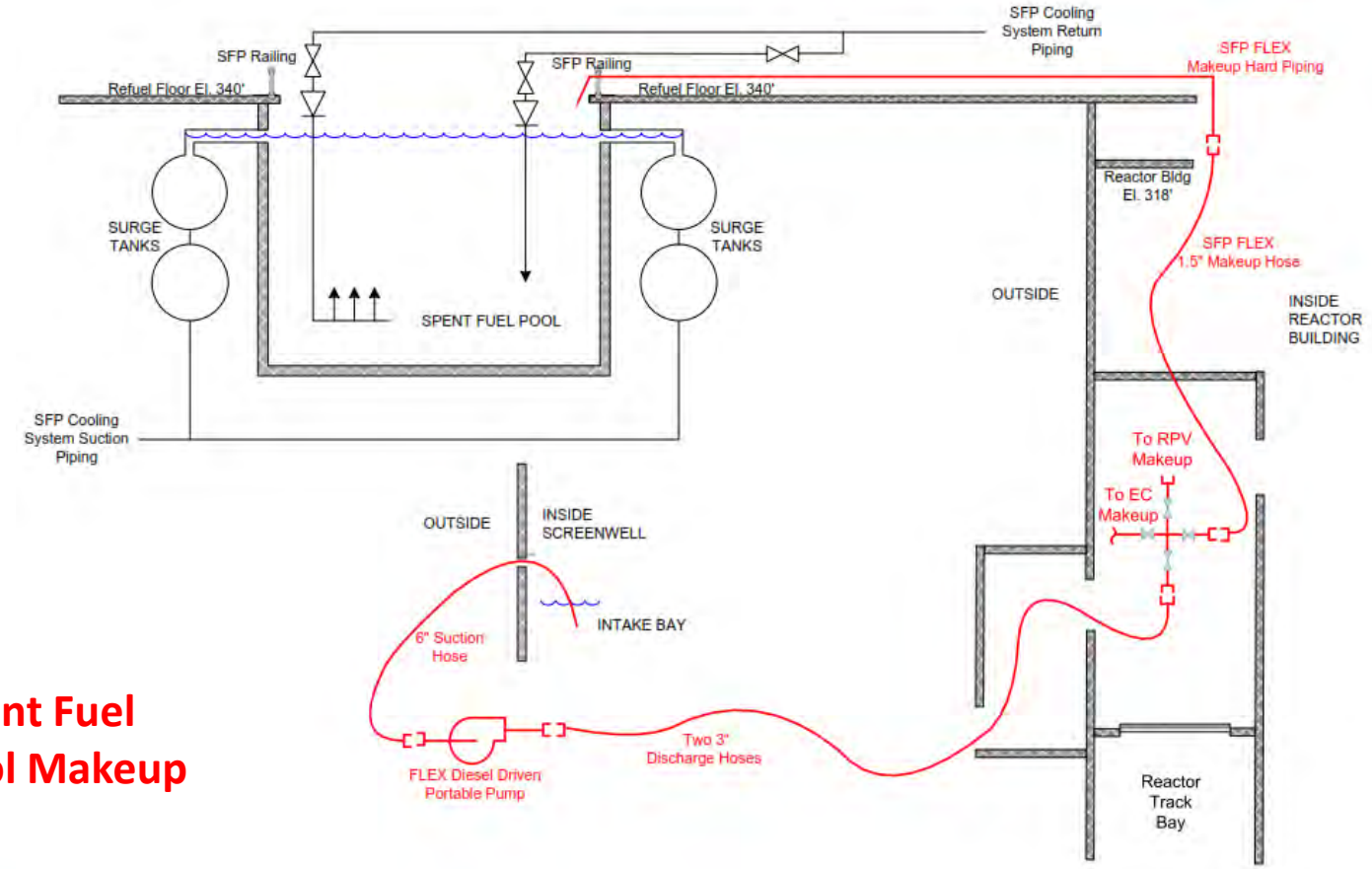
NMP1 Spent Fuel Cooling – Phase 1

- Phase 1 Spent Fuel Cooling at NMP1 is accomplished by utilizing the initial Spent Fuel Pool level and water inventory
  - Design basis heat load analysis
    - 8 hour heatup from 140°F to 212°F (note that normal SFP water temperature is <100°F)
    - 45 hours to reach level 2 (10 feet above fuel)
    - 42.8 gpm makeup rate for decay heat boil off

NMP1 Spent Fuel Cooling – Phase 2

- Provide SFP makeup capability utilizing a diesel driven portable pump
- Modifications
  - Screen House wall openings and hinged intake covers in order to provide access for suction hoses – same as RPV/EC makeup
  - Installation of a SFP makeup line from the Refuel Floor to the next elevation down (RB EL. 318') to provide for connection of portable pump discharge hose

NMP1 Spent Fuel Cooling – Phase 2 (cont'd)



Spent Fuel Pool Makeup

NMP1 Alternative Makeup Capabilities

- Alternative for RPV makeup
  - Hose to the fire water to feed water cross-tie connection in the Turbine Building (shown)
- Alternative for EC makeup
  - Hose to the fire water system that can cross connect and feed the EC makeup tanks in the Turbine Building
- Alternative for SFP makeup
  - Hose up the Reactor Building north stairwell to the Refuel Floor

NMP1 Electrical Power – Phase 1

- Safety Related batteries will provide sufficient power such that all critical parameters will be available for at least 8 hours
  - This analysis is dependent upon load shedding occurring within 30 minutes following an event

NMP1 Electrical Power – Phase 2

- Portable diesel generator to be deployed to connect to the AC power side of an installed station battery charger
- Alternatively, a portable Static Battery Charger (SBC) is available to provide power with the portable diesel generator and connect to either Battery Board 12 or Battery Board 11
  - This is a combined modification that utilizes the NFPA 805 electrical restoration requirements for mitigation strategies
  - NFPA 805 related equipment will be stored in the protected (FLEX Building) location to support this

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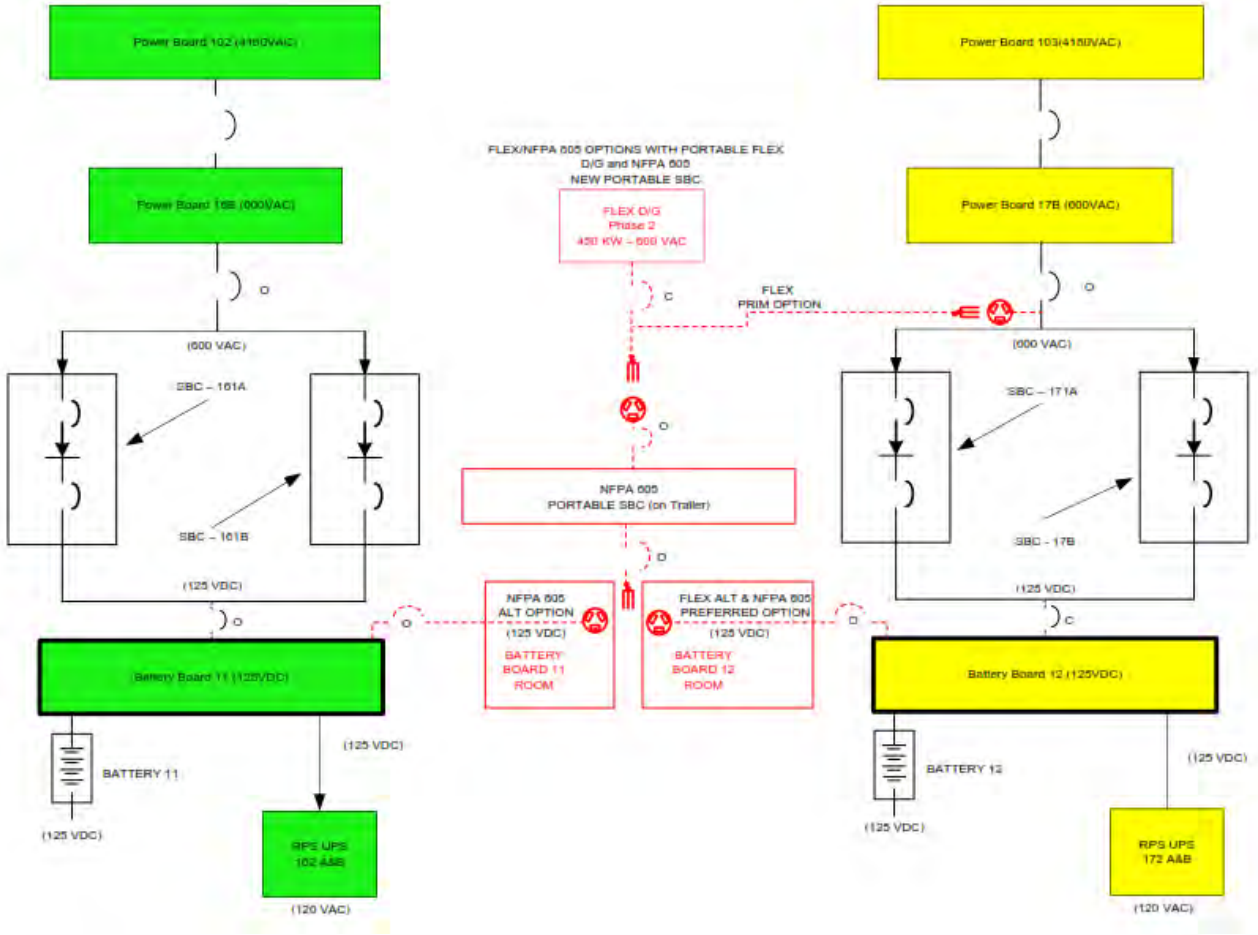
NMP1 Electrical Power – Phase 2 (cont'd)



NMP1 – Phase 3

- Mitigation strategies identified and put in place in Phase 2 can provide for indefinite coping of key safety functions
- Analysis performed supports that the strategies directly intended to satisfy key safety functions will restore or maintain those key safety functions for at least 72 hours
- Other equipment supplied from the National SAFER Response Center (NSRC) will utilize Phase 2 connections and act as spares to the existing Phase 2 equipment

FLEX Mitigation Strategies Overview – NMP2

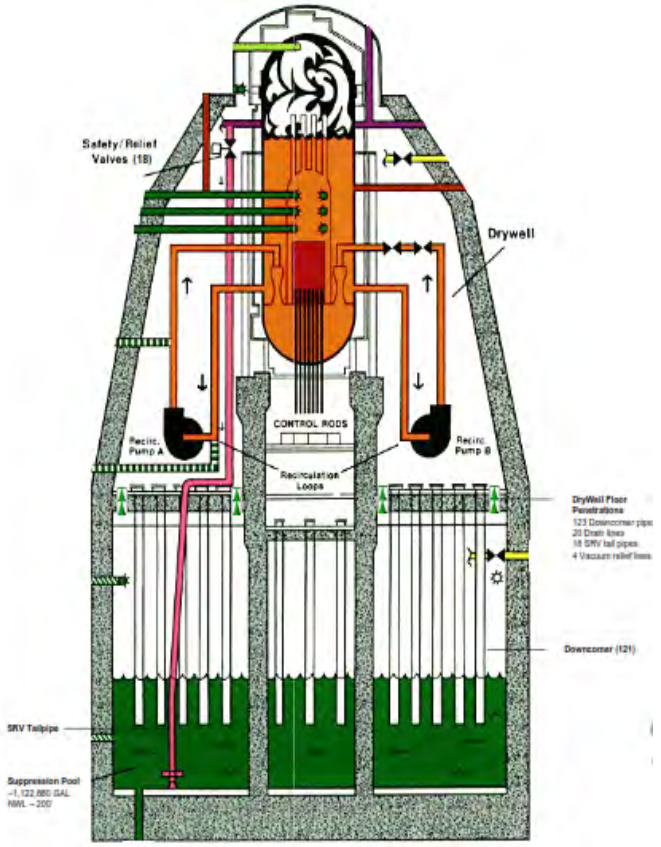
NMP2 Design

BWR 5 Mark II Containment

3988 MWth

Commercial operation in 1988

Licensed to operate until 2046



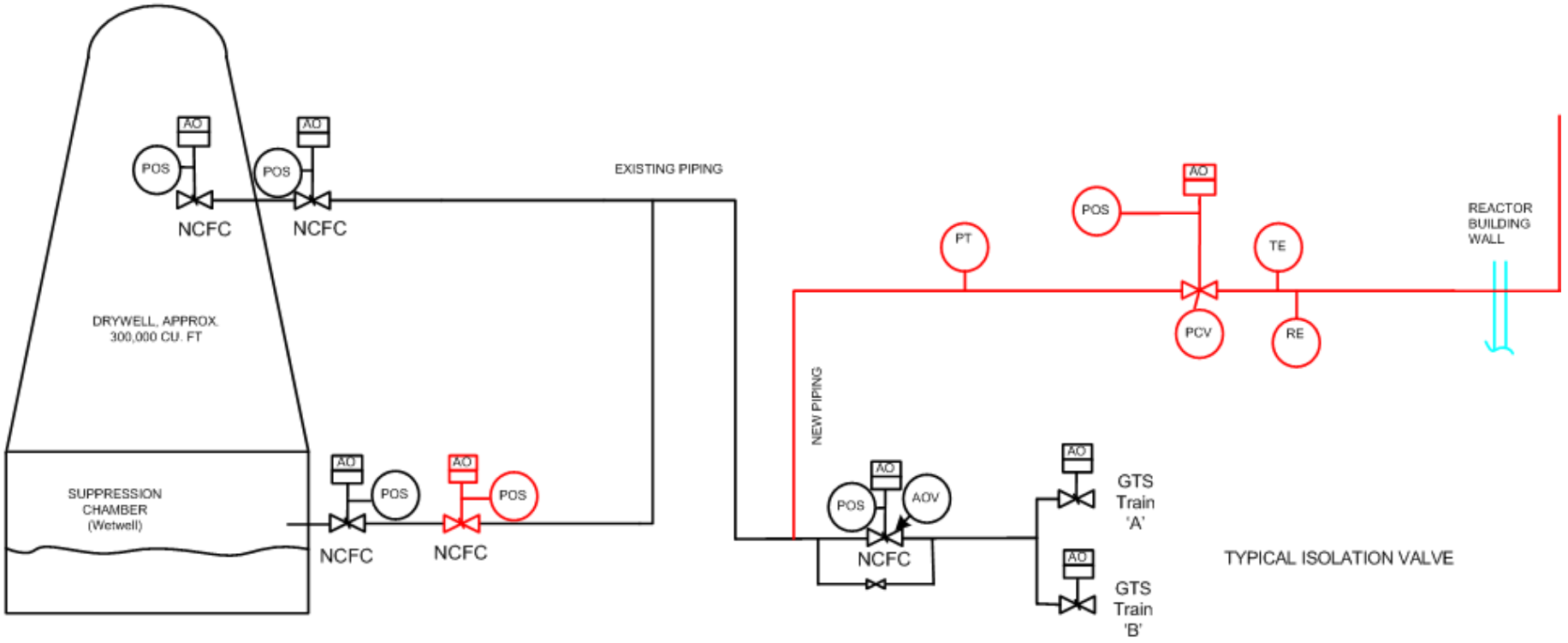
NMP2 Core and Containment Cooling – Phase 1

- Phase 1 Core Cooling at NMP2 is accomplished utilizing Reactor Core Isolation Cooling (RCIC) and the Safety Relief Valves (SRV's) to remove heat and discharge the heat to the Suppression Pool
  - Preliminary analysis indicates acceptable containment temperature and pressure for at least 6 hours to support RCIC operation with no containment venting
  - Deployment of portable pump for RPV injection in 4 hours
  - Electrical power for critical parameter monitoring is maintained for at least 12 hours on the station battery

NMP2 Core and Containment Cooling Phase 1 (cont'd)

- SRV's will be cycled to maintain adequate pressure to run the RCIC system
- Site specific analysis is planned to determine the length of time that RCIC may be functional beyond 6 hours with containment venting
- Containment vent (EA-13-109 wetwell vent) will be opened to maintain the Suppression Pool temperature at or below 240°F
  - Prolong RCIC operation beyond 6 hours
  - Reduce the challenge to the Primary Containment
  - Installation in Spring 2016

NMP2 EA-13-109 Wetwell Vent Design

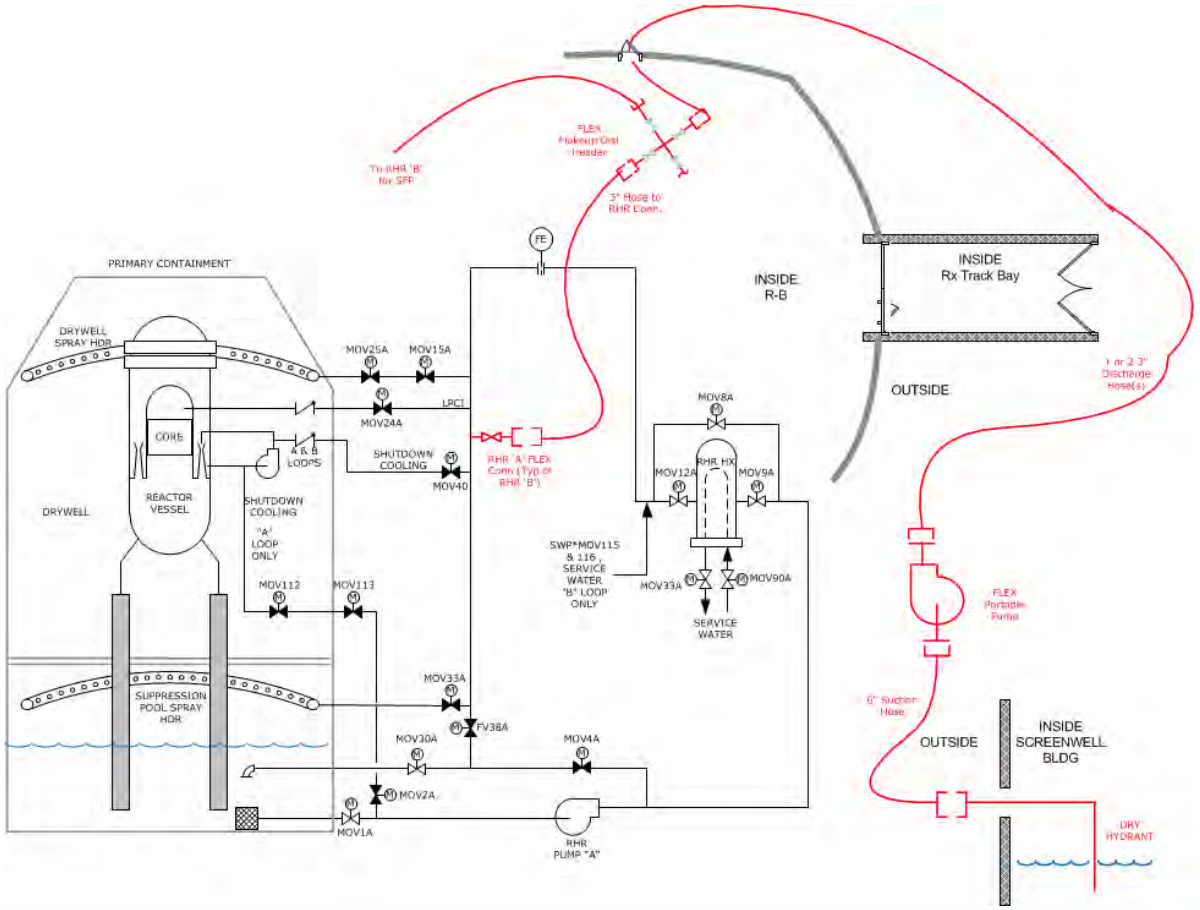


NMP2 Core and Containment Cooling – Phase 2

- Provide RPV makeup capability utilizing a diesel driven portable pump
- Modifications
  - Dry hydrants to be installed in the Service Water tempering line thereby creating a suction path from the intake and/or discharge structure
  - Connection and valve for connecting the portable pump hose to RHR (RB EL. 289')

NMP2 Core and Containment Cooling Phase 2 (cont'd)

RPV and SFP Makeup



NMP2 Spent Fuel Cooling – Phase 1

- Phase 1 Spent Fuel Cooling at NMP2 is accomplished by utilizing the initial Spent Fuel Pool level and water inventory
  - Design basis heat lead analysis
    - 5.4 hours to heat up from 140°F to 212°F (normal SFP water temperature is closer to 100°F)
    - 32 hours to reach level 2 (10 feet above fuel)
    - 73 GPM makeup rate for decay heat boil off

NMP2 Spent Fuel Cooling – Phase 2

- Provide SFP makeup capability utilizing a diesel driven portable pump
- Modifications
  - Dry hydrants to be installed in the Service Water tempering line thereby creating a suction path from the intake structure
  - Connection and valve for connecting the portable pump hose to RHR (RB EL. 289')

NMP2 Alternative Makeup Capabilities

- Alternative to makeup to the RPV through the 'A' RHR system
  - Makeup to the RPV through the 'B' RHR system
- Alternative to makeup to the SFP through 'B' RHR system
  - Hoses up to the Reactor Building north stairwell to the Refuel Floor

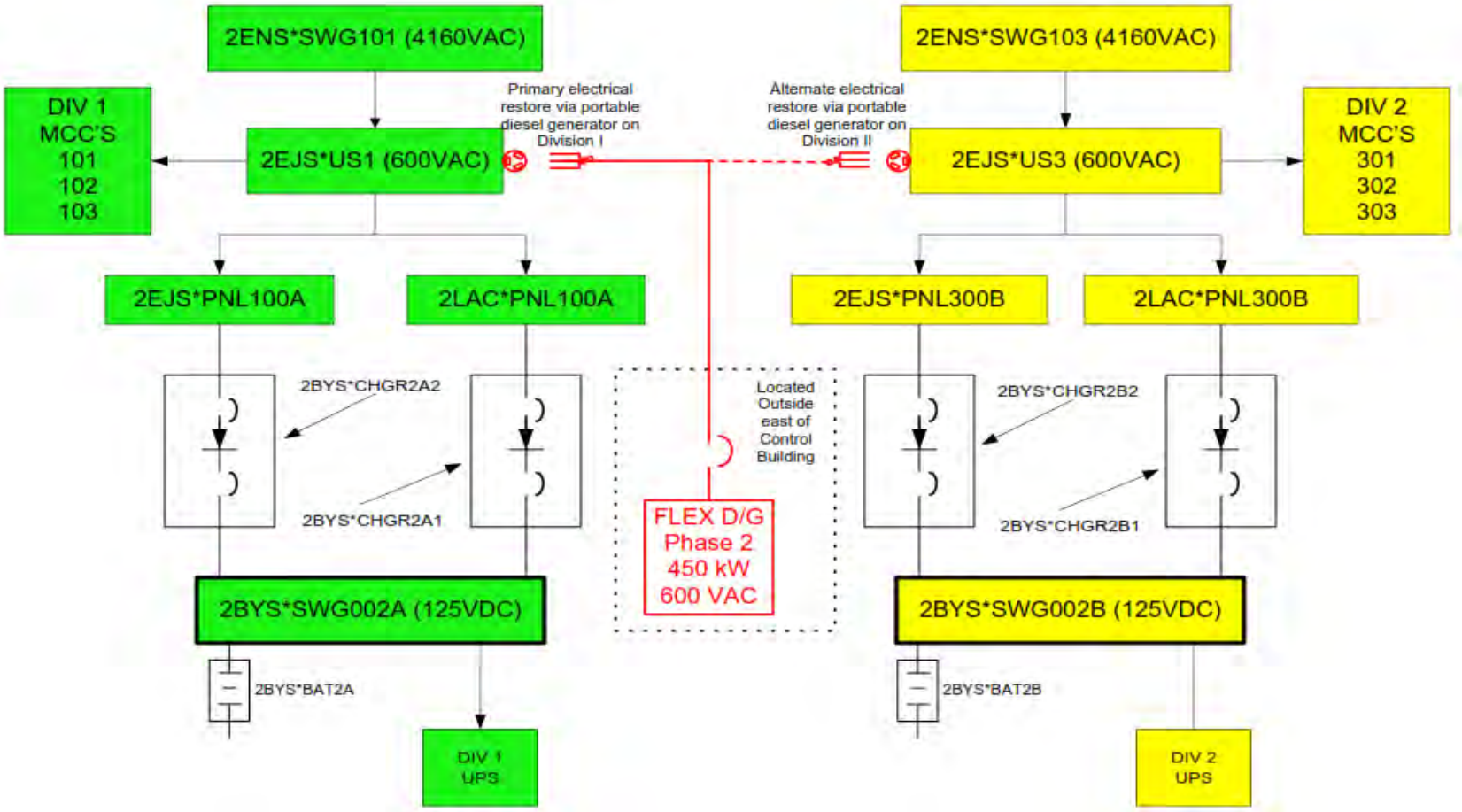
NMP2 Electrical Power – Phase 1

- Safety Related batteries will provide sufficient power such that all critical parameters, RCIC and SRV operation will be available for at least 12 hours
  - This analysis is dependent upon load shedding occurring within the time frames required following an event
- Both Division I and Division II batteries are available and have been analyzed for 12 hour coping

NMP2 Electrical Power – Phase 2

- Portable diesel generator to be deployed to connect to the Division I 600 VAC switchgear via a Breaker Connection Device (BCD)
  - Division I is preferred due to the RCIC system DC power
- Alternatively, portable diesel generator to be deployed to connect to the Division II 600 VAC switchgear via a Breaker Connection Device (BCD)

NMP2 Electrical Power – Phase 2 (cont'd)



NMP2 Electrical Power – Phase 2 (cont'd)

- Primary Electrical Feed - Bus Connection Device (BCD) to 2EJS*US1 600 VAC Bus
- Alternate Electrical Feed - Bus Connection Device (BCD) to 2EJS*US3 600 VAC Bus
  - Deployable 4/0 cables stored in Control Building cable chases or Control Building corridors in metal enclosures and/or on reels
  - 450 kW FLEX DG deployed from FLEX Storage Building to the Control Building courtyard area east

NMP2 – Phase 3

- Mitigation Strategies identified and put in place in Phase 2 will provide for indefinite coping of key safety functions
- Preliminary analysis has been performed and supports that the strategies directly intended to satisfy key safety functions will restore or maintain those key safety functions for at least 72 hours
- Other equipment supplied from the National SAFER Response Center (NSRC) will utilize Phase 2 connections and act as spares to the existing Phase 2 equipment

Mitigating Strategies for all Modes

- Mitigation Strategies at both Units can be implemented in all Modes
- Special Considerations for Refueling Mode will be captured in refueling processes to ensure FLEX capability is maintained
- Deployment paths and equipment locations will be demarcated with signs and postings

National SAFER Response Center (NSRC)

- Staging areas A, B, and C defined
  - MOU's are in place
- NSRC Playbook development is ongoing
- Engineering is reviewing NSRC equipment to ensure it matches NMP FLEX scope or can be adapted for use quickly
- NSRC commitment is to have the first equipment onsite within 24 hours
  - NMP can cope indefinitely (72hrs and beyond) without the NSRC
- Key components arriving from the NSRC (as a backup to phase 2 equipment) includes
  - Medium size portable diesel driven pump (with booster system)
  - 1.1 mW Gas Turbine Generators (480 VAC with 600 VAC transformer)

FLEX Storage and Deployment

FLEX Deployment Routes

Blue arrows depict the primary deployment path

Orange arrows depict the alternate deployment paths

FLEX Storage and Deployment (cont'd)

- Fully protected FLEX Storage Building
- Initial operator response to the building to assess debris issues and deploy debris removal equipment if necessary
  - Three (3) hours reserved in staffing timeline for this resource dedication
  - All operators to be trained and qualified to operate the pay loader
- Deployment vehicles (trucks) will be staged already hooked up to deploy a NMP1 and NMP2 pump immediately
- Deployment vehicle (tractor) will be staged to deploy first diesel driven portable generator to NMP1
  - Return to the building to retrieve NMP2 portable generator

Debris Removal

- Primary and alternate deployment paths from the FLEX protected building to the final deployment locations
  - Primary is to the north to avoid overhead lines
- One large debris removal vehicle (pay loader) will be stored in the FLEX protected building
- At lease one vehicle will have a snow plow

Refueling Portable Equipment

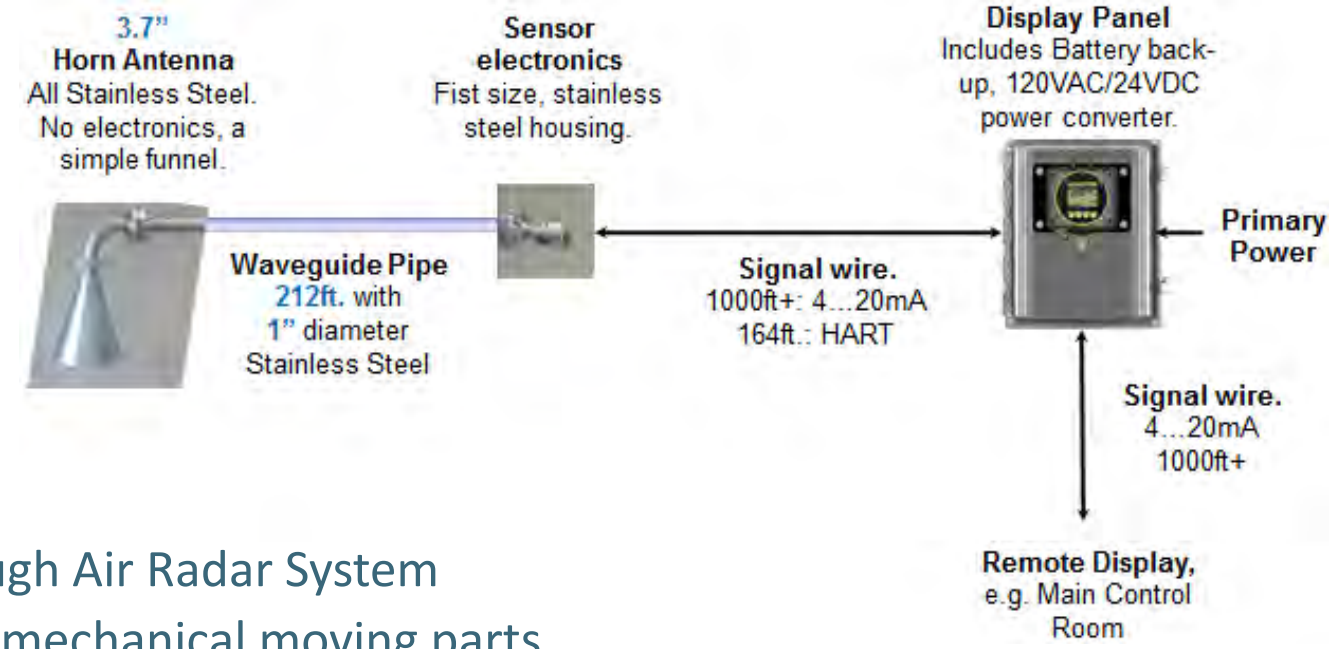
- Both deployment trucks will be stored in the FLEX building
  - Each fitted with 500 gallon fuel tanks
  - Integral battery powered fuel transfer system (~ 20 gpm)
- Small gas powered fuel transfer pumps will be stored in the FLEX Building
  - Transfer out of storage to the 500 gallon tank (~ 30 gpm, as tested)
- Adequate to fuel all diesel-run FLEX equipment
- Simple calculations using maximum loads of FLEX portable diesels indicate substantial margin in refuel timing/capability
- On site Safety Related storage tanks contain over 140,000 gallons of diesel fuel
  - Enough for over 20 days of operation without outside support
  - Indefinite replenishment may be solicited and arranged during the time the on-site fuel is available

Reliable Spent Fuel Pool Level Instrumentation

Reliable Spent Fuel Pool Level Indication

- Provide reliable indication of water level in the Spent Fuel Pool (SFP) from normal water level to the top of the fuel racks
  - Level 1 supports normal cooling system operation
  - Level 2 provides substantial shielding to personnel requiring access to the SFP operating deck (10 feet above irradiated fuel)
  - Level 3 ensures fuel remains covered with water

SFPLI System Overview



- Through Air Radar System
  - No mechanical moving parts
  - Sensor is located outside the process fluid to be measured
  - Immune to most vapors and physical characteristics of the measured media
  - Very low power consumption – 0.5 watts/channel

SFPLI Description

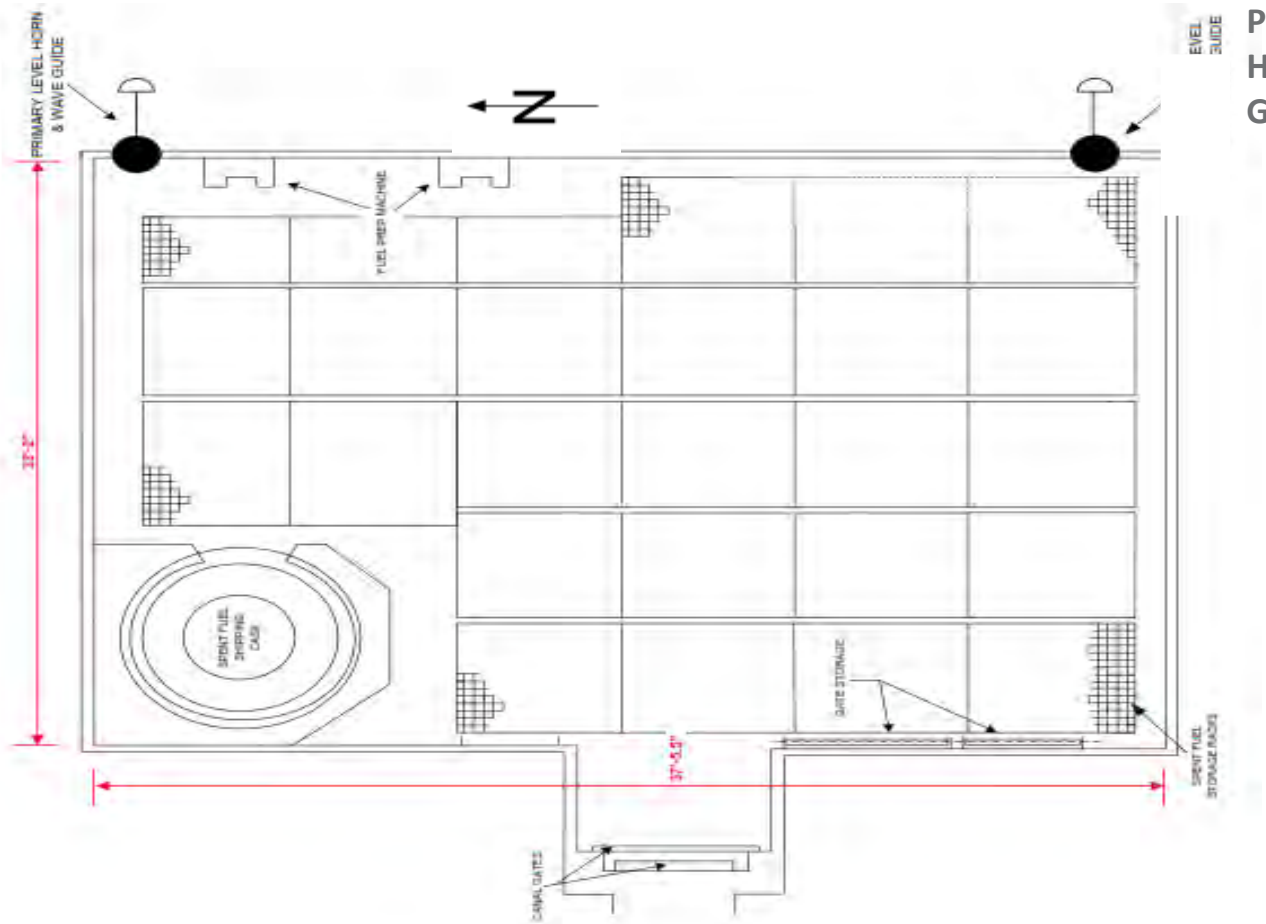
- Two permanently installed instruments per pool
- Indications will trigger certain FLEX strategies to provide SFP makeup based upon SFP level
- The accuracy required by the order is one foot
  - The specification for the instrument is +/- 3” in steam environment
- Normal AC power with battery backup
  - FLEX generator to provide long term backup power at each unit
- Temperature limitations associated with sensor qualification (176°F)
  - Requires RB cooling to be established early in an event (within 8 hours)

SFPLI System Description (cont'd)

- SFPLI Power Availability
  - Each instrument loop normally powered from independent power supplies
  - FLEX generator will provide power to the SFP level loops during ELAP conditions
  - Equipped with internal batteries that can power the SFP level loops until FLEX generator power is provided

Spent Fuel Pool Plan View – NMP1 and NMP2 are similar

Backup Level Horn and Wave Guide



Primary Level Horn and Wave Guide

NRC Audit Summary of FLEX/SFPLI

Open Item Closure Summary

NMP1

Original # Open Items	Added # Open Items	Closed Original	Closed New	Remaining Open
55	3	50	2	6

SFPLI

Original # Open Items	Added # Open Items	Closed Original	Closed New	Remaining Open
18	0	18	0	0

NMP2

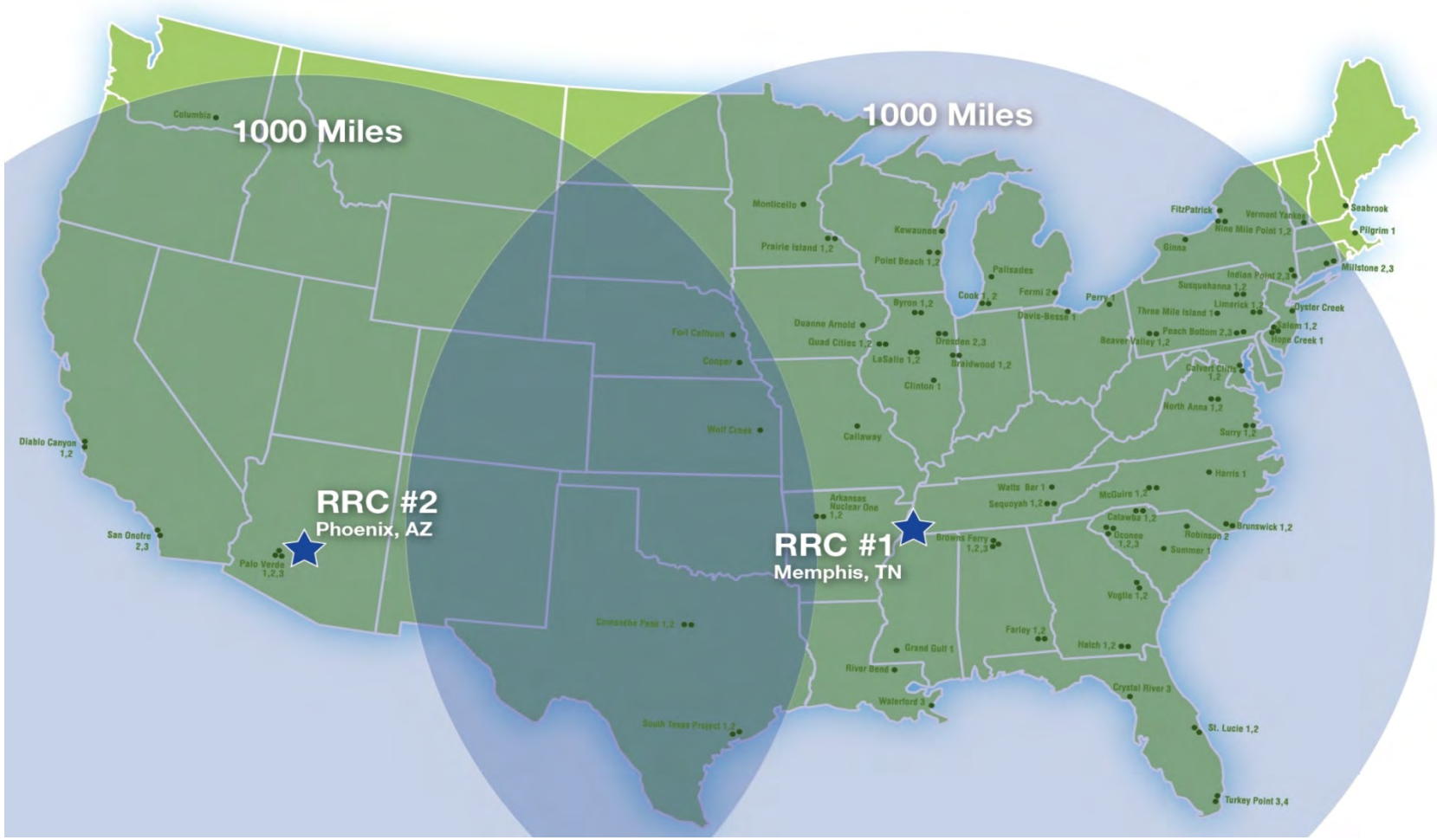
Original # Open Items	Added # Open Items	Closed Original	Closed New	Remaining Open
56	3	36	2	21

National SAFER Response Centers, and the U.S. Nuclear Industry

20 November 2014

National SAFER Response Center (NSRC) Locations

1000 mile radius / 20 hours by truck



Timeline for Emergency Response

- 24 Hour NSRC Equipment (identified by plant)
  - T-0 – Notification
  - T-2 – Mobilization
  - T-4 – Begin transportation to off-site staging area
  - T-20 – Equipment preparation at off-site staging area
  - T-22 – Transportation to on-site staging area
  - T-24 – First equipment on-site
  - T-24 – Remaining NSRC equipment to be delivered to off-site staging area

NSRC delivery to sites

Initial call from site to SCC

Activation of NSRC

Movement from NSRC to local FedEx hub (Memphis/ Phoenix)

Load on FedEx planes

Fixed wing movement to site local FedEx hub

off-load from plane/ load on FedEx trucks

Truck movement to off-site staging area

arrival at off-site staging area

Truck movment from off-site to on-site staging area

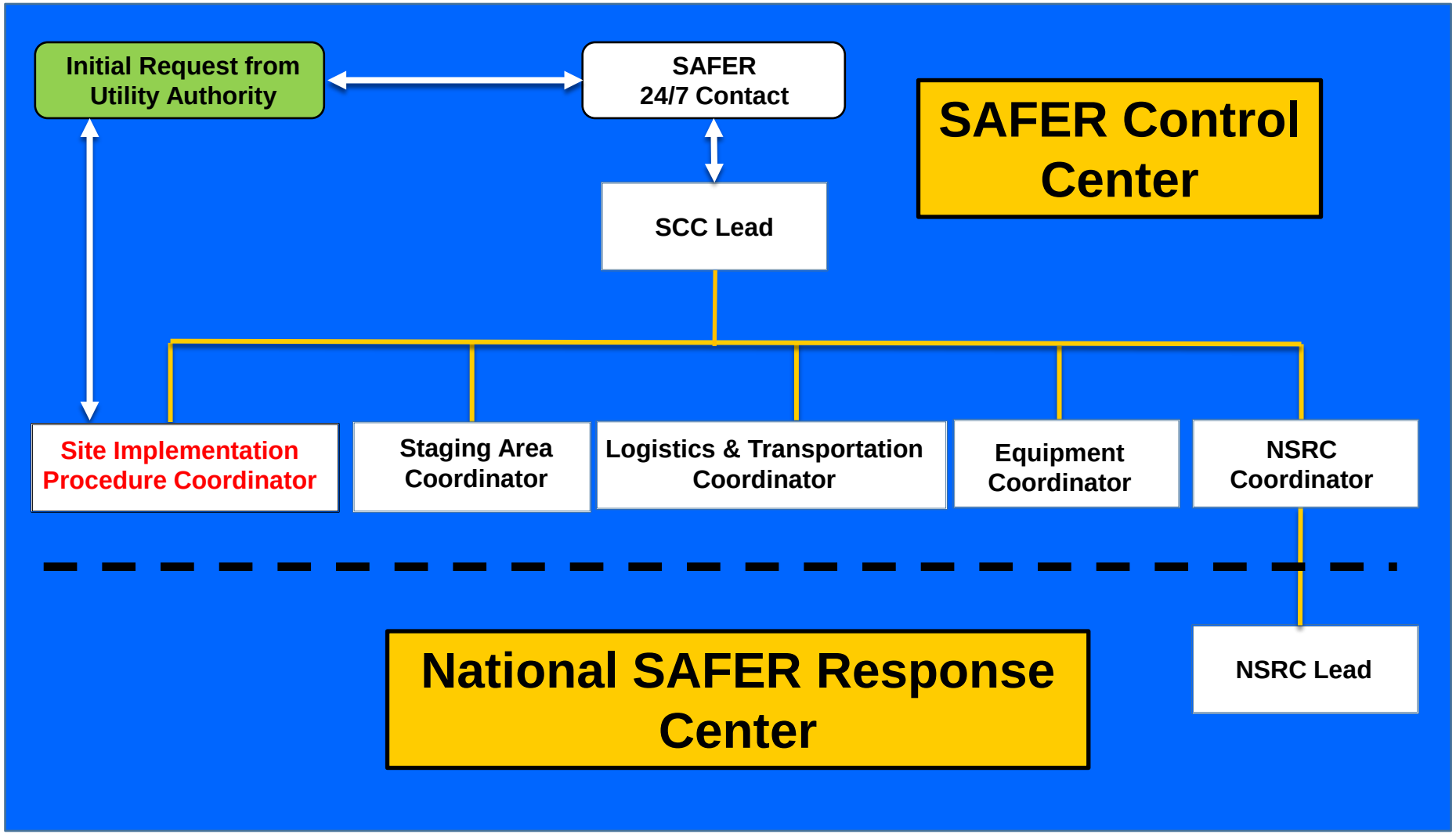
Equipment arrives on-site affected plant

External lift of equipment to isolated site

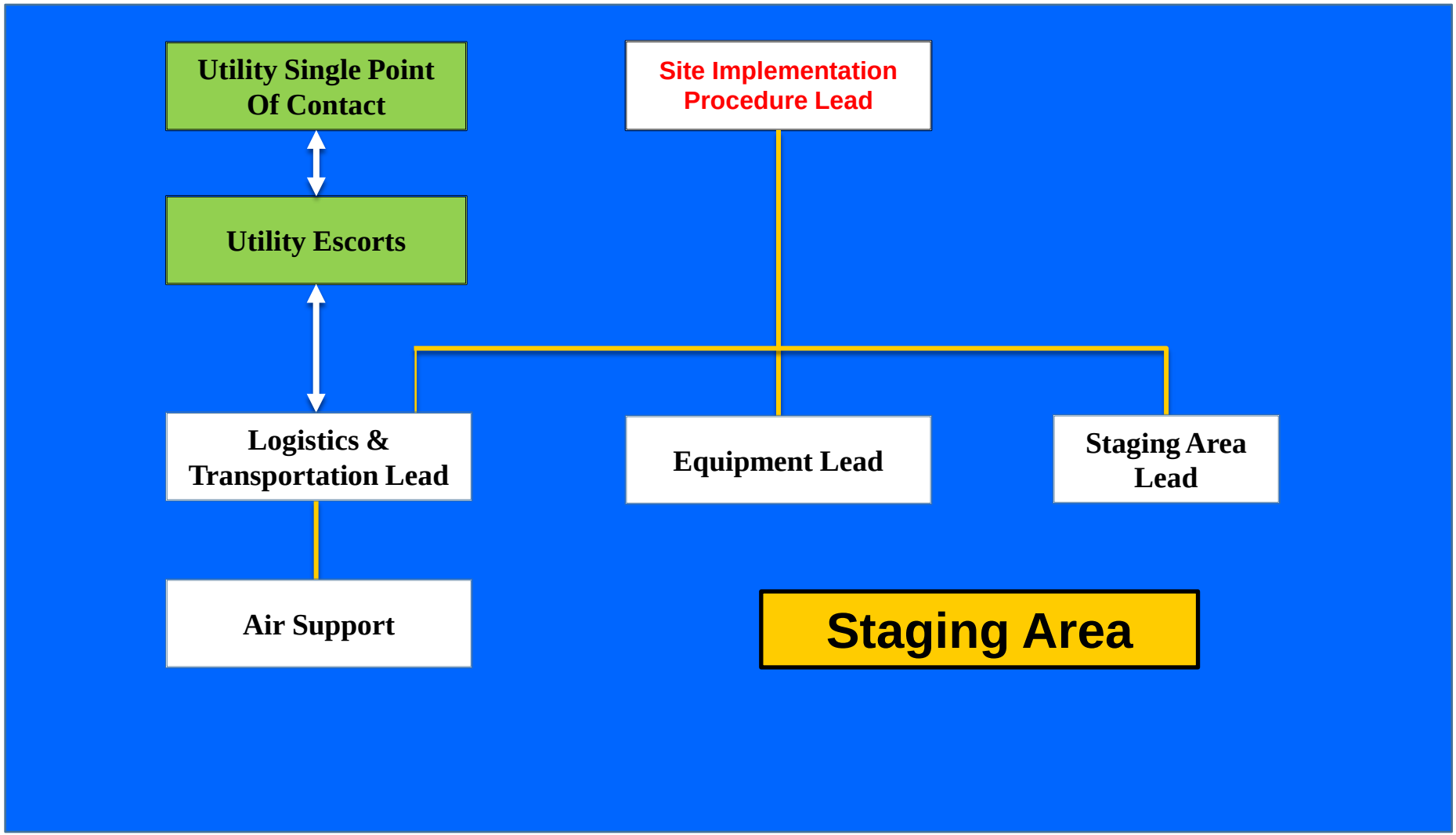
SAFER Organization and Facilities

- SAFER Control Center (SCC)
  - Command and control of overall response
  - Similar to existing Outage Control Center
  - Primary – Lynchburg, VA
  - Alternate – Birmingham, AL
- National SAFER Response Center (NSRC)
  - Equipment warehouse
    - Storage and maintenance of 5 sets of generic equipment and site specific equipment
  - Pre-loaded on commercial trailers
  - Pre- palletized for fixed wing movement
  - Testing and certification

SCC and NSRC Organization



Staging Area Organization



SAFER Response Plan Chapters

1. Introduction
2. SAFER Control Center
3. Regional Response Center
4. Logistics & Transportation
5. Staging Area
6. Site Interface Procedure
7. Equipment Listing
8. Requirements and Basis

Each site has a specific Response Plan used by all organizations to respond

NSRC Equipment

- Each NSRC will have five sets of generic equipment
- Four sets are always available for response
- One set rotated through periodic maintenance
- Additional site specific (non-generic) equipment – as identified by utilities
- Maintained by the NSRC staff / SA operators/ contractors
- Equipment has an ~8,500 pound weight for transport by helicopter
  - Helicopters have at least a 70 mile round trip limit
- Equipment pre-loaded on trailers/ palletized for fixed wing movement
- All equipment will run on diesel fuel
- Industry standard electrical and mechanical connections

NSRC Equipment

	Generic Equipment	Site Specific Equipment
Requires Specification	• 4kV turbine generators • 480VAC turbine generators • High Pressure Pump (60 GPM) • Low Press/Med Flow Pump (2500 GPM) • Low Pressure/High Flow (5000 GPM) • SG/RPV Makeup Pump (500 GPM)	• Transformers*** • 480VAC to 600VAC • Mobile Boration Unit • RO Unit/Water Purification • 4kV turbine generators

Commercially Available	• Diesel Fuel Transfer
	• Standard Hoses and Connections (Suction, Discharge, Strainers)
	• Generator Connection Cables
	• Portable Lighting
	• SAFER Team Equipment
	  • Communication
	  • Habitability
		• Portable Air Compressors
		• Water Storage

Transportation

Contract with FedEx Custom Critical for ground and fixed wing movement

Tiered approach to Helicopter availability

- 1st Level – Contract with multiple commercial helicopter companies for first call out
- 2nd Level – State National Guard via state emergency management organizations
- 3rd Level – Coordinate Federal support through FEMA

NSRC delivery to isolated sites

- Use of helicopters
  - Call out for support
    - Commercial as available
    - State Air National Guard
    - DOD through NRC/ FEMA

    } called out simultaneously
  - Pre-filed Congested Area Flight Plans for each site, off-site staging area to on-site staging area
    - Use flight plans for commercial, Air National Guard, DOD external lifts
  - Purchased external lift slings for all equipment
  - Annual review of all flight plans
  - Annual inspection of all slings

NSRC checklist for each site

National SAFER Response Centers (NSRC)
Checklist to Declare Operational

Byron

Print the name of the Nuclear Site to which this checklist is applicable.

NOTE: The NSRC will be declared READY through the completion of the NRC audit process. Following the completion of the audit and the completion of this checklist, the NSRC is declared OPERATIONAL for a particular nuclear plant site.

INITIAL/DATE		Criteria
DLM 9/29/14	1.	Equipment design parameters documented and bound plants coping strategies.
	2.	Generic Equipment
GBL 10/15/14		a. Delivered and receipt inspected satisfactory.
GBL 10/15/14		b. Entered into maintenance, testing, and calibration program.
	3.	Non-generic Equipment
GBL 10/15/14		a. Delivered and receipt inspected satisfactory.
GBL 10/15/14		b. Entered into maintenance, testing, and calibration program.
MAC 10/13/14	4.	Deployment team support equipment and material available.
MAC 10/13/14	5.	Contract with transport providers for delivery.
MAC 10/13/14	6.	Congested Area Flight Plans have been completed.
DLM 9/30/14	7.	Training program in place and training complete for SAFER response personnel.
DLM 10/13/14	8.	SAFER Response Plans has been completed for the site stated above and, approved by that utility.

Checklist completed by: DEANNA McCOMBS DLMcCombs 10/15/14

Verified by: [signature]

Date: 10/15/2014

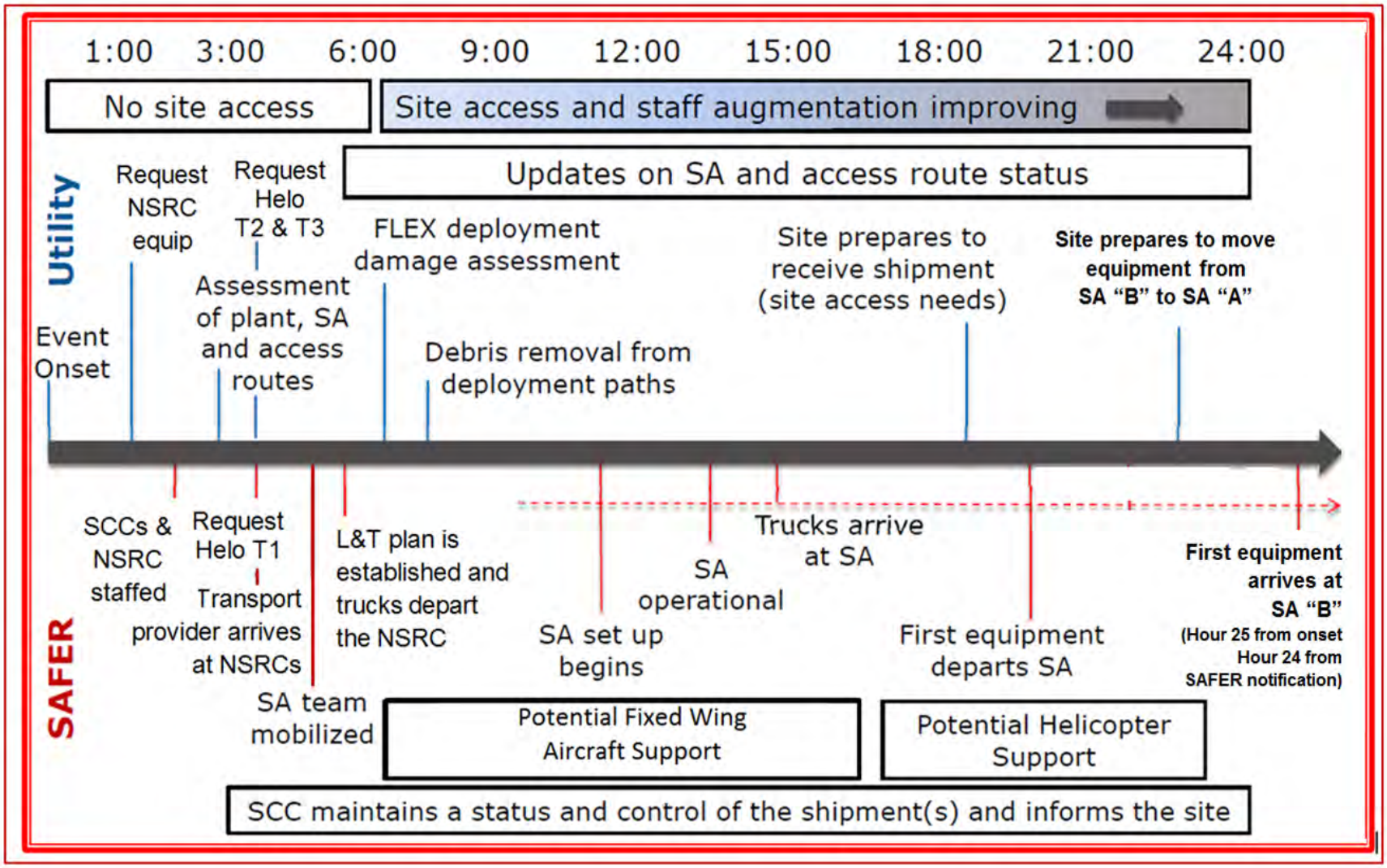
This checklist is completed by SAFER, verified by a SAFER Manager and maintained in PEICo document control.

Additional material

NSRC future assessments

- Current framework for assessment of NSRC includes NUPIC audits to ensure the critical elements of NEI 12-06 for off-site support are met
- NRC Vendor Inspection Branch has existing audit/ inspection relationship that can be used to assess effectiveness of NSRC capabilities
- INPO will maintain its current role in evaluating program effectiveness as it relates to emergency response capabilities
- Existing assessment framework is sufficient to ensure required capabilities for NSRCs are maintained

NSRC Movement Plan



NSRC delivery to isolated sites

Reviewed and Approved:
FSDO #:_____
Inspector: _____
Date:_____

Congested Area Lift Plan
(FAR Part 133)

Lift Site:	Byron Nuclear Power Plant				
Address:	4450 N German Church Rd				
City:	Byron	State:	IL	Zip:	61010
Contact:	SAFER			Phone:	
Date of Lift:	To be Determined	Time:	To be Determined	Pilot(s):	
Aircraft Type:	Sikorsky S-61NM	N#:	N618CK	Airworthiness Category:	Standard

Description of Load

Estimate number of lifts: 78
Maximum Weight: 8,000 lbs
Type of Load: Equipment
Estimated Length of attachment means: 100 feet
☐ Aerodynamic
☑ Non- Aerodynamic

NSRC Demonstrations

- Demonstrations were held for both over the road movement of equipment (TMI) and air movement of equipment (Surry).
- Focus of the demonstration was on the interactions between the Site/ SAFER Control Center (SCC)/ National SAFER Response Center (NSRC).
- No ‘show stoppers’ were identified by the NRC.
- Following the demonstrations, members of the NRC and SAFER teams visited the FedEx Customs Critical facility in Akron Ohio. The NRC was impressed with the ability of the FedEx facility to identify, track, re-route and communicate with their over-the-road trucks as well as identify fixed wing aircraft, develop and file flight plans, coordinate with airport FedEx facilities and deal with restricted flight zones.
- 12 specific comments were provided at the exit meeting by the NRC:
  1) SAFER should clearly distinguish responsibilities (SAFER vs. licensees) at the licensee site (Staging Area “B”) in the SAFER Response Plans (SRPs) and communicate these to the licensees.

  Complete

NSRC Demonstrations

2) Training plans and documentation for SAFER staff should be provided. Demonstrations were performed by personnel with good knowledge of the procedures. Have not provided enough information to demonstrate ownership, expertise, and training related to SAFER operation of equipment.
   - SAFER is currently performing and documenting training.
   - Owner: Deanna McCombs Date:
3) Additional information should be provided regarding the SAFER plan to obtain reliable, available helicopter resources, if needed, to deliver the equipment to the site within the allotted time.

Complete

4) The SAFER Response Plans are still drafts with noted open items and errors. What will be the verification and validation process/ process for getting to final SRPs with high quality?

Complete

NSRC Demonstrations

5) There was a clear lack of understanding by all participants of how to get the SAFER and FedEx personnel onto the site.

   Complete

6) There did not appear to be a method to ensure equipment proper operation/ monitoring of trends and abnormalities after delivery (i.e. logs).

   Complete

7) Communication between SCC and SPOC should be streamlined/ too much communication between SCC and site SPOC in early stages of the event. SCC seems to be collecting a lot of site condition information unnecessarily during early stages. Adds to the potential for SPOC to be overloaded with communication requirements.

   Complete

NSRC Demonstrations

8) The process for FedEx truck arrival, preparation, and departure to/from the Response Centers should be more clearly defined.

Complete

9) Response Center equipment lists are maintained on pre-printed bills of lading. How will configuration control be maintained for these as site plans evolve?

Complete

10) Methods for obtaining and recording necessary information at the SCC should be standardized.

Complete

NSRC Demonstrations

11) Additional information should be documented for supplemental/ support equipment.

Complete

12) Truck height and weight restrictions and necessary permits should be specified for alternate routes, and communicated to state officials (state police).

Complete

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Mitigating Strategies Order EA-12-049

Japan Lessons-Learned Division

November 20, 2014

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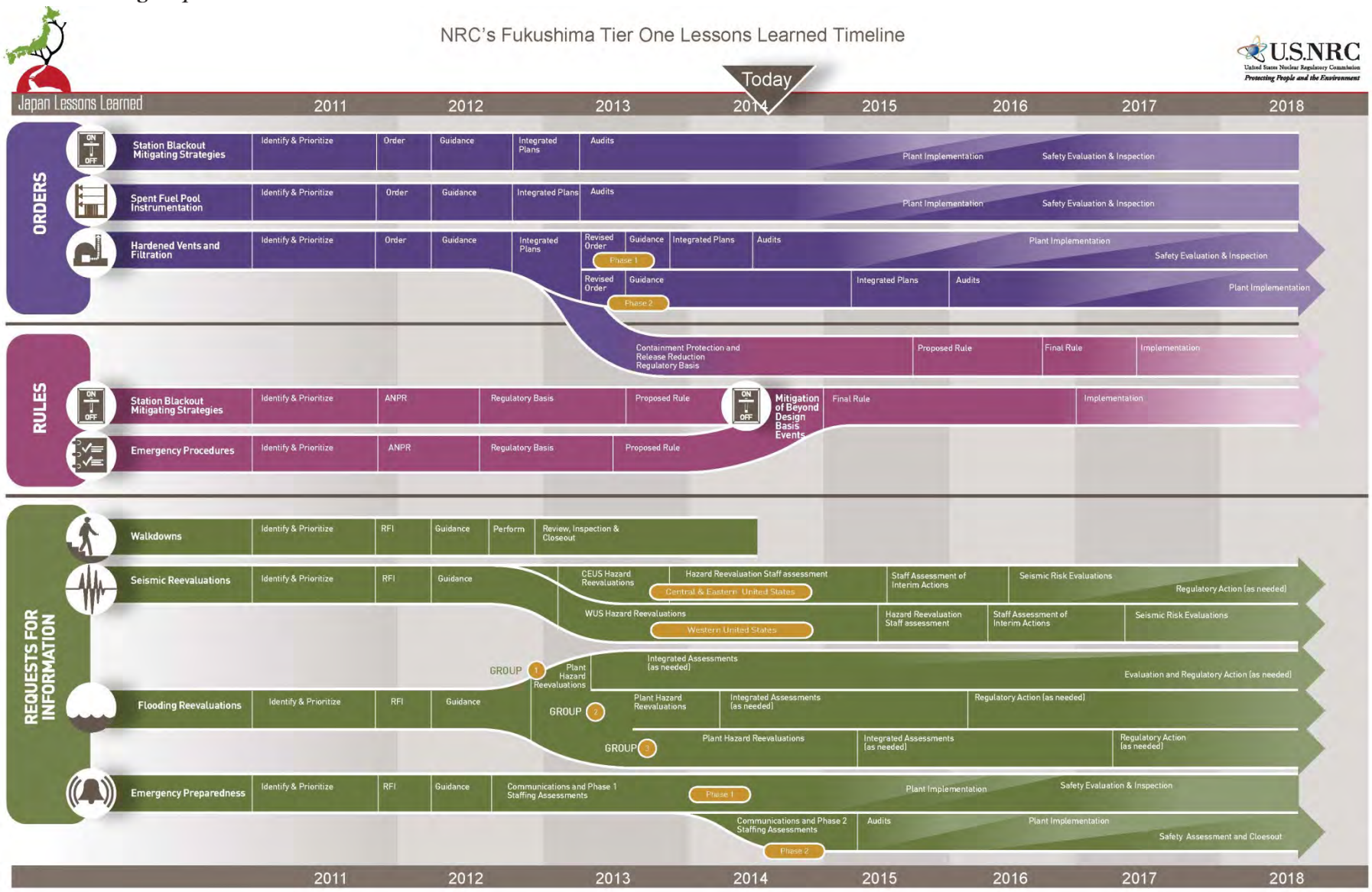
Integrated Timeline



Current as of 09/04/2014

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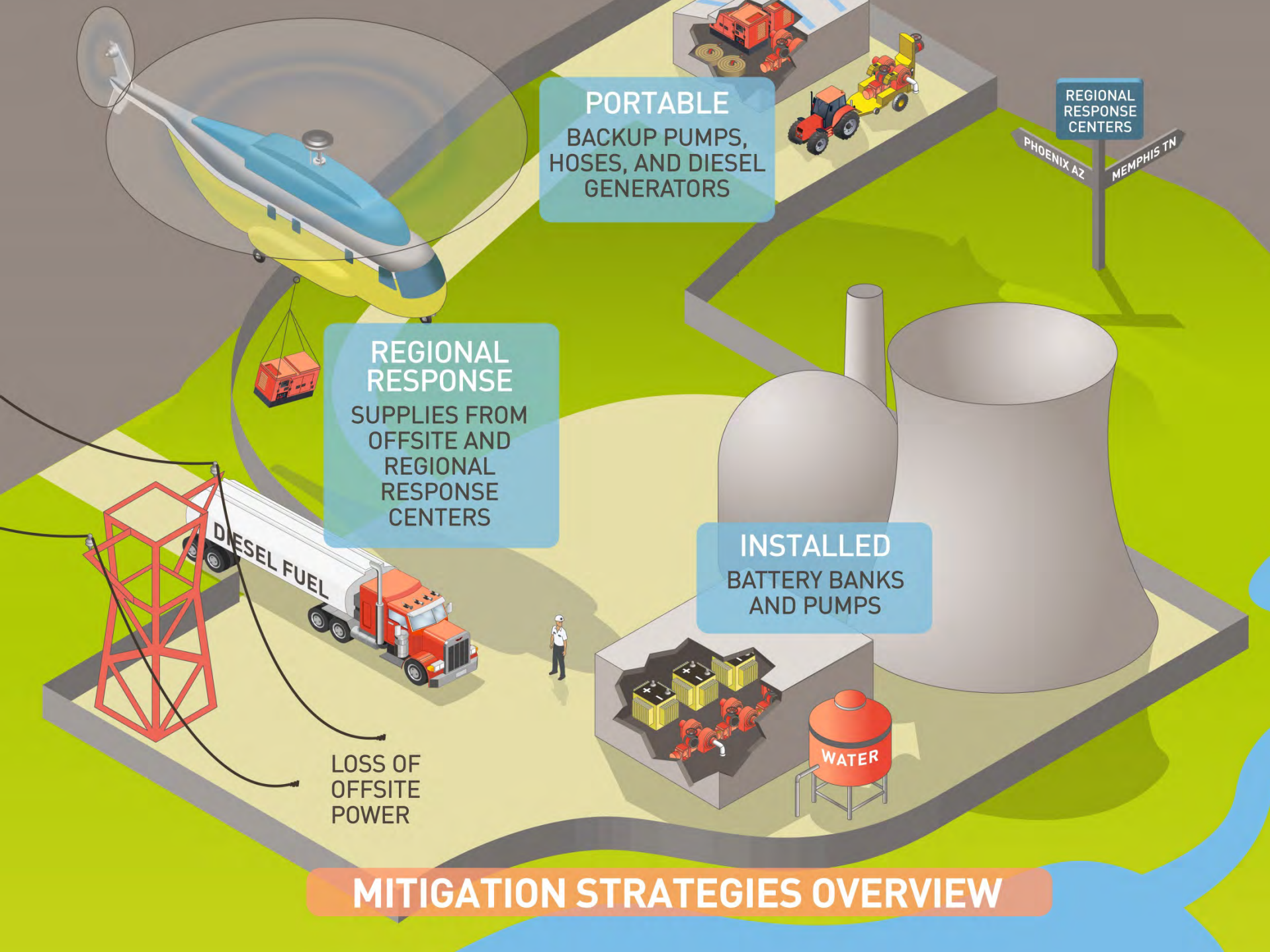
Mitigation Strategies
For External Events

- Requires a three-phase approach for maintaining or restoring core cooling, containment, and spent fuel cooling
- Issued March 12, 2012

Phase	Licensee may use
Initial	Installed equipment
Transition	Portable, onsite equipment
Final	Resources obtained from offsite


PORTABLE
BACKUP PUMPS, HOSES, AND DIESEL GENERATORS
REGIONAL RESPONSE CENTERS
PHOENIX AZ
MEMPHIS TN
REGIONAL RESPONSE
SUPPLIES FROM OFFSITE AND REGIONAL RESPONSE CENTERS
DIESEL FUEL
INSTALLED
BATTERY BANKS AND PUMPS
WATER
LOSS OF OFFSITE POWER
MITIGATION STRATEGIES OVERVIEW

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Order Milestones

✓Overall Integrated Plan submitted

- Order Compliance: no later than 2 refueling cycles after submittal of the overall integrated plan or December 31, 2016, whichever comes first
  - Some licensees have requested and received schedule relaxation

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Regulatory Guidance

- NEI 12-06, “Diverse and Flexible Coping Strategies (FLEX) Implementation Guide”
  - Extended loss of ac power and
  - Loss of normal access to the heat sink
- Endorsed by the NRC in August 2012

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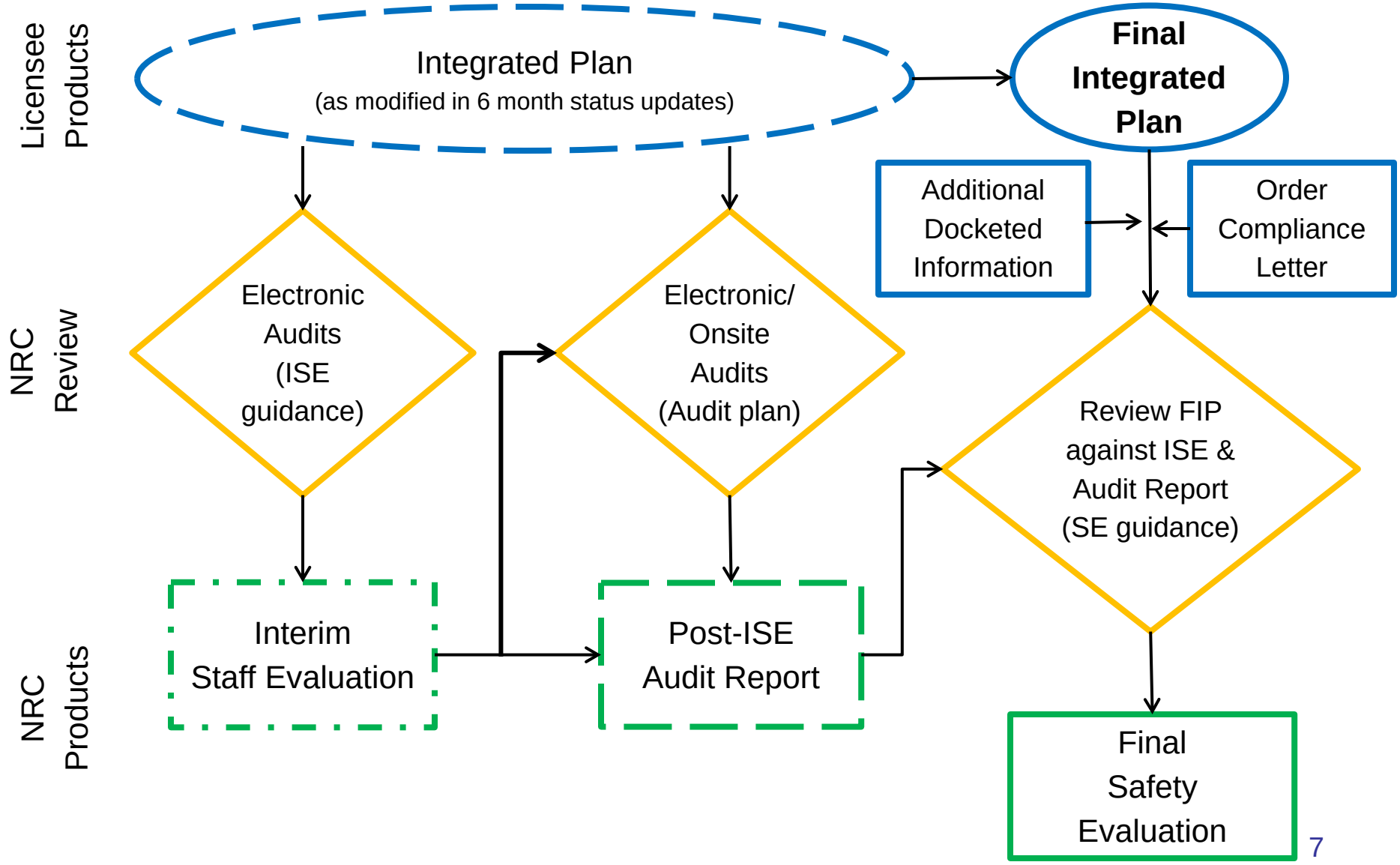
MS – Order Closeout



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Interim Staff Evaluation

- Purpose:
  - Preliminary evaluation of plans
  - Provide regulatory certainty
    (if implemented as described)
- Issue Categorization
  - Open
  - Confirmatory
  - Acceptable/Complete
- Issued November 2013 - February 2014

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Audits

- Efficient Review
  - Schedule/resource constraints
  - Unique aspects of plans
- Electronic Reading Room
- Audit Phone Calls
- Site Visits
  - 17 visits accomplished to date
  - Majority to be complete by Summer 2015

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Safety Evaluation

- Document staff evaluation of plans to meet requirements of the order
- Completed approximately 4-6 months after site compliance and the licensee's submittal of the Final Integrated Plan
- Reference document for post compliance inspections

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Post-Compliance Inspections

- Verify compliance with the orders
- TI-2515/191 covers:
  - Mitigation Strategies
  - Spent Fuel Pool Instrumentation
  - Emergency Preparedness Staffing and Communication
- To be performed within 1 year of the Safety Evaluation being issued

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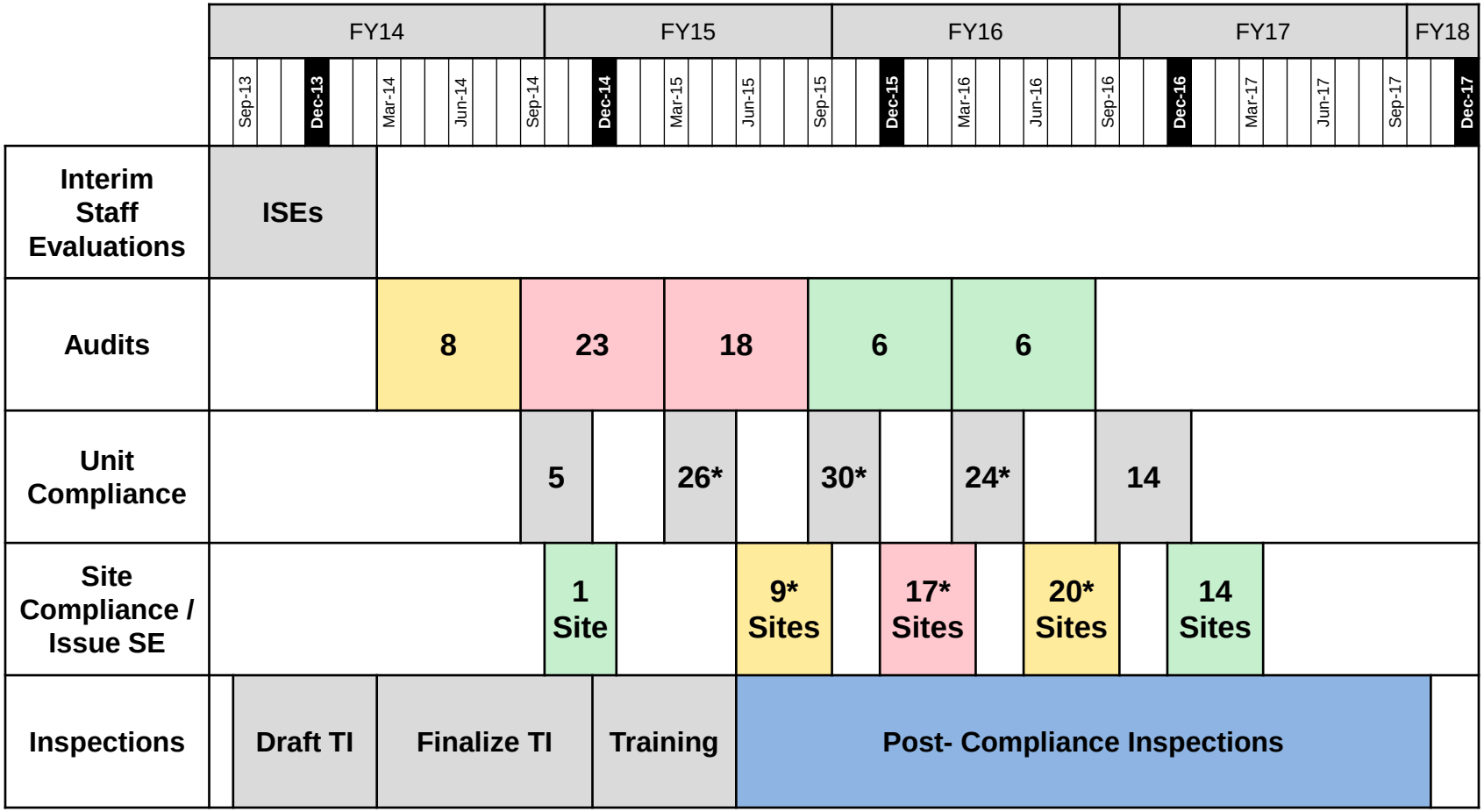
Schedule



* Ten BWR units have requested relaxation to a third outage (past 2016) to align with EA-13-109

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Select Topics

- Response Centers
- Alternate Approaches
- Reactor Coolant Pump Seals
- Equipment Survivability and Functionality
- Instrumentation Qualification
- Operator Action Feasibility

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Response Centers

- For Phase 3 of the order, licensees will receive portable equipment from an offsite facility
- Two redundant response centers :
  - Phoenix, AZ, and Memphis, TN
  - Two redundant Command and Control Centers

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Response Centers

- Operated by Strategic Alliance for FLEX Emergency Response (SAFER), an alliance between AREVA and PEICo.
  - Fixed-wing and ground transportation
  - Rotary wing

Credit: NEI

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Response Centers

- Effective SAFER operations are dependent on integrated planning and coordinated response actions among the nuclear station, governmental authorities, industry, and vendor support personnel.
- Response centers became operational this summer (May 22, 2014 and June 27, 2014)
- The NRC observed proof of concept demonstrations for both centers
  - Some areas for improvement were noted and subsequently addressed
- National SAFER Response Centers Staff Assessments issued September 26, 2014

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Alternate Approaches

- Some licensees proposed approaches not described in NEI 12-06
- Reviewed on site-specific basis by comparison to the order
- Examples:
  - Storage locations for FLEX Equipment
  - Credit for equipment beyond the configuration of NEI 12-06

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Reactor Coolant Pump Seal Leakage – Overview

- ELAP event would interrupt cooling to coolant pump seals, potentially increasing seal leakage rate
- Depressurization and cooldown of reactor is typically recommended to prevent or limit damage to pump seal elastomers (e.g., o-rings)
  - For PWRs, seal leakage is typically the dominant coolant loss mechanism during analyzed ELAP, thereby driving the required timeline for establishing makeup to RCS
  - At most BWRs, seal leakage is less significant because makeup capacity from installed steam-driven systems (i.e., HPCI / RCIC) exceeds expected leakage rate

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Westinghouse Standard Seal

- Initial 21gpm assumption based on WCAP-10541: "Westinghouse Owners Group Report, Reactor Coolant Pump Seal Performance Following a Loss of All AC Power"
- Recent industry calculations associated with NSAL 14-1/PA-1196 predict integrated seal leakage over ELAP duration exceeding original calculations
- PWROG & Westinghouse need to confirm revised leak rate curve with benchmarking of EDF data
- Individual licensees without flow restrictive orifice in leakoff line (and higher leak rates) may need modifications to reduce leak rate
  - Also need to address pressurization of leakoff line as a result of flow restriction

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Equipment Functionality Post-Event

- The intent of the order is to prevent fuel damage
- Equipment is required to be “robust”
- Phase 1 installed equipment is designed to survive the external event
- Order requires reasonable protection of equipment
- Impact of Reevaluated Hazards

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Instrumentation Qualification—MS

- The Mitigation Strategies Order does not have specific qualification requirements
- Guidance in NEI 12-06:
  - Licensees need a strategy to define a minimum set of parameters necessary to implement the strategy
  - Equipment relied upon to support FLEX implementation does not need to be qualified to all extreme environments that may be posed, but some basis should be provided for the capability of the equipment to continue to function
  - Licensees must:
    - Have the appropriate instrumentation available
    - Have a backup available
    - Have a plan in case neither is available

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Instrumentation Qualification—SFPI

- The Spent Fuel Pool Instrumentation Order has specific qualification requirements

> The primary and backup instrument channels shall be reliable at temperature, humidity, and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period. This reliability shall be established through use of an augmented quality assurance process (e.g., a process similar to that applied to the site fire protection program).

- Guidance NEI 12-02, directs the licensees to consider the following beyond-design-basis events:
  - radiological conditions for a normal refueling quantity of freshly discharged (100 hours) fuel with the SFP water level 3 as described in this order,
  - temperatures of 212 degrees F and 100% relative humidity environment,
  - boiling water and/or steam environment,
  - a concentrated borated water environment, and
  - the impact of FLEX mitigating strategies.

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Operator Action Feasibility

ACRS Recommendation of June 17, 2013:

Neither NEI 12-06 nor JLD-ISG-2012-01 provide sufficient guidance for evaluating the feasibility and reliability of the manual actions necessary to implement the mitigating strategies called for by Order EA-12-049. The guidance for the new mitigation strategies rule should address this issue.

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Operator Action Feasibility

> Strategies that have a time constraint to be successful should be identified and a basis provided that the time can reasonably be met.
>
> - NEI 12-06, Section 3.2.1.7

- Time constraints identified by thermal-hydraulic analyses.
  - NRC staff audit of analyses.
- Time constraints listed in integrated plan sequence of events.
- Licensee validation of FLEX Support Guidelines to determine time needed for performance.

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Operator Action Feasibility
NEI Validation Process

- Supplement to normal procedure verification
- Determines time necessary to perform actions, and thus margin to time available
- Considers NUREG-1852/JLD-ISG-2012-05 App. C performance shaping factors
- Feedback available for low time margins to improve process to assure feasibility
- Roll up of results to support staffing/equipment needs

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Operator Action Feasibility
NEI Validation Process

NRC Observations

- As licensees have implemented the process, they have identified issues and made corrections. This is an expected part of the process.
  - Incompatible fittings due to mismatched threads
  - Incompatible gaskets
  - Potential sources of debris
- Actual evaluation of PSF impacts on feasibility and reliability only possible for identified hazard levels
  - Re-evaluated flood hazard information a potential use

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Thank You

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Acronyms

ACRS	Advisory Committee on Reactor Safeguards	PA	Project Authorization
BWRs	Boiling Water Reactors	PEICo	Pooled Equipment Inventory Company
EDF	Electricite de France	PSF	Performance Shaping Factors
ELAP	Extended Loss of AC Power	RCS	Reactor Coolant System
FIP	Final Integrated Plan	RCIC	Reactor Core Isolation Cooling
FLEX	Diverse and Flexible Coping Strategies	SAFER	Strategic Alliance for FLEX Emergency Response
ISE	Interim Staff Evaluation	SE	Safety Evaluation
HPCI	High Pressure Coolant Injection	PWROG	Pressurized Water Reactor Owners' Group
MS	Mitigation Strategies	SFPI	Spent Fuel Pool Instrumentation
NEI	Nuclear Energy Institute	TI	Temporary Instruction
NSAL	Nuclear Safety Advisory Letter	WCAP	Westinghouse Commercial Atomic Power (Westinghouse Topical Report)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Fukushima Subcommittee

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Friday, November 21, 2014

Work Order No.: NRC-1230 Pages 1-338

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

+ + + + +

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

FUKUSHIMA SUBCOMMITTEE

+ + + + +

FRIDAY

NOVEMBER 21, 2014

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 8:30 a.m., Stephen P. Schultz, Chairman, presiding.

COMMITTEE MEMBERS:

STEPHEN P. SCHULTZ, Chairman

RONALD G. BALLINGER, Member

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR., Member

MICHAEL L. CORRADINI, Member

HAROLD B. RAY, Member

JOY L. REMPE, Member

PETER C. RICCARDELLA, Member

MICHAEL T. RYAN, Member

GORDON R. SKILLMAN, Member

JOHN W. STETKAR, Member

ACRS CONSULTANT:

WILLIAM J. SHACK*

DESIGNATED FEDERAL OFFICIAL:

MICHAEL R. SNODDERLY

ALSO PRESENT:

EDWIN M. HACKETT, Executive Director

PHIL AMWAY, Nine Mile Point

STEWART BAILEY, NRR

VALERIE BARNES, RES*

SCOTT BAUER, NEI

JEREMY BOWEN, NRR

ERIC BOWMAN, NRR

DAN BRUSH, Exelon

RANDY BUNT, Southern Nuclear

JACK DAVIS, NRR

GENE EIMAR, Palo Verde

KURT FLAIG, Dominion

BRYAN FORD, Entergy Nuclear

ED FULLER, RES

DAVID GAMBRELL, Southern Nuclear

JOHN GIDDENS, Southern Nuclear

GARY HOLAHAN, NRO

TOM JACKSON, Rizzo Associates*

MARVIN LEWIS*

DAVID LLEWELLYN, Duke Energy

EDWIN LYMAN, Union of Concerned Scientists

JOHN MCKIRGAN, NRO

JEFFERY MITMAN, NRR

ABY MOHSENI, NRR

MALCOLM PATTERSON, NRO

MARIE POHIDA, NRO

MIKE POWELL, Palo Verde

WILLIAM RECKLEY, NRR

TIM REED, NRR

JIM RILEY, NEI

SUZANNE SCHROER, RES

KEN SEE, NRO

JIM SHEA, NRO

GEORGE TARTAL, NRO

BILL WEBSTER, Dominion

DAVID YOUNG, NEI

*Present via telephone

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Adjourn

P R O C E E D I N G S

8:31 a.m.

CHAIRMAN SCHULTZ: Good morning. This meeting will now come to order following our recess. This opens the second day of the ACRS Fukushima Subcommittee meeting. I'm Steve Schultz, the chairman of the subcommittee.

Members in attendance today are Pete Riccardella, Ron Ballinger, Dick Skillman, Harold Ray, Dennis Bley, John Stetkar, Mike Ryan, Charlie Brown, Joy Rempe and Mike Corradini. Also, our consultant, former ACRS chairman, Dr. Bill Shack, is on the phone.

Today, we will build on yesterday's discussion on implementation of Order EA-12-049, an order modifying licenses with regard to requirements for mitigation strategies will be on design basis external events. We're going to first focus on the staff's preliminary proposed rule language for the mitigation of beyond design basis events rulemaking. Then we will review a staff-wide paper which has been prepared on the integration and mitigation strategies for beyond design basis external events with the reevaluation of flooding hazards and explore a number of views on this process.

Mr. Mike Snodderly continues as the

designated federal official for this meeting. We've received no written comments. We have arranged for Dr. Ed Lyman of the Union of Concerned Scientists to make an oral statement this afternoon.

This meeting is open to the public, except that portions today may be closed to protect information that is predecisional, pursuant to 5 USC 55(b)(c), paragraph 9(b). Again, it's our understanding in today's presentation material that it will not contain such information, but we will rely upon the presenters to notify us if our questions do stray into an area where predecisional information may be disclosed. Then we may decide to pursue that discussion, and we would establish a closed session within the meeting.

I want to remind the participants that a transcript of the meeting is being kept and will be made available, as stated in the Federal Register notice. Therefore, we'll request that participants in the meeting use microphones located throughout the meeting room when addressing the subcommittee. All participants should first identify themselves at the microphone or over the phone line and speak with sufficient clarity and volume so they may be readily heard.

Also, at this point, we would request that you silent your cell phones and any other electronic device that may disrupt the meeting.

I understand that there are individuals on the phone bridge line today who are listening in on the proceedings. To effectively coordinate their participation in the meeting today, we will be replacing the incoming bridge line on mute so that those individuals may listen in. At appropriate times later in the meeting, we'll provide the opportunity for public comment both from individuals on the bridge line, as well as for members of the public in attendance.

Yesterday, we had a good discussion related to the mitigating strategies implementations related to the order. Today, we're going to talk further about the next part of that process, which is the proposed rulemaking, another element of the Fukushima action items. And what we're working to examine today, what the subcommittee is examining and what we expect the subcommittee will bring to the full committee in December is a discussion and deliberation related to, given what we talked about yesterday, what is the appropriate regulatory framework that ought to be devised in order to move forward with new ways of

doing things, new operational capabilities, and new considerations as a result of the Fukushima accident and all of the lessons learned that we've established over the last few years.

So with that, as we open up the meeting, I would like to recognize Aby Mohseni, who is going to open the proceedings for today and introduce the speakers. Welcome, Aby.

MR. MOHSENI: Thank you very much, Mr. Chairman, distinguished members. Good morning. My name is Aby Mohseni, as you said, and I am the Deputy Director of the Division of Policy and Rulemaking in the Office of NRR.

Today, we open up the meeting with NRC staff presenting draft language on the proposed mitigation of beyond design basis events rulemaking. These notes that this activity is formally known as the consolidated rule.

To support this presentation, I have with me several members of NRR and a member from NRO. Tim Reed, on my left, from our staff will be leading the discussion of the proposed MBDBE rulemaking, which is a funny acronym to pronounce.

Supporting Tim as the lead technical expert in the mitigation strategies is Eric Bowman from

the Japanese Lessons Learned Division. We have also Bill Reckley, also from the Japanese Lessons Learned Division, to support any discussion regarding feedback from NTTF-2.1, flooding reevaluated hazards and its relationship to this proposed rulemaking. And, finally, we have from NRO George Tartal to support the discussion of the proposed provisions for new reactors.

There are other members from the mitigation of beyond design basis events rulemaking working group in attendance, and they will support questions from the committee, as needed. The preliminary proposed rule language was made publicly available on November 13th, 2014 in preparation for this meeting. The preliminary proposed rule language shows the integration of requirements that reflect and align with industry implementation. Since the Commission has not considered the draft proposed rule language, these clearly do not constitute an official NRC position.

As directed by SRM-14-0046 issued July 19th, 2014, this consolidated rulemaking addresses, either in requirements or through supporting implementation guidance, regulatory actions that stem from all of the recommendations in NTTF-4, 7, 8, 9.1, 9.2, 9.3, with one exception: the maintenance of ERDS

capability throughout the accident, 10.2 and 11.1.

As part of this presentation, we will also present a brief summary of the backfitting analysis and basis for the potential inclusion of SAMGs as requirements in this rulemaking activity. The NRC is very appreciative of the ACRS's time and interest in this proposed rulemaking activity, and we look forward to today's discussion.

I'll turn it over to Tim.

CHAIRMAN SCHULTZ: Thank you, Aby.

MR. REED: Thanks. I'm Tim Reed. I'm the project manager for this effort. I've obviously spoken with this committee on several occasions already.

I wanted to first -- first, I have two background slides. The very first one is simply an accounting, if you will, of some of the more important interactions we've had. And those are the interactions we've had with the ACRS, so they're there for you simply to recognize when they have occurred and which committees they've occurred with. I think that's just a good thing to have. And then the major interactions in the public domain, there's many more than this, are at the bottom of that slide in terms of this is a consolidation really of two major ongoing

rulemaking efforts. One was the on-site emergency response capabilities rulemaking, which stemmed from Recommendation 8 principally. And the other one was, of course, mitigation strategies rulemaking, and we combined those together into what you see today.

So we have two regulatory basis documents and two ANPRs, and I just basically noted those on the slides so folks can see the dates for when we did that. So that's simply really a simple accounting. I thought that was worthwhile providing so nothing more about that.

Aby just mentioned a little bit about what we're trying to do here in terms of its relation to the near-term task force report. It should be pretty clear to most folks that the way the NRC is actually implementing regulatory actions stemming from that report were not binned the same way the NTTF binned them. And so it's resulted in a somewhat complex accounting so people can understand what parts of the NTTF report were actually feeding this rulemaking.

And there were several different interactions with the Commission that really facilitated that consolidation. First, principally, COMSECY-13-0002. Myself and Eric were the authors of that. We consolidated really four and seven. And

what was perceived at that time was a concept that was thought to be two rulemakings going on when, in fact, there weren't. There was only one rulemaking, making EA-12-049 generically applicable. And that order, as I'm sure this committee is very well aware, is being broadly implemented and addresses really all of four and seven. In fact, more than that. So that was to make the Commission aware of that.

COMSECY-13-0010 was also a rack-up of basically EP and NTTF ongoing activities and how those could be consolidated into ongoing Fukushima actions. And I think the committee ought to be also aware most of that was also being addressed as part of the mitigation strategies. So that's basically, essentially, a consolidation, if you will, of those activities.

And, finally, most importantly, Aby just mentioned we proposed to the Commission consolidating these two rulemaking activities together and producing one rulemaking. And I think that makes a lot of sense. You know, I was a big pusher on that because I think that aligns more directly and more coherently with actual implementation out there in the industry in terms of building this new capability of strategies both into the front-end before core damage and after

core damage into the SAMGs. And I think that made a lot of sense to see if we could line this thing up and line it with implementation, and that's what we've been trying to do. And the draft language in front of you today is an effort to try to achieve that integration and consolidation.

So as we just mentioned, this does address all of Recommendations 4, 7, and 8. It addresses 9.1, 9.2, 9.3, some long-term ERDS. It does address the ERDS modernization effort. We've basically -- a very simple removal of a technology-specific language there at 9.4. It also addresses 10.2, command and control and decision-maker because, basically, that's built right into the implementation of EA-12-049. And it also addresses 11.1. Phase three of the EA-12-049 addresses that issue already, as I'm sure you're well aware also.

So what you're seeing there is this is what we can say we're accounting for the NTTF and what we're getting done. In terms of other ways of looking at this, it's also making generically applicable two orders, large measures, mostly EA-12-049, no question about it. But we also have provisions in this to make generically applicable to spent fuel pool level instrumentation order. So you'll see there's spent

fuel pool, vibrating spent fuel pool level requirements in this order, in this rulemaking also. So it does that.

The staffing and communications requirements you see in there, they stem from the 50.54(f) request, okay? So it makes that generically applicable, if you will. And, of course, there's another ongoing issue the committee is well aware of, and that's the NTTF-2.1 feedback, and it may be a very critical aspect of this, and that's another issue we're well aware of and we're following. So, certainly, that could have a significant effect on this rulemaking, so I pulled that out there, too.

CHAIRMAN SCHULTZ: You anticipated my question in a way because my question was the staff came up with the idea of consolidation, but it was some time ago and there were a large number of elements that were bundled together. My question was and still is, although you've explained it a lot, as we've gone through the last 18 months, are there things that have been identified that you've considered should have been part of the consolidation? And then are there things that were originally thought could well fit together that shouldn't have been incorporated in the consolidation because they deserve their own special

attention? You can answer that in the course of the presentation, if you would like.

MR. REED: Yes. I would point out, let me just point out something that's --

CHAIRMAN SCHULTZ: This slide has presented a lot of information --

MR. REED: This could actually get bigger, and I'll tell you why.

CHAIRMAN SCHULTZ: Wait a minute.

MR. REED: You could actually consolidate in portions of EA-13-109 if you wanted. In fact, that was a comment from industry that the severe accident, you know, capable wetwell event, you could work that in. Right now, it doesn't work in scheduler space to work that in, but you could work that in.

So there's been some areas where I think there's opportunities to make it even broader. If I had to do it all over, you know, and I had an ability to control time, I would do 2.1 first and then do this afterwards. Unfortunately, as this committee is well aware, we haven't been able to do that, so that's put us in a tough situation there.

But in terms of everything else, I think this is the most substantive requirements. I think we've got it in there. I don't know. Eric, do you have

anything that jumps into your mind on that or . . .

MR. BOWMAN: I would also include the remainder of the BWR Mark I and II events actions as possible candidates for consolidation because the look at the filtering strategies or the release reduction portion of the containment protection and release reduction, it's so lined up with being severe accident management guidelines for those particular licensees that, if we don't consolidate the two and treat them separately, we run the risk of sending up two separate policy decisions to the Commission with different justifications and with a potential for different decisions that would put us in a bad place.

MR. REED: That's a very good point. And this committee is very familiar with the containment protection and risk reduction effort and the work that Marty Stutzke is doing. But if you think about it, those are SAMGs for BWR Mark 1 and Mark II plants. And so that directly informs SAMGs, and Eric's right: if that were to become requirements, it would make sense that those SAMGs would be built in to this because that's a specific set of SAMGs for that design, if you will.

CHAIRMAN SCHULTZ: So I'm anticipating that we're going to come back to this in the course of

this presentation, so please don't assume that because we briefly touched on it now that you don't have to cover it later.

MR. REED: I'm making no assumptions. Stop me wherever --

CHAIRMAN SCHULTZ: All right. So I appreciate that as part of the introduction, and let's go forward with the presentation. Thank you.

MR. REED: So the plan here today is to simply walk through what I gave or what we provided to you, the draft language as it exists right now, and then also to touch upon some of what I think are other key aspects of the package. I apologize you don't have that package. I'm apologizing right now. But I will talk about backfit and SAMGs and some of the draft findings. Also, I think you have a lot of familiarity with the actual implementation and what's really happening right now, so I think you know the way the end state is going to look, it's a little more difficult to get our draft guidance and everything lined up to get a rulemaking thing put together. We're not there yet. So we'll talk about that, too, when we get to it.

So, first, I want to just walk through this thing. And stop me wherever the committee wants to, and we'll try to explain. I have a lot of help in the

room. Some of this, I'm not as conversant with every aspect of the package as maybe I normally would be. This rulemaking is getting pretty large and complex, and so I'll have a lot of help in the room here if I need it.

So, basically, the applicability session is there because it's applying to both, basically, power reactors, whether it's an operating reactor or a new operating licensee, a combined license, Part 52 combined license holder, or new applicants, okay? So it applies to, basically, all those entities. So that means it applies to both current and new reactors.

And in addition to that, we know about the ongoing decommissioning efforts and work in that area, and we're trying to align ourselves with that where it makes sense. So I'm trying to build into this decommissioning provisions, where that makes sense. And it does, it lines up very nicely with what we're doing, in a sense. If you look at what we're talking about, it really breaks down into functional requirements in terms of maintaining and restoring core cooling and primary containment and then maintain or restoring spent fuel pool cooling, okay? And so when you look at it that way, when I take the fuel out of the reactor vessel permanently, I can remove any

provisions having to do with core cooling and primary containment and focus only on spent fuel pool cooling and secondary containment, if your design has that, okay?

So we've tried to build those provisions in right off the bat. Now, they're not perfect, but they're a good start, I think, and we can see where that takes us, put that out there in public domain and see if we can't fine tune that and make that even better. So that's the idea. So this is applicability, there's the decommissioning.

And then you also see, and George Tartal will talk more about that in a few slides, we have additional requirements for new reactors, in terms of an assessment requirement there. We can talk about that. We have a slide on that later.

CHAIRMAN SCHULTZ: That's important. This is an important slide, so I want the committee to be able to focus on it. I've got a question on the last line, and perhaps we'll go above that. And my question is, with regard to decommissioning, we say one statement, once the irradiated fuel is removed from the spent fuel pools, all requirements cease. It's the line above that that I wanted to focus on. No reactor requirements, the fuel is permanently removed from the

reactor.

It seems, well, there are requirements placed upon the spent fuel pool that have been developed because the reactor is operating. Are we looking carefully at the requirements that we have once the reactor is not operating with regard to what we've asked for the spent fuel pool? In other words, the stand-alone spent fuel pool, are we looking at that particularly and determining what does not need to be done because the reactor is not operating and the operator's attention is not focused on both elements: the reactor operating, as well as the spent fuel pool? That's one of the key issues that came up as a result of Fukushima. Are we able to set up a process that provides the divorce between an operating reactor and the spent fuel pool so that we don't retain some elements of spent fuel pool protection that, in fact, should not be required if the reactor is not operating.

MR. REED: Yes. We're thinking that way, exactly that way. I think if you look at some of the facilities that have been recently decommissioned, you'll see that they removed the EA-12-051 requirements, okay? That's the spent fuel pool level instrumentation requirements. There's no distraction any longer that's possible. So that doesn't make

sense, so we recognized that.

And I'll also say that, right now, it's not perfect what we have there. I think if you look, there's a certain period of time that, once it passes, you could probably say that what I really only need for that spent fuel pool is EDMGs, okay? But right now you see it written, basically, all the spent fuel provisions that might apply.

So we realize that's there, too. And I think that's an area where we want to get some feedback and see if whether we can make that a little bit more fine-tuned and help make that a more efficient process in decommissioning. So, yes, that's exactly our thought process: what do you need for spent fuel pool only once you're into that domain?

MEMBER RYAN: I think, when I think about a spent fuel pool, it's empty, all the fuel is gone, and it's been cleaned and maintained and whatever you want to look at. What kind of a license would apply for, under what part? I mean, to me, it's a materials --

MR. REED: For this situation you're talking about?

MEMBER RYAN: Say again?

MR. REED: You mean for an ISFSI,

independent spent fuel pool installation?

MEMBER RYAN: No, I'm just thinking if you want to tear it down, if you want to get rid of it. If you want to have it for a different purpose, then you'd have to figure out what licensing applies for that purpose.

MR. REED: You've stumped me.

MR. BOWMAN: I think I understand what you're talking about, but we aren't addressing that problem. What we're looking at is at what point can we cease to have a formal requirement for mitigating strategies for spent fuel pool that still contains irradiated fuel? If you look to the relaxations we've done for the decommissioning licensees Kewaunee and Crystal River and we've got the request for San Onofre, we looked at what's the decay heat level remaining in the fuel that's within the pool, how long would it take before a problem would occur that would require positive action on the part of the licensee, and is there sufficient time for the licensee to make ad hoc mitigation strategies, rather than having the formal, I'm going to get the pump there in such a time and start, well, pouring water in or spraying water over the fuel. We haven't got the language like that in the proposed rule. We'll be seeking feedback from stakeholders on

whether or not that should be formalized in that manner, recognizing that we'll still have the mitigating strategies that came out of the B5B effort in place, is it necessary to retain these other mitigating strategies and at what point can we remove those?

MEMBER RYAN: That's helpful. There's a lot of detailed work in front of you, I guess.

MEMBER REMPE: I meant to get you on the prior slide and I wasn't fast enough. But as you mentioned, we don't have the complete, like, the guidance for this draft rule. When are we expected to get it?

MR. REED: Well, I'll give it to this committee when I get it. How's that?

MEMBER REMPE: Is that going to happen in the next year?

MR. REED: Yes. Actually, realistically, we meet with the committee on the 4th and we have two working days next week, so I'm in the office, and there's three the following week and we have to meet with the full committee. So I wouldn't expect miracles. We might be able to give the committee more, better language. We are changing the language. It's still changing, and we're still having a lot of internal interactions.

MEMBER CORRADINI: For the rule?

MR. REED: Absolutely, yes. And in terms of the guidance, I think you've got a pretty good feel of what the mitigation strategy guys are going to look at from the discussion yesterday. That work is ongoing. Eric is working with the folks in the industry to get Rev 1 and get that in a way that we can endorse that.

We have a lot of work, we've already interacted with industry on NEI-13-06. I think we're in a good place there. We can probably get that endorsement. So if you take a look there, we're probably very closely aligned there. And it comes down to NEI-14-01, which is really about some of this integration command and control and SAMGs. And so that brings up the SAMGs issue, and that's been a -- we'll get to that here in a bit. I think that's the main area where we have to focus and see what we want to do there.

So if you take a look at the supporting guidance, it's pretty much the supporting guidance that would be built into this. So that's not very satisfying. I'm sorry, but that's -- I don't know --

MEMBER REMPE: It is what it is.

MR. REED: It is. Actually, we're making progress, and we're really doing the best we can. But

we're not, we're not in any way, shape, and form, right now to do something by December. I mean, that's the practical reality. But we've done an awful lot of internal interactions, in fact, I think that we need to work through to also inform this rulemaking. I think this committee is pretty aware of that, too. How's that for absolutely I don't know?

MEMBER REMPE: Unclear answer?

MEMBER CORRADINI: I took it as to be determined.

MR. REED: Yes, that's it exactly. It's an awful lot of words to say to be determined.

CHAIRMAN SCHULTZ: Let's go forward, Tim. Thank you.

MR. REED: So, you know, I think this is probably the most important part of the rule. I view paragraph B as kind of the heart of the rule, if you will, the central piece. And we talked about building this thing and bringing it together and integrating. To me, this is the part that's the integration part.

It's basically, very simply put, the first portion right there is really FLEX or what the staff called station blackout mitigation strategies. That's paragraph B1. Now we're calling it beyond design basis external event mitigation strategies and

guidance.

Then we have the EDMGs, which are already in existence, of course. They were put in place by the B5B of the ICM order of 2002, then remained generically applicable to the power reactor severity rulemaking as 50.54 changed, too. That's already in place, too, and we would move those in because I think folks probably are now very understanding that those strategies are almost identical, in large measure, to many of the strategies here. It makes a lot of sense for them to be here.

And then, finally, we have the one provision that are not requirements right now. So we have an order requirement that we would put in place, a currently existing requirement in the current federal regulations, and we have a voluntary initiative SAMGs. So those are the three guideline sets, if you will, that we would integrate into the currently-existing symptom-based EOPs.

So that's how we've bulked these together, and it lines up very nicely. They're all basically functionally based. It's very nice how it worked. And what we want, of course, licensees then to do is to maintain this integrated accident response capability that has these basic guideline sets and,

essentially, seamlessly builds them into their symptom-based EOPs, okay?

And then I'll hold on this slide for a second. It's to be worded with sufficient staffing and command and controls. We'll get to the next slide.

So I'll stop here and let folks digest this a little bit. And if you take a look at the draft rule language, basically that's what we're trying to do. Now, what that means is, as a practical matter, as a practical matter and what you've heard so far and what you heard yesterday all day long is FLEX right now being implemented. It's being implemented into, for PWRs, these ECA-0.0, I believe, is the station blackout EOP. What that does is builds FLEX or the station blackout mitigation strategies right into the EOPs and a station blackout EOP. The EOPs right now do have transitions to the SAMGs. They do exist right now. Of course, voluntary SAMGs do exist, okay? So those transitions do exist. Of course, I think we'll be a little bit more thorough in that integration than what exists right now if SAMGs do become requirements, okay? And extensive damage mitigation guidelines also already exists, although the complexity there is, of course, you lose command and control and you have to reconstitute command and control. But once you do that, you're

going to be back into pretty much a normal command and control situation with the EOPs.

MEMBER RAY: Tim, I can't imagine anybody taking exception to the idea that we ought to do what you're doing in anticipation of something being, exceeding the design basis, for example, or, for whatever reason, becoming a severe accident. But do you think, given all that you've just recited and gone through, that anybody sees what you just described as necessarily a substitute for changing the design basis? In other words, is this seen by anybody as an alternative, as opposed to simply preparing for something that inevitably we should prepare for?

MR. REED: I hope it's not. In other words, this is all beyond design basis right there.

MEMBER RAY: Whatever design basis happens to be.

MR. REED: That's right. It is. Everything here is clearly beyond design basis. They have to provide that additional capability.

MEMBER RAY: Right. And it certainly fills an area of need and isn't an alternative to some other regulatory action that we would take? Okay.

MR. BOWMAN: If I could add -- this is Eric Bowman. One of the fundamental reasons behind why the

order EA-12-049 was issued was a recognition that there can be uncertainties in calculating hazards from external events.

MEMBER RAY: Absolutely, yes.

MR. BOWMAN: Such uncertainties would make engineering a solution more difficult, and that's why you get the flexible response that is inherent in the industry's FLEX program. One of the members yesterday mentioned an even more flexible response that might have been a better way to deal with the situation. But going in and deciding that you know enough to engineer a solution to something that's beyond design basis event presumes that you aren't going to have an event that is unpredicted yet. So it's --

MEMBER RAY: Well, I mean, I could argue with that. I don't think we should. The implication of what you just said is, well, this is a better way to go than to design for the event, and that isn't, I don't think that's the intent here.

MR. BOWMAN: It's a different way to go. We struggled with the --

MEMBER RAY: The word different is almost the same as the word alternative, and that's what I asked Tim is is this an alternative and he said no. And I'm saying I don't see it as an alternative personally

because I think you're always going to need to be prepared for something that exceeds what you were designed for. But your recitation makes it sound more like, well, maybe it is an alternative.

MR. BOWMAN: It's a different way of approaching the problem. We have not ruled out modifying the design or licensing basis if we have sufficient information to justify doing that.

MEMBER RAY: Well, I think, at times, that's not very clear, but I wanted to be clear about it.

MR. REED: Yes, I think this is an extended set of tools, I think additional stuff for the toolbox, you know. And I think that's kind of the nice thing about some of this, some of the benefits of the mitigation strategies work that's going on. It's provided an extensive and real additional capability for these folks. I'm not sure you appreciate that. This is a real deal, and that capability is available in a much broader way than I think people may recognize. All those features can be made available after core damage. And in fact, many of those exact same strategies are better than the ones that were the EDMGs originally. And they're the same, but they're only better. They're much more capable. They're

in-depth. I think they're all site-wide.

So there's a lot of benefits to this stuff. So this stuff does really integrate together and just extends that design basis.

MEMBER RAY: And, again, nobody is going to argue that it's better to avoid core damage than it is to mitigate it.

MR. REED: Absolutely, absolutely.

MEMBER RAY: And we lose sight of that sometimes, I think, just because of all the rhetoric and how fast we go through these things.

MR. REED: Absolutely, absolutely. In fact, if I don't remember to say that -- I think I'll try to say that in the SAMGs space. If you're in SAMG space and you're trying to reduce risk and you have a substantial amount of risk there, my first question is you better stop it from ever going there. The best way to answer that problem is never go to core damage, and that's the way we've always done it.

So I agree. But right now, we're really talking about stuff that's not well defined, it's an additional, kind of all-hazards design basis capability that people can have and use if they need to.

MEMBER RAY: And it's needed. Don't get

me wrong, but, I mean, it's murky at times whether we're talking about an alternative, as opposed to something we ought to have because there's no way of knowing that we've got all the bases covered.

MR. BOWMAN: Well, the other piece of it, as well -- it was brought up yesterday. I forget who brought it up, but it provides another tool in the toolbox. One thing the staff is struggling with right now is providing guidance on to what extent the mitigating strategies could be credited and a probabilistic look at the risk for the plant and the significance determination or other action, but it reduces the risk for licensees within the design basis, as well, rather than merely changing the capability of the items that are the design basis protection.

MEMBER RAY: Yes. But, again, when you contrast it that way, it makes it sound like, well, let's do this instead of that. That's where I think we need more understanding.

MEMBER REMPE: So last night I was thinking about this some more, too, and maybe the answer is, again, I don't know yet. But if something were to happen and the equipment wasn't kept up or FedEx isn't kept up, what would happen on enforcement? Would all of the organizations that belong to it be equally fined,

or would you -- I mean, have you started to think about that yet or be placed under some sort of restriction? And I didn't hear that discussed yesterday, and I was just thinking about it last night.

MR. REED: That's definitely thought about.

MR. BOWMAN: We have thought about it. We haven't come to a final conclusion on what the way forward for oversight, particularly of the off-site organizations, like SAFER, will be. We've got options, like the vendor oversight program.

For them, though, we have to recognize that they're a backup to all the equipment that's already on the site. So --

MEMBER REMPE: It's a backup, but if one starts giving them more credit for the backup, it's going to be an issue.

MR. BOWMAN: And that's where it also has to, we also have to look to how much does the existence of the off-site equipment truly affect the on-site risk.

MEMBER REMPE: It was just a question I was thinking about. Thanks.

MEMBER STETKAR: Tim, I've got a simple question, and this is something you're going to skip

over, so I might as well get it out. In the mitigation strategies, you said that, indeed, the rule will apply for both operating reactors and new reactors. I just want to make sure that I understand some words in here. It says strategies and guidelines to mitigate beyond design basis external events from natural phenomena that result in extended loss of all the AC power concurrent with a loss of normal heat sink to the, loss of normal access to the ultimate heat sink or for a plant for which the final safety analysis report references Appendix D or E to 10 CFR Part 52 a loss of normal access to the normal heat sink. Now, in regulatory space, that means AP1000 and the ESBWR. Can you explain that "or?" Is that an exclusive "or?" It is an "and?" Is it "do the ESBWR and AP1000, you need to have mitigating strategies for an extended loss of AC power," yes or no?

MR. REED: I'll let -- George, do you want to . . .

MR. TARTAL: I think I'll deflect this one over to --

MR. REED: Okay. That's actually an NRO question.

MR. MCKIRGAN: So if I could, yes, this is John McKirgan. I think the simple answer is yes. The

AP1000 designs and the ESBWR do have strategies. I think what you'll hear, and maybe I'll defer part of the answer to that question to after George presents his piece of the language, what you'll hear is, you know, the nature of those strategies are a little different. Because of the design, they have more time to address the issue. And so I think if you've had a chance to read the original version of NEI-12-06 and the ISG, there was a specific appendix in that guidance for the AP1000 design. And so that was a little different.

MEMBER STETKAR: Those are NEI reports. This is proposed NRC rulemaking so . . .

MR. MCKIRGAN: You're right. Let me see if I can clarify. So the AP1000 sites have strategies that they proposed to the staff. We're reviewing those. They have committed to the SAFER, the FLEX, the phase three portions of that approach, and so that is our expectation.

So they do have these strategies. We're reviewing verbal submittal now, as a matter of fact. Vogtle received an order. There's a fairly complex history that I don't want to get into now about who received what when. Vogtle received an order, Summer received a license condition. But we can defer that

and we'd be happy to share that --

MR. BOWMAN: I think I might be able to add some clarity to it. In the order EA-12-049, currently operating reactors were subject to the requirements that were included in Attachment 2, which required that the guidance and strategies be capable of addressing simultaneously an extended loss of all alternating current power and a loss of normal access to the ultimate heat sink.

The COL holder at the time was Vogtle 3 and 4. They were subject to the requirements of Attachment 3, and that was phrased as the mitigating strategies that had to be capable of addressing a simultaneous extended loss of all alternating current power and a loss of normal access to the normal heat sink. In recognition of the fact that, during the station blackout period, the first 72 hours, an AP1000 licensee would not lose access to the ultimate heat sink because, at that point, the ultimate heat sink is the atmosphere. It's not going through the circ water system or some other fluid-based system to get the heat out. So that's why the phrase was the normal access to the normal heat sink, and that's how it should be read.

We may need to modify the language to make it clearer if it's confusing to anyone. But the intent

is making that set of requirements generically applicable, and we include the ESBWR as the other passive plant that has the same sort of treatment.

MEMBER STETKAR: Eric, thanks. That helps me a lot. I hate to quibble over words. I read the "or-comma" with a parenthetical phrase as somehow an exclusive or what I heard you say is it's actually a logical "and." That's what I heard you say. Now, if you didn't intend it to be that way, think about it carefully. In other words, if I need to look at mitigating strategies for an AP1000, I need to account for an extended loss of AC power and loss of normal access to the normal heat sink. If you don't intended it to be that way, if you intend it to be something different, make it clear.

MR. BOWMAN: Well, yes. Personally, I love to quibble over words. It was supposed to be between the loss of AC power and either loss of --

MEMBER STETKAR: Or for these things, loss of -- okay.

MR. BOWMAN: And we'll take that back.

MEMBER STETKAR: Okay. I just hung up on it because I tend not to look at the long history of stuff that's evolved, especially in, you know, industry, you know, documents and stuff like that.

This is rule language, so, I mean --

MR. REED: And by the way, in rule language, every word matters.

MEMBER STETKAR: It does.

MR. REED: That's why it makes it hard.

MR. MCKIRGAN: And if I could, I just wanted to make sure it was clear, those licensees and applicants are required to have these strategies.

MEMBER STETKAR: That's -- right at the moment, given the Vogtle and Summer situation, I just want to make sure that the next AP1000 that gets built that isn't Vogtle or Summer, make sure that they know what they need to follow.

MR. REED: Should I -- I go too fast on these, and I recognize that. So I'm going to try to slow down. I talk way too fast.

CHAIRMAN SCHULTZ: Well, I guess, Tim, my questions are, it's in the language, as well, and I'm taking that you've got some fairly general terms here in this slide. And I'm presuming that was a way to frame the rulemaking process and that the detail associated with establishing what those general terms means will come out in the rulemaking process. And I'm looking particularly at would make them generically applicable. We could talk about that for the rest of

the day, I'm sure, what that means: generically applicable. And then also regulation would require SAMGs. So, I mean, that's a general going-forward mission, and the details of determining what those requirements would be, there's a whole spectrum of both actions and requirements and obligations.

We talked yesterday a moment about how, so we have beyond design basis external events and we want to be sure that, as we put our attention toward that, we don't put so much attention toward that that we upset all of those things that we want to do to assure appropriate, safe, routine operation of the facility. So we have to keep that in mind as we go forward with all of this.

MR. REED: Well, I think probably several of the members of the committee know that I've been involved with FLEX regulations since the get-go, and I've also been involved with risk prioritization initiatives, so I'm very familiar with what is, frankly, an extraordinary amount on the plates of licensees out there, and they're having to, basically, prioritize that and make decisions, tough decisions. You heard a little bit of that yesterday at the very end, and that is a very big concern of mine, too. There's been an extraordinary amount of work by very,

very good people, very talented people. Thousands and thousands of hours. A lot of capital has already been spent. A lot going into implementing the mitigation strategies order.

And as we extend it into other areas, it gets me very concerned that we're taking a lot of attention on capital resources and focusing away from the day-to-day operation and reliability stuff that really matters at a much higher level in terms of safety. So I definitely have that very same concern, and I think the committee is sensing that, too.

It makes sense to have some of this stuff in place, no question. But if we take too much attention and focus and push it on that, you know, looking there, guess what? We're not making it better, and we're probably making it less safe. So we've got to be careful about this and how we do that.

So, absolutely, I agree 100 percent. That should be our mind set as we move forward.

MR. BOWMAN: To address the other part of your question or comment, the phrase of making it generically applicable, it's intended to be a recognition that what we're doing is not merely codifying the words that went out in the order previously. We're taking into account the lessons

that have been learned and the implementation. That's why we aren't just going forward and keeping in place the interim staff guidance that was issued in 2012, but we're working up the new regulatory guidance to accompany the rule. And that's why the words that we're proposing in the rulemaking don't exactly match what it says in the order.

CHAIRMAN SCHULTZ: I appreciate that explanation, Eric, because that's not how I think everybody would interpret generically applicable. So that's, it's very interesting that you provided an elaboration which is different than what I would have taken, and I think many others would have taken a different interpretation of it.

MR. BOWMAN: When you do orders -- although in this case, in Fukushima's case, we did have quite a bit, I think it was an unprecedented amount of public participation in those orders. Prior to that, I'm not sure that's ever happened in order space. Certainly, a ton of public participation in development of the guidance for the order, but there was actually even public involvement prior to the March 12th, 2012 orders. But that's not like -- in rulemaking space, we have a lot of openness and a lot of public participation. External stakeholders get much more

ability to influence the process, and we've learned things in implementation space.

All of that factors into it, and so we try to find out did we do it right, did we hit the mark, shouldn't we have done it, can we fix it, can we do some things differently? That's making it generically applicable. I don't like the word codifying because codifying says, hey, we already did it, we're just going to put it in the regulations. No, that's not part of rulemaking and that's not the way we do things. So that's why I'm pretty sensitive to the words generically applicable, and that's what they mean when I use them and that's exactly what --

CHAIRMAN SCHULTZ: I appreciate that. I'm glad to get it on the record. Thank you.

MR. REED: All right. So we're talking about the way this paragraph B is structured, these three guidelines, guideline sets, if you will, and integrating them into what are currently in existence as the symptom-based EOPs that went into place after TMI. And there was an awful lot of work during the 1980s. Some of the folks here were involved with that. And the way this is structured is consciously structured to try to leave the EOPs and all that work intact, not unnecessarily or inadvertently cause any

need to go back and basically dig up any of that. That work should stay intact, and we tried to structure it such that we want the, you know, connections, the transitions, and all that to be built into these guidelines such that they are basically one smooth set of, if you will, or one integrated seamless capability across the guideline sets.

So as a practical matter, you heard how the FLEX guidelines are being built right into the station blackout EOP, so you understand how that goes. And I just give you one example.

So that's the idea, to integrate them and leave that work in place and, hopefully, that's what we want to try -- this rulemaking language should be structured in that way. And if it's not, I certainly want to hear about it because there's no intent to revisit the EOPs and that work that's been done in the 1980s. So that's why it's done that way.

I believe previous draft versions, you might have seen them more listed altogether, and that's why you see a little bit of change on the language the way it is today.

And then I think the other thing is to recognize that, once you have this integrated response capability, well, you need to have command and control

in place to implement that across these different guideline sets and the way the accident proceeds and enough people on the staff to make that happen. In my personal view, I think, and this is another area we want to understand, I believe everything that's been done, in terms of the staffing analysis and that work there, should, in fact, be the staffing that we'd require for this entire response capability. And I think that command and control structure that's in place right there should be sufficient, too. And why I'm saying that is pretty simple. If you have the command and control structure to deal with a beyond design basis external event for your entire site, damaging multiple units, and being able to handle that situation, making calls to off-site resource centers and doing all that, I think you could then extend that into a core damage scenario. I think it's actually pretty simple to do that. In other words, you already have the command and control in place.

So that's what I'm trying to say there. In other words, there's a little bit of a difference here. The command and control and staffing right now has been linked up directly to mitigation strategies, the mitigation strategies order they implement right now, but will they support that with also SAMGs? It's a

slight spread, if you will, in the regulatory into SAMGs, too. But I don't think it makes a real impact on licensees, and I want to make that clear as another area where I would point this out and say, hey, look here, what are your thoughts? So we have to understand what that is there and if, in fact, if it's real.

MEMBER SKILLMAN: Have you tested that assumption with a couple of different licensees?

MR. REED: Not at this point. I'm doing it verbally right now, and it's something I would want to ask questions about to see if, in fact, that's the reason it's back there. And every one of these areas, this is the great thing about rulemaking, I can put a proposed rule out like that, ask all these questions, try to get all this, and try to hit the mark on the final rule I'm getting right, you know, so I don't do anything that isn't going to necessarily impact. So this is an area where I'm just trying to say I think it looks like it's all in place, and I don't believe it's an impact, but, hey, tell me, tell me what it is.

We're going to be ahead of schedule here if we don't start getting this committee to wake up and ask questions.

MEMBER CORRADINI: We can start arguing with each other if you'd like.

MR. REED: If I have to, I'll try to get that to go. I've been in the ACRS a long time, and that's a strategy I use if I have to.

So the next thing I'll -- I'm going to skip, and you're going to see paragraphs C and E. I'm holding D for the next slide, and that will be George's slide. So this is just convenience to fit it all in one slide. And I'll start off C, but we have the expert here if you want to get into the details. It's Eric on equipment requirements from the mitigation strategies order. But once you see, and if you go to paragraph C --

MEMBER STETKAR: We do. So I'll just slow you down and stop you right there. The words say equipment relied on for the mitigating strategies required by paragraph B1 of this section must be reasonably protected from the effects of severe natural phenomena that are as severe as the design basis external events in the licensing basis for the facility. That means we design it, we make sure that this equipment as good as but not necessarily any better than any of the equipment that is disabled by the exact event that we're trying to protected against.

I have a real personal -- this is subcommittee, so I can say I have a real personal

problem with that notion. If this equipment is supposed to protect us against events that are more severe than the events for which we've designed the plant, why do we not have assurance that it has margin, and we can define what that margin is in guidance but margin, additional margin against those events. Because I read this, and it just says if the stuff in the plant is going to fail at a 0.5g earthquake, this stuff has equal likelihood at failing at that same 0.5g earthquake. We don't have to design it to have a lower likelihood of failing at that same earthquake, so what are we buying?

MEMBER CORRADINI: Can I ask -- so I'm kind of with John, although yesterday in the discussion with the utilities I had the sense that they felt there was margin. But I think there's a need to somehow quantify it or at least recognize --

MEMBER STETKAR: In the rule, I'm sensitive in a rule that you do not want to specify how to do that. You want to specify the intent. And to me, the way this reads is the intent is one does not need to design it with any different thought process than I design the safety-related stuff in the plant. Not any worse, certainly; but not any better. It does not need any additional margin. So I'd like to kind

of explore that. Again, notwithstanding any other industry guidance because industry guidance can say whatever it is. This is rulemaking.

MR. BOWMAN: This is an area where we may wind up changing the rule based on the outcome of the draft COMSECY that will be subject to discussion later on. Where we are with this is a direct result of the direction that we got in the SRM to COMSECY-11-0093 that told the staff at the outset of the beginning of this regulatory action to take the actions that had been recommended in Recommendation 1, which were -- the major one of concern that would have allowed us to do that was the establishment of an extended beyond design basis limit. Being told, no, you cannot in these regulatory actions establish an extended beyond design basis limit, it took out, essentially, the option that had been recommended in the portions of the NTTF report Recommendation 4.1, in particular where the task force had recommended adding an additional 15- to 20-foot margin for the flooding hazard.

So that's where we were with it. If you look at the wording that was in the order, it was a little bit different than the wording here. It just said reasonable protection against external events, and the industry guidance, if you look at it, does point

to other information about hazards. But we're very sensitive to arbitrarily choosing an amount of margin to add to the design basis. And the other thing is, recognizing that if you're safety-related structure systems and components are only protected to a certain level, there may be no benefit to having something that is protected to a greater margin than you require for the safety-related structure systems and components. If I have a generator that's protected to 20 feet above the protection that's afforded the electric power distribution system, it's great. I have a generator that will run, but I don't have anything to connect it to.

So that's the dilemma we had, in large part. Tim had mentioned in the beginning of this presentation, if we had the opportunity to accomplish the reevaluation of the external hazards prior to embarking on the mitigation strategies development, we probably would have come up with a different set of requirements. But we are where we are with it, and that's why we've got the proposal that Mr. Reckley's drafted that's going to be presented to the commission to come to a different conclusion.

MEMBER STETKAR: Let me stop a moment because you guys are really good about monopolizing the

time, so I'll stop right here. I hear what you're saying, and, if I was someone who basically did not want to do something, I could interpret all of what you said the way you said it. I'm now seeing words in a rule. And, again, I am not advocating that a rule should specify how to do it. A rule should -- the term specify, the intent or what should be done.

The rule now says effects of severe natural phenomena that are as severe. That is now an even more strong limit that I don't even have anything more severe. I have to think of things that are as severe as the design basis. So it's even more restrictive than what you said now in the rule language. And, again, in a rule, why can't you say that it should have additional margin against events that are as severe?

MR. REED: Because I have to justify that in backfit space, so I need to have a rational backfit justification for imposing that new requirement and that would be a substantial new requirement. So while I understand that rulemakings establish the minimum set of requirements and if I'm going to go beyond that I need to have a very sound basis. I mean, I know that's process. I understand that. But that's the reality in rulemaking space.

MR. BOWMAN: And the other reality is how

much additional margin should there be? Is that something that the commission should delegate to me to decide, or who is supposed to make that decision? We do have the ongoing reevaluation of the external hazards under NTTF-2.1. You see the language as it is because we do not want to get ahead of the decision on the part of the commission in changing the language to presuppose a policy decision that they haven't made yet.

MEMBER CORRADINI: Can I have you guys repeat everything you just said because what John is suggesting seems reasonable. How you put it in the language, it appears to affect you. So say it one more time of why it can't be because one could think of at least as severe or as severe with margin, and then you said that can't be done. One more time.

MR. REED: Sure. I mean, if I were to say let's put in some requirements to say you shall have additional margin on protection of equipment that you've already put in place right now to the tune of $3 or $4 billion in EA-12-049. Guess what I just did? I raised the protection level on all the equipment you just implemented. They're going to have to go -- it's going to be an extensive amount of new modifications and new costs. Okay. What's the benefit for health

and safety? Where am I going to be on 50.109 backfit? Where's my safety benefit? Do I have a substantial additional benefit with regards to safety, and are the costs, both indirect and direct, justified in view of that?

MEMBER STETKAR: So because of time constraints, because we have to get orders issued, and because the industry decided that they will follow their interpretation of a very restricted notion of what I need to do, and they took the risk of that, we're now in the situation where we are. Is that a fair characterization, or is that an unfair characterization?

MR. RECKLEY: This is Bill Reckley. We're going to talk about this a little bit later this morning. And I know it's a bit confusing because you'll have basically two things in front of you to write letters about in the early December meeting. One is the rule language. And as Tim and Eric are describing, they weren't constrained because the Commission hadn't made a decision. Their constraint was because, you know, I had failed to get that paper up earlier to ask the Commission to weigh in on basically replacing that language about as severe as the design basis with what we were being asking in the

COMSECY, which the language will become -- well, I won't say what the language is. I'm not a rulemaker. But the effect will be that the design basis language will be replaced with the reevaluated hazards coming out of Recommendation 2.1, which is the guidance used for citing of new plants.

MEMBER STETKAR: But, Bill, that is still -- I'm glad you said new plants, so let's divorce it from the existing fleet because I don't want to get into words over those. For a new plant, that will become the design basis, right?

MR. RECKLEY: Largely, yes.

MEMBER STETKAR: Okay. This says, this says for a new plant I do not need to design any of my mitigating strategies with any more additional margin above that design basis. So we'll keep it in the abstract new plant arena because it's a little bit less politically incendiary to do that.

For a new plant then where I have the new hazard, I have the new flood level, at least our snapshot of those in time, those become the design basis for that new plant. This says for that new plant I don't need any margin above that, right?

CONSULTANT SHACK: If you go to the next bullet under the equipment qualifications, the

equipment has to receive adequate maintenance such that it's capable of fulfilling its function following design basis external event. So you've got one requirement that says you're only protected up to the design basis event, but the next requirement says we ought to work on a beyond design basis event. It seems somewhat contradictory.

MEMBER CORRADINI: So I have a question. All of this is deterministic. It seems to me that, if you're going to go down this path, you'd want a risk-informed approach that says, at the very least, it's got to be the design basis, and then we evaluate the risk and the consequence when I go beyond it by some amount. And all of this, to me, strikes me as we're parsing it in a way that makes it very difficult to unravel.

MEMBER STETKAR: See, that, in some sense, that might be part of how to demonstrate the additional margin. There might be other ways of how to demonstrate the additional margin. But if it's codified in a rule that I don't need to do that, then you never get to the question of how do I demonstrate that additional margin on a site-by-site basis.

MR. REED: It's interesting. You know, I personally do --

MEMBER CORRADINI: I have smarter people in the committee that --

MR. REED: I think it's an interesting idea. I view the mitigation strategies order, and this is what we're talking about in these two provisions that you brought up, Dr. Stetkar and Dr. Shack, just as basically providing an additional defense-in-depth capability, recognizing the uncertainties associated with beyond design basis external event. And those words are right out of EA-12-049. And I think it definitely does that.

But when you say, okay, I'm going to establish something even beyond that, whatever it might be, you know, twice the seismic event or three times or something 50 feet higher, I don't think that was ever the intent, personally, of that order. It was an additional capability that's there, an all-hazards capability if you will, that's there. And I think it does that, and that's what we're trying to do here.

Now, if 2.1 comes along and establishes a new envelope, then we're going to have to deal with that new envelope. And that's another issue.

MEMBER BLEY: You had a key phrase there, and that was about the uncertainty.

MR. REED: Yes, that comes right out of the

order.

MEMBER BLEY: But that's going to be in the rule language? I mean, that's the key thing. You know, that takes care, at least for me, the things Ms. Stetkar has raised and it's close to what Mike said, at least from my interpretation of it.

MR. REED: Yes. It's in supporting section by section right now. You don't see it here, but I view the extended loss of AC power, loss of ultimate heat sink as a surrogate on-site condition that if you design a capability to address that situation and you give protection to your equipment from external events for your facility, you've developed an additional capability that's sufficient for uncertainties for beyond design basis external events. I don't think you should pretend that that's giving you anything more than that. Just my personal view.

MEMBER RAY: Back to the conversation we had earlier, it is a diverse, an additional capability.

MR. REED: It is.

MEMBER RAY: It isn't a substitute for a --

MR. REED: It's multiple sets of equipment. It's different. It's located different.

I think there's --

MEMBER RAY: It isn't a, it isn't a way of addressing a hazard that exceeds the design basis because it is, as John was implying by his questions or asking by his questions, how we deal with events that are beyond the design basis. It is an additional means of dealing with beyond design basis events.

MR. REED: It doesn't get you margin by more protection, but it does give you something there by additional capability and flexibility. And I know that's a little different way of doing it, but I think it's very real.

MEMBER RAY: Well, in deterministic space, that's what defense in depth did, at least going back to my roots. Nobody claimed that you would never, ever have an event beyond the design basis, but you had defense in depth. Well, this is enhancing that tremendously, but it's not changing it to become something different.

MR. REED: Exactly.

MEMBER RAY: Okay.

MR. REED: That's my perception, and that's why I view these things. I'm not sure that's satisfying to the committee, but that's --

MEMBER STETKAR: That's satisfying to me

because I see people using installed equipment in their plant design and fortified in some cases because they haven't done that yet to only the design basis as part of this mitigation strategy. So I'm not talking about dropping diesel generators into the site with helicopters. I'm talking about taking credit for installed equipment that actually exists in the plant. I'm saying I only need to qualify that equipment up to the design basis seismic acceleration to satisfy this requirement.

MR. REED: I think that's what this accomplishes. And I don't want to advertise it as being anything more than that. People think or are perceiving it's much more, and I don't believe it is.

MEMBER STETKAR: And, yet, this is all in the context of things that are beyond that.

MR. REED: It's saying words I think -- I think you've got a good point there and I think also Dr. Shack does, too. Maybe we ought to look at these words a little more carefully because they may be not the right words.

CHAIRMAN SCHULTZ: I think we do because it seems as if, and we talked about this in general terms and we'll talk about it more, as Bill indicated, but we're trying to move forward, put in place a new rule,

and, yet, we seem to be handcuffed by the way we have done things before and the language that we can use because it's already in place. And, yet, we are doing all of this because the Fukushima event happened and caused us to reawaken in a number of different ways. The first recognition was that our regulatory process is fundamentally sound, the plants are fundamentally safe. However, there are things that we can do. And, yet, as we're moving ahead to do these things, we find the language is bound up in the way we have done things before, and that's why I question just in terms of timing or in terms of how we do things. And I know things have to be done rapidly or they won't have an effect on the current generation of plants. Rapidly is in the eye of the beholder, I guess. But it is important to keep in mind that we shouldn't be constrained by the previous regulatory framework, and we've talked about other frameworks that might be utilized in order to make good decisions in specific areas of improvement that make sense.

And I think what John is pointing out here, using the old language with new approaches, it doesn't seem to make sense, in terms of setting the requirements or, not requirements, the expectations. John said the rule sets expectations, and then it's up to the

implementer to determine how that should be done.

MEMBER BROWN: I mean, I'm just sitting here listening. I mean, I tend to -- not sympathize, that's the wrong word, but understand the idea that the mitigating stuff we have on site, that you've got to establish some ground rules for which it's going to be designed. Your comment is if we design it for anything greater, the stuff we've got in there may have broken and, therefore, we have nothing to connect it to.

I would extend that a little bit because, while I kind of agree with that, to me, you're looking, if you go beyond that and you have stuff that breaks, you're going to be dependent upon stuff you bring in, not necessarily stuff you have on site, because you don't know what's going to break. You may have to bypass some electrical systems with cables out in the plant where you can. You're going to be doing a lot of stuff like that.

That type of stuff you can bypass. A generator with a set of bearings that break, you haul it out of the place wherever it is you want to hook it up. It takes a long time to replace bearings. It doesn't take a long time to do their stuff, and, therefore -- but if you look at the FLEX equipment, what do you bring in? Pumps. You're bringing in

generators, all kinds of stuff for whatever the circumstances are. You're still dependent upon the pipes. All the little fittings, all those pipes, you're assuming in some way are going to still be in place so that you can --

MEMBER STETKAR: The switch gear that you're plugging into, for example, is there.

MEMBER BROWN: No. The pipe that runs the water into the plant you're assuming is going to be there. The electrical stuff you bring in, you may be able to bypass stuff in the electric plant that breaks. The pipes you're still ultimately dependent upon. So there's a lot of subjectivity in terms of how far you go.

But if you ask me what you want to beef up, it's not the stuff you're going to haul in or place. It's the stuff that's there, like the fundamental, what I call the blacksmith technology: the valves you have to open, the pipes that have to feed into the plant. Those are the pieces that you are most subject to lose in the bubble and not being able to accomplish your goal of preventing, as opposed to allowing it to get into a severe accident space.

So I don't know.

MEMBER STETKAR: Let me finish, okay?

You have to establish a level somewhere. And if you put yourself -- I'm taking your side. You're in a never-ending death spiral if you say, okay, now, the mitigating stuff I put in the dome is going to be capable of twice the design basis accident. Well, now, how do you prevent that from keep ratcheting up and ratcheting up? If I'm going to do that, why am I not upgrading stuff in the plant so that I'll be able to use that if I -- I just think it's a never-ending death spiral and you're somewhat dependent on being able to bring in stuff from outside the plant, put it in, bypass electrical stuff, and hope your pipes are in place where you can run water in. Okay. I'll stop there. Now you can go argue, but I'm going to disagree with you.

CHAIRMAN SCHULTZ: Tim, that is objective. Go ahead, Mike.

MEMBER CORRADINI: Yes, this is how time marches on. But I think, Charlie, I might reinterpret what you said to be the -- we'll take piping since you call it blacksmith technology. There's margin there that could be determined by some sort of risk-related analysis that say, for a design basis set of rules and regulations, this is what it can stand, but we know it can stand more than that. By doing some analysis and understanding, I have margin. Now, once I capture that

margin, I might choose to not upgrade it. I might just choose to take that reliability and that chance of being beyond that as part of the future way I handle beyond design basis.

So I'm not disagreeing with what you're saying. I'm just simply saying the way the rule is written or at least the way the current one is written, it doesn't accept that possibility. That's all.

MEMBER BROWN: Naval ships actually have to have a lot of capability that they take, they account for damage. And they have a bunch of junk laying around. That's not junk, by the way. That's a poor choice of words. And they trained on being able to go in and connect stuff right directly, bypassing the entire electric plant, bringing in power separately from another plant and plugging it into special connectors or, you know, whatever you have that are mounted right on the component, still depending on that component still be able to run. There's a fundamental limit as to how far you go.

My only point is I think we can get wound up in working too hard on the language because you have to pick something for the industry to design to.

MR. REED: This very issue is the one we've been wrestling with for a couple of years, and it's good to

hear this interaction because you guys are --

MR. BOWMAN: The reaction I've got is that is what, as a practical reality, licensees are doing. We're seeing them depending on site-specifics. If they know that they may have a flood hazard of a certain level, they plan for where they can connect the generator to the electric power distribution system and where they're going to have to bifurcate the electrical power system so that it doesn't get inundated. And that's what you will see as an outcome if the Commission goes forward and accepts the recommendations in the COMSECY. We may wind up making that generically applicable as a requirement as part of this. But I'm very hesitant to say in regulatory language that you have to add margin because it's just as bad as using language like you have to provide reasonable protection. Reasonable means something different to me than it does to the rest of you guys, and I do believe you're all reasonable, but I recognize that we all have different opinions. The amount of margin that you can consider margin, somebody may think one millimeter over the reevaluated flood hazard is adequate margin. Some people may think you need 15 or 20 feet.

MEMBER STETKAR: Let me stop you for a moment here. How do you answer, and this is from an

actual plant, obviously will not be named, the attitude that says our mitigating strategies take credit for this equipment that we have installed in the plant. Now, that equipment is not currently safety related, so we realize that we have to enhance this equipment and right now we're doing that because we need to meet a certain deadline and we need to absolutely comply with the law or at least our interpretation of the law.

So we are enhancing that equipment to be able to withstand our current, our current design basis earthquake acceleration, which I'll use a bizarre number of 0.05g just so I don't identify the plant. And that's what we're doing right now. We need to get that done in this refueling outage so that we satisfy our interpretation of the rule. We've already reevaluated our new hazard, and we know that that's 0.1g. But we don't have to update our equipment right now to 0.1g because we don't know what that's going to mean. We don't need to design additional margin in because we only need to do it to 0.05g right now because that's our interpretation. So no notion of additional margin, and that's installed equipment. That's not helicopter dropped stuff with cables.

And, oh, yes, well, if it's later determined that our design basis hazard is 0.1g in

regulatory space, yes, we might need to further upgrade that equipment to 0.1g. No more because that's what the rule says. That's the attitude. That's the attitude that's promulgated by words like this, and that's what's really being done by the industry.

MR. BOWMAN: The way I would address that is that --

MEMBER STETKAR: I used seismic because seismic is a continuous spectrum, as opposed to floods.

MR. BOWMAN: I recognize that. That's an approach that can be taken by individuals that are working in stove pipes. We looked outside of just what is happening in mitigating strategies. We've also got the Recommendation 2.1, seismic activities, that include the evaluation of the phase one mitigating strategies equipment to the reevaluated seismic hazards, and that's supposed to be taking place in the not very distant future.

A licensee that operates in a stove pipe and acts the way you suggest they'd act is setting themselves up to have to redo it in order to comply with future requirements.

MEMBER STETKAR: Just remember, stove pipes apply to regulators, also.

MR. BOWMAN: Oh, I know. I recognize

that.

CHAIRMAN SCHULTZ: Here's a concern. So you put the language in here, and there's some level of dissatisfaction somewhere because we're only up to the design basis there. So now I can see a tendency to say, well, we need to then handle this with the revised definitions or evaluations of external hazards. And as we do that, we come up with a different, really a different conceptual approach to the reestablishment or the establishment, I'll call it a reestablishment because I think it could be a different approach, to establishing now what the new design basis is for external hazards. And instead of doing what I did 30 years ago, I'm doing it differently because I'm using a different philosophy. I can understand using different data. Data changes. But if you use a different philosophy in order to bump up or increase the design basis because you couldn't handle it here and establishing what one would do and your expectations for beyond design basis, then you really have created a poor situation again for the operating plant you were trying to work with so that they can continue their safe operation, which we've established exists. You say, well, we don't want to do that because it would cost a lot to upgrade that

equipment. By increasing the design basis and expecting the compliance to that revised design basis, that's going to be extremely expensive.

MR. REED: Well, it's interesting because we're mixing two different worlds here. There's a world where you want to establish a new event and there's an additional capability, and they're not the same. And that's what's going on here. So you want to talk about a bigger event, okay? That's basically, that's GDC-2 against, make it a bigger event. That's a defined event, a defined damage state, and I would have a defined way I would try to address that. Here we're talking about an additional all-hazards capability that's there for you. They're not the same, and every time we try to mix it it gets really hard and it's what's happening right here. If you have a new event and you have the risk information and it's there and it's warranted, then certainly we would take regulatory action in that circumstance, no question about it. But until you have that, I think we're in this additional capability thing, and maybe we can stretch it and maybe we can make it work and give that capability for some of these other things, even if we don't have all the risk information available, and get a lot of benefit there perhaps. But until there's

really sound risk information to take a regulatory action, you're not going to see that. Well, we're going to take your SSE now, and it's two or three times bigger. Before that happens, there better be some sound risk information because I have to do that in backfit space in an order. I mean, so --

MEMBER RAY: You do have adequate protection as an alternative.

MR. REED: Yes.

MEMBER RAY: Let's not forget that.

MR. REED: Yes, and that's based upon risk.

MEMBER RAY: But it's an alternative to backfit space.

MR. REED: Well, adequate protection means you don't have --

MEMBER STETKAR: I think adequate protection, I believe the case history is whatever the Commission defines it to be.

MR. REED: Well, that's policy.

MEMBER STETKAR: So it's -- don't book it to numerical risk.

MR. REED: I'm going back to the section for 50.109, but, yes, you're right.

MEMBER RICCARDELLA: Just from a

practical perspective, and I'm trying to improve my understanding, what we're trying to address is Fukushima and what happened at Fukushima, and we're talking about adding this extra equipment. Would the rulemaking, as it's written, permit the Fukushima plant to install this emergency equipment at the same elevation as their existing diesel generators? And if they did, would the extra equipment have done any good?

MEMBER STETKAR: The answer to that is, I believe, Pete -- that's a good question because their design basis was whatever that tsunami height was. So I believe this rule would have allowed them to put the additional equipment at, you know, three meters above sea level because that was their design basis.

MEMBER RICCARDELLA: And then, you know, again, I'm not enough of a systems guy, but if they had done that, would this additional equipment have done any good to mitigate that accident?

MR. REED: No, it wouldn't have been, but if you had the information available to them and we did a 2.1 assessment for tsunamis on Fukushima, what would we have found? A lot of historical information, an analysis saying over 50 feet. If I do that analysis, guess what I end up with? I have an order to immediately shut down all six units and fix them, no

question about it.

So 2.1 on Fukushima says shut it down immediately. The risk was pegged based on information available. So that would have been a 2.1 situation, Fukushima.

MR. BOWMAN: We can ask the same question when we get to the recommendations of the COMSECY that the mitigating strategies be capable of dealing with a reevaluated hazard, which would, if these requirements were imposed on Fukushima, have had them show that they could withstand that particular hazard.

And the other thing that I suggest is that if we. As I mentioned before, I love quibbling over words. The phrase beyond design basis, you can take it to mean ever-increasing hazard levels, or you can take it to mean events that happened that are not covered by the design basis. I would prefer the events that happened that are not covered by the design basis because that doesn't put me in the position of needing to figure out when I say in regulatory language that it needs to be able to work in a beyond design basis event just how severe a hazard in the beyond design basis is it. But you're anticipating that in a response to 2.1. The design basis is going to change, and then these plants are going to have to go back and

reevaluate this equipment to make sure that the new equipment at least meets the new design basis. Is that what you're saying?

MEMBER RICCARDELLA: No, what I'm saying is that, depending on the outcome, it may or may not change the design basis or the licensing basis.

MR. BOWMAN: Oh, sure, some plants will still --

MEMBER RICCARDELLA: But the recommendations to the COMSECY would be more that the mitigating strategies have to be able to operate with the systems of the plant in order to show that they can prevent fuel damage when that hazard or if that hazard occurs.

MR. BOWMAN: Clearly, this plant, the 2.1 hazards aren't going to change. But, you know, as I understand it, it's about a third of the plants that the response spectra is going to double. So for that one-third of the plants, how are they going to have to address this new equipment that they just put in?

MR. RECKLEY: Eric, if I can, again, we're going to talk about this a little later, but I think one of the things that the Committee can think of is to start to think of the COMSECY and this rule language in tandem because what you'll see when you have to make

or choose to write a letter on a COMSECY that, if the Commission were to not affirm what we're asking them to, which is that these mitigating strategies should address the reevaluated hazard, this is the outcome. And all the questions you're asking about the limitations, the mitigating strategies, the placement of equipment at the same level being vulnerable to the same event, that's the outcome if the Commission were to choose not to affirm what we're asking them.

So when you're looking at these two things, I know we put you in an awkward position basically of saying the rulemaking is on track one and, at the same time, we have another proposal that's actually changing what you're hearing right now that we're going to ask that you also weigh in on. But really what you're seeing here in the rule language is if the Commission were to not act on the COMSECY or to not affirm what we're asking them to do, this is the outcome. So just think of it that way as you're kind of developing what your opinions of both the rule and the COMSECY.

MEMBER STETKAR: You were worried about getting done early.

MR. REED:

CHAIRMAN SCHULTZ: Tim, do a few more slides. I want to call the break at 10:15, so go ahead.

I'm going to stop you --

MR. SHEA: Just a quick comment on that last -- I'm also in the flood hazards --

CHAIRMAN SCHULTZ: Oh, identify yourself.

MR. SHEA: Jim Shea. I don't think Bill has that quite true. If you look at the flood hazard 2.1, they actually have to reevaluate their flood in the flood hazard reevaluation. Interim actions have to address any new level, and, in fact, licensees then are addressing with their FLEX equipment that they still have. And then they would protect it against whatever that new flood hazard is. So really it doesn't, it's quite, you know, it's a little different to what Bill was saying.

MR. REED: Let me continue then. I think we're done with the equipment requirement section and gone to training. I hope I can get through this. I may need some help.

So what you see right now in terms of training is aligned, I think, with some of the thoughts you heard yesterday.

CHAIRMAN SCHULTZ: We did.

MR. REED: We're talking about using a SAT process. This would not be required to be INPO-accredited, but it would be site type process

looking at basically all the new job tasks, a job task analysis of what's new, what's put in place, and then using a SAT process to make sure that folks get trained accordingly.

So we're trying to make it as flexible as possible, what makes sense there. Nonetheless, I think people would have to be taking a look at what their already trained on, what's new, do that gap analysis, develop that training, and do the training. So that's the kind of idea.

I'm personally not a training expert, as you, I'm sure, can tell. I think that this would largely be -- now, when I say new training, I mean beyond the order, beyond the EA-12-049, okay? There's a substantial amount of training in place for that. There's some training going in place for level instrumentation, as you heard yesterday. What I'm talking about is what's beyond that in terms of what's new in this rule. I think that would be focused, again, presuming SAMGs as requirements in the SAMG area in terms of making sure engineering staff understand the SAMGs, making sure the ultimate decision makers are trained on the SAMGs and understand that material and how to use it.

CHAIRMAN SCHULTZ: Don't focus only on the

SAMGs. It's training on the integrated suite of guidance, directives one through three. So it isn't, it isn't EOPs in isolation. It isn't orders in isolation. It's not SAMGs or EDMGs in isolation. It's now training on the integrated suite of guidance. I mean, that's the way I've --

MR. REED: That's what the requirement would cover, in fact. I was looking at what would be beyond what's already happening right now. It's not a lot beyond what's happening right now.

MEMBER STETKAR: Tim, kind of building on John Stetkar's comment earlier about equipment and to the current design basis, I want to make a comment about the training words where the proposed wording or at least the present wording communicates at F3, "The licensee shall conduct subsequent drills, exercises, or both that collectively demonstrate a capability to use these strategies and guidelines in paragraphs (b)(1), (b)(3), in succeeding eight-year intervals.

Getting to the notion that John just mentioned, there really is a suite. It begins with the EOPs and flows into the beyond design basis ELAP, EDMGs, and the SAMGs. The wording doesn't say each of those, and I've spent enough time training and being involved in exercises for years that, unless you say each, then

the training can be schmoozed and one element of that can be short sheeted.

So if you really want to know that the teams can do SAMGs, you've got to rehearse them on that. If you want to know that they can do the EDMGs, you've got to rehearse them on that. So somehow in that wording, each need to be exercised and the suite needs to be exercised, and you've identified an eight year period. That would probably be reasonable, but that period needs to make sure that all the ships and all the new people on the ships experience the training so everyone is qualified.

So I think adding the word "each" assures that no piece of the suite has been unexercised.

MR. REED: I'm going to need some support from folks in the room, but a lot of this is in NEI-13-06, which we're going to endorse. A lot of these details are not here. I would say and, in fact, I have a slide here in a bit on paragraph F that we're trying to be as flexible as possible here and allow people to do bits and pieces. For example, you heard yesterday about somebody may illustrate a part of this, the stripping portion separate, and another part, you know, hey, show me you can move debris. That can be done separately. It doesn't have to be all continuous

in time or what have you. So we have that flexibility. But I understand what you're saying, too. Hey, you need to show me you can do FLEX, you need to show me you can EDMGs, you need to show me you can do SAMGs.

MEMBER STETKAR: Bingo. That's all I'm saying.

MR. REED: And we understand that, too. And I believe --

MEMBER SKILLMAN: It is captured in NEI-13-06, but bearing in mind that that would be just one acceptable method of meeting the requirement. It may be prudent to either say collectively demonstrate a capability to use each of or all of the --

MEMBER STETKAR: Not each of because we already have experience where we have plants that have fire response procedures and emergency operating procedures. And operating crews are trained and they become proficient on use of each of those, and they have drills on each of those. And we've had events in the plant, real events in real plants, where real operators who were trained on each one and drilled on each one in isolation have gotten hung up and have focused on the wrong things because they're never trained on the integration of all of those in a real event. That's why not each is not the appropriate --

MEMBER SKILLMAN: It needs to be that each is rehearsed, but the integrated suite is also rehearsed. That's the point I'm making. Words matter. NEI-12-06 is industry guidance, and you're writing regs. So if we want it to happen in the regulatory space, it's got to be written in a way that assures that we get what we're asking for.

MR. REED: Yes. I think we want to have that assurance, and we want to touch upon all the different pieces of it. But at the same time, I'm going to be sensitive to the fact that this could be an extensive amount of drilling, too, so we've got to be careful on that, too. And we could do that and then see what folks feel about that, how much of an impact that is.

CHAIRMAN SCHULTZ: Tim, I'm going to ask you to move to the next slide.

MR. REED: Sure. That will be George Tartal's portion.

CHAIRMAN SCHULTZ: Okay. If that's the case, we will stop here, take a break, and be back at 10:25, please.

(Whereupon, the above-referred to matter went off the record at 10:12 a.m. and resumed at 10:27 a.m.)

CHAIRMAN SCHULTZ: I'd like to call the meeting back to order from recess and move forward on the slides. We've had a request from the bridge line, and you might understand this, that they're having difficulty knowing which slide we're on, so as we move through them we'll just call out the number when you're making the presentation. So, we are on Slide 8, and I'll turn it back over to you, George, for your presentation on this slide.

MR. TARTAL: Okay. Good morning, everyone. I'm George Tartal from the Office of New Reactors, and I'm going to be addressing Slide 8 here on the Proposed Rule Language for Paragraph D, the New Reactors Requirements. I'm going to start in the middle of the slide here on the intent. All right?

So, the intent of the additional rule language under Paragraph D is really in implementing the Commission's Advanced Reactor Policy Statement. And I've added a couple of clips from that policy statement on the slide here so that in the Advanced Reactor Policy Statement it says that, "The Commission expects at least the same degree of protection of the environment, public health and safety, and the common defense and security that's required for current generation light water reactors." And also, "Enhanced margins of safety and/or the use of simplified inherent passive or other innovative means to accomplish their safety and security features."

Additionally it says that, "New reactors should consider the following attributes," and there's a couple of bullets that I pulled out from the policy statement, such as longer time constants, sufficient instrumentation to allow for more diagnosis and management before reaching safety systems challenge and/or exposure of other equipment to adverse conditions." And also, "Simplified safety systems that where possible reduce required operator actions, equipment subjected to severe environmental conditions, and simplified systems should facilitate operator comprehension, reliable system function, and more straightforward engineering analysis."

So, with all of that said in the Advanced Reactor Policy Statement, what we're

looking for for new reactors is for new reactors to be better able to address the effects of the extended loss of AC power that we've been discussing here this morning. And in doing so, we're looking for new reactors to have a greater reliance on installed equipment versus the FLEX equipment like we've been talking a lot about this morning. Also, less operator actions, if possible. And also, more time for diagnosis, planning, and preparation like you heard in the Advanced Reactor Policy Statement.

Now, I'll also caveat that this rule language would not obviate the need for FLEX equipment. Right? What we're talking about mostly here is the installed equipment that's being considered for Phase 1 that I believe you heard about yesterday.

So, with that, with that intent B-

MEMBER STETKAR: George, can I ask you B-

MR. TARTAL: Yes, go ahead.

MEMBER STETKAR: B- just B- and shut me down if you're going to get to this, but if I look at the longer time constants part of that policy statement, and I think about what we were hearing yesterday B- I understand AP 1000 and ESBWR. What I want to look at now are other so called active new reactor designs. We've got a couple in the design certification pipeline right now. And if I look at those designs, for example, they have what I call traditional battery lives, the safety-related batteries have design lives of like two or four hours. If I had an extended loss of AC power at one of those plants, I would need to invoke extensive load shedding like the current operating fleet to extend the lives of those batteries.

As part of this for new reactors, are you looking at those types of issues, or are you only looking at dropping a diesel generator in more quickly?

MR. TARTAL: I'm going to turn this one over to John McKirgan. He's leading the B-

MEMBER STETKAR: That's part of that time constant.

MR. TARTAL: It is. And now you're down into sort of the guidance level of the rule.

MEMBER STETKAR: Okay.

MR. TARTAL: So, I'm going to turn it over to John.

MR. McKIRGAN: Thank you, George. John McKirgan again for the New Reactor Staff. Those are exactly the considerations that we're struggling with right now. And that's exactly why we're putting this proposed draft language before the Commission, because we do want to B- historically, we had been following the operating fleet and using the same guidance and following along that. And as we reflected on that and thought about some of the opportunities available for the new reactors, and as you've keenly focused on, the active designs are an area of focus for us in this area. We thought this was enough of a deviation from what we had been doing that we needed to go to the Commission and get explicit approval from the Commission to take this path. But those are the kinds of considerations.

In New Reactor space could you simplify some of the actions that are necessary? Could you extend the diagnostic time? So, the short answer to your question is yes. A lot of that, as you'll appreciate, will come in guidance, so we are very much B- the guidance is not, unfortunately, ready yet, but those are the considerations that we want to have, but we felt we needed Commission acknowledgment to pursue that.

MEMBER STETKAR: Thanks, that helps a lot. Thank you.

MR. TARTAL: So, one other piece before I get into the specifics of the rule text is going back to, I think something Dr. Schultz said about an hour ago, talking about sort of being handcuffed by the way that we are implementing the current orders on the operating fleet. So this would be going outside of those bounds, if you will. This will be going something in addition to what's happening with the orders. And we wouldn't be, necessarily, bound by those restrictions. The operating fleet has already implemented this, so there's some limitations to what we can do in the rule. So, this is outside of those bounds.

And in saying that, so let's go to the first sub-bullet under the Assessment Requirements, is we are applying this rule language only to applicants that are listed in Paragraph (a)(4) of the applicability language. So, the intent here is that we're forward fitting this part of the rule language. This Paragraph D would be a forward fit. We're not intending to backfit any current licensees, we're not intending to backfit any of the current design certification holders. This is a forward fit. This is going forward for new reactors.

And the other part of this is B-

MEMBER CORRADINI: If I might ask, is that because of a technical reason, or is that just B-

MR. TARTAL: Backfit justification.

MEMBER CORRADINI: Oh, I thought you were going to say something different. AP1000 have a character that are different, so I thought that's what you were going to say.

MR. TARTAL: No, I wasn't going to go specifically to ESBWR, ABWR, or any of those. This is more of a generic issue B-

MEMBER CORRADINI: Okay.

MR. TARTAL: B- that in going forward we can't justify the B- at least the way it's currently drafted we can't justify the backfit for any of the current design certifications to include this assessment piece. So, this would be for any applicants going forward.

MR. McKIRGAN: If I could, George.

MR. TARTAL: Go ahead, John.

MR. McKIRGAN: Going back to B- I think part of the intent here was to look at design attributes and design features, and so to the extent that we were going to impact design looking at designs going forward, trying to assess the already certified designs had limited benefit. AP1000 ESBWR, I think you appreciate the B-

MEMBER CORRADINI: So, you would treat them C-the ones going backward that have certifications on a case-by-case basis then?

MR. McKIRGAN: Let me say it this way. I mean, it is B- when you look at the overall rule, those licensees that are referencing already certified designs have the other provisions of the rule applied to B-

MEMBER CORRADINI: Okay. Right. Okay, okay. All right, fine.

MR. TARTAL: So, the other piece of this that I wanted to mention is, we're really trying to get at implementing this as early in the design process as possible. I talked a few minutes ago about the use of installed equipment. The best time to plan for that is during the design process, so that's why we're going at it at the applicant stage.

So, the next sub-bullet here talks about the specifics of the rule language of requiring a design-specific assessment of the effects of an extended loss of all AC power concurrent with the loss of normal access to the ultimate heat sync. And then based on the results of that assessment, we're looking for the applicant to incorporate into the design features that B- and, again, I'm going back through these same concepts, minimizing reliance on human actions, enhancing coping durations and demonstrating the ability to maintain those functions. That's what we're really trying to get, and as well, possibly providing diverse power supplies to support extended coping and recovery.

So, with that I'll turn it over to the Committee. The Committee have some ideas, questions about the rule language?

CHAIRMAN SCHULTZ: Any comments or questions on this slide? We'll move forward. Thank you.

MR. REED: Okay, back to me. George doesn't throw his arms around enough. I'm sure you're getting bored, so get back to me and watch me flail about.

MR. TARTAL: Keep them awake.

MR. REED: Exactly.

MR. TARTAL: Thank you.

MR. REED: We've talked about two things on this slide, both probably will be of a lot of interest to folks. First is the drills and exercises requirements of Paragraph F. We've talked about this a little bit already. In fact, in that regard, I was talking to some gentlemen out in the audience at the break and they indicated that the implementation guidance is exactly what you were suggesting, Mr. Skillman, that the intent is to show all the capabilities. So, I just wanted to get back to that real quick because you brought that up earlier, so I want to make sure I didn't forget that.

It's structured to first have initial drill that basically would be something that would show the use and transitions. And if I go wrong on anything, I've got experts in the room to correct me, but it would be something would be unqueued, so essentially as a licensee you'd have to be able to basically have the capability to do anything in this suite of guidelines. So, that would basically show us in a drill form that you can do this stuff. You can use and transition between the different guideline sets and EOPs. And whether that's in the FLEX, or SAMGs, EDMGs, what have you. And then following that we have this continuing 8-year calendar period recurrent cycle that you see there. So, that's how it's structured. It gets very complex, unfortunately, because of all the different circumstances that we could find ourselves in in licensing space in Part 50, and Part 52. So, I apologize for the complexity, but depending on who you are and where you are in the licensing process will basically define whether you have to do a drill prior to getting your license, and then what the periodicity is following that. So, that's really in a very high level, I'm not getting down into all the machinations of that complex cycle, what that's really getting to.

I'll hold on that, see if that's B- if the Committee has any questions on that from the drill requirements.

So, then going on to change control. This is another issue I'm sure that's B- I know some folks have some interest in. We're dealing with beyond design basis event capabilities here. 50.59

does not work in beyond design basis world. Okay? So, we know B- we knew from the get-go that we needed something to evaluate changes in a beyond design basis regulatory framework, so the idea of Paragraph G is to put in place an additional change control provision that addresses the beyond design basis aspects of a change.

Basically, the current structure has B- it's different in terms of every other change control that I'm familiar with. In other words, it doesn't have a threshold criteria against which a licensee would say hey, I might cross this boundary and now I've got to come to the NRC. Okay? What it simply says is you shall comply with the requirements of this section. Okay?

Now, obviously, that goes without saying. If you're a licensee you have to comply with these requirements, and so somebody might say what's that? You know, if you were going to change your facility you would have to comply with them, but what it's making people do is evaluate this thing, document it, maintain that documentation for NRC inspection so that we can come and look at it and see whether, in fact, we agree with it.

What we did, frankly, is punt on this threshold because it's a very challenging thing to do to try to understand where would I set a threshold to judge changes? Okay. I might be able to do something like that for mitigation strategies, just thinking off the top of my head. Maybe I have a set of criteria says hey, have you done anything to degrade your ability to maintain or restore core cooling, or spent fuel pool cooling, or containment, or reasonable protection? I could go through the B- I could do it almost set that kind of stuff. I haven't tried to do that here because that would be one set of criteria if you could ever get there on mitigation strategies. They would be different for SAMGs. Okay? They would be different for EDMGs, so it's a pretty complex situation.

I think it's an area where I'm looking forward to trying to get some feedback from external stakeholders and say hey, this is what we've got. Right now it doesn't have a lot of flexibility. This section, my section supporting this would say hey, if you're making a change and it remains within

basically endorsed guidance, you're good to go. And as you folks heard yesterday, that that endorsed guidance is, in fact, building in all the new information alternatives, so there is more flexibility being built into the endorsed guidance for mitigation strategies, so it would allow that. But right now that's the envelope you're in, the box you're in in change control. And if you get outside of that, okay, you really have really two options here. And it would be up to licensees' own decision.

One, if you don't think you meet these requirements, clearly, you have to send an exemption under 50.12. Okay? So, that's just, you know, Regulations 101. That goes without saying. So, you don't meet a regulation, you think you're okay. You come in under exemption space. I don't think B- it's not optimal but that's, nonetheless, the situation we'd be in.

The other one is if you're a licensee and you say hey, I'm not B- I don't think I really am in compliance with endorsed guidance, but I think this is a better way to do it. And I think I meet the requirements. Then I think that licensee right now, there's no B- there's really nothing there for that licensee. Under their own volition they could send in something for us to review and approve, and I think we'd have to probably follow something like 50.90 license amendment or process.

Now, that's just the way I see it right now real time. We're wrestling with this issue, and I know industry is wrestling with it, too. And I'm very interested in hearing that feedback from industry, and their thoughts on this, too. So, nonetheless, that's where the change control provision is right now.

We had some feedback from industry earlier on at one of the public meetings about a negative consent type approach. We thought about that. You don't see a negative consent approach right now in there, so I'm just saying that we've considered that feedback, but right now this is where we're at. So, I will be quiet now and see if B- what the thoughts are on the room.

CHAIRMAN SCHULTZ: The example or the sequence that you didn't mention is I'm a licensee and I'm meeting the requirements, but I feel I can still meet the requirements and change my

equipment, change my process in such a way that reduces effectiveness but still meets the requirements. And this would say that is acceptable. I just have to meet the requirements, and I can B- it's not like an emergency planning situation where any degradation to the program needs to be reviewed and evaluated; rather, I could change the program, not get review and evaluation, as long as I meet the requirements.

MR. REED: That's correct. That's exactly the way it's structured today, and the licensee that would do would be taking that at their own regulatory risk, so they would have to maintain that documentation. And if we came later and said you reduced effectiveness, of course, we would be looking at that. So, that's the circumstance as it exists today. That's correct. The current draft rule language is, that's correct, I should say.

CHAIRMAN SCHULTZ: Any other questions on this area? Let's move forward.

MR. REED: Okay. So, we have all these new requirements basically broken into two chunks, if you will. We have a kind of a standalone portion, if you will. It doesn't work quite this way, the 50.XXX portion that you saw. Then we have a separate set of requirements that we've located over into Appendix E. Okay? So, these are, obviously, requirements that relate to EP, and that's why we relocated them there. We thought that was a good place. We had some stakeholder feedback to that regard.

So, the way we've done that is kind of two-fold. We've built directly into the current Appendix E, or we're suggesting building in directly into requirements what are called the multi-source term dose assessment requirements. Okay? So, the idea there is a licensee updating that software capability, developing the training, completing that training. Once that's in place, that will be invisible to basic of the EP organization, so that kind of makes sense to build it into the current EP capability, so that's why we did it that way.

Then in addition to that, we've built in a new Section 7 that's separate from the

current six sections of Appendix E, and which, by the way, it's outside the change control of Appendix E. And that's 50.54(q) would not apply. Instead, the change control I just talked to, 50.54(g), I mean, 50.XXX(g) would apply, so that's this Section 7. And that's getting to staffing and communications requirements, the requirements that if you recall were part of the 50.54(f) letter that I mentioned at the very beginning, that's where you see those in Section 7. So, that's how we did that.

And then we have a final, I'll call is a clean-up provision. Right now if you go and you look in the emergency response data system portion of Appendix E you'll see a reference to modem technology, and we're going to remove that. Obviously, we're a little behind the times around here in technology but we're trying to B- I shouldn't joke about that, but we're removing the modem reference and making that more neutral in terms of technology. So, that's an easy thing to do. That's already been implemented, so we can clean that up. So, that's the Appendix E portion of this proposed B- draft proposed rule language as it stands today.

Okay, then we have B- and I don't have a lot of detail on this. We have application requirements, because until we establish submittal information type of requirements for new applicants, whether that's under a Part 50 or a Part 52-type process. And, you know, essentially if you go and you look at that, you'll see basically what we're requiring in terms of information on this integrated capability, as well as the B- as George Tartal mentioned earlier, this design assessment capability. Depending on what part of that process you're in, if you're early enough in the applicant process you'll have basically all of it, if you're later on the process, and operating license process we'll be asking about this integrated capability. And if you go through that you'll see exactly the language. And we tried to basically make it whether you're in Part 52 or Part 50, it's basically the same kind of situation where that's a parallel part of the process, or a similar part of the process, recognizing they're different. So, there's the application submittal requirements that we have to build into our regulations, also.

Okay. Now, the next part of this regulation is a part that you did not get. It's not complete, and that's the implementation section. So, I B- basically, if you're looking at draft language, you'll just see basically a bullet, a list of items that I know that if we, in fact, are going to put into place, this is all the new kind of thing B- all the new stuff the licensee would have to put in place to be in compliance with this new set of requirements. So, this is important from a CER, cumulative effects of regulation process standpoint. We need to understand what that is, how long does it take, get as much information on that as we can, and give people an opportunity, a proper opportunity in terms of implementation schedules to get that done. So, we're working that issue.

Right now I see that in several different areas. Licensees would have to develop, or at least supplement the current configuration, change control process to add this new change control provision in there. They would have new training requirements. As we mentioned before, there would be this new basically a gap analysis to understand what new jobs and tasks there are, develop that training, do that training. There may be more command and control, there may be more stuff. As I mentioned, I don't suspect that, but I don't know that for sure, but there may be some impact there.

The SAMGs I think would be where most of this, in fact, would occur, basically putting in place plant-specific SAMGs that we would expect to reflect the Owners Group, the most recent Owners Group SAMGs, updating that to be, you know, consistent with the current plant configuration, and then maintaining them within the configuration of the plant. Again, presuming that SAMGs become requirements. The efforts to integrate these guidelines I think are largely done, but I think it would be more thorough and systematic how we work through that guideline integration. That would have to be another area of where licensees would have to work through the process to implement this.

Equipment requirements, of course, those could be substantial requirements. I think largely would be in place right now because of the two orders but, nonetheless, it's a potential there

that we could have some new requirements. And, actually, another potential, if some the Commission's actions on Mr. Reckley's paper here that could change the rulemaking and be substantial impact there.

Multi-source dose assessment capabilities, again, licensees changing out that software, making it multi-source term capable, develop the training, training the appropriate staff and deploying that. So, these are right now what I see as additional beyond everything that they will have done based on the post-Fukushima orders. These are new pieces that I think we'd have to be sensitive to, and understand what it's going to take to implement this. But those provisions are not written at this time, so working on them as we speak.

CHAIRMAN SCHULTZ: The phrase, "will use the cumulative effects of regulation process," that's for B- during the rulemaking, or the rulemaking will establish that this will happen in the future?

MR. REED: That's a process we use as part of rulemaking. And the aspect I'm talking about here is, in particular, when it comes to implementation, is during the final rulemaking process, what we do is we have a public meeting where we meet with external stakeholders. We basically at that point have a fairly complete set of final requirements, and what we do is we try to understand as best we can at that point in time what the situation is from licensees, and what they can accommodate in terms of implementation, and then make adjustments, as appropriate. So, that's a part of the current CER process that we have right now.

CHAIRMAN SCHULTZ: Late in the process.

MR. REED: Yes, that's in the B- that particular piece of the CER process, much bigger than that, but that particular piece is at the final rule. And it supports understanding, implementation impacts, and adjusting implementation periods.

CHAIRMAN SCHULTZ: Want to clarify when it occurs.

MR. REED: Yes.

CHAIRMAN SCHULTZ: Late in the process, is appropriate. Thank you. Any other questions on this slide? Moving to Slide 11.

MR. REED: So, you guys have heard me say the word "backfit" a few times. I'm a big fan of backfit if you haven't figured that out. But one of the things that when we consolidated this rulemaking together into one basically consolidated rule, or what we're calling the mitigation beyond design basis events rulemaking now is we recognize very clearly that there are some fundamental different bases for different parts of this rule. Okay?

The requirements stemming from the previously implemented orders are not backfits. They have already been imposed, so making those generically applicable, okay, would basically be not a backfit. Presuming you're not stepping way beyond that and, in fact, extending the requirements. So, those are one set of requirements and, in fact, that's right now where we stand in terms of if you look at mitigation strategies order and the way that's been implementing, the intent right now is to basically make that, as you've heard yesterday, part of this framework and in that footprint. So, no intent right now to go beyond that regulatory footprint in terms of mitigation strategies, and neither in terms of the spent fuel pool level. So, those are not "new backfits." Okay?

Basically, this is B- that's about making those provisions now putting them into the Code of Federal Regulations, that's basically just good rulemaking practice, making that available in the Code of Federal Regulations.

Now, everything else now beyond that does not have a supporting backfit basis. Okay? So, that really is all the portions on the onsite emergency response capabilities rulemaking that we pulled in. Now, it can get rather complicated, and I think it's really B- kind of a better way to look at it is to bin this into kind of a couple of different bins.

First of all, it's all the order requirements, not backfits. And then, basically, everything else that really is substantive relates to SAMG requirements from the onsite emergency response

capabilities portion of this. Whether that's the SAMG guideline set itself, whether it's training for the guidelines, whether it's drills to send into SAMGs, it relates to SAMG requirements. So, the way we're structuring the supporting analysis is to be able to basically bifurcate, if necessary. If the Commission directs us and says no, SAMGs will remain voluntary, then I can basically be able to go to what I call Plan B, make the change, switch out SAMGs, and adjust the package accordingly. So, that's the way we've kind of structured that. So, it works pretty much like that.

Then we have a few additional requirements that don't really work into that. We have the multi-source term dose assessment, which is a voluntary B- voluntarily being implemented by industry, as I understand, to be complete by the end of this year, I believe. Okay? So, that will be implemented. It's a backfit but it will be no impact in terms of its ultimate impact. So, backfit without impact I believe is how I am calling it there.

And then we have B- Mr. Tartal was talking to today what are called forward fits, and that's chosen very nice to say not backfits, so it's not an imposition on a current licensee. It would be going forward, and we can do that without jumping through the hurdle of backfit. So, that's another area.

And then what I call a kind of clean-up provision to remove the technology reference currently in the ERDS portion of Appendix E. So, looking through that, that's how the requirements bin B- and I just want to start with that so you understand how they're sorting out, and then we can go to what are obviously the most substantive portion of the backfit, and that's SAMGs. That's the next, and I think probably the most interesting slide in the package, at least in my view, so that's the next.

SAMGs, it's a very B- I think B- and it's a very interesting situation we find. I think there are very strong arguments for SAMGs, and very strong arguments against SAMGs. And what we B- our intent is to provide the entire picture to our Commission because this is why B- this is what the Commission is there for, to make these kinds of decisions. So, our job is really to try to completely

inform them, give them the complete picture, and let them make the best decision possible.

So, one of the qualitative and I think personally strong arguments for SAMG requirements. Now remember, folks, there are SAMGs. They do exist right now. They've been in existence and implemented at facilities since December 1998, and they were, obviously, voluntary initiatives. Okay? What we'd be doing is making that a requirement.

I think it's B- the strong arguments for them are this. Once you get to core damage, and you have fission products, basically, now becoming in existence, obviously, and getting released, now is when containment really matters. This is why the containment exists, so when you're trying to make your best decisions concerning containment, and maintaining that capability, you would be using B- making those decisions informed by this guideline set, the SAMGs. So, in my view, they're kind of like the direct guideline set that informs one of the most important defense-in-depth features in nuclear power plants, the containment. That's a pretty strong argument by itself.

At the same time, the same guidelines that would be used, of course, to inform the emergency response organization in terms of the fission product barrier integrity, and whether you've lost that, or you expect to see them, and that could be pretty important in terms of forming onsite and offsite protective actions. So, EP, Emergency Preparedness, is another one of our defense-in-depth foundational portions of our regulatory framework, and I see SAMGs as basically informing that. So, my view is qualitatively I think SAMGs inform two big pieces of our defense-in-depth framework. And I think they have extraordinary value. They have -- an amazing amount of talent, and expertise, and effort went into these things from the beginning in 1992 when EPRI did the first technical basis document, recently updated in 2012, a lot of great work by the Owners Group here recently to update these things. These things have a lot of good information, pre-planned strategies that would be very useful, and a lot of great supporting information in terms of what you might expect in an extreme event such as this.

And, basically, I think the value comes in, is that this is a tool that allows you to make the most optimal decisions and use of all your resources available to you. That is the value. And I think it's a very good value and, like I said, it's an enormous amount of effort over the years with extraordinary people involved, and it certainly is B- in that sense you could say boy, this makes all the sense in the world. Why aren't these things requirements right now?

Now, if I go to look at this thing from a quantitative standpoint and I tried to use all of the available risk information that are available to us, and I've been I think rightfully accused of not doing enough risk for this, and I don't forget that. I think you're right, we haven't done enough risk-informed thinking in some of this.

Well, I went and looked what's available, and what's available, as this Committee is probably very familiar with, is the work that Marty Stutzke has done for the containment protection and release reduction effort there, and the regulatory basis effort there. He was looking at, of course, the strategies that Mark I containments would take after core damage, and looking at where I can get benefits from those strategies. And if you think about that, those are SAMGs. You're in SAMG space for a Mark I.

In a sense, what you're really looking at there is what would SAMGs do for me in terms of safety? And I think what Marty's work is showing is that while they don't do much in terms of quantitatively and safety, and that's B- by the way, that's a good answer. That shouldn't surprise anybody, and if it came out any other way I'd be actually concerned because after 50 plus years of regulation, okay, we've reduced that core damage frequency pretty low, and that's what we do. Okay? And we've pulled in 1980 EP regulations that are pretty effective, and move people out of harm's way, so by both those front end and back end, and I'm in a severe accident situation and I'm doing what I can with SAMGs, basically, stop B- halt the progression of it, or minimize the releases, I shouldn't see a lot of benefit. If I do, then I actually would say whoa, I should not let this thing B- this sequence shouldn't

even get to core damage. You see what I'm saying? And that's the way we've always done it. We see something that's an internal-external event driving something creating risk, we've got to go to SAMGs and use SAMGs to reduce that. Of course not, we don't let it go to core damage. So, I think Marty's work bears out that, basically, the product of all those years, and shows that unfortunately from a quantitative standpoint they don't have a lot of benefit. Okay?

Again, from a health and safety perspective, I think it's a great thing for folks to know that. Now, so I have that quantitative information there and says no, I don't think we could possibly meet the backfit. No, you're frankly not even in the ballpark to meet the backfit kind of risk kind of measures we typically look at. And you have a very strong qualitative argument says you really should have these. Okay?

I think our thought is B-1 I think this is the kind of issue the Commission should weigh in on. We would propose B-1 frankly, I think we ought to get all the folks, external stakeholders to weigh in, too. And that's our proposal. Let's put this to the Commission, and suggest to the Commission hey, let's get everybody's feedback, see what we think, and see what we do with the final rule. So, that's kind of our proposal right now. So, right now you see a draft set of requirements with SAMGs in place. So, I just wanted to talk through some of that work and see what the Committee's reaction is to it.

MEMBER BLEY: The one thing you didn't mention here, or at least not directly, is the thing you mentioned earlier, which was defense-in-depth as a measure to take care of our uncertainty, and among other things getting outside of the design basis to a point we haven't looked. So, one thing these offer, as does all of the FLEX stuff, is that should we have an event occur that we don't expect to occur either because we just got unlucky, or because somehow our understanding of the uncertainty of getting outside the design basis in one way or another wasn't complete. And then both the FLEX equipment and the SAMGs give you a way out of that thing you never expected to happen. And you

didn't quite put it that way anywhere, and I wonder if you B- you must have thought along those lines somewhere along the way.

MR. REED: Yes, I think B- we did. I think the B- there's a great B- a substantial additional capability to mitigate, basically as you heard to alternate ways to maintain recirc cooling, especially for cooling containment. All those capabilities are now in these facilities have become very real. Guess what, they're also available in a post-core damage environment. So, the SAMGs now with that additional capability, that's another big plus here to build that into the SAMGs, at least give those tools to the folks. And on a bad day, at least they could have that available to them and see whether, in fact, they can make the best use of it. So, that's another good thing about SAMGs, and make them requirements, make sure those are built into.

Now, I forgot to mention, and this is another B- I did mention this earlier, and it bears mentioning right here. There's another con to this, it's a pretty significant one depending on how this would be implemented, and to what level of rigor.

If you put too much attention on SAMGs B- and, by the way, this was a focus in the original SAMG effort in the '80s and '90s, you are diverting attention away from much more important stuff. So, it was explicitly in the original SAMG B-

MEMBER BLEY: Put too much, you said too much.

MR. REED: Yes.

MEMBER BLEY: And I think another thing you didn't mention was right after Fukushima you had a couple of orders to go out and look at B-

MR. REED: Yes.

MEMBER BLEY: B- B5B stuff, and at the SAMGs.

MR. REED: Right.

MEMBER BLEY: And you found at least some deficiencies in almost all of them, and

some pretty severe, not being kept up to date and that sort of thing.

The thing that just I'm pretty convinced of is that you see a lot of credit to the industry and to you guys for going ahead both with what we talked about yesterday with the FLEX, and with the SAMGs, and making sure they're intact. And that is that some day sometime in the future, some poor guy in a power plant is going to be really grateful to the folks who put all this stuff in place because something happened beyond what the designers were thinking about, or what the safety people had thought about, and this going to get them out of the way.

I still go back to the little thing I said yesterday that we could have made it a little more flexible to be even more grateful. There might be day they'd say boy, I wish you had put a connection somewhere else.

MEMBER STETKAR: Spray the containment, for example.

MEMBER BLEY: For example. And I think that idea of making sure B- the issue of how much you train on these and that sort of thing is a different issue, and that does interfere to some extent, although it might not be the same people that we're training. From the things we hear, it would be a lot of other people who aren't every day in the running of the plant who are going to be taking over the running of the plant and making sure they're up to that task, is something that B-

MR. REED: Yes. To some extent, I think you're right. As long as I'm not taking an operator, you know, out there and training him so much on SAMGs versus safe B-

MEMBER BLEY: And the arguments for that have always made sense, but having them so they could give guidance to the operators B-

MR. REED: Yes.

MEMBER BLEY: B- and for the people who are, if we go that route, taking over the B-

MR. REED: I think if we had the guidelines set, you know, as a requirement and it

was maintained and updated over time, I mean, there's I think a substantial improvement in the most recent SAMGs that EPRI put together. You know, Ed can talk to that. He's reviewed them, and so there's a lot B- these things have really improved from 1992 to 2012, and the Owners Group and industry to their credit has done a great job. So, you know, we'd like to make B- you know, get the benefit of that, but at the same time the minute you do that, if you start to get B- say the B- we start to look at SAMGs and now we start to say well, if you think it was difficult doing the mitigation strategies order and trying to figure out how much is enough and what's right, imagine what that would be in a beyond design basis type of scenario with core damage, and how do we get involved with that from regulatory space? That's what concerns me, because that's extremely difficult to do, and we could get very heavily resource-intensive and start driving this into a lot of detail. And then guess what, all our folks and resources now have gone off, you know, basically away from plant safety and over here in the space here, so that's one of the concerns I have.

MEMBER BLEY: But I think you can balance that. And the idea that these are out there and you're looking at them to make sure they're up to date, people are doing what they say they're doing with them, makes a lot of sense. I haven't heard, and there might be a tremendous feeling against having some oversight on these SAMGs. And I think it sounds like we're past the point that we will have oversight. We do now have oversight on the FLEX equipment and what needs to be in B5B. It would be a shame to let worries not have us make sure this stuff is available.

MR. REED: And that's B-

MEMBER BLEY: Now, how much you train on it, most of those situations as they were originally set up, you've got time to work things out. You get lots of help. But not having that guidance available, not having the equipment that can make it work better, just because we haven't kept vigilance on those B-

MR. REED: Yes.

MEMBER BLEY: B- would be a shame.

MR. REED: I've got to keep remembering, they do exist, and they're in place, requiring them. And that's why B- that's a good reason to put this thing out there and get the feedback, so folks out there may be able to inform us about how we can get that struck right, get the maximal benefits, minimal impact, get the benefit of all that work and all that thought, and maintain it, and not get us all of our attention, everybody, too much off the rails and over in some place where it's probably not helping any of us in terms of public health and safety.

MEMBER BLEY: We don't get to talk to INPO very often. We're going to again soon, and we did not long after the accident occurred, but the folks we talked to at that time were pretty sure they were going to be tracking these a lot more than they ever had just because it's there.

MEMBER SKILLMAN: I'd like to reinforce Dr. Bley's commentary here on the importance of these. Thirty-five years ago we were seven months into the TMI-2 accident, and I guarantee to if those crews had had something like SAMGs, I don't know that the outcome would have been radically different, but I believe that the thinking process that was really being done ad hoc would not have been ad hoc. And there would have been some structure to the chaos that was occurring on March 29th.

So, I think the thinkers in the industry would say these are worth, I don't want to say codifying. These are worth being created in a very similar fashion as the EP, as the emergency procedures so there's a smooth flow and transition either into the SAMG or into the EDMG, so the teams in the control room really have comfort that they know when to move, and how to move to provide the greatest protection for the containment, for decay heat removal, and for fission product release. I'm with Dennis.

MR. REED: And there's been an awful lot of work, and I think that's out there, you know. It's already occurred, and this is basically about making that work a requirement. And I don't

know if you want to say B- Ed, we're fortunate enough to have Ed. He's been an expert on this forever, and he's actually looked at the new work that has been done.

MR. FULLER: This is Ed B- is this on?

COURT REPORTER: Yes, it is.

MR. FULLER: Okay. This is Ed Fuller. Forever is a relative term, and permanent is an absolute term. Regarding what Dennis was saying, I think that's very valuable insights, and I don't know your name, sir.

MEMBER SKILLMAN: I'm Dick Skillman.

MR. FULLER: I appreciate what you said, as well.

The thing about the SAMGs is, yes, they've been a voluntary initiative for a long time, officially since 1998 when all of the plants had to be in compliance, but really quite a bit earlier than that, in the early '90s when the EPRI Technical Basis Report was developed and scrutinized very closely by Owners Groups and the utilities. So, it's been an effort all along to find out what the right strategies would be, the high-level actions would be, and put that in the context of the various designs. And in my opinion, the industry did it right, that these SAMGs were quite good. Of course, there's always room for improvement, and improvements are still happening. So, by the time 1998 came, I think we probably were in pretty good position.

Of course, after the Fukushima accident, it was realized that certain things were not properly addressed, or not addressed rather at all, particularly regarding spent fuel pool, and alternate water sources. So, when EPRI made its revision to the Technical Basis Report, it added five more candidate high-level actions which made sense. So, I took the time to review the new material, found first of all that, indeed, the 15 candidate high-level actions identified still were valid, and the five additional ones, in my opinion, are appropriate.

So, in terms of providing a technical basis for the rule language here which is very

short and simple, you know, protect B- try to prevent the core from melting, and try to prevent B- try to mitigate fission product releases, try to keep the containment integrity as long as possible, those are very simple. And I believe the approach taken is a good one.

And the reason why I think it's a good idea to make sure this is a rule is that after Fukushima, some of the Staff went out and found that perhaps these weren't B- perhaps the training wasn't being done as quickly, or thoroughly as it could have been, and perhaps people weren't up to speed on how to deal with severe accidents. So, I believe that we're not asking the industry to really do anything different, just to make sure they keep doing it.

CHAIRMAN SCHULTZ: Thank you. Tim?

MR. REED: Yes.

CHAIRMAN SCHULTZ: Just one comment and I'll make it short, but you mentioned the work that has been done on the Mark I-Mark II plants, and we talk about in this context after core damage, there was a lot of good work done to identify what could be done to prevent core damage and all of that. And I just want to make sure that that's captured going forward, as well. Slide 13.

MR. REED: Sure, and I think I apologized once before about not providing draft guidance, apologize again. Basically, our draft guidance is actually fairly extensive. As you can see, we're planning to have a Draft Guide 1301. Principally, we review the most substantial portion of this rule, and that's the mitigation strategies work, was not going to become 12-06 Rev 1. That's under development right now. In fact, there was a public meeting a couple of days ago on that work, and that's rolling into 12-06, the Lessons Learned, and the alternatives, and a lot of good information that has resulted over that time period implementation of mitigation strategies.

In addition to that, we have a Draft Guide that would simply endorse NEI-12-02, and that's the guidance that was developed in support of the spent fuel pool level instrumentation order. That's NEI-12-051, and simply endorse that as one acceptable way to combine with the high-level

performance-based requirements that we put in this rule, or the draft rule as it exists right now, and that's the wide range spent fuel pool level requirement that you see currently in the draft language. So, that would be an acceptable way.

In addition to that, we have several sets of additional guidance. First, there was a staffing assessment set of guidance that we endorse, that's in NEI-12-01. We have guidance in NEI-13-06 which goes to the drills, and gives drills in the EP portion of it. That's there, and we're in good shape. I think we can endorse that guidance. We're basically crossing Ts and dotting Is, but we're close on that.

And then we have NEI-14-01, which gets into this integration and SAMGs portion of this. And that's where we have to fight the issue on SAMGs. So, right now endorsement of NEI-14-01, we'd be staying out of endorsement of the Owners Group's SAMGs at this point. We're certainly familiar about other SAMGs, they're in a portal. We've reviewed them, but they haven't been submitted to us for review and approval at this point in time.

Again, I think, as presumptive, I think we need to determine, let the Commission determine whether, in fact, SAMGs should be requirements, and then at that point we can move on and see what we want to do with that set of guidance. So, like I said, we're not quite there on the guidance, but we have a lot of work. And I think you heard all day yesterday about, you know, basically in the field what's happening. There's been an enormous amount of work that we're trying to roll up into this. We're just not quite there in providing that draft guidance to the Committee. I again apologize for that.

MEMBER STETKAR: And what's the status, and what's the time B- you say we're there. It sounds like these are pretty well ready to issue. What's the schedule? Because they haven't come across our radar at all yet.

MR. REED: Yes, 13-06 we've been back and forth several times. I think we're in pretty

good shape. 14-01, I don't believe we actually have had interactions that I can recall yet with industry, so we B- now in terms of our B-

MR. BOWMAN: I think we did B-

MR. REED: We did one time? Okay.

(Simultaneous speaking.)

MR. BOWMAN: But that is really dependent on the outcome of whether or not severe accidents should be required. The 12-06 Revision 1, which would be the Draft Guide 1301, we had our first public meeting and we're still working through some portions of it.

MR. REED: I've got to also point to the fact that the new provisions for new reactors is an assessment portion, and that needs to be built into NEI-12-06, so that work is ongoing right now, so that also has to occur. So, there's a little bit of a gap right there. But, otherwise, I think that's kind of the lay of the land right now as it exists, so we're not quite there.

(Simultaneous speaking.)

MEMBER STETKAR: So, like are we talking, you know, a month, six months, 12 years? Do you have any kind of time B-

MR. REED: Personally, if you ask me right now, I would say a couple of months.

MEMBER STETKAR: A couple of months, okay.

MR. REED: Maybe two, maybe three at the most. I don't think too far off.

MEMBER STETKAR: Okay, that's fine. Thanks.

MR. REED: But I want the Committee to have the benefit of all the information if you're going to weigh in on this proposed B-

MEMBER STETKAR: Well, I mean, typically we get an opportunity to see whether or not we want a briefing before a Draft Guide is issued for public comments. And I want to make sure that we have that opportunity.

MR. REED: It's been my experience that, you know, ACRS is more interested in Draft Guidance, actually, so that's why I'm sensitive to this.

CHAIRMAN SCHULTZ: It can be that case. Eric, in your remark, did you mean that NEI-14-01 has a dependency on the White Paper and the Commission's views on the White Paper?

MR. BOWMAN: No, 14-01 includes some addressing of the severe accident management guidelines B-

CHAIRMAN SCHULTZ: Okay.

MR. BOWMAN: B- and the extent to which we need to actually endorse it would depend on whether or not those actually become B-

CHAIRMAN SCHULTZ: You're going to get into this further on the next slide. Correct? Slide 14.

MR. REED: So, going to the status we're working hard, we're making progress, we're meeting as a work group basically every day, and we are making progress. I figure there's an awful lot of complexity, a lot of internal interaction across the Agency on this, so it's certainly created a challenge. So, we're working to complete that, the language, the supporting section by section analysis, in fact, the entire proposed rule package and all the supporting analyses, the reg analysis, the backfit analysis, and also this draft endorsement of the regulatory guides I just mentioned.

We're scheduled to provide this proposed rule to the Commission as a practical reality is truly impossible at this point in time, so I don't know exactly what it will take, how much more. I had mentioned in my gut, I think it's a couple of months, two to three months, and I do believe we did that. We still could meet the end date, by the way, of the end date providing the final rule to the Commission by end of 2016. Just so folks know that that's the date. I think our Commissioners have committed external stakeholders that I think that's the important date from their perspective.

Now, I would also add that in terms of public health and safety, I think there's

another perspective that needs to be minded here, and that is, in fact, almost entire amount of safety return is already occurring right now in the implementation of the orders. And it's mostly for the mitigation strategies order, okay? So, that in terms of safety, that if you're looking at it from an external stakeholder feedback, you know, and concern about this Agency, they should be concerned about implementing the order.

This rulemaking in terms of additional safety, I don't see doing much substantial. Even though I argued qualitatively for SAMGs, I think if you look at it from a quantitative standpoint and safety space, probably not a lot of return for public health and safety. So, that's why I'm saying the orders in terms of public health and safety, I think, where that focus ought to be. And the rulemaking, nonetheless, it's a Tier 1 activity, so you know in terms of external pressure that was a December 2016 type of final rule schedule, but I'm trying to make sure people are aware from a public health and safety standpoint, I don't think this rulemaking in that perspective is doing a lot.

So, certainly, we're going to have a meeting with the full Committee, which is almost this Committee, with perhaps one more person, I think.

CHAIRMAN SCHULTZ: A few more.

MR. REED: More, Dana Powers isn't here, so I mean B-

CHAIRMAN SCHULTZ: That's correct.

MR. REED: Exactly. And that would be on December 4th, which is only actually a few working days from right now. And then we'll have I think, obviously, future meetings with this Committee on the final rule, too. Obviously, that goes without saying, so that's B-

CHAIRMAN SCHULTZ: Well, three people are not here today. And as you said, you're working every day, so plenty of time between now and the full Committee.

MR. REED: Well, you know, I B- even this week some B-

CHAIRMAN SCHULTZ: Other questions on the status? Are we going to have a

discussion, Bill, associated with B-

MR. RECKLEY: If you can give me a little time.

CHAIRMAN SCHULTZ: Sure, that will be fine.

MR. RECKLEY: So, this discussion will be the COMSECY. You saw it as a Draft White Paper. We talked about this at a full Committee meeting on October 3rd, kind of high-level discussion. We subsequently provided the Draft White Paper.

This topic of trying to integrate these activities, we talked to industry and other stakeholders in a couple of public meetings, and a couple of weeks ago I think NEI dropped by and I know you all talked about the letter that they had sent in on November 4th, where there seems to be a general alignment. There's a lot of details, obviously, that would need to be worked out, but it does seem to be a movement towards an approach.

As you saw in this discussion on the rulemaking language, the current status is confusing, but there's a couple of tracks that are going on at the same time. And we apologize because it all kind of comes to a head right now. And I think actually it works out pretty well, you guys ended up being the enforcement function which was pretty good. However, the tracks are not B- the mitigating strategies are good all hazard plans, but not necessarily protection against all reevaluated hazards.

Reevaluated hazards on another track under 50.54(f), Requests for Information with the regulatory decision to come after, so it's fairly common NRC practice, issue a Request for Information, a Generic Letter, a 50.54(f) letter, and then determine regulatory action. And that's the track that that is on.

The concern that drove the COMSECY was the same concern that Dr. Stetkar and others have brought up that, as Tim has mentioned, the backfit rule. You look at all of these pieces and how they will work, that there could be at the end of a day a real potential that you would have good all hazard plans that would not survive a reevaluated hazard, and we would not have a strong

regulatory basis to make it do that. So, that really becomes the driving purpose of the COMSECY, to ask the Commission to affirm that when they told the Staff to pursue mitigating strategies for beyond design basis external events, that in my language they were serious about the external events part of that title. Otherwise, again, it's a good all hazard plan, it's a good backup to station blackout and loss of heat sync, but the external events part, ahh, not so much. So, that's the reason for the COMSECY, to make sure that there's some minimum action taken.

The impact of that, as I mentioned earlier is B- what you heard earlier on the language of the rule would have to change if we went down this approach. And, again, it would have been better had the sequences worked out differently, but it is what it is. So, when we meet with you on the 4th, you're going to have to look at these things kind of together and consider the impact of one on the other.

The language that you're seeing is generally consistent with the White Paper. I've had to deal with lawyers and others, so if you saw redline strikeout it looks like it's a lot of changes, but it's not really, changed in words but basically the same concept that you saw in the White Paper.

MEMBER RAY: We should tell people on the line that we're on Slide B-

MR. RECKLEY: I'm sorry. The second slide.

MEMBER RAY: Yes, correct. I'm looking at this language here that I don't know whether the lawyers crafted it or not, but the reevaluated flooding hazards from Recommendation 2.1 within, interesting word choice, that are mitigating strategies for beyond design basis external events. What does that mean? I listened carefully to what you were saying, but B-

MR. RECKLEY: The change would be that mitigating strategies which would be FLEX plus potentially more than FLEX right now as it would be described, but what the Staff would say falls under the rule of having mitigating strategies would be required to address the reevaluated flood.

MEMBER RAY: Okay. Well, the way it's expressed is they need to do this, but now

you said it in a way that makes it more clear, I guess, would be obliged, or required.

MR. RECKLEY: I didn't have the benefit of rule people.

MEMBER RAY: What?

MR. RECKLEY: I didn't have the benefit of rule people to get my words. These are mine, so they may not be the best. But, basically, the bottom line is that there will be a plan in place for the reevaluated flood under mitigating strategies.

MEMBER RAY: Yes, but see the word "under mitigating strategies", or within the mitigating B-

MR. RECKLEY: Okay.

MEMBER RAY: The connection there is what is so hard to really understand. I mean, if you just stopped by saying they need to reevaluate flooding hazards, and didn't say anything more, then that would be B-

MR. RECKLEY: Well, that's where we are now. Basically, what we're proposing to change is you need to do something about the reevaluated flood hazard. And you're going to do that as part of mitigating strategies.

MEMBER RAY: Okay. And that's where we get to the connection that we B- at least I brought up a couple of times yesterday and today, which is that the mitigating strategies, in fact, do address reevaluated external hazards. You know, I asked the question did it or not, and the answer was well, no, but in this example here the answer is yes.

MR. RECKLEY: Well, one way to look at this is that you have a good all hazard plan let's say, and to some degree it's going to address events beyond your normal or existing design basis. By its nature, it will B-

MEMBER RAY: By definition, of course it does. yes.

MR. RECKLEY: It will. All right.

MEMBER RAY: That's what it's for.

MR. RECKLEY: Now what we would be requiring is you take a specific hazard or hazards in the case of flooding because there's more than one mechanism, and you take those reevaluated floods, and as a test against what you've put in place for mitigating strategies you assault the plant with that new hazard. Mitigating strategies will have to address those specific scenarios.

MEMBER RAY: Okay.

MR. RECKLEY: So, take the case of a connection. The all hazard plan might have connection on Elevation X, but I have a flooding hazard that's X+. This would say you have to address an X+ flood. You can move your connection, you can come up with another plan, but you have to have something within mitigating strategies to address the higher flood.

MEMBER RAY: Wait a minute, let me just finish the thought here. Supposing I said oh, I'm going to change the design of the plant so it can withstand this new flood. Now what do I do?

MR. RECKLEY: Well, if a licensee were to say that I am going to B- I am as a licensee going to take the reevaluated flood, and then basically call that my new design basis flood, protect all safety-related equipment from the new design basis flood. Right?

MEMBER RAY: Right.

MR. RECKLEY: Under our current approach, they would then screen out of Recommendation 2.1 because the new hazard is bounded by their design basis flood, in effect. It's not set up this way.

MEMBER RAY: Okay.

MR. RECKLEY: But in effect B-

MEMBER RAY: All right, but that's a choice that exists. Yes or no?

MR. RECKLEY: Yes, the licensee could take that approach.

MEMBER RAY: It's never mentioned as a alternative. Is it just supposed to be

obvious?

MR. RECKLEY: I suppose. I'll be honest, I didn't think any licensee would contemplate such a B-

MEMBER RAY: Well, I don't know why we want to be so dismissive of that, because it could be quite simple, as a matter of fact.

MR. RECKLEY: It could be. The dilemma, I guess, when I look at it from my side of the fence is whether we could make a licensee do it.

MEMBER RAY: Well, then B-

MR. RECKLEY: So, I'm always looking at what can we make them do versus what they might elect to do.

MEMBER RAY: You're saying the difference between adequate protection and backfit, perhaps, but let's leave that debate aside.

MR. RECKLEY: Right.

MEMBER RAY: It's just that this is a case which I've been asking about, because it seemed to be, at least in some people's mind true, that oh, well, yes, I do have this new hazard.

MR. RECKLEY: Right.

MEMBER RAY: And I'm going to address it with mitigating strategies. Now, that's a profound change in the way we have traditionally done business.

MR. RECKLEY: Right. And the way the White Paper is crafted is that it tries to set out, and that the COMSECY is set out, that at a minimum mitigating strategies would address the reevaluated hazard. Then after you establish or re-establish as a regulator that's the minimum requirement, we'll look at the re-evaluated hazards to see if anything else needs to be done.

Now, if you had a very high frequency flooding event, the Agency may very well decide the frequency and consequences of that are really B- should be considered in the traditional

design basis sense, then the Staff would pursue that for that plant under those circumstances.

MEMBER RAY: Okay. But let me just assert to you for whatever it's worth that I don't think that possibility is being understood.

MR. RECKLEY: Okay.

MEMBER RAY: It's assumed that what you say is so, perhaps, by people.

MR. RECKLEY: Okay. There's actually in the COMSECY B- there's actually, in discussions with the lawyers there's now actually a sentence that says that.

(Simultaneous speaking.)

MR. RECKLEY: I know, you will have it this afternoon.

MEMBER RICCARDELLA: I didn't see that as a minimum in the B- reading the COMSECY, I didn't get that as a minimum connotation there.

MEMBER STETKAR: That White Paper certainly does not convey that notion.

MEMBER RAY: Because it is as if we're now going to address something that we need to address by mitigating strategies, which almost says it's okay to let something bad happen, and then mitigate it, instead of avoiding it happening in the first place.

MR. RECKLEY: Yes.

CHAIRMAN SCHULTZ: No.

(Simultaneous speaking.)

MR. RECKLEY: Let me just finish. But the difference here is, in flooding in particular, we're taking models and approaches that are used for siting. And I can't re-site a plant. Right? So, I'm taking hazard information that I use in siting, and I'm applying it to an operating reactor. And we have to look at it from a backfit standpoint of what can we require the licensee to do. Obviously, they can't move, and in many cases B-

MEMBER RAY: You're not talking about moving. Look, you're talking to somebody

who changed the SSE from .5 G to .67 G. It can be done.

MR. RECKLEY: Yes.

MEMBER RAY: You can put seals on doors. you can do things.

MR. RECKLEY: You can, yes. I'm not disputing that it can be done. We have to look at it from the standpoint of what's the safety benefit, which means what's the difference in the earthquake between .5 and .75.

MEMBER RAY: That's B-

MR. RECKLEY: And what does it cost to make those modifications, and try to come up with a balanced view of what we want to put in place as a requirement.

MEMBER RAY: But that process I'm just suggesting to you isn't really clearly part of the discussion here, and it should be.

MR. RECKLEY: Okay.

MEMBER RAY: In other words, mitigating the consequences of something that you can't make some change to prevent may be okay given whatever probability you want to assign to it.

MR. RECKLEY: Right.

MEMBER RAY: But preventing it from happening in the first place is clearly what we have traditionally viewed as the better choice.

MR. BOWMAN: I think one of the things that we see as potentially being missing from the equation is the part that you mentioned, whatever probability you want to assign. So, the new methodologies that are being applied for determining the flood hazards, if they don't assign a probability for the occurrence of that flood hazard, they don't fit in very well with the analysis to figure out whether or not it's justifiable to change the design basis.

MEMBER RAY: Look, I'm not trying to do anything other than make explicit and clear that preventing something from happening ought to be on the table, rather than just mitigating the

consequences of it happening.

MR. RECKLEY: Okay, and I'll grant you that. And it's always better to prevent than to mitigate. Just in the terminology, we do need to talk about when we're talking about mitigation here, we're talking about mitigating core damage. I mean, that you're putting in a place B-

MEMBER RAY: Preventing core damage is what you mean.

MR. RECKLEY: Preventing core damage B-

MEMBER RAY: It also includes mitigating the consequences.

MR. RECKLEY: I understand.

MEMBER RAY: All I'm B- look, all I'm trying to do is get something explicit on the table and make it clear that it is an option that ought to be considered.

MR. RECKLEY: Yes.

MEMBER CORRADINI: Bill's point is it's there, but it's not clear to you it's there.

MEMBER RAY: I may be unique, Mike. It may be clear to everybody but me, that's true.

MEMBER SKILLMAN: No, I don't think it's clear at all. I think Harold is right. He's simply saying give as an option the opportunity to adjust your design basis so you do screen out on 2.1.

MEMBER RAY: Well, it may be a necessity.

MEMBER SKILLMAN: But making that option very clear provides perhaps many owners the ability to say I see a different ray of light through this problem. Just don't underestimate the capability of the owners to be clever and to be compliant. Making that option available opens up a lot of options that right now seem to be very obscure, so I think Harold is right on the money.

MR. RECKLEY: Okay.

MEMBER BALLINGER: Are you saying you're making an option or having a trip point beyond which you must do something?

MEMBER SKILLMAN: It's an option.

MEMBER RAY: I think it should be part of the process, and I'll just leave it there.

MR. SHEA: Just real quick. This is, again, Jim Shea from the B- I'm actually working in the Flooding Group. I don't see any of my colleagues here but I'm doing the interim actions. But if you look at the 2.1 process as a whole, it actually does what you're talking about. For the majority of the sites, you've got to remember some of these deterministic events that we now evaluate for new plants are very conservative. If you look at the current lip event, for example, which I would say the majority of operating plants do not meet that requirement. A lot of them didn't even evaluate that, but that's basically a Noah flood. It's a Noah-type event. And, you know, one of the thoughts was you build a Noah FLEX, build the ark. So, as you look at that, if you take that into context and you look at what licensees are B- when they do their flooding hazard evaluations and they redo their lip event, in many cases they don't meet that. And then in the Phase 2, I forget exactly the nomenclature in 2.1, but part of their option will be to seal the doors, meet that lip event, and then protect their safety-related equipment.

It's only in some cases where you have band failures that were not part of the original licensing basis that you might have some plants that are going to have to rely on FLEX as an interim B- as a strategy.

Now, I can go back to Bill's concept of, if you put your FLEX pump at your current licensing basis, you're still going to have to address the dam failure in a reevaluated flood, and then you may need another FLEX pump in order to pass the hurdle of the 2.1 process. But if you're a smart licensee, you're going to take your FLEX equipment and try to B- for that specific hazard, and you're going to site it or protect it against that new hazard.

And I think I B- you know, I can't speak for licensees, but what I've seen as far as looking at some of these plants phase in Category 2 of interim actions, that's what many of them are

doing. And that's what it is, so you've got some plants that can't meet that lip new requirement, they're going to seal their doors, and that's part of their interim actions. And eventually in that last phase to submit their 2.1 information, they would either, you know, change their design basis to those doors, or just keep that as interim actions and say that they're protecting their safety-related equipment in that event. But you've also got to put it in context. These new Chapter 2 events are very conservative.

MEMBER CORRADINI: So, can I ask about that? So, that means that you have an estimate of the frequency, or you don't? It's just simply B-

MR. SHEA: No, and that's actually B- that's one of the things one could say, that they're not looking B- we don't have any risk frequency when it comes to Chapter 2 events. There are some proposals to look at that in the future to start thinking B- you know, put some probability to B- and it really has to do with if you do the combination events.

Right now when you look at deterministically individual events at one time, so then the question is what happens if I put all these events together, what's the flood level there? But we've never gone down that risk path. That's why you take these deterministic events that are very conservative.

MEMBER RAY: Well, let's just say the people who put Fukushima where it is didn't do so consciously thinking it was going to be inundated. They believed it was a very rare event, also, or a Noah flood, if you want to call it that.

We're taking this too far, if I can say. My only issue is what obligation is there to try and prevent the need for mitigating strategies to be employed in the first place. And it's not clear, and I B- that's I think all we need to say at this point.

CHAIRMAN SCHULTZ: That should be clear. And, Jim, thank you for your comments and getting them on the record. I appreciate that.

MR. RECKLEY: Okay. Quickly going to the next slide. The second point that the

COMSECY will be asking the Commission to affirm or acknowledge might be a better word in this case, is that there will be some scenarios, and Jim just mentioned some of these dam failures that may not have been originally considered when plants were sited and licensed, that will involve mitigating strategies, and some unconventional measures.

Quickly upon being notified of a dam failure, plants shutting down, changing modes, preparing ahead of time for being inundated which for some scenarios is just a lot of water, and would, I guess in plain English, going to overwhelm the site. But what the regulation as we are proposing it in the paper would say even under those circumstances a licensee needs to be able to show that they have some ability to mitigate.

I mean, it will be obvious in these cases the plants are lost, basically, as an electric plant or financial asset, but even in such circumstances that mitigating strategies would have to be in place to prevent core damage, or damage in the spent fuel pools. We thought that was important enough to ask the Commission to acknowledge or affirm that there would be such scenarios. And then B-

MEMBER RAY: Of course, you know Watts Bar does today have a wet site strategy which long predates all of this.

MR. RECKLEY: Right. Yes, this won't be the case for all plants, but it'll be the case for some plants.

MEMBER RAY: My point is, it's a perfectly satisfactory design basis to do what you just said.

MR. RECKLEY: Okay.

MEMBER RAY: Which is to be aware of impending flood, shut down the plant, and to hook up special equipment to mitigate. And one wouldn't say that that was anything other than part of the design, at least I don't.

CHAIRMAN SCHULTZ: Go ahead, Bill.

MR. RECKLEY: Okay. Last thing we'll be asking the Commission to affirm is the B- really the point of most internal discussions, and that is actually the integration of these two activities. And the White Paper actually talks about this in some detail and the concerns, but this goes really to the need, or our feel the need to look at the big picture and how all these parts are fitting together, and the possible outcomes, and trying to make sure that we end up with at least a minimum requirement. And to factor in past experience on cases where the technology and the analysis was being developed. And we think flood fits into this category. As Jim mentioned, and Dr. Corradini, probabilities are being introduced to the flooding but it's not as well established as in seismic and some other areas, so it's difficult for us to fit this into our process.

Traditionally when that's the case, technologies are being developed, new models are being developed. What that takes is time, and we're concerned that as we get into this mode of analyzing and developing models, and introducing new concepts like probabilistic flood hazards, that we'll miss an opportunity to address the actual reevaluated hazards via what we think is a practical way, which is at a minimum through mitigating strategies. And then as the technologies develop, if the understanding is such that we should do more, that's the normal process. But we don't want to miss an opportunity now to build into the mitigating strategies the need to address the reevaluated flood. And that really is what drives us to try to integrate these at this time in order to look at this big picture, how the different pieces are moving in terms of timing, what the requirements will be, what the chance of ending up with nothing is. I mean, that's the B- if we stayed on the current track and let backfit analyses take their course, is there a chance that we would end up with no protections against the reevaluated hazards? As we look at it, you have to acknowledge that is a potential. So, when we look at it in the big picture, we came up with the proposal in the COMSECY, as it's been provided.

Last slide, you will get the COMSECY, if not today, Monday. Then we have the full

Committee on December 4th, I think, where this is also on the agenda.

CHAIRMAN SCHULTZ: Okay. I'm going to thank you, Bill, for the presentation and discussion. We are going to see the COMSECY soon, and we'll have an opportunity to talk with you again at the full Committee meeting.

And we have other consideration, comments coming up this afternoon on this topic, so I would like to quickly move you folks out from the table, and industry is going to come up. They're on a schedule to finish the morning's presentations. And we've already prepared them to move forward with those quickly, so as soon as we get the slides up we'll begin. I don't want them to move through the presentation quickly. We just need to get started quickly.

David, welcome. I understand you're going to be the main presenter for this B-

MR. YOUNG: Well, it actually will be Bryan. I'm just going to do quick introduction and turn it over to Bryan.

CHAIRMAN SCHULTZ: Oh, I'm sorry. Yes, Bryan. I've got you straight now. Thank you.

MR. YOUNG: Okay.

CHAIRMAN SCHULTZ: David, please do the introduction.

MR. YOUNG: Good morning, everyone. My name is David Young, and I'm a Senior Project Manager in the Emergency Preparedness Department at the Nuclear Energy Institute. With me is Bill Webster, Dave Gambrell, and Bryan Ford. Bryan is the Senior Manager of Regulatory Assurance in Entergy, and will be providing the bulk of the presentation here momentarily.

We appreciate the opportunity to provide an industry perspective on the proposed language for the mitigating beyond design basis events rule, and the observations that we're going to share with you here were developed by an industry task force that was formed to foster and promote engagement with the NRC Staff on development of the rule. And we've had, I think you've

heard already, several public engagements on this stretching back into earlier this year. And many of the members of the task force who helped to develop these comments are in the room today, and some are up here with me.

So with that, again, Bryan is going to present an overview of our perspective on the rule language and then, of course, we'll be happy to take your questions and have discussion, as well. So, with that I'm going to go ahead and turn it over to Bryan.

CHAIRMAN SCHULTZ: Bryan, before you start, because it's coming up on the lunch hour, I am going to B- to members of the public who are on the telephone, we are going to have an opportunity for public comment after B- just after this presentation, so I didn't want people that want to make a comment take a lunch break. We will fit that in before we take a lunch break here. So, Bryan, you go ahead with your presentation. Appreciate it.

MR. FORD: Thank you very much. You know, as this process goes on we look forward to the chance to provide our detailed comments in the rest of the rulemaking process, but we have sat down and come up with some initial comments. And our primary one is one that I think has been discussed a little bit, is that for those areas where guidance or requirements already exist, we think that guidance needs to be able to be used as written. And we should only expand the requirements in those areas where we can see a tangible significant safety benefit of adding to those requirements. So, that's our primary comment that you'll see in several of the areas.

Some positives with the proposed rule. We think that the right topics are in there, and it's high-level. It supports in most cases the use of the industry-developed guidance and it reflects a significant amount of work that has already gone on. And think that it has a reasonable approach to SAMGs, which as you all have heard, that's been an ongoing industry effort for years.

Some areas for improvement. The first one is on the additional requirements, or the requirements for decommissioning plants. Although it wasn't specifically culled out in the list of what

was a backfit or not a backfit, the current order EA-12-49 wasn't issued to plants that were in the decommissioning state. They've been in the decommissioning state for some time. When it came out, the revised rule would add requirements to those plants, it would also add requirements to plants that have been granted some relaxations to these orders since they went into the decommissioning state.

As many studies show, once we have permanently defueled, the risk associated with the spent fuel pool decreases relatively quickly over time, and we think that the order, if it's going to require items for decommissioning plants needs to reflect that. So we don't necessarily disagree with requiring a strategy for additional spent fuel pool refill strategy, but it shouldn't go out until all fuel has been removed from the pool. We think the bulk of the risk went away well before that time, and we don't see that those requirements should be added to a plant such as Millstone Unit 1 that has been decommissioned, or in decommissioning for over a decade.

There's also requirements in there on secondary containment. The wording of the requirement is kind of confusing. It can be read to be adding significant requirements, it can be read to not add very many. As a minimum it sure needs to be cleared up, but we're concerned with the secondary containment requirement that's in there.

Another area is the equipment section, specifically, the A, B, and C section of the equipment. We really think that it' something that would be better addressed at the guidance level, and we think that the thrust of the requirement is already in Rule Element (b)(1) which says that I have to have it readily available and functional equipment to implement the mitigating strategy. And that is the requirement that is being used to insure say for the B- what I think of as the (hh)(2), the extreme damage mitigation equipment. That is what we're using to insure that that equipment is available, and it seems inconsistent to put additional requirements on the mitigating system equipment just for one section.

With respect to multi-unit sites, you know, we have some concerns with the wording

for the extreme damage mitigating guidelines, or the B5B requirements, and how it's implementing the previous orders and guidance. Those were for single unit events. It's not real clear, some of these requirements are dual unit events, some of these are single unit events. We think that should be clarified.

There's also some ways that the staffing requirements that are in this rule, and how they apply to those specific activities we think really needs to be explored whether or not those are holding the right requirements.

MEMBER SKILLMAN: Bryan, let me ask you a question. With regard to your first bullet there, I would have expected industry to have made a comment along the lines, we certainly agree with FLEX, but we would like to have the option to do internal plant modifications that enhance our ability to cool, and to protect against fission product release, and that we can justify it from both the seismic and flooding perspectives. Give you an example.

Connecting an alternate power supply to a heater drain pump, or one of the smaller pumps in the plant that you can use to deliver water to a steam generator or to reactor vessel. Actually, making use of the same type of defense-in-depth that you would use to defend yourself in a violation when you show that you have margin. Those of us who have operated plants know you've got all kinds of margin deep within the plant, but we really B- we rarely take credit for it because we say we're constrained by the SSCs that are qualified.

Well, there are an awful lot of other devices in the plant that are very robustly built and they can deliver an overwhelming amount of margin, but we don't talk about them. So, I'm surprised industry didn't say we would like to have an ability to justify some of our presently non-qualified equipment that we know for certain is fit for duty and can give us the defense-in-depth that we want to have.

MR. FORD: And we're doing that. It's just in a different forum. Where we've been

addressing that is in the revision to NEI-12-06 Revision 1, because one of the things that the plants have found as they've been developing their strategies is places where it would be more appropriate to do modifications, or qualifications, or things to installed equipment that would greatly reduce operator actions, or speed up our response times versus pulling in a staged piece of equipment. So, what we're doing is B- have proposed modifying 12-06 in Rev 1 to clarify how to, you know, use that installed equipment for the transition phase. And after the first when you're using RCIC or something like that.

MEMBER SKILLMAN: Are you also considering asking the NRC to adjust the language in the proposed rulemaking so that that option is acceptable under the proposed regulation?

MR. FORD: I'll go back and look. I didn't see anything that would prevent me from doing that, because what it said is I had to have a mitigation B- mitigating strategy. So, I didn't notice anything, but I will look to see whether or not anything concerns me to prevent that.

MEMBER SKILLMAN: Thank you.

CHAIRMAN SCHULTZ: Bryan, I wanted to ask the industry rather than the Staff, what is the schedule for the release of Rev 1?

MR. FORD: We have a first draft and we got comments on it day before yesterday.

CHAIRMAN SCHULTZ: Understood.

MR. FORD: We're supposed to meet it looks like the second week of December internally to try to resolve those comments. I wouldn't be surprised that we get it out first quarter, hopefully with the staff's comments resolved in it. Our goal is to get to the state where the staff is happy with it and doesn't feel the need to take exceptions, and sometimes that can take some back and forth to resolve those concerns.

CHAIRMAN SCHULTZ: Thank you. Anything else? We're moving to Slide 5, I just wanted to announce to the B- for the benefit of folks on the phone. Thanks.

MR. FORD: Next one is on the change controls. The Staff talked about this a little

bit in their presentation. We agree we need change controls for these beyond design base events. We don't want to try to apply 50.59. We think we need to work to define that process quite a bit better. I think most of that can be done in guidance.

One place that we think we need additional guidance is the interface with the change controls for the normal design basis issues. I think my best example is that when we implement these mitigating strategies, we're opening doors, we're potentially going through security barriers, we're taking a lot of actions, and we don't want to get in the state of trying to evaluate those beyond design base actions in the design base world because they really don't B- many of those don't comport too well, so we think we need to provide additional guidance on just how you navigate those change control processes for these types of things.

And then we need to define the NRC approval process better. Once we've come to the conclusion we need NRC approval, is it a 50.90, or what is that process?

The next thing is to talk about the B- basically, the subject that was the discussion of the COMSECY. You know, one of the items we've discussed quite a bit is the impact of the new B- potentially new evaluated hazards on the mitigating systems, and the plants themselves.

Our major focus so far has been responding to the NRC orders and the work associated with the Requests for Information. We think our next big task is trying to integrate the new information from the reevaluated hazards into our plant in the mitigating systems in the work we've been doing.

Now, the Staff pointed out that they don't have that in their current draft rule language. We did provide a suggestion from the industry which seemed pretty consistent with what is in the COMSECY, and we agree with that path.

You know, as has been discussed here, the current mitigating strategies were developed using a consequence-based approach, because we didn't know the event. So, since we don't

know, you know, how big, or what kind of beyond design base event is, we're going to define here's the conditions you have to deal with. So, we assume that we've lost all of our AC power and access to our normal heat sync, and then we define how you would take credit for installed systems.

So, we think the difference here is that as you get the B- sorry, I'll finish this slide before I go to the next one. So, the B- from that the current design basis govern the strategies and how we made our designs. And we recognize that that may not be optimum based upon updated hazard information, so we think a key difference going forward is once we have the reevaluated hazard assessment, you know, we don't necessarily have to use the defined here is the conditions that you're in after the event; instead we can use the hazard itself to develop the initial conditions that you have to evaluate against. So, you would know whether or not with this evaluated hazard you have lost your offsite power source because you know what the level is, and you know where the power comes in at. So, you could then develop a specific set of conditions for the new hazard itself, and then determine the impacts on key equipment, availability of equipment, you know, what actions you could take to address it.

MEMBER CORRADINI: And you B- just to clarify. So, you would go through all of B- not just flooding, but you go through all of these in a similar fashion?

MR. FORD: What I have seen is that we are also looking at how you would go about addressing seismic, let's say. But right now we're focused on flooding and on how to resolve that.

So, our suggestion is that we review the impact of the reevaluated external hazard information on mitigating strategies, and the goal being that we can assure that we still have the key safety functions to restore or maintain them, or we may have to develop a hazard-specific mitigation strategy, or a targeted mitigation strategy to go in and address that.

Now coming up to a discussion that happened earlier, personally I think it is acceptable to go increase the protection of your plant such that you have protected the normal

safety-related components, and that they provide you the protection you need for the revised hazard. That's what I would personally prefer to do in all of the cases, but the next step would be to make sure that your mitigating strategy works, or modify it to make sure it works, and if that doesn't work you may have to come up with something different to go deal with the specific hazard.

MEMBER BROWN: So, is that directly related to Harold's comment earlier. I mean, you'd prefer more the upgrade, increase the licensing basis slightly?

(Simultaneous speaking.)

MR. FORD: If I can. I mean, this is myself personally, if I can, I want to protect the plant. And I would rather have the B-

MEMBER BROWN: Rather than mitigate.

MR. FORD: Yes, I'd rather have that big diesel that we keep up all the time. I'd love to have that working and providing me all the power I need, and protect my asset going forward. So, if possible, I think that'll be the path that many people will take, is can I do that reasonably? And in many cases you're going to be able to. I mean, we've already done it at a couple of our plants for the reevaluated hazard because it was pretty straightforward.

Other plants, that may not be something that is really viable to do, so they may need to go to the step of making it so that their mitigating systems or strategies work, or coming up with a targeted hazard, and a few plants have identified they need to go to those steps.

Well, Slide 9. Now, I think that was it. What other questions do you have?

CHAIRMAN SCHULTZ: So, what we're dealing with is a spectrum. You said personally this is what you'd prefer, and then many in the industry, and then a few, so our challenge in terms of evaluating where things stand and making the Committee's B-

CONSULTANT SHACK: Let me just add to thought that sort of came up before. Even if you did introduce protection to say the findings to flooding protection, it would seem to me a way

that the mitigating systems works now, you'd still have to assure that our mitigating system is working, and you postulate your diesel is gone. You don't know why it's gone any more. It isn't gone because of flood, perhaps. But your mitigating system strategy would still have to assume the new revised hazard and be protected against that.

MR. FORD: And that's one of the things we need to talk about going forward with the Staff, is how you integrate that in. I mean, today the mitigating strategies are based upon the undefined so you just assume just a set of initial conditions, your diesels are gone, your offsite power is gone. That may not be necessary or the right thing to do when you have more specific information on the hazard that you're evaluating against. And that could severely limit for these people who need to go develop a targeted mitigating strategy, you know, what actions they could go do, because they need to take credit for the equipment that will be available after whatever this new evaluated hazard occurs.

MEMBER STETKAR: Bryan, do I hear you starting to focus this effort, though, on yet another very clearly defined set of check boxes that we say yes, we solved that problem, we solved that problem, rather than the more integrated process that I thought was supposed to be the focus of this whole effort? In other words, I thought at the beginning you said well, this is B- we're not trying to define a specific hazard. We're trying to establish mitigating systems and processes that are not specific to a given hazard. And the reason that we're B- you know, the Agency, the whole industry has been accused of getting too pigeonholed in the past, and we've learned that that might not necessarily be good. But what I hear you saying, maybe I'm not hearing it correctly, is well, yes, but we'll define specific strategies for a specific hazard once we can define that hazard for this specific site.

MR. FORD: Well, we're not talking about undoing the current work that has been done B-

MEMBER STETKAR: Okay.

MR. FORD: B- for mitigating systems.

MR. YOUNG: You're just trying to recognize the difference between the work that's already been done with mitigating strategies order where we just assumed the consequence-based outcome versus what we're going to know in the future based on the hazards re-analysis.

MR. FORD: That's correct.

MR. GAMBRELL: We're trying to put this into context.

MEMBER STETKAR: See, some of our opinions, individuals, my opinion certainly is that you don't know what the next thing is going to be. And everybody focuses on Fukushima because Fukushima happened. We don't know what the next thing is going to be, so we don't want to define for the things that have happened, and only define for the things that have happened because that's the traditional event-focused reactionary approach. Some of the strategies that have been in place are, indeed, very good because they don't take that event-driven reactionary approach. They say regardless of how we got in this bad place, we want to be able to address it.

MR. FORD: And I think what we're saying is we want to keep that current flexibility, but now that we've identified some specific new information we want to insure that we have a method for maintaining or restoring the key safety functions for that new information.

MEMBER STETKAR: Okay.

MR. YOUNG: Notwithstanding you understand now the impacts from these new hazard reevaluations, I mean, you're still going to have, I think it was Eric or Tim who said that, you know, you're still going to have the tools in the toolbox for a broader response for mitigating strategies capabilities.

MR. GAMBRELL: That was the basis for our fundamental approach previously, is to B- since we couldn't identify a specific event, then we bounded it by a specific response, or a generic response that could provide to any hazard.

MEMBER STETKAR: And that's good, it's just that some of the words, at least as I

heard them, sounded like well, once we understand Hazard X precisely, we can back off from that more generalized approach, and have more focus on Hazard X so we can fix that.

MR. GAMBRELL: Well, I think functionally we're wanting to assure the same end point to make sure for a specific hazard that we reach the same functional requirements or end point.

MEMBER STETKAR: But not B-

MR. GAMBRELL: They may not need all of the other elements that are generic.

MEMBER STETKAR: Did you say may not need all of the other elements that are generic? I didn't quite hear you.

MR. GAMBRELL: The event itself may not necessitate the use of all the tools in the toolkit, so we want to make sure that that generic set that we put in place would be available to respond for any specific event.

MEMBER BLEY: But you're not throwing away the tools you don't need.

MR. GAMBRELL: We're not throwing away those tools.

MEMBER BLEY: Okay.

CHAIRMAN SCHULTZ: This is why we need some consensus.

MEMBER RICCARDELLA: But you're not guaranteeing that those tools will necessarily work in the case of certain severe events. Right?

MEMBER CORRADINI: Well, you don't know what you don't know.

MEMBER RICCARDELLA: Because you're saying that those events don't require it.

MR. GAMBRELL: An example could be would you utilize water from a non-seismic tank in response to a flooding event? Because you have additional capabilities at the site that may not be affected by that specific event, that you want to be able to apply to that solution.

MR. YOUNG: So, you're saying where we have reevaluated hazard information we can use that to inform better how we're going to implement those particular mitigating strategies in

those cases. Right? But the whole toolbox still remains available at all times.

MR. GAMBRELL: Yes.

MEMBER RAY: But you also may want to protect your plant from that specific thing.

MR. YOUNG: And that's another B-

MEMBER BLEY: That's the point that you were making.

MR. WEBSTER: As an example, if we have a mitigating strategy or prevention that we want to protect the current diesels because it's easy, smart, right thing to do, you know, then at the same time we don't want to have to go and say well, I have to assume that diesel I just protected don't work, and I've got to make B- so, it's a combination of things that you're looking at with this.

CHAIRMAN SCHULTZ: Other questions from the Committee? All right. I want to thank you very much for your discussions today, but again thank you for the discussions and presentations that we heard yesterday.

MR. YOUNG: Appreciate the opportunity.

CHAIRMAN SCHULTZ: Thank you. At this time, I would like to provide the opportunity for public comments, and we'll open up the phone line, but in order of the business of providing comments I'm going to ask first in the room here. We have a number of people B- for those on the phone line we have a number of people who are in the audience here. I'm going to give them the first opportunity to speak. Any comments from the audience? Yes, please state your name and provide your comment.

MR. BUNT: Yes, Randy Bunt with Southern Nuclear, but also the Chair of the BWR Owners' Group Fukushima Response Committee. Just one comment was made earlier that implementing 049, the FLEX items or the rule, i.e., would not have prevented the events at Fukushima. In many of the evaluations we've done, we believe it would have because the blacksmith equipment we talked about, the installed equipment performed for a period of time until your backup equipment,

or even the ones stored on site would have been available. So, the functionality we believe that's given here, and the redundancy and the diversity of it would in most cases, would have prevented that.

We understand on Unit 1 there were some other operator issues that would have been addressed through training and more knowledge of their isocondensers, so the thought is that it very likely would have prevented core damage. The plant would have had a significant impact to it, from a core damage standpoint there is a lot of evaluations that this rule and this activity would have in very likely terms prevented that event from going to the point it did.

CHAIRMAN SCHULTZ: Thank you for your comment. Any other comments in the room? Then I'll go to the phone line, and I believe the phone line is open, but the way our system works, we'd like somebody to say hello so we know the phone line is open.

MR. LEWIS: Marvin Lewis.

CHAIRMAN SCHULTZ: Hi, Marvin. If you would like to make a comment, Marvin, the phone line is open to you.

MR. LEWIS: Excellent, excellent. Thank you, thank you. First of all, I'm glad you're looking at this stuff daily, something original with the equipment which is what happened at Fukushima. Namely, they had to get very, very original.

Secondly, I'm very worried about the spent fuel pool. I feel that even when the spent fuel pool is emptied and the core is out, a lot of these nuclear power plants have storage of spent fuel, storage containers on site. The only way to empty out if they have a problem with the fuel in those storage containers, the only way to empty them out, basically, I hope, is in the fuel pool. There's no hot cell for them to be emptied out in. They have to empty them out, if they have to reprocess them in some way for transit, the only way is in the fuel pool. And they are shutting down fuel pools, emptying them out, and destroying them supposedly at San Onofre. And the people there are very perturbed about this because they have onsite storing wherein if they do get into trouble with the onsite storage

or they have to prepare them in some way for transit, namely by opening them, the only way to do it is in the spent fuel pool, which is no longer in existence.

So, I just throw that out as a situation that is not being addressed. And thank you again for allowing me to speak.

CHAIRMAN SCHULTZ: Thank you, Marvin. Other members of the public on the phone line who would like to make a comment?

(No response.)

CHAIRMAN SCHULTZ: Hearing none and just letting everyone know who is out there, that we will have an opportunity at the end of the meeting for additional comment.

With that, I'm going to close the phone line and call a recess to the meeting until after lunch, and we'll reassemble at 1:30 for the afternoon presentations.

(Whereupon, the above-entitled matter went off the record at 12:23 p.m., and resumed at 1:31 p.m.)

CHAIR SCHULTZ: We will call the meeting back in session following the lunch recess. This afternoon -- well, let's start with this morning.

This morning we heard about the draft white paper, which the committee had received on the integration mitigating strategies for beyond design basis external events and its connection to the reevaluation of flooding hazards. And as we know, that white paper has been in various draft forms for some time. And some differing views have been presented regarding the white paper that was out in an earlier

version. The COMSECY is coming out in final version, we expect, next week. But there were some differing views that had been presented by members of the staff. They made their views known and we wanted to hear about those views. And so we have invited first one group to come before us who gathered their thoughts together and are going to be presenting them in concert today. And we have another group that is going to present to us afterwards. And since we are going to be moving forward and inviting our views to the attention in our deliberations -- following our deliberations in the full committee, we wanted to get a full picture of the level of concerns and views in order to develop our best position.

With that, I would like to recognize Suzanne Schroer, who is going to be leading the presentation. Suzanne, before you start, let's hear at least an introduction from each of the members who are available for our discussions this afternoon. Jeffrey?

MR. MITMAN: My name is Jeff Mitman. I am a senior reliability and risk analyst with the Office of Nuclear Regulatory Regulation.

CHAIR SCHULTZ: Thank you.

MR. PATTERSON: I'm Malcom Patterson. I

am a reliability and risk analyst for the Office of New Reactors.

MS. PROHIDA: I'm Marie Prohida. I'm a senior reliability risk analyst in NRO.

MR. SEE: And I'm Ken See. I'm a senior hydrologist in the Office of New Reactors.

CHAIR SCHULTZ: Welcome this afternoon. And Suzanne, why don't you begin with the presentation? Thank you for being here, all of you.

MS. SCHROER: Thank you for having us.

Good afternoon. My name is Suzanne Schroer. And although my name tent indicates that I am still in NRO, I have made a recent move to the Office of Research. But when this whole process started, I was in NRO but I will not be responding to your letter on 17.4 because I am in research now.

CHAIR SCHULTZ: Okay.

MS. SCHROER: This morning, we wanted to talk to you about our staff concerns regarding the white paper -- and it was referred to this morning as a draft COMSECY, so, the same thing. They are not two different documents -- about integrating mitigating strategies for beyond design basis external events and the reevaluation of flooding hazards.

And really before I started, I wanted to

clarify a couple of things that were said this morning. One is we wanted to make sure it was clear that for some sites, the design basis floods are not rare events. So, that was kind of alluded to by a commenter. And so we wanted to clarify that.

And another thing that was said was that under the current R-2.1 process, if the licensee decided to protect to the new re-evaluated hazard, it would be screened out from the R-2.1 process and that is not correct either. So, I just wanted to make sure both of those were on the record to clarify.

So, I guess I should have started saying that I am representing a large group of staff from NRR/NRO in the Office of Research, just a few who are able to be here today. And this doesn't just represent a wide variety of offices within the NRC but also a wide variety of disciplines. The PRA staff, human factors staff, Val Barnes, who is listed on the slide is on the phone with us today as well, hydrology, geotechnical engineers. So, we really have quite a diverse group that share these concerns.

So, our plan today, for those of you that have the slides, is not to go through all 27 of them but rather go through the first five and then, if there is time, go through the plant examples. And the other

slides are just there for your reference and in case there are questions on any of the specific concerns.

CHAIR SCHULTZ: We'll see how the pace goes but we have allocated a good 45 minutes for your presentation. So, let's proceed. Thank you.

MS. SCHROER: Okay. So, moving on to slide 2. So, we have 12 concerns that we have documented with the white paper. And in the interest of time today, we have planned to hit on only concerns 5 and 6. These represent our fundamental safety concerns with the approach given in the white paper. But as I kind of mentioned, we can talk about the others if there is interest in time later.

So, moving on to slide 3. And this is kind of our boiled down version of our concerns for 5 and 6. And the first one being that the white paper approach, as it is now, fails to address some important safety issues. It was kind of discussed this morning that the white paper approach will not systematically cover flooding protection of safety related equipment. So, it was unclear to us, as well as it appears it is unclear to you how protection would be handled in the white paper. And from the way we saw things, it wouldn't be considered at all. And we really think that is a big gap.

And the other really big safety issue is that the white paper approach results in non-safety-related mitigating strategies, our only defense for reevaluated flooding hazards.

So, if you will remember under the recommendation 2.1 process, there were kind of two steps. The first step was to reevaluate the flood hazards using present-day guidance and methods. So, those methods that are used for new reactors. And then the second step was to do an integrated assessment that would look at the total plant response to the new flooding hazard, if it exceeded the current design basis. So, it would first look at protection, how the plant does or could protect against a new hazard. And then the second piece would be it would look at the mitigation. And when we say mitigation, it is a little bit different than the mitigating strategies that have been discussed and are discussed in the white paper. Mitigating strategies is more lax and the paper also makes mention of some targeted mitigating strategies. But when we say mitigation, we mean something much broader like maybe you have got a little water in your diesel building and you just need a pump, like a small pump to get the water out. That is the kind of things we are thinking of when we say mitigation, not

necessarily the whole FLEX approach.

CHAIR SCHULTZ: Do you mean then mitigating the result of the hazard, of the event for the given hazard?

MS. SCHROER: So, when we look at total plant response, we look at one, the protection, so keeping the water out. And then two, mitigation being doing something if the water got in. But you still have your diesel, perhaps. You don't have these assumed conditions like you do under the FLEX approach. So, it wouldn't necessarily be a big thing.

I mean, and it could actually be FLEX equipment. That is one of the things that we have allowed for but it doesn't have to be. It could be something small. It could be something that plants are already doing under their design basis.

MEMBER CORRADINI: But just to make sure. So, the answer to Steve's question is yes. It is mitigation of the hazard.

MS. SCHROER: Yes.

MEMBER CORRADINI: Okay.

MS. SCHROER: Yes. And when we say that there is a lot of words packed into this one bullet, so I am going to kind of break it down a little. So, when we say non-safety related, it means it doesn't have

to meet the single failure criterion, it is not redundant, and it is not diverse.

And Tim Reed kind of talked about this this morning. Not this but kind of a similar concept. He said we don't want SAMGs to be safety-significant because if they are safety-significant, it means we are in a bad place already.

And so that is kind of how I think about this. We don't want FLEX to become safety significant in a flooding event because that means we are in a bad place already.

Then moving on to the next bolded bullet, without the systematic integrated assessment, we cannot understand the impact of the reevaluated flood hazard on plant safety. So, the way the approach is in the white paper right now is it says you don't need to figure out what happens at your plant because you have FLEX and that should take care of it or you have these targeted mitigating strategy.

And with the integrated assessment, the first approach is to figure out what happens to your plant in a flood event and then see how your plant responds, so you can really develop specific strategies for that flood.

Without the integrated assessment, you

won't be able to understand the potential vulnerabilities. So, the integrated assessment, I know several of you are familiar with PRA and those built on PRA tools and concepts. So, I like to think of this as kind of a WASH-1400 we didn't think small break LOCAs would be a big deal. We didn't know until we did the analysis. And similarly, we don't know what could potentially be our vulnerability at a plant without doing the assessment of the flood.

Without the integrated assessment, we won't be able to determine whether protection is adequate. And this I am going to veer off a little and this next piece is my personal view. I am not really sure that we would be able to understand whether mitigation is adequate, since the current evaluation in criteria for FLEX is feasible, it doesn't include reliability of the plans. And so, that is something that we really emphasized in the integrated assessment and the plant response would be both feasible and reliable.

Without the systematic integrated assessment, we would not be able identify safety enhancements and determine their significance. If you don't look to see if there could be any, then you won't be able to identify them.

For example, something like this, with those discussed this morning is maybe you can just put another foot of sand bags around your diesels to be okay during a flood event. But through the white paper approach, there really isn't a path for that. And perhaps after the discussion this morning, that will be added.

And then I think most importantly without the systematic integrated assessment, we won't be able to gather enough information to support a decision to modify suspend or revoke a license. When we issued the 50.54(f) letter to implement recommendation 2.1, the purpose of that letter was to gather information to be able to modify, suspend or revoke a license, if necessary. You know, obviously, this wouldn't be necessary in all cases.

And without the integrated assessment, you are losing a lot of that information. And I will talk about that a little bit more on the next slide as well.

And finally, the staff doesn't have confidence in the undefined approach advocated by the white paper. It seems to rely on an unspecified staff process to initiate new regulatory actions. And it is really not clear what that would be and how you would have enough information to make that decision.

Another thing that Tim Reed mentioned this morning that if we don't have information to make a regulatory action, then we are not going to. So, if you eliminate all the information that you would gather as part of the integrated assessment, how would you have enough information to initiate some sort of new regulatory action? And if you were to initiate a new regulatory action, 1) what would that be; and 2) it wouldn't be necessary if you kept the integrated assessment that currently is required.

And this is also -- so I feel like I am going to say this is a big one. These are all big ones. But the white paper approach assumes that the NRC already knows which plants will require additional action. If you will look on page 2 of enclosure 1 of the white paper, it says the NRC staff does not expect the reevaluated flood hazard for most plants to affect the design-basis flood against which safety-related SSCs would need to be protected.

And so this is already presupposing. Now, we know what is going to happen with the flood. And in fact, we have never assessed it or evaluated it systematically. So, how can we make those assumptions? And I think that some would argue in some cases we already do know that there will need to be some

sort of action. So, it is not clear why that is the assumption for the white paper.

Are there any questions on this slide before I move to the next slide?

MEMBER CORRADINI: I guess maybe I misunderstood but let me say it to make sure, just to clarify.

So, you are saying that the COMSECY or the draft COMSECY essentially excuses the completion of the 1054-3.1 evaluation? That is what I am --

MS. SCHROER: Absolutely. And that is one thing that I don't think was clear this morning. It was the white paper was discussed as if the only intent was to make sure that mitigating strategies met the reevaluated hazard. And that is actually something that we agree with. We agree that FLEX should be able to meet the reevaluated hazard.

What we don't agree with is elimination of the integrated assessment, which is what the white paper approach proposes.

MEMBER CORRADINI: So, just one follow-on. So, certainly -- integrated -- systematic integrated assessment. Is that not correct?

MS. SCHROER: Only one. But certain plans have started but it looks like those will be

deferred.

MEMBER SKILLMAN: I would like to get educated on why a plant can't screen out. There are several plants that are hundreds of feet above nearby water.

MS. SCHROER: Oh, right. Yes. So, when I was saying that plants wouldn't screen out, what was said this morning was that if a plant is protected to the new hazard, that they could screen it out. And that is not correct.

If the new hazard doesn't exceed their design basis event, they don't have to do anything. But let's say it turns out their new hazard is five feet higher and they say okay, we are going to build a flood wall around the whole plant five feet high, we are protected, we can screen it out. We don't have to look at plant response at all.

And while it happened under the integrated assessment, we would say well, we want to look at that flood loss. We want to make sure that is reliable. So, that is what I meant.

MEMBER RICCARDELLA: I thought I heard that it could screen it out from the mitigating action for beyond design basis events. I didn't hear that you screened it out from a 2.1 evaluation.

MS. SCHROER: Well, I think the white paper would remove the 2.1 evaluation. So, if you were screening it out from the mitigating strategies under the white paper, there wouldn't be a 2.1 evaluation for it to be evaluated under.

The only thing that would --

MEMBER RICCARDELLA: If I make something a design basis event, then I don't have to mitigate against it because it is a beyond design basis event. I thought that is all I heard this morning.

MR. MITMAN: So, under the current 2.1 rule, if a flood hazard goes off, then there is requirement to do the integrated assessment. The plant has to go in and look at things.

Now, if the plant remains a dry site, even though the hazard has gone off, it should be a quick and easy integrated assessment. It is anticipated to not be time consuming or expensive to do but they have to do that. And then that information will come into the Agency and the Agency would make a decision based on that, as to whether to modify the license or not.

If the new hazard goes above the current protection, then it gets more complicated and more difficult. So, you have got a flood wall that is four feet high. The new hazard goes up two feet and it goes

a foot over the wall. Now, it becomes much more complicated and now the consequences of that new flood hazard could, for instance, say we will do ECCS.

And now that information will come in. The licensee would do an integrated assessment. They would explain why you have added appropriate measures to protect the core and they would submit that. And then the Agency would look at that and decide whether to modify or suspend the license.

That whole process, as we understand it, is not going to be done if the white paper COMSECY goes forward. They will simply say, under all these scenarios, you will have the FLEX mitigating strategies. You don't need to do anything else.

MR. SEE: There is additional information in what is called the trigger letter. It basically lines out the approach, the different scenarios that are postulated and kind of covers what Jeff just summarized. So, if you are interested in that information.

CHAIR SCHULTZ: Ken, what is that related to, this trigger letter?

MR. SEE: The trigger conditions for performing the integrated assessment. It was signed out by Dave Skeen December 3, 2012, ML12326A912.

MS. SCHROER: Any other questions on this slide?

MEMBER BROWN: Trigger letter. You said the trigger letter was lined out. I am trying to connect the trigger letter to --

MR. SEE: The trigger letter provides guidances for when and how to perform the integrated assessment.

MEMBER BROWN: Okay. The details, in other words.

MR. SEE: There is four scenarios that are outlined here. Scenario 1 is the reevaluated hazard is bounded by the design basis. You don't have to do anything. You're good.

Scenario 2 is then your local intense precipitation value exceeds its design basis. You trigger an integrated assessment that it is a low level of effort, is the way I like to describe it.

And then there is a scenario 3 which is called all permanent and passive flood protection. And the scenario I use here is say a berm. So, if you have a berm that is five-foot tall, your design basis flood was three feet previously, your reevaluated hazard goes up to four feet. So, you still have margin on your berm.

What you would have to do under the integrated assessment is just demonstrate that that berm can still handle that flood. It has gone up a foot, do some stability geotechnical work to show that berm is good and you are done. It is not a large level of effort. But if it goes up and it goes above your berm, then the level goes up and it gets a little complex.

And then scenario 4 is when you just do a full integrated assessment. That is the more complex one.

So, it gives industry some more guidance as to that event.

MR. PATTERSON: Let me point out the mitigating strategies order still applies.

MR. SEE: Yes.

MR. PATTERSON: The rule will still apply. So, we are not removing any mitigating strategies just because you are still within your design.

MEMBER CORRADINI: But just again a clarification. If I understand, the group's main point is is that you won't have the knowledge of the integrated assessment, even though you have moved forward with the rule.

MS. SCHROER: That is correct.

MR. PATTERSON: That is correct.

MEMBER CORRADINI: So, you want the full knowledge of whatever that turns out to be.

MR. SEE: Exactly. There was a lot of discussion here this morning about having the tools in the toolbox. To me, the integrated assessment will help ensure that I have got the right tools and it will help me use those tools in a more effective manner.

MS. SCHROER: And I think if you will look back at slide 2, concern number eight is that the current white paper fails to distinguish between the intended purpose of the integrated assessment and activities for mitigating strategies and does not recognize the difference between guidance associated with the two.

So, if you want us to speak to more detail in that.

MEMBER CORRADINI: I get it fine.

MR. MITMAN: One clarification. The concerns that we are expressing today are against the white paper COMSECY. We haven't looked at the rule for the language in the rule. You mentioned the rule and we really haven't started to think about the rule.

MEMBER CORRADINI: No, no, but I just wanted to make sure I understood your clarification of

what you felt was missing.

MS. SCHROER: Any other questions on this slide?

Okay, moving on to slide 4. Another concern that we had with the white paper is that the justifications are what we have called here questionable. The justifications for the white paper approach include this assumed effectiveness. And although we have assumed only under this first sub-bullet, I would say that assumed applies to all of the bullets.

The efficiency and resources, industry consensus, and I think after the discussion this morning that NEI gave about preferring to have a protection option maybe conflicts with the industry consensus that is presented in the white paper, and then time frame.

And these justifications are, I would say, inconsistent with the way we do business at the NRC. They have neither technical nor safety basis. It is all based on schedule and efficiencies. And we would say that this is inconsistent with a culture emphasizing safety over competing goals.

Additionally, this approach may be inconsistent with adequate protection requirements.

So, currently, regulatory actions and processes have been subsumed by the R2.1 I don't know what it is -- it is a whole project and may need to be revisited. So, basically what happened is we had some activities that were ongoing with flooding and when Recommendation 2.1 implementation started, we said we will take care of that under Recommendation 2.1. And now if we are getting rid of this whole process with the integrated assessment, it is not really clear. Those would have to be kind of restarted, I guess.

And there was some discussion this morning about cost-benefit. But for adequate protection issues, as I think Dr. Bley said, we don't have to consider cost benefit.

MEMBER BROWN: Don't have to or not permitted to?

MS. SCHROER: Not permitted.

MEMBER BROWN: Different set of words.

MS. SCHROER: Yes, thank you. And for flooding issues, licensees have not shown adequate protection for flooding at some sites. And that was the whole intent of the R2.1 process was to determine whether the NRC should modify, revoke, or suspend a license -- modify, amend, or suspend. Too many suspends.

And so without going through this entire process, it is not clear that we will be in alignment with our adequate protection requirements.

And the claimed efficiency under the white paper approach comes at a significant cost. On page four of the white paper, it states that the planned approach reduces the level of information to be submitted by licensees and the assessments will focus on mitigating strategies, instead of more varied enhancements to protect against a range of flooding conditions.

A broader assessment could, for example, identify protective measures for equipment important to safety against some flooding scenarios and, therefore, reduce the reliance on mitigating strategies to address such events.

So, the white paper, itself, states that we are going to be reducing the amount of information that we get, due to the elimination of the integrated assessment.

Are there any questions on this slide?

Okay, slide 5, the integrated assessment. If the white paper approach were modified or disapproved or something, if we kept the integrated assessment we would have a systematic review of all

plants with increased flooding hazards and we will know the extent of flooding issues at plants with known issues; the total number of plans that may have issue, including plants not yet identified. I think people that have been working in flooding for a while you know you kind of have a handful of plants in your mind that you think oh, that is a flooding plant and that is a flooding plant. There might be other plants that we don't know about because we haven't done this detailed assessment. And with the integrated assessment, we would be able to identify those plants.

We will know whether all plants can demonstrate adequate protection under flooding scenarios and we will know whether there are efficient and effective flood protection measures that are cost justified substantial safety enhancements. So, essentially, we would have information to pursue a back fit, if necessary.

And oh, I've jumped to my last bullet without even knowing it. With the integrated assessment, we will know information needed to support regulatory decisions. And I think this is really -- the white paper approach, I think we are kind of left in the dark about a lot of these things and we just assume everything is fine or that the mitigating

strategies will take care of a lot of these things but we won't really know. And with the integrated assessment in doing a systematic review, we will be able to have confidence in the protection at sites under flooding scenarios.

Any questions on this slide?

CHAIR SCHULTZ: Hearing none, proceed to slide 6.

MS. SCHROER: All right. So now I am going to turn it over to Jeff Mitman and he is going to talk about a couple of plant examples, just to give you a feel of what does this actually mean. Jeff?

MR. MITMAN: Okay, I'm Jeff. Go over to slide 7. So, the next three slides are three plants. They are actual plants.

CHAIR SCHULTZ: Louder, please, Jeff.

MR. MITMAN: Louder? Okay.

The next three slides are talking about three actual plants. They are not named because the point is to use illustrations and not to pick on any particular plant.

So, the first plant, PWR, under the current licensing basis, I have normalized all the water levels so that the normal water level is zero feet. So, site grades, 13 feet above that. The 100-year flood per the

FSAR is about 10.3 feet and the design basis flood is a normalized elevation of 23 feet.

So, under the current rules and licensing basis, the plant has a full set of ECCS electrical power systems to protect itself against the design basis flood.

There is new information coming in from the reevaluated hazard that indicates that the flood hazard goes up by tens of feet, more than 20 feet. And this will disable the ECCS, the offsite power supplies, and the on-site power supplies.

MEMBER BROWN: Is this a reevaluated hazard at that plant?

MR. MITMAN: It is a reevaluated hazard at that plant.

MEMBER BROWN: Well, I was looking at the parenthesis, based on present-day licensing criteria. So, if you were looking at it fresh today --

MR. MITMAN: If you were trying to license the plant today under the current licensing --

MEMBER BROWN: It wouldn't meet the twin feed.

MR. MITMAN: Right.

MEMBER BROWN: I'm sorry to interrupt you.

MR. MITMAN: The flood would go up by more

than 20 feet.

MEMBER BROWN: Okay.

MEMBER BLEY: And this was the reevaluation done by the plant.

MS. SCHROER: Yes.

MR. MITMAN: By a federal agency. I am being a little cagy here because for this particular plant there is some sensitive information involved. And so, I need to be a little bit -- I can't say everything I would like to say.

MEMBER BLEY: Okay.

MR. SEE: This is part of the R2.1 effort.

MEMBER RICCARDELLA: So, for this plant, the 2.1 effort is done, has been completed?

MR. SEE: The flood hazard is not completely done but the design basis mechanism has been done.

MR. MITMAN: So, the flood hazard is up by more than 20 feet. It disables everything on the site. Okay? So, of course, they still have FLEX equipment, as is appropriate and is another layer of defense but it raises questions. Are the mitigating strategies under FLEX, under the mitigating strategies, are they appropriate?

All right, the next one. Should we really

be talking about efficiency and effective protection options? Should we consider changing the design or licensing basis? Is there an adequate protection issue here?

So, under the current regime, where you do a 2.1 and an integrated assessment, the hazard has gone up. They are required to do an integrated assessment. They will come in and talk about how they are going to compensate for this new hazard, what they are going to do and why they are okay.

The Agency now has the opportunity to look at what they are planning, decide whether the license needs to be revised, suspended or revoked, and can move forward.

Under the COMSECY white paper proposal, all that discussion will stop because there is an assumption that the mitigating strategies are sufficient. And so we ask the question. Do we really want to just jump there without looking a little bit harder based on this new hazard information?

MEMBER CORRADINI: So, can I just get a clarification? So, just the numerical values. The 100-year flood was 10.3 and now the 100-year flood is 23. Is that what am I understanding?

MR. SEE: They are higher than that.

MEMBER CORRADINI: More than 23.

MR. MITMAN: The 100-year flood, which is not the design basis, okay, the 100-year flood, one of the problems we have got coming into is frequencies. Okay? In hydrology space, it is really hard to get frequencies out of the little bit of flood information we have. We can get a 100-year flood data or a flood frequency. You can extrapolate. You can pull that off of the data. When you start to get out beyond 1,000 years, the hydrology community gets really uncomfortable with trying to come up with frequencies.

So, typically in PRA space, we are very comfortable talking about one in 10,000, one in 100,000, one in a million. We are comfortable with that. The hydrology community is not. So, what you will hear when you talk about floods is that people don't want to extrapolate out the flood groups.

But put in here is simply a known point to give a little bit of perspective on what the frequencies are. Now, that is not to imply that the design basis flood is a 100-year flood. It is not. It is something smaller. The design basis flood has something at a lower frequency than a 100-year.

CHAIR SCHULTZ: But here it is higher, is it not?

MR. MITMAN: Pardon me?

CHAIR SCHULTZ: I don't want to get into the details specifically. This is an example. You have a 100-year flood normalized elevation of 10.3 feet and you have indicated the design-basis flood is normalized to 23 feet.

MR. MITMAN: So, it is significantly less than that, one in a hundred years.

MR. SEE: Yes, significantly less probable.

MEMBER REMPE: Okay, so we evaluated hazards. Is that a design basis flood that would be 20 feet greater than the prior design basis flood? What do you mean by reevaluated hazard?

MS. SCHROER: So, as part of the Recommendation 2.1 process, the first step was to reevaluate the flood, using present-day licensing criteria. So, if this were a brand new plant being built, this would be their design basis.

MEMBER BROWN: Forty-three feet?

MEMBER REMPE: That is what I'm trying to say.

MEMBER BROWN: So, the present design basis is 23 feet. It would have to be 43 feet.

MS. SCHROER: Yes.

MEMBER BROWN: Okay.

MR. MITMAN: One of the problems we run into with the old plant is that what they were designed and licensed to skip certain things. All right? So, a lot of the plants, their licensing design basis doesn't include local intense precipitation. So, it is not in the design basis right now. Okay?

And so, if a plant has that scenario, then that is new information and the hazard has gone up. And so that automatically puts them into an integrated assessment.

So, with the old plants, there is just various mechanisms that are just not covered. A lot of the plants looked at still water levels and they didn't take into consideration wave runoff.

A lot of the plants have still water level, they don't take into consideration debris loading. You know you have a flood. All these trees come down and it hits your berm. Is your berm good enough to take the impact from that debris? It is not in the licensing basis because it wasn't considered back in the late '60s or early '70s but under current design requirements, they would have to look at that.

These are all the subtleties that you start to see that come out in the integrated assessment that

just simply get pushed aside by the COMSECY that says it doesn't matter. They have FLEX.

MEMBER BLEY: Let me ask you a couple of questions because I am a little confused and I didn't study the COMSECY the way you have. And we have an earlier draft, which is probably when you wrote all that.

I am kind of where Mike was. I almost need to be walked through the COMSECY. I'm not sure where it says you don't need an integrated assessment or anything else that you assume that the FLEX will work, no matter what is going on with the flood. And the stuff we heard this morning, separate from what is in the COMSECY, the discussions, were that one has to look at FLEX against a place where you have exceeded the existing design basis and show that it can work.

And what I am hearing is that regardless of what the reevaluated flood is, the COMSECY says you don't have to look at anything. FLEX will work. And I just didn't --

MR. MITMAN: You didn't hear what I talked about this morning?

MS. SCHROER: Let me read you a quote from the COMSECY on page four. It says focusing the phase 2 decision-making on mitigating strategies means that

the integrated assessment in phase 1 is no longer needed in its current form. Instead, the mitigating strategies, equipment, and actions will be confirmed against the reevaluated flooding scenario.

MEMBER BLEY: Okay, that is different than what I heard you say out loud. That says it won't exist in its current form. It doesn't say what form it would be in. But it says you have to provide some basis to show that the FLEX would work.

MS. SCHROER: And then later on, it says that the planned approach reduces the level of information to be submitted. So, and this was actually one of our concerns.

MEMBER BLEY: But it doesn't say how much, either, does it? So, it is a little vague. It is a lot vague.

MS. SCHROER: And one of our concerns, I can't remember what number it was.

MEMBER BLEY: It doesn't matter.

MS. SCHROER: I think it was that it is not -- the staff didn't think it was clear to the Commission what they would actually be affirming because what we have been told is the integrated assessment would be gone. But then if you read this, you are kind of like, well.

MEMBER BLEY: Yes, I understand the first half of what you just said. It is vague. And it is not -- well, my interpretation of the words you read and having read this before isn't that it is gone. It is somehow controlled in its extent but that is not defined.

Now, this is one of those Phil was talking about this morning when you get something this wild, wildly different from the current design basis, why wouldn't it be a new design basis? Why wouldn't you have to go into the new design basis, under which you would have to do substantial analysis to show that you were covered.

MEMBER RAY: That leaps to the -- I am only saying make it more explicit that you must consider the process. And determine that the better course is mitigation prevention.

MEMBER CORRADINI: Well, if I just go back -- I'm sorry, I have forgotten the gentleman at the far end.

MS. SCHROER: Ken.

MEMBER CORRADINI: Ken, so you had repeated the four potential categories.

MR. SEE: It's from the trigger letter.

MEMBER CORRADINI: Well, whatever it is

called. This would be in the fourth category where it says a substantial to, it has got to be evaluated. Have I got it approximately right?

MR. SEE: Yes, you are correct.

MS. SCHROER: Using the current guidance.

MEMBER CORRADINI: Right.

MS. SCHROER: And so one thing that the COMSECY says is that instead of this integrative assessment, and I would like to mention that the guidance that was created to develop an integrated assessment, JLD-ISG-2012-05, it was created with a variety of technical expertise, a variety of NRC offices, and with significant industry and stakeholder input.

So, if we don't use that current form, then we may need to address, and I am quoting from the COMSECY here on page 6, we may need to address some specific flooding scenarios that could significantly damage the power plant site by developing targeted or scenario-specific mitigating strategies.

So, it is this whole big we might need to do something maybe if it is significant.

MEMBER BLEY: Let me push you a little further. I think what you said, and I haven't recently looked at the guidance for doing the integrated

assessment was that there is already substantial flexibility there, that the assessment only needs to be done to the extent to demonstrate whatever the issue is you are trying to look at.

MS. SCHROER: Yeah, so, the integrated assessment guidance --

MEMBER BLEY: Well, this kind of further softens it so maybe you don't even need to do that much.

MS. SCHROER: Yes, the current guidance provides for a graded approach. So, if you have a cliff around your site -- well, maybe a wall instead of a cliff, --

MEMBER BLEY: We get it. Go ahead.

MS. SCHROER: -- then you can say look, I have a large wall. We're good. But if you say well, I have a kind of small wall and my reevaluated hazard is above that, then you would need to do more. And so it provides for this graded approach that depending on what scenario your specific plant finds itself in, it would have a different level of rigor.

And what the COMSECY does is kind of softens that even more. And not only softens it but doesn't provide a clear process by which these would be evaluated. In our opinion, we already have that process.

MR. MITMAN: Now, this particular plant is on the NRC's radar. And so a lot of people are aware of the issues, aware of the increased hazard, and aware of the consequences of the increased hazard. But without the integrated assessment, it is not necessarily clear that the Agency will know the consequences of the increased hazard. And so that is one of the points that Suzanne made earlier, that without the integrated assessment, all we will have is a hazard and won't necessarily have all the information we need to make sure to understand the significance of that increased hazard.

MS. SCHROER: And I just found --

MEMBER RAY: Let me comment that what you just said was what at least I was intending to try and say about the mere implication that well, oh yes, we could do something other than just impose mitigating strategies. The fact that we don't systematically require that to be done is the issue that I am trying to surface for, our awareness. I guess I will put it that way.

MR. PATTERSON: Isn't that precisely what the purpose of the Near-Term Task Force and other post-Fukushima activities has been about, have a systematic method to deal with things that we don't even

know about yet? When a new hazard comes down the pike, we will have an established methodology for dealing with it.

MS. SCHROER: And I knew that this was in there somewhere and I just found it. And so I think it was you, Dr. Bley, who said it wasn't clear that the integrated assessment would be eliminated. So, if you go to Enclosure 2 on the first page it says focusing the flooding reevaluations on the SSCs serving key safety function within the mitigating strategies requirements will, in many cases, improve the efficiency of the NRC's regulatory process by eliminating the need for a broader assessment of the plant response, as described in current plans and staff guidance for integrated assessment.

So, it is in there.

CHAIR SCHULTZ: But again, it says in many cases. So, that doesn't --

MS. SCHROER: Well, in many cases, it would improve the efficiency.

MEMBER BLEY: What does that mean eliminating some aspects of it? I think I know what you guys are saying. And I think I know what others were trying to craft.

MR. MITMAN: In ending the example 1, I

would like to come back and say should we really be talking about plant efficiencies when, in my mind, there is a real adequate protection issue here. To me, it is adequate protection that a flood of this height -- I'm not even sure that the FLEX strategies will work under this scenario and how bad this flood gets. That there will be no place to stage the FLEX equipment if the flood is so bad.

And so why are we talking about efficiencies when, to me, there is an adequate protection issue that needs to be addressed first?

Now, the Agency, in my opinion, needs to look at this, decide whether there is an adequate protection issue. And if there is no adequate protection issue, then you can go forward on the basis of efficiencies. But until you address the adequate protection issue, the court decisions forbid us to look at monetary basis for doing this.

MEMBER BLEY: And they still would.

MEMBER RAY: Yes, but aren't you saying though that we wouldn't know? Because this is such an egregious example -- let me finish. But the point is, we wouldn't really systematically know that without the integrated assessment.

MS. SCHROER: Correct.

MR. MITMAN: For each site.

MEMBER RAY: For each site.

CHAIR SCHULTZ: And that is what I meant, Jeff, that in terms of efficiency it is eliminating those sites that can be eliminated from --

MR. MITMAN: Yes, but the integrated assessment allows you to do that. If the flood hazard goes down, you're out. If the flood hazard goes up but you are still dry, you are pretty much --

CHAIR SCHULTZ: Pretty much. That is what I am --

MR. MITMAN: It should be a quick, a comparatively quick and inexpensive process to show that you are okay. All right?

But when you start to see examples like all three of these examples, it becomes questionable about whether it is so easy.

MR. SEE: I would like to point out another document that may inform you. There is a deferment letter that the Agency has prepared deferring the integrated assessments. As you are aware, they had two years. If their design basis flood triggered an integrated assessment, the licensees were required to submit their integrated assessments within two years. The Agency has prepared a deferment letter and I will

give you the ML number for you to look at it. It has been changing, so it may inform you. I am just going to give it to you. It is ML14303A465.

CHAIR SCHULTZ: When you say the words have been changing --

MR. SEE: Well, it was a suspension letter, now it is a deferred letter. So, they are still working it.

MS. SCHROER: It is publicly available.

CHAIR SCHULTZ: Is this a draft of some kind or something that has bene issued?

MR. SEE: It is a draft is my understanding.

MS. SCHROER: No.

MR. SEE: Oh, is it out?

MS. SCHROER: It hasn't been issued to the licensees but it has been concurred on within the office and is publicly available.

MR. SEE: Well, it has been discussed with some licensees, with project managers. I know that.

It is just something that would further inform you as you make your recommendations. And it is profiled publicly in ADAMS.

CHAIR SCHULTZ: Jeff, you mentioned that in R2.1, now we are looking at the reevaluated hazard.

And that is fully consistent with what is being done for new plant sites, for a new plant site evaluation. Is that correct?

MR. MITMAN: Yes.

MS. SCHROER: Correct.

CHAIR SCHULTZ: And then you said that in the reevaluation this is being done in concert with other agencies. And at this point in time, even though the earlier establishment of design basis was done at least with some understanding of what the 100-year flood was, and then add margin in some way, shape, or form.

MR. SEE: I think the 100-year statistic is just that. It is not really raw. I think it is adding some confusion to our discussion. It is information but it is not relevant to the point Jeff was trying to make.

MR. MITMAN: The 100-year flood is not the design basis flood.

CHAIR SCHULTZ: I can see that.

MR. MITMAN: It was simply put in there to give some kind of benchmark of frequency, not a very good one, obviously.

CHAIR SCHULTZ: Well, why isn't it -- because the design basis reflects a much higher number.

MR. MITMAN: Right. But I don't know what the frequency of the design basis flood is.

MEMBER RICCARDELLA: We don't have the information but in the seismic world, we design to ten to the minus four.

CHAIR SCHULTZ: Right.

MEMBER RICCARDELLA: So, presumably, there is some kind of a scaling like that in there but nobody wants to write down what the probability is.

MR. SEE: If you could figure that out, you would be a wealthy man.

MEMBER RICCARDELLA: I'd be what?

MR. SEE: A wealthy man.

MEMBER RICCARDELLA: I doubt it.

MR. MITMAN: There is no frequency on the design basis flood. The staff, as part of an SDP has tried to come up with one and we --

CHAIR SCHULTZ: That is what I want to know, what the staff's thinking is.

MR. MITMAN: But I don't. If I had a frequency for it, I would give it to you. But I don't have it.

CHAIR SCHULTZ: Right.

MR. MITMAN: And so the 100-year flood there simply is kind of a mile marker to help a little

bit.

MEMBER RICCARDELLA: I was just saying it is not surprising that the design basis flood would be greater than the 100-year flood just by parallel.

MS. PROHIDA: But it is important to --

MEMBER RICCARDELLA: It would be a bigger flood than the 100-year flood. That doesn't surprise anybody, does it?

CHAIR SCHULTZ: Of course. No, it doesn't surprise me but then you get into discussions about well, you have to add in the PMP and the flood and all of this. And then you get into probability evaluation and we are not willing to do that.

But then you indicated that there is thinking going on.

MR. SEE: The Agency has a probabilistic flood hazard analysis research project. I think there is a paper going through concurrence as we speak. It is a five-year program. So, we are moving in that direction. We are just not there yet.

MS. PROHIDA: But it is really important to note that hazard frequency information is not needed to perform the integrated assessment. Okay?

The integrated assessment uses probabilistic concepts but you don't need the hazard

frequency information to complete the integrated assessment. I think that is very important to note.

CHAIR SCHULTZ: Well in this case, somehow the 20 feet greater is determined.

MS. PROHIDA: Yes.

CHAIR SCHULTZ: R2.1 defines the hazard just without a frequency.

MS. PROHIDA: That is correct.

MR. SEE: It is a deterministic process through HMRs and physics base models for a flooding scenario.

MR. MITMAN: Can I go on to example 2?

CHAIR SCHULTZ: Sure.

MR. MITMAN: All right, going to slide 8.

MS. SCHROER: How much time are we looking at?

CHAIR SCHULTZ: Just keep going. We are relatively open-ended. We will see how the next presentations go but go ahead, please.

MR. MITMAN: So, Plant 2 is an existing BWR, again, everything is nominalized levels. So, the normal river level is at zero feet. Site grade is 22.5 feet above that. The original design basis per the FSAR is a normalized flood level of 17 feet, which the FSAR comes out and says is a 200-year flood and it is

385,000 cubic feet per second.

So for the original design basis, we have a full set of EECS, diverse, redundant, single-failure-proof. All this remains available because the flood is below grade.

In the FSAR, however, they talk about, because of the SEP program, they went back and they revisited it, and this is in the plant as the current licensing basis. They revised the flood to 29 feet. Okay? So, seven feet, six and a half, seven feet above grade.

Now, the next quote comes out of the hazard report that was submitted recently. "There no incorporated/exterior or temporary flood protection features designed to protect the site against a flood greater than the plant grade elevation." So, what is the plant to do?

Again, this comes out of the hazard report. The reactor shutdown is followed by a reactor disassembly and the cavity is flooded up. All station loads are de-energized and the plant doors are opened. Again, this is a BWR. So, when they open the plant doors, they are opening up the secondary containment. Gasoline driven pumps provide makeup water to the pools and the reactor.

So, we have got a BWR that has no ECCS under this design basis flood. The flood has gone up. They have disassembled the reactor. So, that is one safety barrier gone. They have opened up primary containment. That is a second safety barrier gone. Of course, the deinerted, so we don't have any hydrogen capabilities anymore. And now when the flood waters come above grade, they open up secondary containment and they let water into the reactor building.

Now, the reevaluated hazard comes in and the water level goes up some more. So, under the current licensing basis, they have a license to operate with this strategy that is explained under the current licensing basis.

Now, the flood hazard has gone up. We get a slightly higher water level at different flows and we get back to the same questions. Are mitigating strategies appropriate for the reevaluated hazard? Are there efficient effective protection options? Should we consider changing the design or licensing basis? Is this an adequate protection issue?

The integrated assessment, if it were allowed to continue and be conducted and completed, would address these issues, and it's phase 2 of 2.1 flooding, we would get the opportunity to decide

whether to revise, or suspend, or revoke the license.

MEMBER BLEY: So now we have a shutdown reactor, pool reactor, with all the water on top of it but no containment.

MR. MITMAN: No reactor. No containment. No ECCS. And no class 1 --

MEMBER BLEY: Well, ECCS might be irrelevant because you have got all the water sitting on top of it already. Right? It is sitting there. It is a pool reactor that is shut down but with no containment.

MS. SCHROER: Well and disassembled as well.

MEMBER BROWN: What do you mean? I was going to ask you that.

MR. MITMAN: They shut down. It is a long-term flood. So, there is lots of time.

MEMBER BROWN: So, they can watch it build up. Is that what you mean?

MR. MITMAN: Yes. It is days to come. So, there is lots of advance warning. So, they shut the reactor down. They go to cold shutdown with RHR. They get to cold shutdown. On a BWR, they take the shield plugs off of the top. They take the dry well head off. They take the reactor vessel head off and

they flood the cavity like they were going into a refueling outage. And then they sit there and to keep the core cool, they use a FLEX-type pump to pump reactor into the reactor vessel cavity. And that is the way they want to deal with a design basis event, a design basis event that looks like it has the frequency somewhere around a small LOCA frequency.

MEMBER CORRADINI: What did you mean by that? I don't understand what you mean by that.

MR. MITMAN: Again, I can't tell you the frequency, because I don't know the frequency.

MEMBER CORRADINI: All right. Something like what then? You've compared it to B

MR. MITMAN: Under the thousand years.

MEMBER CORRADINI: Okay.

MR. MITMAN: Now, some people might probably get really upset by me saying that, but it could be that. Could be a little bit more frequent than that, you know.

The integrated assessment would allow us to ask questions about that and go forward and try and understand that better.

Under the COMSECY approach, simply it's like they've got a strategy, they've got a FLEX system, what more do you need?

MEMBER BLEY: I'm just curious. Has it been this way for a long time?

MR. MITMAN: Yes, since the B the original design B

MEMBER BLEY: I mean, when did they figure out that it might be as high as 29 feet? That was some time ago.

MR. MITMAN: I want to say in the SEP program probably in the early 80s.

MEMBER BLEY: Okay. And this strategy was laid out at that time?

MR. MITMAN: Yes.

MEMBER BLEY: Okay.

CHAIRMAN SCHULTZ: Well, you said it was slowly developing, but apparently not slowly enough for them to unload to the fuel pool.

MR. MITMAN: That's not part of their strategy.

CHAIRMAN SCHULTZ: That they have described.

MR. MITMAN: There are B

CHAIRMAN SCHULTZ: They have described.

MR. MITMAN: There are procedures in place today to do all this. And they've been in place for a while, okay.

And so, those procedures are there, the Agency knows the procedures are there, they're inspectible. This is their planned strategy if they need B if they are going to face a flood of above grade.

MEMBER BLEY: This has been sitting there and this is the way we do business from the past.

MR. MITMAN: It is.

MEMBER BLEY: I never saw one like this.

MR. MITMAN: But the hazard has gone up, okay. And it, to me, the whole purpose of NTTF was to say based on Fukushima Daiichi, maybe we should go back and look at some of these external events a little bit more.

And so, when you go look at it, this is what comes out of the review so far is these types of B this scenario.

And this is not unique. This is not the only BWR that has a strategy like this.

MR. SEE: And so, Jeff, they would utilize this procedure for floods less than the PMF.

MR. MITMAN: Yes. So, the PMF is 29 feet. Any B

MS. SCHROER: And PMF is probable maximum flood, for those who might not be familiar.

MR. MITMAN: All right. For any flood that

goes above grade, which is the 22 and a half foot, this is their strategy.

MEMBER SKILLMAN: How could they know they have as much time as they have assumed in order to make provision for this strategy?

MR. SEE: Good question. It's a postulated scenario where the precipitation falls in a particular sequence and a particular location. And then it takes time, travel time to come through the rivers and reach the site.

So, many plants have postulated these scenarios where you'll have a three-day event that's 40 to 50 percent over PMP, three days of no rain, and then three days of the main PMP. So, you have a nine-day sequence.

And they will take this storm and move it around the watershed and try to identify what they call the critical location, which will give them the highest flood.

MEMBER SKILLMAN: Okay. Thank you.

CHAIRMAN SCHULTZ: All right, Jeff. Next scenario. I think you said you had three; is that correct?

MR. MITMAN: Three, yes. Plant 3 is on Slide 9. It's another BWR on a river, okay.

Current licensing basis, again, normalized water level is zero feet. Site grade is 25 feet above that. I probably shouldn't have put this in, but that's nine feet above the thousand-year flood.

All right. PMF under the current licensing basis is normalized 34 feet. Current analysis is that the flood will take 12 days to develop. So, lots of lead time. And that floodwaters will remain onsite for 11 days after they come onsite.

MEMBER BLEY: You don't have the design-basis up here. This is the B

MR. MITMAN: The PMF is the design-basis.

MEMBER BLEY: Okay.

MR. MITMAN: So, that's the 34 feet. The licensee flood protection procedure requires they shut down the plant, they construct a ring levee to protect the plant.

If the construction of the levee is not completed or the levee fails, neither of which are low probability events, station blackout will occur. So, the backup to that is to run RCIC without dc power.

So, that's the licensing basis today. That's on the books. That's their NRC-approved, AEC/agency-approved approach to the design-basis flow.

Okay. So, they go out and they redo the

hazard and the PMF goes up and we're back to the same set of questions.

Now, is it really appropriate to just say, hey, we'll go buy two or three commercial grade pumps, store them in an appropriate condition and use them to deal with this event if it happens?

There are three examples. There's others, okay. There's some talk in the COMSECY that for unusual events they can use the targeted B a targeted assessment, you know, how many of these are there out there?

I probably can come up with five or six, all right, but I don't know how many others are out there.

MEMBER BLEY: Do they give a definition for this targeted assessment?

MS. SCHROER: That's another one of our concerns is that it's not clear what the targeted scenario-specific mitigating strategies would be.

MR. MITMAN: And then once you find those, it doesn't give you any direction on how you do any kind of a targeted assessment.

MS. SCHROER: Or how you ask for that information, even.

MR. MITMAN: One of the arguments that we've

heard raised over the last week or so is, well, there's nothing under the current regulatory regime that would prevent us from using the normal processes to revisit these three plants or any other plants that might have these types of scenarios.

And that's perfectly true, but this is B Plants 2 and 3 is not new information and we haven't revisited them over the past years. And it's not clear that they would be revisited.

MEMBER BLEY: Just for me to understand this, if, in fact, when they did their B the seismic reevaluation this one and Number 2, it didn't go up, but it stayed at the high level that was already high enough they had to take these special measures B

CHAIRMAN SCHULTZ: The flood evaluation, yes.

MEMBER BLEY: -- it would not have triggered an integrated assessment. Would not have.

MR. MITMAN: It would not have. If the hazard had gone B

MEMBER BLEY: So, the integrated assessment wouldn't have helped us here, because it wouldn't have been triggered.

MR. MITMAN: That's true. If the hazard had gone down by half an inch, they would not have done

an integrated assessment and I couldn't use these B those two plants as examples.

MR. SEE: The staff weren't happy about that, by the way. But, you know, you have to make compromises.

MEMBER BLEY: The trigger letter that you write to us, is that the thing that set up the criteria for how you do integrated assessments, or it's not related?

MR. SEE: It is related. Sue, do you want to take it?

MEMBER BLEY: I mean, we're going to see that, but we haven't seen it yet.

MS. SCHROER: The trigger letter says these are the conditions by which you have to do an integrated assessment. And then there's the integrated assessment ISG which says, okay, if you've triggered one, this is how you do it.

MEMBER BLEY: Okay, against those four categories.

MR. SEE: The trigger letter is a clarifying letter that, you know, tells you when you trigger one, it adds some clarifications as to what I would call the level of effort.

MS. SCHROER: Right.

MEMBER BLEY: Clarifies the ISG.

MR. SEE: Yes.

MEMBER BLEY: Okay. Thanks. That's what I didn't quite have how those things fit together.

CHAIRMAN SCHULTZ: Okay, Suzanne. Do you have additional slides for the presentation? You said there were five, and then the examples.

MS. SCHROER: We have B

CHAIRMAN SCHULTZ: I know you have backup slides.

MS. SCHROER: Yeah, we do have slides that go over all 12 concerns.

CHAIRMAN SCHULTZ: I'll poll the members of the Committee to see if they want to follow up on any of the first slides' items besides the ones we've discussed or other questions that you might have.

MEMBER RICCARDELLA: Seeking what might be middle ground here, would the group B seems like this integrated assessment is the real sore point.

Would the group be comfortable if the requirements came out that while you needed to do an integrated assessment, but that assessment could include the FLEX mitigating strategy equipment?

MS. SCHROER: That's what the current guidance says. So, right now the current guidance for

the integrated assessment says if you don't have out of B well, that's B if you don't have protection for the flood, the reevaluated flood hazard, and you do mitigate the event, you can credit your FLEX strategies already in place.

So, the integrated assessment guidance that's currently on the books and has been for a couple years, already has that kind of language.

CHAIRMAN SCHULTZ: No, no, no. But to go back to Pete's comment, though, that would, I think, match up with what you said.

The problem is that the systematic assessment is not being required by the COMSECY.

MS. SCHROER: Right.

MEMBER RICCARDELLA: You know, my understanding is about, you know, from what I heard from industry is that they intend to do mechanistic assessments of these 2.1 reevaluated hazards.

Now, you know, and the key difference they were making was mechanistic versus non-mechanistic. In other words, currently the FLEX are based on a non-mechanistic assumption that you lose power and you lose access to your ultimate heat sink.

And as they get into considering these new hazards, they're saying, well, we're going to consider

them, but we're going to consider them in a mechanistic fashion.

And, you know, to me, that almost sounds like at least B I don't know exactly what's in an integrated assessment, but they are doing an assessment of the specific hazard.

MS. SCHROER: I think it's a little different. So, right now the order EA-12-049 mitigating strategies is for an undefined event. And I could be totally wrong and I'm going to interpret industry slides. So, maybe this is a bad path, but I'm already on it.

And what industry seems to say is that they would instead of having this broad, you know, mitigating strategies, they would look at flood-specific mitigating strategies.

And I guess to understand maybe the nuance, so the purpose of the R21 hazard was to look at what would be a design-basis event now.

So, it wasn't to look at, you know, this really bad day. It was to look at what could reasonably happen at your site.

And the purpose of the mitigating strategies was, okay, you have this really bad day and something unknown has happened. And so, I think

there's a little different perspective there.

So, if you're looking at it as this could happen and having, you know, some unknown frequency, but it's a, you know, probable maximum flood is probable, you know, that's a little different slant than assuming that it's just this unknown, you know, very rare bad day.

MEMBER RICCARDELLA: I'm just wondering if we're not necessarily that far apart between what the industry intends to do, which is some form of an evaluation of a specific event, but just take into account the FLEX equipment in addition to their design-basis when they evaluate that.

Maybe they need to, you know, maybe you'd need to have some requirements that would increase the level of rigor in that evaluation.

MR. SEE: The amount of information that they would be missing, there's an information gap between the approaches, is the big issue, I think, for us.

The mitigating strategies is based upon a set of assumptions. You've had a bad day. Whereas if you do the integrated assessment, you're going to be taking actions based upon more information and, you know, smarter actions, cheaper actions, potentially,

you know. This has B

MS. SCHROER: And also specifically looking at how the flood would affect your plant. And you wouldn't make this assumption that you're just going to let the water in and then what's the best way to get it out, but you would be really looking at what specific impacts it would have on your plant.

MEMBER BALLINGER: What I thought I heard was something similar to what Pete thinks he heard, and that is they're going to do the 049 stuff and that establishes a baseline.

Then we're going to go look at reevaluated hazard. In this case, flood. And they're going to evaluate that.

Now, they didn't say B I didn't hear them say specifically what they were going to do as part of that evaluation.

MR. SEE: Yes, they didn't use the words "integrated assessment."

MEMBER BALLINGER: They didn't use the word "integrated assessment."

MR. SEE: But it might not be that far from B

MEMBER BALLINGER: But, again, it would -- I would hope that it would B the kind of evaluation,

the kind of analysis they would have to do would depend on when they got into the flood analysis, what the answer came out to.

Am I doing that wrong?

MEMBER RAY: I think the issue of how this proceeds on the front end whether it's an integrated assessment or something short of that, is where we need to focus our attention.

Don't forget, though, the adequate protection milestone which is if the integrated assessment shows that you should take cognizance of this from a design-basis standpoint, it sort of ends there. You don't go on to, well, maybe I can mitigate it with the flood stuff. And that's all I'm going to say.

MEMBER BALLINGER: But that's part of the whole process.

MEMBER RAY: Well, it may or may not be is the point.

MR. PATTERSON: I would point out that "integration" is being used in several different ways in this conversation.

From our point of view, the appropriate integration of mitigating strategies or the integrated approach is that at the end of the day you're assured

that the equipment you plan to use for mitigation will survive the reevaluated hazard.

MS. PROHIDA: With a reliability component, if I may add. You know, we had a separate Appendix C developed to look at the feasibility of operator actions performed under very extreme conditions to make sure that they were reliable.

And I'm, you know, providing an estimate of about, you know, with a greater reliability than, you know, 0.1.

We also looked at the reliability or -- the reliability of the mitigation path. Of all the equipment that needed to change, state, you know, how it was being maintained, what were its support systems.

Once again as, you know, we don't need hazard infrequencies to do the integrated assessments, but probabilistic concepts were utilized to evaluate the reliability of the mitigation path in terms of equipment and operator actions.

MEMBER CORRADINI: So, can I say it back to you another way? You're saying given some mechanism to get the threat B

MS. PROHIDA: Yes.

MEMBER CORRADINI: -- you use probabilistic approaches on how the mitigation would

function and how successful it would be.

MS. PROHIDA: That is correct.

MS. REMPE: But also if you have to rely on some equipment that is non-safety-related, you might decide to put some requirements that are not currently there on that equipment, for example, the FLEX equipment, with this integrated assessment evaluation methodology, right?

MS. PROHIDA: It would ask about how frequently is this equipment being, you know, tested? Is it common to the maintenance rule, you know?

MR. SEE: Right. You could decide to put a second one there instead of just relying on a single piece of commercial equipment.

MS. PROHIDA: Right.

CHAIRMAN SCHULTZ: Any other questions or comments?

(No response.)

CHAIRMAN SCHULTZ: Well, thank you very much. We really do appreciate your presentation and the level of detail that you have provided in the discussion. It was very helpful. Thank you.

And we're going to move right on to the next presentation. That will likely take us to the break.

And, Gary, I didn't mean that you only have

until the scheduled break time. I mean B

(Laughter.)

CHAIRMAN SCHULTZ: -- after your presentation, we will have a break.

Gary, your presentation fits into my introduction to the afternoon session here. So, you already introduced yourself to the Committee and there's no real need to, but go ahead and introduce yourself for the record and we'll move forward. Thank you.

MR. HOLAHAN: I will. I am Gary Holahan, the Deputy Director, the Office of New Reactors. I actually appreciate the opportunity to speak to the Committee today representing Scott Flanders who is the Division Director responsible for all of the seismic and flooding work that you've heard about earlier today. And also on behalf of Glenn Tracy who is our Office Director for New Reactors.

You'll see that the title here says "Non-Concurrence." And I know we've danced around the issue of SECY papers and white papers, and I don't care to dance too much.

There is, in fact, a SECY paper. It is in concurrence and it has not been concurred upon by a number of people who have reservations about it. And

I think that's what we should be talking about.

This is a serious issue. I think the Fukushima experience is serious. I think not only is the flooding issue serious, but I think part of this non-concurrence and the concerns are about regulatory philosophy and about how to make, you know, important safety decisions.

And that's part of the reason why the New Reactor management decided to issue a separate document as opposed to simply endorsing the staff document you heard about earlier.

So, my presentation will speak not at the same level of detail that you just heard, but take these issues to a policy and practice level that I think has important implications for flooding, but it has implications for many, many future decisions because it relates to the relationship between or among adequate protection, design-basis, beyond design-basis events, how decisions are made in the light of new information, and I think this is quite a significant issue.

And the fact that there's been some change in the proposed approach to it, I think it's important to deal with this issue now when we have a clear example so that the staff, the Committee and the Commission has

a clear view on how to make decisions in the future.

Can I have the next slide, or should I do this myself?

MEMBER STETKAR: You get to do it yourself.

(Laughter.)

MR. HOLAHAN: Okay. Well, among other things, I had the privilege of being on the Near Term Task Force although I didn't write the flooding recommendation, but I certainly endorsed it.

And I think we should recall that, in fact, the entire chapter of the Near Term Task Force report that talks about the technical recommendations is entitled "Safety Through Defense-in-Depth."

And, in fact, the entire set of recommendations are built on a certain concept where you can see Recommendation 2 is targeted at enhancing protection for design-basis floods and seismic events and says "where warranted." Obviously it means something to be studied, evaluated and dealt with appropriately.

Recommendation 4, which is also which is the way the mitigation strategy issue is, was also called upon for enhancing mitigation for design-basis and beyond design-basis events.

The Committee probably also recalls that

there's a Recommendation 8 dealing with severe accident management and how to deal with core melt and beyond in container performance. And there's also a Recommendation 9 dealing with emergency preparedness.

I think the original recommendations were seen as a package and that the right way to put regulatory philosophy forward is to deal with important concerns through a defense-in-depth approach where appropriate.

Mike, push the button. Okay. Defense-in-depth -- I will also memorize the button that Mike is pushing. Thank you, Mike.

Okay. So, these recommendations were intended to constitute a rational set of enhancements for defense-in-depth and they were targeted on Fukushima issues. This is not the only recommendations you can develop, but these were quite targeted.

I think it's important to recognize that the Commission supported all of these recommendations in whole or in part through various mechanisms.

So, for example, the mitigation strategies had a very clear order issued, rulemaking was initiated on the number of activities, and the demand for information is the approach that was taken on

Recommendation 2.1, but the Commission is addressing each level of these defenses.

So, I'd like to spend a few minutes and you'll hear that there's quite a lot of overlap between the concerns you just heard from staff and that the NRL management has put forward. I would say the major difference is that the concerns are at a different level.

We see the integrated assessment and the current approach going on as a systematic and effective way of answering the safety questions about protection for flooding.

It may not be the only way. You could probably develop alternatives. You could develop an alternative that involved a research program. You could develop alternatives that were perhaps more streamlined.

And I don't wish to defend a specific alternative at the moment. I think if there's a desire to be more efficient to get some of these issues closed in a more timely manner, I think we would be supportive of that, but there are some things that it would have to do.

It would have to be systematic. It would have to be consistent with current regulation. It

would have to make some regulatory sense.

So, the proposal in the COMSECY or call it "white paper," if you like, it would limit staff and industry's efforts on flooding to a confirmation that the mitigation strategies could cope with the reevaluated flood. And I think you heard quite a lot of discussions of that.

Now, at least the way I read the paper, it does involve a commitment that the mitigation equipment, and in most cases that involves at least early on, batteries and turbine-driven system, and later on FLEX equipment, that that equipment would be protected against a reevaluated flood.

RECORDED VOICE: Pardon the interruption.

(Telephone interruption.)

(Off the record comments.)

MR. HOLAHAN: So, I think the SECY paper does clarify the relationship between flooding levels and protection of mitigation equipment. And in my mind, that is a good thing and it ended as reasonably clear.

What it does is it eliminates -- and I insert the words "in our view," because I think there is some disagreement about whether what the paper is proposing constitutes a systematic reconsideration.

And you've heard a lot of people don't think so, but some claim so.

So, I would say at least in my view and in our management view, it does eliminate the systematic reconsideration of external flooding protection for the rest of the plant beyond the just the mitigation equipment.

Okay. So, what does it mean to do that? So, the post-Fukushima recommendations then lose their concept as a defense-in-depth collection, because, in fact, you end up focusing on mitigation and you heard quite a lot of discussion about backing away at least to some extent, and in some muse to a very considerable extent, to the plant protection.

And I think if you think about it B well, I'll come back to the specific equipment of most concern.

Second consequence is that the systematic evaluation of total plant response, both protection and mitigation, and I think the integrated assessment is one way of doing that, that would be cut off and we would really lose the opportunity to understand the plants, their vulnerabilities and the potential for enhancements in the right areas.

Third, and I think you heard this before,

non-safety-related systems and equipment, in this case, FLEX equipment, but even the safety-related equipment would be only partial systems.

So, it may be a turbine-driven aux feed water pump, but not the motor driven. So, there's a loss of redundancy.

There's a B batteries would be used, but they would certainly be used well beyond their original design intent. So, there's a lot of load shedding and running batteries out to extreme conditions. There's quite a lot of operator action well beyond what you would see in a design-basis event.

So, in total, what that ends up is non-safety-related systems or a collection of systems through the mitigation Phase 1, Phase 2 and Phase 3 being used to compensate for potential weaknesses and even non-compliances with the flooding design-basis protection.

MEMBER SKILLMAN: Gary, I feel quite comfortable understanding your One and Two, but I think in your Number 3 there is a contradiction from the perspective of when an event really gets going, the operators are going to use every tool at their disposal in order to arrest the trajectory of the issue.

MR. HOLAHAN: Agreed. They should.

MEMBER SKILLMAN: And we would want them to do that. We would want them to use every piece of equipment that's credited B

MR. HOLAHAN: Yes.

MEMBER SKILLMAN: -- and every other piece of equipment or tank or device that they can somehow get access to, to halt the progression of the event.

Is the distinction that you're making that in Number 3 if the SECY goes ahead the way it is currently written, Three becomes, if you will, gold plated as part of the ongoing order or a new order or a new rulemaking, or that it is somehow made more important that it diminishes the importance of something else?

I just don't appreciate the point you're making in Number 3.

MR. HOLAHAN: The point I'm making in Number 3 is also alluded to in the earlier presentation.

And that is, normally the design-basis protection for the plant, let's say, just form flooding, it would consider general design Criteria 2. You would establish some flooding level like you saw in these examples and you would have plant protection at that flooding level by redundant safety-related equipment that turned up in a Chapter 15 safety analysis

with, you know, with all the pedigrees and requirements and covered and all those things. That's what you would expect for design-basis flooding protection.

Now, I think what the SECY paper is suggesting is that whether there are potential weaknesses in that collection of equipment and process of procedures, you would not deal with it.

You would step back and say, well, even if there are weaknesses, at least I could survive this flooded condition, because I have the FLEX equipment. I don't need the diesels. I don't need the motor-driven aux feedwater pump. I'm going to rely on the steam-driven pump to give me enough time to get FLEX equipment hooked up and that will be good enough.

I think the concern is that's not the way the regulations are set up. That's not our normal safety expectation for protection against design-basis floods.

MEMBER SKILLMAN: Now, I understand. Thank you, Gary.

MR. HOLAHAN: Okay.

MEMBER CORRADINI: And the key point I guess I want to make sure I understand is, given the current methodology to determine a design-basis flood, that's outside of the realm of how business is done in the past.

What I'm trying to get at is, the last group got me B I guess I still don't understand how these floods are determined since they're deterministic, but yet of some unknown frequency.

But given that structure, your point is that's a design-basis. They've got to be treated in that regard.

MR. HOLAHAN: I think the best way to understand, historically they were done in a lot of different ways. And I think you've heard from the examples and their reference in the Task Force report and I think it's quite clear.

The way the staff is thinking about currently doing B I'll just call it the reevaluated flood. Don't call it design-basis. Don't call it B just call it reevaluated flood.

It is basically using the same data collection, the same analysis, the same methodologies as used for new reactor siting that the Committee has seen for every early site permit and combined license application.

It's that technique. It's that approach. So, I would say the same requirements have existed since -- this general design criteria 2 was probably written in 1971. And I think there was a draft in 1968, to my

recollection.

That same general design criteria has existed for all these years. Obviously, the state of the art has changed. The guidance documents have changed. It has resulted in some additional conservatism, but we now know things that we didn't know then.

And the question is, how do you deal with new information? Some of that new information you might find out in the past you were wrong. Some of the differences, the new information may be I changed the level of conservatism I would like to see.

To me, those are two different things and you deal with them differently in the regulatory process, but there are a number of different opportunities.

You can see events that weren't included in the design-basis 40 years ago that we think appropriate to consider now. How do I deal with that?

So, the questions of how do we deal with new information, it is not simple, because there are different types of information and there are certainly different circumstances for each plant. But unless you look, you won't know how to do it.

And the implication is of the word

"compliance" means some of those examples even today we would say they don't look like they meet NRC's requirements.

Some of them are interpretations and they're a little soft and say, well, that would really be a cost-justified backfit, because you're just trying to get more margin, which is a good thing, but some of them are pretty fundamental.

And some of the examples you just heard are a little bit concerning about whether they are good enough or not. And this B the integrated assessment or at least some systematic approach is appropriate to finding out those cases and deciding in a logical way what to do about it.

Okay. So, the position that the NRO management would consider is that we do support the fact that the paper is clear about how the flooding level, the reassessed flooding level would be used in the mitigation strategies.

That's the B it establishes a benchmark flooding to protect mitigation equipment. And there again I think you could pick other levels. This is B the orders simply say that it should be extreme external events. So, you could probably come up with a probabilistic technique.

You might not have it now, but at least the flooding reevaluation levels represent a reasonable and practical way of establishing an extreme flooding event. And what that means, basically you've got to protect your mitigation equipment.

It's a limited amount of equipment, but that's the equipment that would be protected. And that's a very good thing. And I think most everyone is supportive. And the industry, in fact, is supportive of that approach. And, in fact, I should say for all our stakeholders.

And that's part of what makes you comfortable in taking time to work out is the design-basis exactly where I'd like it to be?

Mitigation strategy is not just an order. It also turns out in a way to be an interim compensatory measure if you think about how plants normally deal with issues that they're concerned about.

If you're not entirely comfortable with flooding protection, at least we have interim measures and of course they're for fairly unlikely events. So, you have, I think, a solid basis for saying, we're okay today, but this is not necessarily where we want to stay as the safety-related design-basis protection for this plant as we go forward.

MEMBER RAY: Gary, you haven't yet, and I don't think you will looking at your slides, used the word "backfit." And yet, we heard that word over and over and over again.

MR. HOLAHAN: Yes.

MEMBER RAY: Would you insert it somewhere in what you're going to say?

MR. HOLAHAN: I will. If you will allow, I will insert it at the end, because I think it's a very important word. And I think it's a very important point of confusion in this, or maybe it's a point of different perspective.

In fact, I think that's probably the biggest disagreement with how we move forward and how we deal with this. So, let me get there in two steps.

CHAIRMAN SCHULTZ: One question, Gary, while we're on the first bullet. Appreciate your comments related to what you're indicating as the reevaluated flooding level.

In looking at new reactors, looking at this systematic integrated assessment, flooding is different than seismic.

I mean, we talked about what is the likelihood, but there's a time element involved. But we looked at the previous examples and said, oh, my

goodness, the level is above.

If that level occurred in an hour, one would have some level of concern. If it happened over the course of 15 days, you'd have a different level of concern.

MR. HOLAHAN: Absolutely.

CHAIRMAN SCHULTZ: Is that expected to be evaluated within the assessment process?

MR. HOLAHAN: Yes. Yes. And I think B

CHAIRMAN SCHULTZ: And do you have B does the reevaluated flooding information provide some sort of spectrum associated with timing and levels and B

MR. HOLAHAN: Yes, it involves not only the level, but timing. And both are important. And certainly the industry has felt that that was quite important in developing the approach.

Whether you are protecting equipment or you are moving fuel or whether you're changing the plant configuration has a lot to do with it.

So, reevaluated means not B we talk about it simply as a level, but it's really a full characterization of a flood.

CHAIRMAN SCHULTZ: Thank you.

MEMBER STETKAR: But don't get trapped too much in this sort of looking at each issue in isolation,

because one can have a seismically-induced failure of dams that affects not only that dam, causes a flood and affects your plants. And the warning time on that may be quite short, you know.

You're talking about larger issues, but I caution against necessarily saying that every flood B

CHAIRMAN SCHULTZ: No, I didn't mean that you wanted to focus only on one B the long-term flood. You know, obviously talking about the seismic event you have a different likelihood and B

MR. HOLAHAN: I think all of those are true. And my experience with staff is that they're quite good at figuring these things out.

Even when there is a dam failure, the analysis of how long does it take that flood to get to the plant and how far away and are you talking about two dams, I see that there's quite good analysis being looked at when we give them the chance to do it.

CHAIRMAN SCHULTZ: Okay.

MR. HOLAHAN: So, I think I'll just finish this slide. Although we support using the reevaluating flood levels for the mitigation strategy, we think it's also necessary to have a systematic evaluation of the protection of what I would say is not just the mitigation equipment, but your normal safety

equipment.

And in this case, I'm not so concerned about loss of coolant accident in ECCS, but I am concerned about decay heat removal, the normal decay heat removal which is, you know, diesel generators and even reliability of offsite power, although there's probably not much you can do about it, but motor-driven auxiliary feedwater systems and service water and other things.

The question is, should I be looking for opportunities to make that stuff more reliable for a design-basis flood, or should I walk away and say I have a different way of dealing with it?

And not willing to divert too much, but we do look and work with our colleagues in other countries. And, for example, if you see, the French have taken quite a serious view as to how to deal with Fukushima.

You could argue that their approach is largely a mitigation approach to build a separate bunkered system to handle all safety features and they're really not relying on the plant's normal equipment. But I think the B so, it is possible to have a mitigation-oriented approach, but that approach doesn't look like FLEX equipment. It looks very much like safety-related equipment. It's just another set

of it.

So, I think there are different ways to approach this problem, but you always ought to be thinking about defense-in-depth and have I really done a reliable job.

MEMBER BLEY: Gary, before you leave that, a couple related questions. They relate to the integrated assessment. I can't say I'm fully conversant with what the ISG says on that. I know we've looked at it B

MR. HOLAHAN: We can both ask for help. Staff is still here.

MEMBER BLEY: Okay. But my questions about that are a couple. One is your second bullet. Wouldn't the graded integrated assessment provide that kind of information and also provide information about whether the FLEX equipment will work under these conditions?

MR. HOLAHAN: Yes.

MEMBER BLEY: And since it's graded, given the stuff they presented to us and talked about, I'm not sure why the COMSECY seems to be backing away from that concept.

And I didn't read it that way at first, but it seems to be at least somewhat leading away from what

you=re suggesting it could be modified.

MR. HOLAHAN: I prefer not to put B to speculate about why people have proposed what they have proposed.

MEMBER BLEY: That's fine with me, but I was asking about wouldn't the integrated assessment, which is a graded approach, provide that kind of information you're suggesting would be B

MR. HOLAHAN: It would provide the kind of information. You would still have to make a decision about what to do with that information.

MEMBER BLEY: Of course.

MR. HOLAHAN: Yes.

MEMBER BLEY: Okay. Thank you.

MR. HOLAHAN: Okay. I'm getting closer, Harold.

MEMBER RAY: I'm waiting.

MR. HOLAHAN: Okay. Good. Simply stated, we, the management of NRO, doesn't believe that mitigation is an appropriate substitute for protection.

That consistent with the Commission's defense-in-depth safety philosophy, we ought to be worried about both mitigation and prevention, and we should be treating both of those in some appropriate

way.

Anything else to say? Good. Let me talk about backfit, because I think it's important. So, what you heard from me and from some of our staff is that they are thinking that there are potential compliance issues, there are potential licensing basis issues.

Some of this stuff looked like, well, maybe in 1971 we thought this was a reasonable way of meeting GDC-2. But now that we've learned what we've learned and we know what we know, it's kind of hard to make that decision now.

I would say the people who are not in agreement with the COMSECY are worried about whether additional assurance ought to be provided on the protection end.

I think the authors of the COMSECY and the staff supporting it are thinking the original design-basis constitutes adequate protection. If I want to change that, I should be in a cost-justified substantial safety improvement backfit process.

So, if you lay out the backfit rule, 50.109, it addresses adequate protection, redefinition of adequate protection, cost-justified enhancements.

Whether you see this issue of new

information about flooding as supplemental to an adequate design-basis or whether you see it as the necessary action to be sure that the design-basis is adequate, is the difference between compliance backfit and cost-justified backfit.

And I think when you read the paper and it talks about B the paper is written from the point of view that, you know, probably most of these potential improvements wouldn't pass the cost-justified backfit test. So, why am I spending my time working on them when I'm busy and I could be doing other things?

Okay. So, the staff supporting the SECY paper, they're not ignoring safety, but they are thinking about safety in a different way.

They're thinking the plant got licensed, it has a licensing basis, we declared it was an adequate protection, we've never declared it as inadequate, and anything I do to supplement the protection now ought to be justified by cost.

It's not likely to except maybe in a couple of extreme cases, I'll know them when I see them, and I'll just focus on those.

Not only that, when I've got the mitigation equipment in place, it will make the likelihood of this being a substantial safety enhancement worthy of cost

is even less likely. And, therefore, this will not be a bad time to walk away from the integrated assessment, because it probably isn't going to get me where I want to go.

I can tell you the Task Force report was written from a point of view, and I didn't write that section, but I know it very well, that perhaps the design-basis protection for these plants does need another look because of new events that we know, new analysis that new facts make it legitimate to ask design-basis adequate protection questions, not just cost-justified questions.

And it will also say if you do the integrated assessment or something similar to it and you get sufficient amount of information, you can answer both of those questions.

And it may be a few of these and a few of those and a lot of plants that don't need anything more, but it seems to me until B well, until you put the pieces together and have a systematic way of collecting the information and making the logical safety decisions, you're probably not in a place that you want to be. At least that's my perception.

Does that help?

MEMBER RAY: Oh, yes. I think B I hope my

colleagues, I'm sure they listened closely, as I did, but that's a better way of saying what I tried to comment on earlier from time to time.

CHAIRMAN SCHULTZ: Are there other comments or questions from the Committee?

(No response.)

CHAIRMAN SCHULTZ: Gary, I want to stress the Committee's appreciation for your discussions this afternoon especially given your background on the NTTF document and your other work associated with addressing issues that came from Fukushima.

You provide a unique perspective that is very helpful for the Committee's deliberation. So, thank you.

MR. HOLAHAN: Thank you.

CHAIRMAN SCHULTZ: And I want to thank everyone who participated in the discussions this afternoon.

With this at this time, I'd like to declare a recess and we will break until 3:40 and begin B reassume the discussions.

(Whereupon, the proceedings went off the record at 3:25 p.m. for a brief recess and went back on the record at 3:42 p.m.)

CHAIRMAN SCHULTZ: I'll call the meeting

back from recess and we will now proceed to the final session portion of the afternoon and at this point, we're pleased to hear from Ed Lyman, Union of Concerned Scientists who would like to present some views associated with the rule and the staff white paper.

Ed, welcome. Thank you for being here.

DR. LYMAN: Yes, and thank you on behalf of UCS, I appreciate the invitation to give a presentation.

When I was first invited to speak it was about the proposed preliminary draft rule language that was a version which was less mature than the one that was circulated recently.

There was also no white paper and certainly there was nothing on the schedule about staff nonconcurrence. So, all that was new from, I would have to say, the previous panel was a tough act to follow.

And I had to try to interpret what the white paper meant over the course of the last couple of days and I thought I was going out on a limb, but now I feel more confident that I do understand the basis for it and I was right. So, you'll see there's a lot of similarity between some of things I'm going to be saying and some of the concerns we've already heard.

MEMBER RAY: Ed, if you could speak up just a little --

DR. LYMAN: I'm sorry.

MEMBER RAY: -- bit more, that's fine.

DR. LYMAN: How's that?

MEMBER RAY: Good.

DR. LYMAN: So, I think it's clear that the NRC has a big problem and that problem's also the American public's problem because we have a hundred odd nuclear reactors here and it seems that many, if not most, of them currently exceed the -- or they face hazards which exceed those that they were designed to withstand according to their original design basis.

And the question is, what is the NRC going to do about that?

The industry and it seems some of the NRC staff apparently maintain that these are beyond design basis hazards and should be treated accordingly. But, in thinking about it, our conclusion is this is a misuse of the term, it's conflating two different things, one was the original licensing basis of the plant in the Stone Age and the other is a legal concept of design basis.

So, in our view, the simplest way to think about it is that the reevaluated hazards done according

to the same methods that are being used now for new reactors and in a more consistent and complete way. But that constitutes the true design basis and the original ones were wrong.

So, that pretty much sums up where we think the threshold should lie and I'd like to point out that I apologize for the ongoing confusion between design basis, beyond design basis and the cost justified backfits. You may know that the Union of Concerned Scientists versus NRC that led to the Court decision that is being cited here before today and has caused, I think, more damage probably than it's helped matters.

So, with regard to the rule making in general, we don't see a problem with having a mitigation of beyond design basis events rule and maybe it should be called mitigation of extended design basis events rule because we think that that could be a vehicle for addressing some of the concerns that were raised by the Near Term Task Force and were supposed to be remedied with Recommendation 1 which is now God knows where and it's in limbo.

So, this rule could actually be a mechanism for doing that if it's done the right way. And so we think the cleanest way to do it at this point, of course, it depends on how you define what the beyond design

basis or what the extended design basis is.

So, the cleanest way at this point is we upgrade the design basis to incorporate all the reevaluated external hazards, that's certainly a design basis. It's possibly moving, you know, just the bar line from one arbitrary point to another but at least we know it's being done according to a more consistent set of methods, a more complete set of methods and, therefore, it probably can clean up that heterogeneity that establishes the current licensing basis for some of the plants.

And then, more severe events would constitute the extended design basis and those would be addressed by the mitigating strategies, so, simple.

But the rule should not be a codification of the current orders and the FLEX guidance. And this is the approach that's been taken by the NRC staff and the industry. I sat in on the meeting marking up the NEI-12-06 and the intent was to turn that into the guidance for the new rule.

And since there is not even a draft rule yet, it seems pretty true to me to have guidance in the first place but the fact that it's just being -- it's a line edit of the FLEX guidance concerns us because we think that's not the way to address the problems with

the current approach.

And the current approach, as we've heard already, is that we have some unspecified beyond design basis external event that does not cause damage beyond the design basis to anything other than the AC power sources and normal access to the ultimate heat sink. It's a beyond design basis that magically doesn't cause damage beyond the design basis.

And that scenario does not represent what happened at Fukushima given the whole point of this exercise is supposed to be at least to address the circumstances of Fukushima. We think it fell short from the beginning and this has to do with the fact that DC power is assumed to be available as well as the electrical distribution systems. So now we've raised very early on the development of the guidance that was ignored.

It also contains these confusing concepts, robust and reasonable protection that have been implemented in what seems to be a very unequal way across the fleets. Utilities seem to be building category one seismic buildings for the FLEX equipment, others less than that. That was the kind of thing that this whole effort was supposed to avoid because the public still doesn't have the sense of is there a

consistent level of protection now against a Fukushima type accident.

And this has happened because the industry tail has wagged the NRC's dog. That started back in 2011 when the industry started to buy equipment which they called FLEX before the NRC had even acted on developing or putting in an order of guidance.

That made it politically very difficult for the NRC to reject something -- reject FLEX or, you know, except for tinkering around the edges. And this isn't just a conspiracy theory, but if you read the interim SERs on the FLEX plans, you see this statement, stakeholder input influenced the NRC staff to pursue a more performance based approach, e.g. FLEX, and Near Term Task Force Recommendation 4.2.

So, there you have it, it was the tail wagging the dog. And I think part of the problem where we are now with, I would say in an illogical and inconsistent framework of which that's become clearer over the last two days is partly because the NRC was reluctant to really honor the intent of the Near Term Task Force in coming up with a comprehensive framework agree with these things, the industry's approach seems to be they want to make the whole thing go away to the extent they can and get away at least with the minimum

amount of expense and difficulty they can.

And just another example of the kind of confusion that's coming out of these FLEX plans and the fact the design basis is what the FLEX strategies are being designed to. I won't read the whole thing but for Columbia Generating Station is a dry site. It doesn't have to address floods at all.

Yet, if there were an upstream dam failure, the Energy Northwest itself has reported that some of the strategies for bringing in equipment from the staging areas for the SAFER deliveries could be difficult to perform if there were innundation levels that resulted in the airports and roads not being usable. And they raised that concern and the NRC staff replied, well, you don't have to worry about that because that event is beyond the design base.

So, you have, again, you're talking about an event which may not represent anything near what the type of event that you need to worry about with regard to the available infrastructure being supporting the delivery of the SAFER equipment.

So, as far as consolidation and a few weeks ago, this was still called the consolidated rule, but, you know, we think it does make sense to consolidate the pieces that are being put together, put mitigating

strategies together with the procedures that are needed to carry them out and also consider pre and post-core damage in the same framework. That makes sense.

But, it should be noted that we heard before the FLEX equipment would be there and could be used post-core damage but I think everyone recognized that there may be strategies and procedures would have to be a lot different for post-core damage. Deployment, the equipment may have to be modified so it's not that simple. But putting it all together in the same rule might clarify that.

The division of the recommendations into these different orders has already listed inconsistencies and the issue of the mitigating strategies being separated from reliable hardened vents which are, in many cases, needed to carry out the mitigating strategies has led to other things I don't understand like why some Mark I and II boiling water reactors need to satisfy the hardened vent order before they can satisfy their mitigating strategies and others don't.

Some of them are relying on their existing vent apparently even if it's not a reliable hardened vent.

But, after consolidation we thing the

station blackout piece of it should remain a separate subrequirement because I think it's getting too confusing by trying to lump everything together in one integrated response. I think focusing on the station blackout related aspects is as important.

And so the core of the original proposed rule which was the station blackout focused rule should remain.

And we think trying to develop different parts of the rule or subject different parts of this consolidated rule to different backfit requirements sounds like nightmare and maybe the Commission should just step back and say that adequate protection means no Fukushimas in the United States and I think that would cover the entire rule.

Now validation was something that was not really present in the original guidance. We were pressing for it for several years. I understand it's now in the proposed revision of NEI-12-06 and that's a good thing but we haven't seen really the details other than how it was presented at the meeting the last couple of days.

But if you're going to have a performance based rule, then you need performance evaluations. Otherwise, they're meaningless. So, you know, the

model we think should be the security rules and performance assessments should be based not unlike on a force-on-force inspection model rather than the emergency planning exercises which we've heard about. So, that would mean something more like a three year rather than an eight year planning cycle.

And validation should be scenario driven. And I was very interested to hear that the industry now wants to challenge FLEX scenarios by using a sort of stress test approach where you assume the specific event and follow that all the way through where ever it may lead and be consistent because we were calling for that two or three years ago.

The other thing we heard was FLEX has to be flexible. You don't want to tie it to any one scenario because you can't deal with everything. And that makes a certain amount of sense but also the flip side of that is if you choose a specific scenario, then you should be able to show that the FLEX strategy is going to work. And why not at least do that for some select range of initiating events? In other words, a stress test type approach just to validate that the strategy is flexible. You can't do everything but you can do a subset.

And so --

MEMBER SKILLMAN: Ed, before you change slides, let me ask this. I would like to appreciate UCS's thought that the real validation is force-on-force. Let me tell you why I present that challenge.

Security is a potent team at every site but the operations team is a potent team and the maintenance team is a potent team. The organization that has the shift technical advisors is a potent team. And all of those have to work together, for whatever scenario comes at the site.

So, it seems to me that by suggesting that just force-on-force inspections will be sufficient --

DR. LYMAN: Oh, no, I'm sorry --

MEMBER SKILLMAN: You know, it prevents having the other teams whose excellent participation is essential from rehearsing and it is that rehearsal that really makes the difference when the event really occurs.

DR. LYMAN: No, there's a misunderstanding here. I wasn't suggesting you should just test the security portion. I was saying that the model for how force-on-force inspections are conducted.

In other words, there's an NRC team, they

go to the site, that is a period of inspections. They present scenarios for beyond design or design basis extension events and then the staff, to the extent you can, actually exercises the scenarios and shows that they can do what they're supposed to do. That's what I meant.

CHAIRMAN SCHULTZ: So, that it would be conducted in the same -- but the emergency preparedness exercise will be conducted in a similar fashion that force-on-force security evaluations are done?

DR. LYMAN: Right, it's a distinguish from EP where it's not, you know, you get people together in a room, right, and you do, you know, table tops or role playing, that kind of thing that's short of what we think needs to be done.

Now, security simulates, you know, you have miles here and you simulate the actual combat, probably not to that extent, but the kinds of validation we were hearing about, you know --

In other words, you choose a scenario, you develop the plant state and then you show the FLEX strategy that you have on the books, we work for that plant state and where, you know, you need to do actual physical validation and you can do it then you do it. It will be artificial but I think you might learn a lot

from that. I mean that's just integrated validation.

MEMBER SKILLMAN: I see what you're saying. Thank you. Thanks for that clarification.

MEMBER BROWN: Did you want every -- I mean are you suggesting every three years rather than eery eight years also? I mean that was another thing, not just a model but also the --

DR. LYMAN: Yes, I mean that's the current frequency of the force-on-force --

MEMBER BROWN: That's three years?

DR. LYMAN: -- inspections.

MEMBER BROWN: Okay.

DR. LYMAN: And so, as far as the white paper in which, you know, I only read a couple of days ago but it seemed to me and I think I've heard this as well, that the approach is FLEX is a panacea for nearly all these difficult issues about what to do with plants that are now outside of their design basis. And it's like a get out of jail free card almost. I mean we don't think these difficult issues can be resolved that simply and so I would put in a plug for maintaining the integrated assessments.

I think the staff panels made the case made the case pretty clear that that kind of information was valuable no matter where they can go with it. And I

also, and I know we heard this just before that this approach seems to put too much emphasis on mitigation on the projection rule, I agree with that.

And also the question of delay, if this were all farmed off to the rule then we may not be talking about compliance until 2020 or later. If you look at the compliance with the order as in the time it's taking for that, so hopefully staying on the current path might help to resolve some flooding risks with the reevaluated hazards sooner than that.

So I think we're worried that there will also be an unacceptable delay in what we think is an acute threat.

So, and I put this slide in before. It came up earlier today but I was also struck by this confusion between the draft rule, so I see that I wasn't the only who's confused. So, this is the kind of thing that really needs to be cleared up but hopefully if you had a rule which took, you know, Recommendation 1's approach seriously, tried to come up with a consistent way for treating extended design basis events then we wouldn't get into this kind of confusion.

That's all I have, so thank you.

CHAIRMAN SCHULTZ: Thank you. Any additional comments or questions from the committee?

MEMBER RAY: Yes, let me ask this. We're talking about in terms of eternal hazards things that have long intervals between them, presumably they exceed its design. I think that's a fair starting point if it's not, you tell me. But --

DR. LYMAN: Well, it's an open question. You can ask the question, though.

MEMBER RAY: All right. My question is how urgent USC sees this to be? For example, there was a proposition floated at one point in the wake of Fukushima of an every ten year assessment of external hazards.

In terms of something with a recurrence interval of a thousand years or so, perhaps every ten years isn't unreasonable. I just wanted you to opine on that in terms of how urgent it was that we get this nailed down or is it something that would take five years to complete or ten years to complete reasonable?

DR. LYMAN: Yes, I mean we didn't see a problem with that ten year interval when the recommendations first came out. I think it's not much analysis put into that.

But, I think, you know, there's certain -- probably certain climatic variations are maybe occurring on a time scale that would say ten years

is reasonable, maybe seismic reevaluations are not something that need to be done that frequently.

But, I think we need to keep an eye on climate change and be flexible enough to know when it looks like things are changing and address them. So maybe you don't want to be locked into a rigorous, you know, some sort of a set interval but there are other criteria you can use.

MEMBER RAY: But it sounds to me like you'd say some reasonable time for phenomena of the kind that we've been discussing is acceptable or not unreasonable to --

DR. LYMAN: Right. And in the general question is if you -- are you going to change the design basis each time? And I think that's a little more difficult. You know, we're suggesting this kind of one time update, but I think you'd really get a lot of push back if you try to say we're going to be changing the design basis for all the safety related equipment every ten years.

So, I would have to think about that. But, you know, maybe this is the reset where you could then transition to something less but I think we need a reset at this point at least to clean the slate with regard to the initial design basis issues that aren't being

dealt with right now.

And as afar as the frequency goes, I think we've heard that the flooding people can't give you a frequency, right, if it's more -- less frequent than a hundred year flood. And the seismic people, they may give you frequencies but I know some people don't believe that could be done with enough precision to be meaningful.

So, I don't think you can conclude. I think one of the lessons of Fukushima was, you know, we suppose that something is a low probability accident when you're dealing with external events and a lot of certainty.

And I think the flaw that I keep hearing here in this agency is that's still the bottom line assumption. We heard it yesterday, we heard it today. These are rare events but you don't have to, you know, be wasting money chasing after them and I don't think that's established right now. When you're talking about external events, we simply don't know if the initiating event frequencies are well enough you can say in the PRA sense that they're low frequency and deserving of less treatment. We don't know that yet.

CHAIRMAN SCHULTZ: Well, thank you very much, Ed. I appreciate you being here and we'll

certainly take your remarks into consideration. Appreciate it.

At this point in time, I'd like to ask for additional public comments and we'll do so within the room. If anyone would like to -- Jim?

MR. RILEY: Thanks, Steve.

CHAIRMAN SCHULTZ: You asked for some time at the microphone here. So, why don't you start, Jim?

MR. RILEY: Thanks, Steve.

My name's Jim Riley, I'm with Nuclear Energy Institute and I'm responsible for our response to the providing 50.54(f) letters.

I want to start off with I think what everybody on the panel or the committee fully understand is safety is paramount to the industry.

And the concepts behind what we have done to respond to Fukushima including some of the things we're doing to tune our response to 50.54(f) response all relate to that issue.

After spending a day and a half or so on FLEX, I know you folks are very well familiar now with the degree of work effort that has gone into the development of FLEX and the thinking on ability to get the equipment to the plants and the analyses that have been done to ensure that it would work.

In fact, the existence of FLEX, and it is there, the plants are putting into place now or have already. That's a very significant safety benefit to everybody.

And I think any additional actions that we might undertake ought to be looked at from the perspective of the net safety benefit that would be added beyond that that we've already achieved with FLEX in place in addition to the basic safety that the plants already have because of their protection and the other things we're all very familiar with.

That being said, one of the reasons that we got, I think to where we are now and some questions about how the integrated assessment ought to be done was some work we did to develop examples for integrated assessment to figure out exactly what would be necessary to do one and what was the amount work that would be necessary to finish the graded approach that has been discussed.

And it was becoming apparent that the graded approach was still involving a very significant amount of work. The evaluations that were required by the appendices for equipment and operator response were a complex evaluation.

So, the question becomes whatever an

intent to do that level of safety -- of evaluation and is it necessary in light of is the effort, I guess, justified by the increase in safety?

So, that led to some questions about how is this integrated assessment being done? And there are ways that we can focus it.

As I've already mentioned, FLEX is kind of the foundation of the industry's response to Fukushima and we feel it's really important to ensure that mitigating strategies, whether it be FLEX or some other method that deals with individual hazards is essential to ensure that you can continue to deal with these hazards using FLEX or another mitigating strategy.

And so, we felt that if we're going to look at ways to focus our efforts on the integrated assessment, again, from the standpoint of cumulative effects of radiation, or excuse me, radiation sometimes it seems that way, regulation or things of that nature that we ought to be taking a look at where our efforts can best be spent.

So, we thought an acceptable way to do this, and this is something that developed into this other approach to an integrated assessment would be to look at the ability to continue to carry out mitigating strategies in the face of flood packets to looking at

the specifics of how you can carry out mitigating strategy, focuses the effort.

And the things that we were coming up with was a way of doing that that focused the scope in the manner that I just talked about. And also, I did that with a level of rigor that's appropriate for dealing with beyond design basis events.

And one thing that is probably worth mentioning and that didn't come out yet is the kinds of things that can cause the utility to do an integrated assessment can be relatively minor, not always. But remember, that anybody that's driven into the integrated assessment then has to follow the procedure.

And the kinds of things that would get you to do an integrated assessment, for example, are cases where your design basis was silent on a hazard, in particular here, local intense precipitation, sometimes that can have pretty significant ponding effects but most plants didn't consider local intense precipitation as part of their flooding design basis.

The fact that they would now how to consider it as part of a reevaluated hazard would drive you into doing an integrated assessment.

The methods for doing local intense precipitation calculations were very conservative.

They used hydrometeorological reports that had very conservative values in them.

Some sites are trying to use -- are using site specific evaluations to reduce that, but it's an example of the hydrometeorological reports would, in some cases, tell you you had to assume 19 inches of water in a rain in an hour with no drainage. Well, you know, that's a pretty conservative approach to doing these. So, it caused, yes, that's what caused some folks to look at site meteorological studies.

In addition, here's another example, if your design basis flood level was, pick a number, X feet, and you do a reevaluated hazard and it turns out that your new hazard, that flood level is, I'm going to use numbers.

Let's say your design basis was ten feet and there was no information in your design basis as to what was driving the ten feet other than a particular event. You do your reevaluated hazard and it turns out that the hazard was giving you eight feet of water and there was two feet of wind driven waves on top of the water, you're still at ten feet.

But you had to do an integrated assessment because there was no mention of wind driven waves in your design basis, whereas, there is one now in your

reevaluated hazard. That's a trigger for integrated assessment.

I'm only saying that not to deride the fact that an integrated assessment is required there because you have to figure out what the hydrodynamic effects of those wind driven waves were.

But to give you an idea of what kinds of things captured folks into doing an integrated assessment.

So, a fair number of people have to do these. The amount of effort that needs to be provided or to only to do an integrated assessment, again, ought to be taken on in recognition of the net safety benefit of what you're trying to do.

And, one other thought, as we considered what we might do with integrated assessment in light of the concepts that are in the draft white paper, the draft SECY, I want to make sure everyone realizes that integrated assessment was not -- was a fairly rigorous evaluation that we were conceiving. We're developing thoughts on how to do that, we'd have to meet with the staff.

But the -- what we were conceiving was something that would use a methodology similar to that that was used for designing FLEX. There's a pretty

detailed guidance within the FLEX implementation guide, NEI-12-06, on how to account for floods.

We're also going to rely on the FLEX validation process that, which if you're not familiar with, is a way of validating that operator actions can be completed. There's a time line that's laid out what actions are necessary in the evaluation of whether those actions can be done.

So, the process that we are envisioning would look at, when you say can I still implement FLEX in light of this flood? It would consider all aspects of FLEX. Your ability to carry out phase one and phase two of FLEX, your ability to shutdown the plant and deploy the equipment, be able to get it to where it's supposed to be, hook it up, all the operator actions could be done in consideration of the conditions that were in place, the flooding conditions that we're weighing or when or whatever's appropriate.

But the evaluation to say that I can implement FLEX would include all those things to a level of rigor that we felt was appropriate for the event that we were considering again.

Again, remembering what we need to be looking at is what can we do here to prevent distracting our plants from other things that they ought to be doing

that are truly safety significant and the amount of work we're talking about to address all these various aspects of Fukushima response is very significant.

So, I think we need to be smart, we need to be spending our efforts where they can bring us the most benefit.

CHAIRMAN SCHULTZ: Thank you for your comment.

I'm gong to turn to the phone line now because they've been patiently waiting and I want to -- I'll come back to the room for any additional comments. But at this point, I'd like to go to the phone line and as we did earlier today, if someone would say hello so we know that the line is open, I'd appreciate it.

Thank you, we do hear you now. If anyone would like to make a comment at this time, please state your name and make the comment you'd like to provide for the record.

I'm not hearing comments. Is anyone trying to get off mute? Not hearing any comments, we'll go ahead and close the phone line and I'll ask for any additional comments from members of the public in the room.

Seeing none, then we'll close the public

comment period and I'd like now to go into the next topic on the agenda which discussion -- is a discussion by the members of the committee.

Bill, are you still on your line? Bill Shack?

CONSULTANT SHACK: I'm still here.

CHAIRMAN SCHULTZ: Bill, this would be an appropriate time for you to share your thoughts given what we've heard over the last two days.

CONSULTANT SHACK: Well, I'll be writing up some notes.

CHAIRMAN SCHULTZ: Thank you.

CONSULTANT SHACK: You know, on the COMSECY, I think I certainly agree that there's a need to make sure that the FLEX equipment and the mitigation strategies are updated for the flood hazard. And I'd even go so far as to say it should be updated to a current seismic hazard, too. Although, I think the flood hazard is the one that there's a drastic difference.

I'm still a little bit concerned about the level of treatment in the rule as in the order for, you know, the beyond design basis is still undefined. I think I'm actually really comfortable with seismic because we do have it so that (telephonic interference) talk about the hardware that there is, in fact, fairly

significant margin and the equipment itself is fairly robust.

But again, the flooding is a greater problem where you're quire sure or you have less confidence that you understand the hazard I think than we do of the seismic base.

Again, I think on the white paper you really do have to do the integrated assessment. I just don't see any real choice there. I don't understand the reluctance to do it. It just seems to me it needs to be done whether it changes the design basis or not, it's something I think you decide after the integrated assessment. But it's certainly something that should be considered.

And again, in the rule, if you don't change the design basis, I do not -- I'd certainly like the words design basis disappear from the rule and say, you know, the most recent evaluation of extreme external events just in case we do go through a ten year evaluation or, you know, the curve reevaluation, but we've decided not to change the design basis. I think it still should be taken. The mitigation rule on our best estimate of the extreme hazard that you might face it.

Those are the comments that come off the

top of my head right at the moment.

CHAIRMAN SCHULTZ: I appreciate that very much, Bill.

I want to go around the table now with members of the subcommittee and remembering that we have the full committee meeting coming up, let me give you a premier of what I have been thinking related to the conduct of that meeting.

We've had three major, well, we've had three major elements of our presentations over the past two days and we have on our agenda placeholders for each of those, that is, the industry and the presentations associated with what has been done with the approach to addressing extreme external events through the FLEX program.

We have a placeholder for the discussions associated with the proposed rule.

And then we also have discussions associated with the COMSECY and the nonconcurrences as presented this afternoon, that information.

And so, we have opportunities for the full committee, three of whom are not here right now, to hear all of that material. Of course, it's much condensed, the time frame is much condensed over what we've had for the day and a half.

We have about three hours in the full committee meeting for those topics.

So, my thought is, we do need to spend time associated with the COMSECY because we're going to receive that next week and we have not had a chance to examine the wording which we've learned over the past day or so is very important to understand how it's being presented. Is it being presented in a way in which we would interpret a position and then we have to determine what we would agree with or disagree with in regard to that.

So, I think that block of time associated with a discussion gives the staff a chance to also look at the document and come back and we have a chance to ask additional questions related to that. And that segment would be fine.

I would like the industry to make a presentation. Again, they need to condense it and I've talked with them about how they might do that and they have indicated that they have some experience in doing that because they've made the presentation both in kind of the day long format as well as the hour format.

So, they feel that they can accomplish that by providing a prime example instead of several examples of the overall FLEX approach and a summary of

how the process would work in a condensed form.

Now, we're not going to get additional information associated with the rule making process, the proposed rule making. As Tim indicated this morning, he's not providing us any additional information between now and the full committee meeting.

At the same time, we have an opportunity to reflect on what he has presented today and what we've heard and we can perhaps get the transcript by next Friday and look at that if we want.

So, I would suggest that we -- my approach would be to focus the full time we have allocated to that first topic that I've described. Perhaps give a little more attention to having the industry present what they have, in a summary fashion, what they've delivered to us today for the benefit of the other committee members.

And then have the staff available to answer any questions we might have, follow-up questions we might have on the rule making.

So, that's my perspective and as we go around the table, I'd like you to provide yours as well as comments on the discussions we've have over the last few days.

So, Pete, I'd like you to begin in terms

of addressing those two topics as you see fit.

MEMBER RICCARDELLA: Yes, well, I guess I could start out with a question I had. Are the plans to write a letter, one letter, two letters or could you clarify that a little bit?

CHAIRMAN SCHULTZ: We have not made a commitment -- we going to discuss and deliberate at the full committee meeting the action that we will take. So that's the answer to your question.

MEMBER RICCARDELLA: To be determined in that regard, determined, but can you make a guess?

CHAIRMAN SCHULTZ: Well, we need to deliberate and the deliberation may form a position that we would like to follow-up immediately with a letter or we may defer. We have yet to decide.

But we certainly have time on the agenda to come back and see if we can't better understand all of this before we would conclude our deliberation at the December meeting.

MEMBER RICCARDELLA: It seems to me that the real issue at hand is the COMSECY paper and the nonconcurrence --

MEMBER STETKAR: Speak up a little bit, Pete, because we're not --

MEMBER RICCARDELLA: -- the COMSECY

letter and the associated nonconcurrence, were does the committee lie on that issue? I think, you know, a review of the other two topics would be nice, particularly for the members who aren't here but it seems to be somewhat redundant.

CHAIRMAN SCHULTZ: Okay. Thank you. Ron?

MEMBER BALLINGER: Yes, I think I agree with Pete. And the presentations have been very, very informative. We've had a bunch of other discussions about that.

And so, I think that the issue of the dividing line between integrated assessment and what the plan is now and the pros and cons in much more detail I think I'd like to hear about.

CHAIRMAN SCHULTZ: All right. Thank you. Dick?

MEMBER SKILLMAN: I agree with Pete and with Ron, but I actually have a few additional thoughts.

First of all, I think the presentations yesterday and today have been thorough and on target for what we need to consider over the course of the next several weeks. So, I appreciate and thank the presenters and all of the work that went into those presentations.

As I sit here at the end of this meeting, I've got a couple thoughts.

Number one, protection needs to be at a higher priority than mitigation. Protection needs to be at a higher priority than mitigation.

We need to make clear in the documentation that it's okay to change the design basis, whatever that might be, at least for some plants.

The public needs to have confidence that the NRC is the agency commissioned to protect their health and safety is able to do that. And if we fail to follow through, in other words, if we water down the NTTF recommendation for an integrated assessment, that will be seen as diminishment of all of that effort that went in to considering the public's protection after Fukushima. I think that will create problems that we will wish we hadn't allowed if we don't require an integrated assessment.

So, I think the passion around the integrated assessment is appropriate and valuable.

Thank you.

CHAIRMAN SCHULTZ: Thank you. Harold?

MEMBER RAY: Well, I've commented throughout the time as many others have as well. I agree with most all of what Bill Shack said as I

understood it.

The one thing I'll comment and then pass on to others that I found disturbing this afternoon was the proposition that doing an integrated assessment could be a distraction because we have limited resources and the benefits of doing aren't measured by the consequences of the distraction it would constitute.

That's something that I find -- the idea that we have a potential negative impact by doing a thorough assessment that we're referring to is an integrated assessment, I guess, is something I can say I find real concern with. And I think we have to disregard that threat and we want to make a judgment about the need to do what would be involved to systematically define what the hazards are and then disposition them.

And I happen to be in the camp that says we can take reasonable time to do that because I think that a proper answer in due course is far better than a rushed answer which so far, we've been consumed by it seems.

So, those are the things that are on my mind at the moment. In terms of answering your question about what we should emphasize at the full committee

meeting, I wouldn't disagree with anything that's been said so far. I think we ought to focus on the most important things first.

CHAIRMAN SCHULTZ: Thank you. Dennis?

MEMBER BLEY: Yes, I've given my comments on FLEX earlier on several occasions.

I'm going to make three comments about prevention and mitigation and then get on to the topic of the real need for our December meeting.

You know it's always better to prevent of course, but if it happens, we want to be able to mitigate. So there needs to be a balance.

What was described -- discussed yesterday was those concepts often get mixed up because anywhere along the scenario, you can think about preventing getting to that point and mitigating having been at that point for the rest of the day.

A lot of times, we talk about prevention of core damage and mitigation of release. If we're talking that, then all of the FLEX stuff as designed is preventive strategies rather than the mitigative strategies they're called, because that's what they're aimed at doing. Enough of that.

I can't -- I think we have to write a letter but that's not my decision. I don't know that should

be in it until we get a look at the COMSECY and I hope we really do get it by the first of the week because if we don't, we won't have time to really digest it.

I've started looking back through the ISG on integrated assessment trying to understand exactly what that's about and what degradedness of it is and, you know, on the surface, I get a little confused about if, in fact, there's a reasonable graded approach why we need to back away from that at all for anything.

One thing I think I really want to hear at the full committee meeting is a little more from industry about what they're doing with respect to playing their FLEX against these reevaluated hazards and how they become convinced that they'll get the benefit that they think they'll get.

Just a side comment, the deputy director's slides, I think the folks on the panel could have used those slides and marked their points from them. I mean everybody's focused on kind of doing the right thing. But I think we ought to spend some time really understanding this distinction of what's in the COMSECY that we haven't seen yet, the final one and these questions about the integrated assessment because I'm like most of our colleagues, the integrated assessment seems like it's needed.

We have to look at whatever's at the plant and that includes FLEX against these new reevaluated hazards in a way that we're convinced we're good with them whether they're in the -- brought into the design basis or not. We've got to be sure that they do what we think they're going to do. That's more than enough.

CHAIRMAN SCHULTZ: Thank you. John?

MEMBER STETKAR: I don't have anything to add. Everything's been said already, I'm not going to repeat.

Regarding conduct of the full committee meeting, I'll go out on a limb and say I actually think that it would be useful if the staff could exercise some restraint, you know who you are, to actually have a brief presentation on the rule, but not the whole rule, only sections B, C and D of the rule, that's the meat of the rule.

And the only reason for that is it shows in a rule making perspective how some of these notions that we've been discussing in the context of the yet to be presented COMSECY might manifest themselves in actual rule making -- proposed rule making language.

And I think that might be useful at least for the three members who aren't here or at least a refresher after we look at the document that we're

hopefully going to receive.

So, I'd advocate carving out not a big piece of time, ten minutes perhaps, because it's only three little sections. We don't care about, you know, the planning, we don't care about all the nuances of change control. But I'd recommend that.

CHAIRMAN SCHULTZ: I think we would assume those are going to be covered very nicely, so I would agree and we've got a good presentation on those and that would be of the most interest especially in concert with the other issues that we want to address.

MEMBER STETKAR: That's a little different from the need to saying having them available to answer questions. So, I think --

CHAIRMAN SCHULTZ: Yes, no, that focal point is appropriate that we came to it.

Joy?

MEMBER REMPE: I think I agree with my colleagues about the need for an integrated assessment. But, I guess I'd like to have a little more information.

For example, we heard today that one integrated assessment's been done and could we have some information and see what happened with that one integrated assessment? Because I'm not aware of it and I'd like to have that.

There were several ML -- while I'm asking for more information, there's a couple of the ML documents that were mentioned by the staff today that I'd appreciate getting copies of before the meeting.

In addition to the COMSECY, the updated version of it, I believe I heard today that the rule has changed, too, the draft rule and if we could have an up to date version, I believe Bill mentioned that -- oh, that sentence is gone or some one did in the staff. And so, if we could have an updated version for that, I'd like to see it, too.

And I think there's been enough discussion about the COMSECY that I would tend to agree with Dennis that I do hope we decide that there's some points that we should mention in a letter.

MEMBER STETKAR: Can I interrupt? I'm sorry to keep coming back on this but one thing important for our meeting, certainly if we do write a letter or more than one letter, is we will need to refer to specific documents.

We do not refer U-graphs or oral statements, so the staff needs to exercise discipline and get things to us because we're not going to write letters that are based on, well, we heard in some discussion this testimony.

MEMBER BALLINGER: By the way, speaking of ML numbers, one of them has to be wrong. When I go through things, I'm accumulating them as we go along and this ML 14303A465 comes up with zero. So, it's one of the letters that was -- that I think you mentioned.

MEMBER STETKAR: They'll get them to us.

MEMBER BALLINGER: Yes, we'll get them. I'm just saying that -- I dialed it in and --

MEMBER STETKAR: Sorry, Joy, I just wanted confidence in the way that we define them.

CHAIRMAN SCHULTZ: Well, just to be clearer, because I think John is always very clear, but, you know, the staff should provide to Mike Snodderly the references that we've discussed in the context here. We'd really appreciate that.

MEMBER STETKAR: And the documents which you want the Advisory Committee on Reactor Safeguards to review.

CHAIRMAN SCHULTZ: Mike?

MEMBER CORRADINI: People have already gone through a lot of things. I guess I thank the industry and the staff for their presentation.

I guess I'm more struggling about what to do and when to do it. So, it seems to me that if there's letters going to be written in December, it's got to

be about the COMSECY, maybe bring the rule in but only to the extent you answer some of the questions the staff was asking which is, do you want a rule?

I think UCS suggested that the filtered vent -- the hardened filtered vent be rolled into the rule. So I think we ought to have some opinion whether it should stay as it is or it should -- and separate it from the filter vent or not.

I think we ought to say something about whether we want SAMGs in it or not. Staff also asked us that.

Except for that, I'm not sure if there's much more to talk about the rule because we haven't seen the guidance.

On the COMSECY, it seemed to me that if you're going to have so little time in front of all of us again plus the three members that aren't here, I would have the staff explain exactly what they intended, the COMSECY staff, I can't -- we'll call it the current COMSECY staff -- what they intend to mean if they're going to excuse industry from an integrated assessment.

Conversely, if industry's going to be asked to talk, it seems to me they ought to focus their talk on why it's inappropriate to do the integrated

assessment, what's so bad about doing it and then that'll help us come to some decision as to where to go with it.

I think we understand from the two afternoon speakers as to what their concerns were and I assume you're have some sort of summary of that. I'm not exactly sure how you want to handle that.

CHAIRMAN SCHULTZ: We will handle it, we'll have the opportunity for them to present them.

MEMBER CORRADINI: But it seems to me unless we do that, we're not going to focus on soon enough of that.

And the only other thing after that is I think Bill said it, I'm not exactly sure how he said it, I think we want to decide what ought to be in the COMSECY and given we've decided that we want or don't an integrated assessment or some variation of it, what we do with it after the fact is for a later discussion. There's no point in dealing with it now because we'll just argue about it.

And I think that the Commission would rather hear about what ought to be in it and what ought not to be in it and why. So, that's it.

CHAIRMAN SCHULTZ: Appreciate that.

Thank you for your comments and we will

work on making sure that the pieces that we've discussed around the table, I didn't hear anything I would disagree with in terms of the preparation for the meeting.

So, Mike, we'll work together to talk to the participants and make sure that their focus is appropriate.

MEMBER CORRADINI: And one of the things, it doesn't -- about this topic, but if there's we can jettison from the December meeting so we have more time because, to me, this is a very important -- I know, I see the chairman's already grumbling at me.

CHAIRMAN SCHULTZ: That's because he's sorry he didn't make it a range.

MEMBER STETKAR: It's because we've already published the agenda and -- no?

CHAIRMAN SCHULTZ: The agenda will stay.

MEMBER RAY: There is one thing, though, that John and I have touched on, I don't want to say we've agreed --

MEMBER STETKAR: In terms of what we review, we as a committee, decide what letters we feel we need to write. But in terms of terms of topics for presentations, we're locked in --

MEMBER CORRADINI: Okay. Fine, fine,

fine.

MEMBER STETKAR: -- to those time frames. But we have B

MEMBER CORRADINI: I don't want to deal with leadership, leadership --

CHAIRMAN SCHULTZ: As compared to other meetings, we've allocated good time to this discussion already and it's in the published agenda that we need to stick to.

MEMBER CORRADINI: All right, thank you.

CHAIRMAN SCHULTZ: We don't have the same latitude that we've had today and yesterday.

In any case, thank you for your discussion. I would like to close the meeting by, again, recognizing the presentations that we have had from the staff, from industry, the comments that we've received from members of the public. They have been very well developed, very well presented and they are really helpful for our deliberations. I appreciate that very much.

I also want to thank Mike Snodderly arranging the two day meeting, especially on a topic like this with as many participants as we have had. It's been outstanding work and I really appreciate, Mike, you pulling this together for us and you've already heard the assignments for the full committee

meeting, so we'll --

MEMBER RAY: Why don't you thank me for putting on off the AP1000 meeting?

CHAIRMAN SCHULTZ: Of course, Harold.

I also want to thank Kathy Weaver who also participated in preparing this meeting. She wasn't able to attend today which was her focus because she's on travel. But she has really helped with this and will help us also with regard to the full committee meeting. So I wanted to do that officially as well.

With that, I will move forward to close the meeting.

(Whereupon, the above-entitled matter went off the record at 4:44 p.m.)

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Mitigation of Beyond-Design-Basis Events (MBDBE) Proposed Rulemaking

Advisory Committee on Reactor Safeguards

Fukushima Subcommittee

November 21, 2014

Background

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Consolidated rulemaking (now MBDBE proposed rule)
  - ACRS full committee on July 10, 2014
  - ACRS subcommittee on June 23, 2014
- Previous ACRS interactions on Station Blackout Mitigation Strategies (SBOMS):
  - ACRS full committee – June 5, 2013
  - ACRS Regulatory Policies and Practices subcommittee – April 23, 2013
  - ACRS Regulatory Policies and Practices subcommittee – December 5, 2013
- Previous ACRS interaction on the Onsite Emergency Response Capabilities Rulemaking:
  - ACRS Plant Operations and Fire Protection subcommittee – February 6, 2013
- Regulatory bases and public interactions:
  - Station Blackout Advance Notice of Proposed Rulemaking (ANPR) Issued – March 20, 2012
  - Station Blackout Mitigation Strategies Final Regulatory Basis issued – July 23, 2013
  - Onsite Emergency Response Capabilities ANPR- April 18, 2012
  - Onsite Emergency Response Capabilities Final Regulatory Basis- October 15, 2013

Background

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Consolidation of post-Fukushima regulatory efforts:
  - COMSECY-13-0002: Consolidates 4 and 7 into SBOMS rulemaking
  - COMSECY-13-0010: Consolidates EP-related with EA-12-049 implementation
  - SECY-14-0046 enclosure 6: Consolidates SBOMS and Onsite Emergency Response capability rulemakings
- Scope of proposed rulemaking as it relates to originating Near-Term Task Force (NTTF) recommendation:
  - All of recommendations 4, 7, and 8
  - All of 9.1, 9.2. and 9.3 – except long term Emergency Response Data System(ERDS)
  - !0. 2 (command and control/decision maker qualifications) and 11.1 (delivery of equipment to site - phase 3 portion of EA-12-049)
  - Includes NTTF 9.4 (ERDS modernization)
- In terms of post-Fukushima already underway:
  - Makes generically-applicable EA-12-049 and EA-12-051
  - Addresses staffing and communications 10 CFR 50.54(f) request
  - May also address feedback from NTTF 2.1 (flooding)

Proposed Rule Language

Paragraph (a) - Applicability

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- Applicability
  - Current operating reactors
  - New reactors
  - Decommissioning reactors
- All requirements apply to both current and new reactor licensees and applicants
  - Additionally: New reactors have an additional assessment requirement (forward fit)
- Decommissioning provisions:
  - Once fuel is permanently removed from the reactor , no reactor requirements
  - Once irradiated fuel is removed from the spent fuel pool, all requirements cease

Proposed Rule Language

Paragraph (b) – Integrated Response

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United States Nuclear Regulatory Commission
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- Integrated Accident Response Capability

  - Beyond-design-basis external event mitigation
    - Would make EA-12-049 generically applicable
    - Formerly referred to as SBOMS (industry's "FLEX" program)
  - Extensive Damage Mitigation Guidelines (EDMGs)
    - Would move § 50.54(hh)(2) requirements to this rule
    - No substantive changes to requirements
  - Severe Accident Management Guidelines (SAMGs)
    - Currently voluntary
    - Regulation would require SAMGs
    - No additional equipment requirements

Proposed Rule Language

Paragraph (b) – Integrated Response

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- Integrate with Emergency Operating Procedures(EOPs)
  - Would not revisit any 1980s EOP work or requirements
- Supporting staffing and command and control
  - Both staffing and command and control should be in place after EA-12-049
  - Recognizes challenge of a site-wide event that could lead to core damage and involve offsite assistance

Proposed Rule Language

Paragraph (c) – Equipment Requirements
Paragraph (e) – Training Requirements

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- Equipment Requirements
  - Would make EA-12-049 equipment requirements generically applicable
  - Would make EA-12-051 spent fuel pool level instrumentation requirements generically applicable
- Training
  - Training of personnel for activities not already addressed
  - Systems approach to training
  - Expect most training already addressed as part of EOPs and EA-12-049 implementation
  - New training should be in the SAMG area

Proposed Rule Language

Paragraph (d) – New Reactor Requirements

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- Assessment requirements:
  - Only applies to applicants listed in paragraph (a)(4)
  - Would require a design-specific assessment of the effects of an extended loss of all ac power concurrent with a loss of normal access to the ultimate heat sink
  - Based on the results of the assessment, the applicant would incorporate into the design those features that:
    - Minimize reliance on human actions
    - Enhance coping durations
    - Demonstrate ability to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities
- Intent:
  - Implement the Commission's advanced reactor policy statement
    - "…longer time constants and sufficient instrumentation to allow for more diagnosis and management before reaching safety systems challenge or exposure of vital equipment to adverse conditions."
    - "simplified safety systems that, where possible, reduce required operator actions"
  - New reactors would be better able to address effects of extended loss of ac power

Proposed Rule Language

Paragraph (f) Drills and Exercises
Paragraph (g) – Change Control

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- Drills provide assurance that guideline sets are integrated and can be used
  - Initial drill(s) to show use and transitions
  - Follow-on drill(s) to provide assurance of continuing capability
  - Complex drill schedule: Initial drill within 2 refueling outages (RFs) and follow-on in 8 calendar years
  - Current operating licensees/holder of combined license (COL) after 52.103(g) finding:
    - 1st drill within 2 RFs – after that 8 year period
  - Applicants for a part 50 operating license (OL) or holder of COL before 52.103(g) finding:
    - Demonstrate use and transitions – initial drill(s)
    - Subsequent drills - 8 year period
- MBDBE Change Control
  - Facility changes can impact multiple regulatory areas; all change controls must be applied
  - No threshold criterion; must comply with requirements

Proposed Rule Language

Appendix E, Application, Implementation

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- New Appendix E requirements
  - Multi-source term requirements are incorporated directly into current Appendix E
  - New Section VII requirement for staffing and communications
  - Technology-neutral ERDS
- Application requirements
  - Submittal information to support part 50 and part 52 applications for new reactors
- Implementation: Compliance dates, will use the Cumulative Effects of Regulation (CER) process to inform establishment of dates
  - Change control
  - Training
  - Command and control, staffing
  - SAMGs
  - Guideline integration
  - Equipment requirements
  - Multi-source dose assessment

Backfit Considerations

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- The MBDBE rule has different supporting backfit bases:
  - Proposed rule requirements are severable
  - EA-12-049 and EA-12-051 requirements are not backfits
  - All other requirements need justification under Part 50 backfitting provisions (operating reactors) and Part 52 issue finality provisions (new reactors) are “forward fits”
    - Items supporting EA-12-049 are technically backfits without impact
    - SAMGs and supporting requirements (drills and training that involve SAMGs)
    - Multi-source dose assessment (voluntarily implemented): Is a backfit but should not cause additional impact
    - New reactors requirements (forward fit)
    - Technology-neutral Emergency Response Data System (ERDS) remove specification of technology, no backfit

SAMGs Backfit

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- Qualitative basis for imposing SAMG requirements:
  - Guideline set used by operators and decision-makers following onset of core damage
  - SAMGs support making optimal decisions concerning containment
  - SAMGs support informing the emergency response organization with regard to protective actions (e.g., fission product barrier integrity)
  - The value of SAMGs, pre-planned guidelines for best use of all available resources to mitigate the accident
- Quantitative analysis: drawing conclusions from recent Mark I and II CPRR effort
  - Measuring the benefit to public safety of strategies for Mark I and II plants implemented after core damage – “SAMGs” for Mark I and II
  - Quantitative results: High level conservative estimate is over an order of magnitude below the Quantitative Health Objectives (QHOs)
- Staff is proposing that Commission issue proposed MBDBE rule for comment with SAMGs as requirements
  - Allow stakeholder feedback to inform final decision

Draft Regulatory Guidance

U.S.NRC
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Protecting People and the Environment

- DG-1301 “Flexible Mitigation Strategies for Beyond-Design-Basis External Events”
  - Current draft guidance endorses NEI 12-06 rev 0 with clarifications
  - NEI is revising NEI 12-06 to reflect feedback and lessons-learned from implementation of EA-12-049 to develop rev 1
  - Include guidance for new reactors assessments (paragraph (d))
- DG-1317 “Reliable Spent Fuel Pool Instrumentation”
  - Would endorse NEI 12-02 with exceptions and clarifications
- DG-1319 “Enhanced Emergency Response Capabilities for Beyond-Design-Basis Events”
  - Would endorse NEI 12-01 and NEI 13-06
  - Considering endorsement of NEI 14-01
    - Not an endorsement of Owners Group SAGs

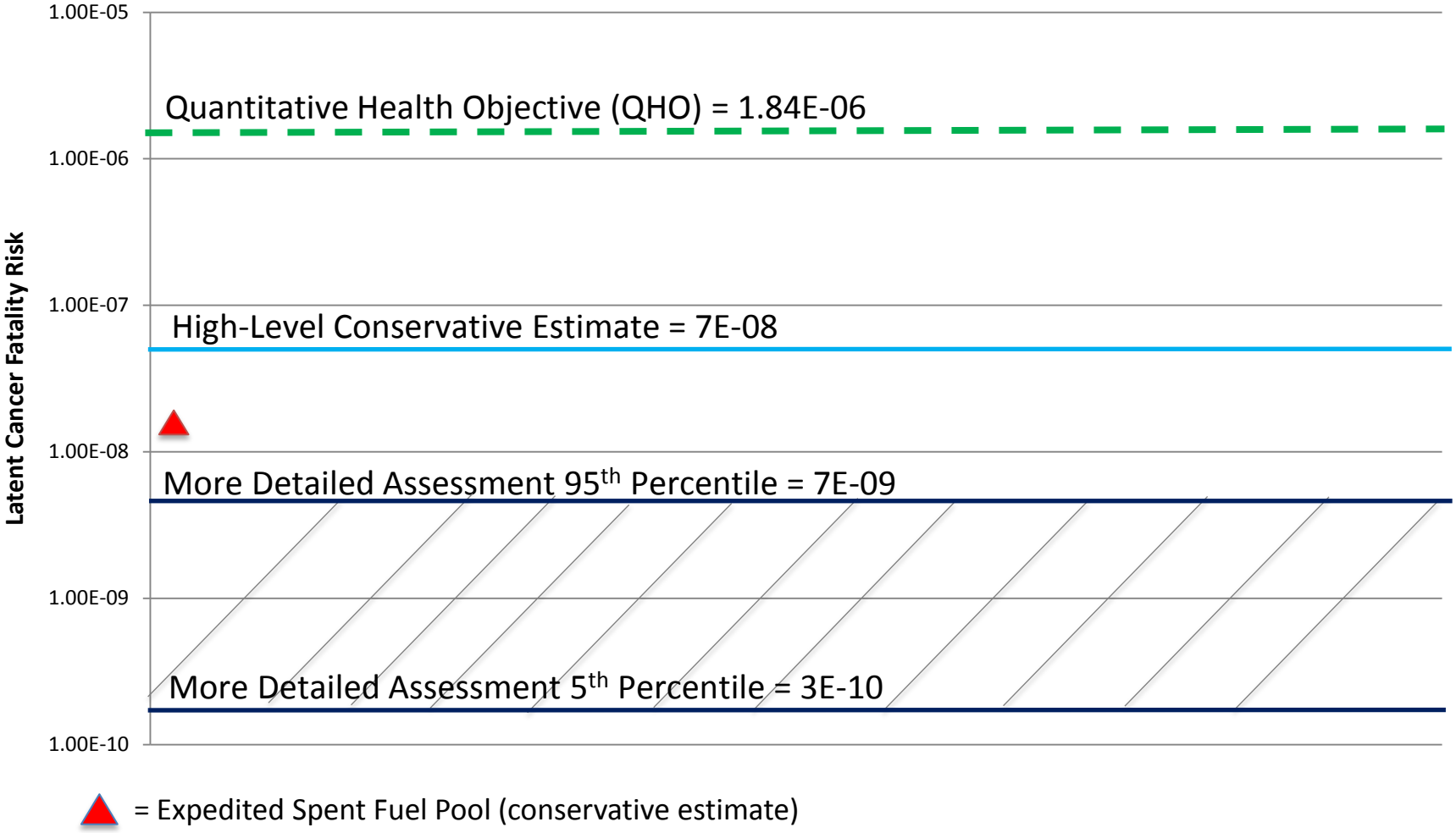
Status and Path Forward

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Current focus:
  - Completing the proposed rule package
  - Begin concurrence in early December
  - Scheduled to deliver the proposed rule to the Commission by Dec 19, 2014

- Future ACRS interactions
  - Full committee – December 2014 (proposed rule)
  - Full committee – TBD (final rule)

Results Suggesting that No CPRR Rulemaking Alternative can be a Substantial Safety Enhancement



U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Integration of Mitigating Strategies and Reevaluation of Flooding Hazards

Advisory Committee on Reactor Safeguards

Fukushima Subcommittee

November 21, 2014

Background

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Presentation to ACRS Full Committee on October 3, 2014
- Draft White Paper
  (ADAMS Accession No. ML14314A063)
- Public Meetings & Letter Dated November 4, 2014 from Nuclear Energy Institute
  (ADAMS Acc. No. ML14309A544)

Discussion

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Requesting Commission affirm the following:

1) Licensees for operating nuclear power plants need to address the reevaluated flooding hazards from Recommendation 2.1 within their mitigating strategies for beyond-design-basis external events (Order EA-12-049 and related MBDBE rulemaking)

Basis: to ensure that some measures are taken to address reevaluated flooding hazards

Impact: Affects rule language and subsequent implementation of the regulation

Discussion

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Requesting Commission affirm the following:

2) Licensees for operating nuclear power plants may need to address some specific flooding scenarios that could significantly damage the power plant site by developing targeted or scenario-specific mitigating strategies, possibly including unconventional measures, to prevent fuel damage in reactor cores or spent fuel pools

Basis: To ensure Commission is aware that some scenario-specific mitigating strategies may involve unconventional measures

Impact: May affect rule language, would affect subsequent implementation of the regulation

Discussion

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Requesting Commission affirm the following:

3) The staff should revise the Recommendation 2.1 flooding assessments and integrate the Phase 2 decision-making into the development and implementation of mitigating strategies in accordance with Order EA-12-049 and the related MBDBE rulemaking.

Basis: Best overall results involve an appropriate compromise between information gathering and analysis and actual, timely regulatory actions to achieve safety improvements

Impact: No affect on rule language, would affect current plans for integrated (total plant) flooding assessments

Status and Path Forward

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Current focus:
  - Issuance of COMSECY
  - Scheduled to the Commission by November 28, 2014
- Future ACRS interactions
  - Full committee – December 2014 (final COMSECY)

Industry Perspective on Draft Mitigating Beyond Design Basis (BDB) Events Rule

Bryan Ford
Senior Manager - Regulatory Assurance
Entergy Nuclear
November 21, 2014 • ACRS Meeting

Industry Perspective on BDB Rule

- Positives
  - Right topics addressed with “high-level” language
  - Supports use of industry-developed guidance
  - Reflects the significant amount of industry work performed to enhance BDB event response capabilities since Fukushima
    - Codifies existing Order requirements
  - Reasonable approach to SAMGs

Industry Perspective on BDB Rule

- Areas for improvement
  - Adds requirements to decommissioning plants that are beyond those intended by current orders and beyond the requirements for operating plants
    - Current permanently shutdown plants were not required to implement EA-12-049/051
    - “Secondary containment”
    - Should need to maintain one spent fuel pool refill strategy/capability for a limited time

Industry Perspective on BDB Rule

- Areas for improvement
  - Equipment section is captured in guidance, and better addressed at the guidance level
    - Rule element (b)(1) would appear to subsume the requirement to have readily available, functional equipment to implement a mitigating strategy
  - With respect to multi-unit sites, ensure that rule wording is consistent with EDMG/B.5.b response requirements from previous orders/guidance

Industry Perspective on BDB Rule

- Change controls for BDB response capabilities
  - Need to define a workable and predictable change control process (at the guidance level)
    - Address the interface with change controls from other programs – fire protection, emergency preparedness, security, etc.
    - Process for obtaining NRC approval of a proposed change (i.e., prior to implementation) in cases where such approval is necessary

Reevaluated Hazards

- Major focus has been responses to NRC orders and the work associated with the NRC requests for information on external hazards
- Next major activity is integration of mitigating strategies with reevaluated external hazards
- Staff position not included in draft rule
- Industry position stated in NEI letter to NRC Chairman (dated 11/4/14)

Development of Mitigating Strategies

- Mitigating strategies were developed using a consequence-based approach
  - Assumed an unspecified BDB external event causes a loss of all AC power and access to ultimate heat sink
  - Credit taken for other installed systems or components designed to meet design basis external hazards
- Design basis external hazards governed the development of the mitigating strategies (e.g., for connections, storage locations, etc.)
- Recognized that these assumptions and strategies may not provide the optimum plant-specific response in consideration of updated hazard information

Industry Approach to Reevaluated Hazards

- A key difference between the reevaluated hazards assessment and the development of the mitigating strategies is the “initial conditions”
  - Instead of an assumed consequence from an undefined event, each site will have a set of specific hazard conditions
  - Assessments can determine hazard impacts on key equipment, and availability of permanent plant equipment, to support a new hazard-specific mitigating strategy, if needed

Industry Approach to Reevaluated Hazards

- Review the impact of reevaluated external hazards information on mitigating strategies
  - Assure that the strategies can still restore or maintain key safety functions in light of the new hazard information, OR
  - Develop a new hazard-specific mitigating strategy or a Targeted Hazard mitigation strategy that can be implemented until recovery actions are initiated

Staff Concerns Regarding White Paper Titled "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards"

Presentation to ACRS, November 21, 2014

Michelle Bensi, Ph.D., Civil Engineer, NRO/DSEA/RHM1
Suzanne Schroer, Technical Assistant, RES/DRA (formerly NRO/DSRA/SPRA)
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Staff Concerns with White Paper

1.	It departs from the intent of NTTF Recommendation 2.1.
2.	It departs from previous Commission and Congressional direction.
3.	It deviates from the implementation process currently established for reevaluating flooding hazards and plant response.
4.	It may create regulatory inconsistencies.
5.	**It presumes a conclusion that adequate protection has been achieved and, in most cases, additional regulatory actions are either not expected or not warranted.**
6.	**It does not elicit sufficient information to support a staff conclusion regarding the need for additional regulatory action.**
7.	It does not incorporate lessons learned from operating experience.
8.	It fails to distinguish between the intended purpose of the integrated assessment and activities for mitigating strategies and does not recognize the differences between guidance associated with the two activities.
9.	It does not adequately distinguish between consequential floods and the reevaluated flood hazard.
10.	It is vague in its description of “targeted mitigating strategies.”
11.	It is not responsive to external recommendations by regarded experts.
12.	It creates inconsistency regarding the manner in which different external hazards are treated by NRC under Recommendation 2.1.

Primary Safety Concerns of Staff

White Paper fails to address important safety issues

- White Paper approach will not systematically consider flooding protection of safety-related equipment (e.g., EDGs, ECCS)
- White Paper approach results in non-safety-related mitigating strategies as the ***only*** defense for reevaluated flooding hazards
  - Reevaluated flood hazards are based on present-day guidance and methods

Without the systematic integrated assessment (JLD-ISG-2012-05), we cannot:

- Understand the impact of reevaluated flood hazard on plant safety
- Understand potential vulnerabilities
- Determine whether protection is adequate
- Identify safety enhancements and determine their significance
- Gather information to support a decision to modify, suspend, or revoke a license

No basis for confidence in undefined approach advocated by White Paper

- Relies on an unspecified staff process to initiate new regulatory actions
- Assumes NRC already knows which plants will require additional action

Questionable Justifications

Justification for White Paper approach:

- Assumed effectiveness
- Efficiency and resources
- Industry consensus
- Time frame

However:

- Justifications have neither technical nor safety basis
  - Inconsistent with a culture emphasizing safety over competing goals.
- White Paper may be inconsistent with adequate protection requirements
  - Some regulatory actions/processes have been subsumed by R2.1 and may need to be revisited
  - For adequate protection issues, NRC is not permitted to consider cost
  - Licensees have not shown adequate protection for flooding at some sites
- Claimed efficiency under White Paper approach comes at significant cost
  - Important information will not be available due to elimination of integrated assessment

Integrated Assessment

- With the **systematic review** of all plants with increased flooding hazards via the integrated assessment we **will know**:
  - The extent of flooding issues at plants with known issues
  - The total number of plants that may have issues (including plants not yet identified)
  - Whether all plants can demonstrate adequate protection under flooding scenarios
  - Whether there are efficient and effective flood protection measures (e.g., sandbags to protect EDG building) that are cost-justified, substantial safety enhancements
  - **Information needed to support regulatory decisions**

Licensed Plant Examples

Plant 1

Current licensing basis :

- Nominal river level is normalized level of 0 ft
- Site grade elevation is normalized elevation of 13 ft
- 100-year flood normalized elevation is 10.3 ft
- Design basis flood (PMF) is normalized elevation of 23 ft

Therefore: under the current design/licensing basis, the site is protected from a design basis flood by a full set of safety grade ECCS and onsite electrical safety grade distribution system (i.e., diverse, redundant, single failure proof).

Reevaluated hazard (based on present-day licensing criteria to site new reactors):

- More than 20 feet greater than design basis
- Disables the ECCS and Class IE electrical distribution system

Key questions:

- Are mitigating strategies appropriate for reevaluated hazard (including less severe but more frequent events)?
- Are there efficient/effective protection options?
- Should we consider changing the design or licensing basis?
- Is this an adequate protection issue?

Integrated Assessment is needed to answer these questions.

Plant 2

Current licensing basis

- Nominal river level is normalized level of 0 ft
- Site grade is a normalized elevation of 22.5 ft
- Original design basis flood per UFSAR is normalized elevation of 17 ft. (200-year flood, 385,000 cfs)
  - Full set of safety grade ECCS (i.e., diverse, redundant, single-failure-proof) remains available because flood is below site grade
- Later revisions resulted in normalized elevation of ~29 ft

  "There are no incorporated/exterior or temporary flood protection features designed to protect the site against a flood greater than [plant grade elevation]."
  - Reactor shutdown is followed by reactor disassembly and cavity flood up
  - "All station loads are de-energized and all plant doors are opened …"
  - Gasoline driven pumps provide makeup to pools and reactor
  - May be similar to "targeted strategies" described in White Paper

Reevaluated hazard (based on present-day licensing criteria):

- PMF normalized level slightly higher than 29 ft (1,200,000 cfs)

Key questions:

- Are mitigating strategies appropriate for reevaluated hazard (including less severe but more frequent events)?
- Are there efficient/effective protection options?
- Should we consider changing the design or licensing basis?
- Is this an adequate protection issue?

Integrated Assessment is needed to answer these questions.

Plant 3

Current licensing basis

- Nominal river level is normalized level of 0 ft
- Site grade is normalized level of 25 ft (this is 9 ft. above 1000-year flood)
- PMF is normalized elevation of 34 ft
  - Elevation would be reached in ~12 days
  - Elevation would be sustained for ~11 days
- Licensee flood protection procedure requires construction of a ring levee to protect the plant.
- If construction of the levee is not completed or the levee fails (neither of which are low probability events), station blackout will occur.
- Backup is to run RCIC without dc power.

Reevaluated hazard (based on present-day licensing criteria):

- PMF has increased

Key questions:

- Are mitigating strategies appropriate for reevaluated hazard (including less severe but more frequent events)?
- Are there efficient/effective protection options?
- Should we consider changing the design or licensing basis?
- Is this an adequate protection issue?

Integrated Assessment is needed to answer these questions.

Supplemental Information: Summary of Specific Concerns

1—Departs from the Intent of NTTF Recommendation 2.1

Task Force recommends that the Commission direct the following actions to **ensure adequate protection** from natural phenomena…

NTTF 2.1 Order licensees to reevaluate the . . . flooding hazards at their sites against current NRC requirements and guidance, and if necessary, update the design basis and SSCs important to safety to protect against the updated hazards. …

- NTTF recognized that flooding hazards must be accurately characterized to determine whether it is necessary to
  - update the design basis
  - modify SSCs important to safety
- For flooding that was not considered in the licensed design, the white paper proposes to ***substitute*** mitigation for protection in all cases.
- The white paper ***assumes*** that the mitigation strategy will be adequate and ***eliminates*** the assessment required to validate that assumption.

2—Departs from Commission and Congressional Direction

- White paper does not clearly describe previous direction
- White paper does not clearly acknowledge that the proposed path forward represents a significant deviation from previous direction

SRM on SECY-11-0093	NTTF Report
SRM on SECY-11-0124	"Identify actions…to address plant-specific vulnerabilities"
SRM on SECY-11-0137	NTTF Prioritization
SRM on SECY-12-0025	"….necessary to confirm the adequacy of the hazards assumed for U.S. Plants and their ability to protect against them."
Consolidated Appropriations Act	"The [NRC] shall…require licensees to reevaluate the…flooding …hazard…The Commission shall require the licensees to update the design basis…if necessary."

3—Deviates from Established Implementation Process

Current NTTF R2.1 implementation process:

- Phase 1: Information Gathering:
  - Stage 1: Hazard Reevaluation using present-day licensing criteria (i.e., present-day design basis methods)
  - Stage 2: Integrated Assessment if reevaluated hazard > design basis*
- Phase 2: Regulatory Decisionmaking (e.g., change design or licensing basis)

The white paper does not:

- clearly articulate a sound basis, technical or otherwise, for the changes to the implementation process
- completely describe the consequences of the proposed changes to the implementation process

4—Creates Regulatory Inconsistencies

The proposed path forward may lead to several regulatory inconsistencies:

1. The treatment of increased flooding hazards from dam failures may differ between:
   - sites for which there is ongoing regulatory activity that may lead to changes in the protection of the plant or other backfits
   - sites for which regulatory activity is not already ongoing
2. The treatment of new information about different flood mechanisms may differ.

   Ex: NRC may treat new information about increased flooding hazards from dam failures (at some sites) differently than new information about increased flooding hazards from other mechanisms such as storm surge and local intense precipitation.

5—Prejudges Safety Conclusions

- White paper prejudges the outcomes of Phase 2 of the implementation process for NTTF Recommendation 2.1
  - ". . . the NRC staff does not expect the reevaluated flooding hazards for most plants to affect the design-basis flood against which safety-related SSCs would need to be protected."
- This approach may conflict with NRC's obligation to continually assess whether there is adequate protection of the public health and safety

6—Insufficient Information To Support a Staff Decision

White paper states:

- "Focusing the Phase 2 decisionmaking on mitigating strategies means that **the integrated (total plant) assessment in Phase 1 is no longer needed...**"

  and

- "There **may be** circumstances where the staff concludes that the flooding reevaluations warrant investigating the need for additional protection or mitigation beyond that provided by mitigating strategies.."

- A systematic evaluation of the impacts of the flood hazards from different flooding mechanisms on plant safety-related SSCs will not be performed.
- Staff cannot determine whether additional regulatory actions are needed regarding adequate protection or safety enhancements.
- Proposed approach is undefined and sufficient information **will not be** available to systematically know when to pursue further assessments.

7—Lessons Learned from Operating Experience Are Not Incorporated

- Since 2010, there have been:
  - 6 actual flooding events
  - 9 identified flooding issues related to flood protection or flood mitigation
  - 6 non-cited violations or green findings related to flood protection or flood mitigation
  - 12 greater-than-green findings related to flood protection or flood mitigation
    - 1 notice of violation
    - 8 white findings
    - 3 yellow findings

- The integrated assessment was developed with knowledge of operating experience.
- The white paper approach would reduce or eliminate the assessment of plant response.

8—Differences Between Integrated Assessment and Mitigating Strategies Are Unclear

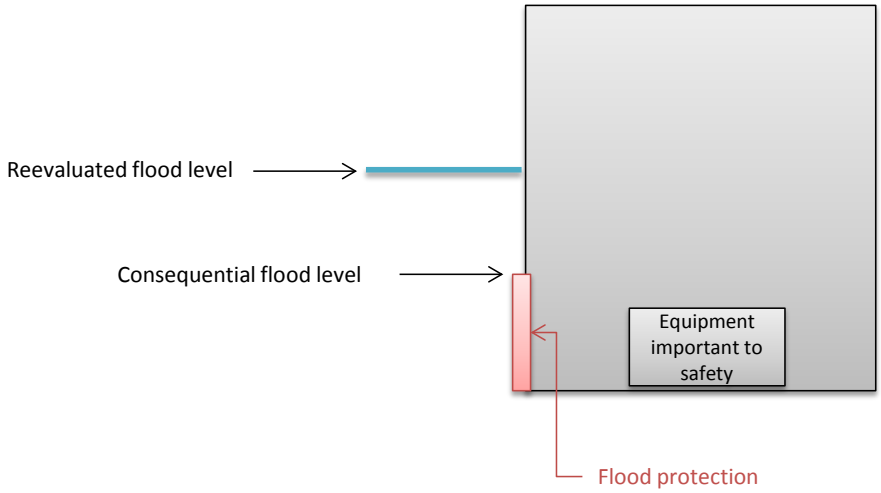
	Integrated Assessment	Mitigating strategies
Initiator	Flooding events (e.g., flood height, associated effects, flood event duration)	Extended loss of AC power and loss of normal access to ultimate heat sink
Purpose	Support decision to modify, suspend, or revoke license, if necessary	Provide additional defense in depth
Focus	Effects of flooding on total plant response, including safety-related SSCs	Effects of flooding on mitigating strategies equipment
Scope	Protection and/or mitigation,* as needed	Mitigating strategies only
Review criteria	Rigorous, systematic, and flood-specific assessment of total plant response. Supports regulatory decision regarding needs to change DB/LB.	Relies on considerable engineering judgment. Substantially different from the review of design basis accidents
Review criteria - Manual actions	Feasibility and reliability of manual actions, when used	Feasibility of "representative" manual actions
Outcomes	Confidence that site can withstand reevaluated flood hazard; information to support regulatory decision	Evaluate compliance with Order EA-12-049 to additional defense in depth

*The term "mitigation" in the integrated assessment ISG is not synonymous with the term "mitigating strategies" used in the White Paper

9—Lack of Understanding of Consequential vs. Maximum Credible* Flood

* Maximum Credible Flood ≡ Reevaluated Flood

- NRC flood hazard regulatory guidance currently uses deterministic framework
  - Limited number of stylized event combinations used to develop estimates of "maximum credible" flooding hazard for each SSC important to safety
  - Such combinations are considered appropriate for establishing sufficiently severe flood for design purposes
- Operating reactors may be vulnerable to events that are smaller in magnitude than these "maximum credible" events
  - This insight is important to support regulatory decisionmaking
- White paper focuses on single maximum credible flood but does not address the importance of smaller events that still may be consequential to a site.




Source: USACE, via Wikimedia Commons

10—Vague Description of Targeted Mitigating Strategies

- FLEX guidelines proposed by industry and endorsed by the NRC staff are *function-based*.
  - "The FLEX strategies are focused on maintaining or restoring key plant safety functions and are not tied to any specific damage state or mechanistic assessment of external events. " (from NEI 12-06)
- "[T]argeted mitigating strategies" as described in the white paper are described as *scenario-specific*.
  - Scenario-specific strategies are not addressed in
    - existing regulatory guidance related to mitigating strategies
    - NEI 12-06 (FLEX Implementation Guide)
    - JLD-ISG-2012-01 (Compliance with Order EA-12-049)
  - What triggers a targeted strategy is not specified.
- Integrated assessment ISG provides scenario-specific evaluation guidance that is flood-specific and systematic.

11—Responsiveness to External Recommendations

- **NRC response to Government Accountability Office report**

  "The NRC staff will evaluate the licensees' responses to this request for information, and will determine whether additional regulatory actions are necessary to provide additional protection against the updated hazards."

  The White Paper reverses, without technical justification, the NRC position documented in response to a recent report from the Government Accountability Office.

- **National Academies of Sciences report**

  "Failure of the plant owner…and the principal regulator…to protect critical safety equipment at the plant from flooding in spite of mounting evidence that the plant's current design basis for tsunamis was inadequate."

  Despite key Fukushima-related observations from a National Academies of Sciences report, the White Paper reverses direction from NTTF recommendation.

12—Inconsistencies in the Treatment of External Hazards

- Parallel implementation processes are being used for both seismic and flooding
- The white paper proposes significant changes to the implementation process for flooding
- The White Paper does not describe whether similar changes will be implemented for other external hazards
- It remains unclear why flooding hazards should be treated differently (and potentially less rigorously)
- The impacts of these inconsistencies have not been appropriately evaluated and could result in inefficiencies

Supplemental information—Background

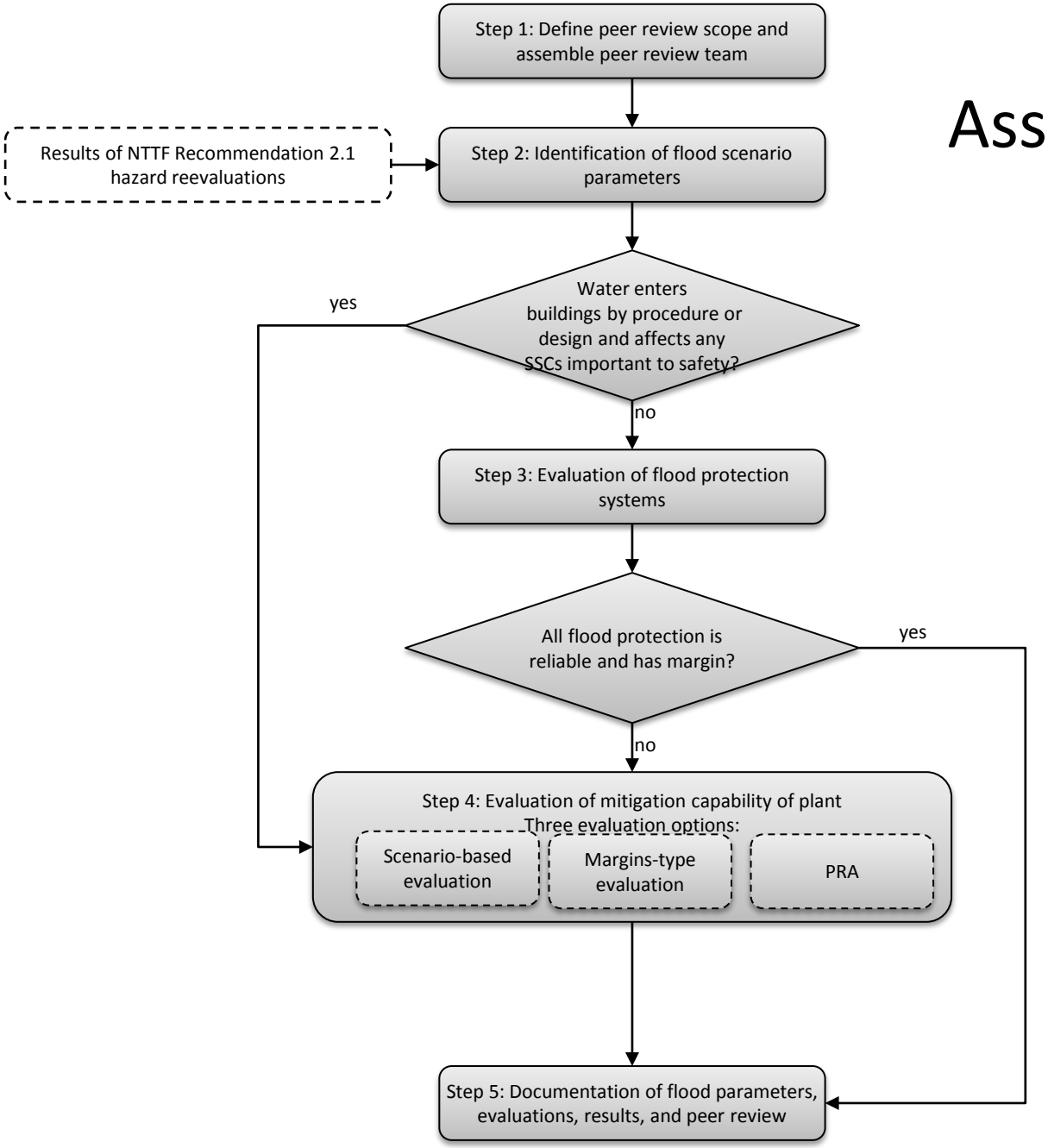
Background: Mitigating Strategies

- Purpose of mitigating strategies:
  - Provide "strategies and guidance for **additional defense-in-depth measures** to supplement the capabilities of permanently installed plant structures, systems, and components that could become unavailable following a **beyond-design-basis [external] event**"
- Rigor of staff reviews:
  - Substantially less rigorous than the review of design-basis accidents
    - No diversity
    - No redundancy
    - Single failure criteria do not apply (and all plant equipment assumed available)
  - Relies considerably on engineering judgment and existing knowledge and expertise in determining the acceptability
- Level of review is commensurate with the intended use of mitigating strategies as a **defense-in-depth measures** for **events that are expected to be rare**.
  - Note: Consequential flooding is not rare at all plants.

Background: NTTF R2.1

- NTTF Recommendation: Ensure that plants have **adequate protection** from seismic and flooding hazards, consistent with the current state of knowledge and analytical methods
- Actions are required by Congress
- Implementation:
  1. Reevaluate flood hazards using present-day guidance and methods used to site new reactors (i.e., design basis methods)
  2. Perform integrated assessment (IA) if reevaluated hazard is not bounded by the design basis
     - IA involves:
       - Complete flood characterization
       - Flood protection evaluation
       - Mitigation evaluation (if needed)
  3. Staff makes regulatory decision (e.g., update the design basis, including protection of SSCs important to safety)
- Recognizes that operating reactors cannot be resited/redesigned
  - IA provides comprehensive evaluation
  - IA adequately informs a regulatory decision

Integrated Assessment Concept



Key definitions

- Per Integrated Assessment ISG:
  - **Flood protection**: An incorporated, exterior or temporary structure SSC (e.g., barrier), or an associated procedure that protects safety-related SSCs against the effects of external floods, including flood height and associated effects.
  - **Mitigation**: The capability of the plant to maintain key safety functions in the event that flood protection systems fail (or are otherwise not available).
    - Note: The term “mitigation” in the integrated assessment ISG is not synonymous with the term “mitigating strategies” used in conjunction with FLEX or in the White Paper

NON-CONCURRENCE 2014-011 RELATED TO "INTEGRATION OF MITIGATING STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS AND RE-EVALUATION OF FLOODING

Submitted by: Glenn Tracy, Gary Holahan, and Scott Flanders

Background

- NTTF recommended “Safety Through Defense-in-Depth”, including:
  - Recommendation 2: enhanced protection from design-basis floods and seismic events, where warranted.
  - Recommendation 4: enhanced mitigation, for both design-basis and beyond design-basis events.
  - Recommendation 8: enhanced severe accident mitigation capability, and
  - Recommendation 9: enhanced emergency preparedness

Background

- These recommendations constitute a rational set of enhancements, strengthening defense-in-depth, with each recommendation having a specific nexus to the Fukushima Daichi accident.

- The Commission supported these recommendations, in whole or in part, through various mechanisms: Orders, rule-makings, or information demands.

COMSECY proposal

The fundamental changes being proposed in the COMSECY are:

- 1) to limit staff and industry efforts on flooding to a confirmation that mitigation strategies can cope with the reevaluated flooding hazard; and
- 2) to eliminate (in our view) the systematic re-consideration of any other external flooding protection.

Consequences

1. The post-Fukushima recommendations would no longer constitute a full set of potential enhancements consistent with the Commission's defense-in-depth safety philosophy;
2. A systematic evaluation of the total plant response to flooding, addressing both protection and mitigation would be curtailed. This would constitute a lost opportunity to identify potential plant vulnerabilities and to implement practical measures to protect key safety-related equipment; and
3. A non-safety-related system or collection of systems, intended for beyond design-basis events would be used to compensate for potential weaknesses in or even non-compliances with flooding design-basis protection requirements.

NRO Position

- We support the paper's approach on one specific issue; namely, reaffirming the issue of flooding protection for mitigation equipment (i.e. using the 2.1 re-evaluated flooding levels in the 4.2 mitigation strategy).
- We believe it is also necessary to conduct a thorough and systematic re-evaluation of protection of the normal, design-basis safety equipment used for decay heat removal (e.g. the first line of defense including: diesel generators, electrical distribution equipment, motor-driven auxiliary feedwater, service water and other support systems) .

Summary

- Simply stated, we do not believe that mitigation is an appropriate substitute for protection.

- Both mitigation and protection are essential, but separate, elements of the Commission's defense-in-depth safety philosophy and should be treated as such.

UCS Views on the Consolidated Rule and the Staff White Paper

Edwin Lyman
Senior Scientist
Union of Concerned Scientists
ACRS Fukushima Subcommittee Meeting
November 21, 2014

NRC has a big problem (and so does the American public)

- It is becoming evident that the reevaluated hazards at many (if not most) U.S. nuclear plants exceed those plants' design bases
- The industry maintains that these are "beyond-design-basis" hazards and should be treated accordingly
- But this is a misuse of the term: the reevaluated hazards are part of the *true* design basis; the original ones were *wrong*

Rulemaking

- A Mitigation of Beyond-Design-Basis Events rule, if carefully done, could address some of the problems that Near Term Task Force Recommendation 1 sought to rectify (and perhaps should be called Mitigation of Extended Design-Basis Events)
- A key question, as always, will be how to define beyond- (or extended-) design-basis events
  - The cleanest way is to simply upgrade the design basis to incorporate the reevaluated external hazards
  - More severe events would then constitute the extended design basis and would be addressed by mitigating strategies

Wagging the dog

- The rule should not merely be a codification of the current orders and FLEX guidance (the approach currently being taken by the NRC staff and the industry), or it will enshrine the inconsistencies and half-measures of the current FLEX approach into NRC's regulations
  - Unspecified "beyond-design-basis" external event that does not cause beyond-design-basis damage other than to AC power sources and normal access to ultimate heat sink
  - The stylized scenario in NEI 12-06 falls far short of the conditions at Fukushima (e.g. DC power and electrical distribution systems are available)
  - Confusing concepts ("robust" and "reasonable protection")
- The industry has already "wagged the dog" once by beginning to spend money on FLEX equipment before the NRC issued the mitigating strategies order and approved guidance; this made it practically difficult for the NRC to later reject FLEX

Wagging the dog

"Stakeholder input influenced the NRC staff to pursue a more performance-based approach [e.g. FLEX] to improve the safety of operating power reactors than envisioned in NTTF Recommendation 4.2 ..." – boilerplate language in NRC Interim Safety Evaluation Reports

Typical confusion

- Upstream dam failure at the Columbia Generating Station (from June 10, 2014 meeting summary)
  - "The NRC staff took an action to provide guidance on how Energy Northwest should consider the dam failure analysis results when responding to the Mitigating Strategies Order … Energy Northwest indicated that some of the strategies for flying equipment into nearby airports from the regional response center could be difficult to perform if the dam failure analysis led to flooding inundation levels that resulted in the nearby airports and roads to the site not being useable.
  - "In response to the above action item, the NRC staff informed Energy Northwest that the response to the Mitigating Strategies Order does not have to consider inundation levels provided in the USACE FHR. The Order requires licensees to develop strategies to address current design/licensing basis external hazards. The NRC staff will evaluate whether to modify the licensing basis flood hazard required to be considered for the Order as part of the broader FHR activities."

Consolidation

- It makes sense to consolidate in a single rule the requirements for mitigating strategies (pre- and post-core damage) with the procedures needed to carry them out
- The separate orders for mitigating strategies and reliable hardened vents have led to inconsistent implementation among licensees
  - Why can some Mark I/II BWRs (supposedly) carry out mitigating strategies that require use of wetwell vents without complying with the RHV order while others do not?
- Mitigation of station blackout (due to any cause) should remain a separate sub-requirement
- The entire rule should be implemented as an “adequate protection” requirement
  - Adequate protection = no Fukushimas in the United States

Validation

- Compliance with performance-based rules must be demonstrated through rigorous performance evaluations
  - Model should be force-on-force security inspections, rather than emergency planning exercises (e.g. every 3 rather than 8 years)
- Validation should be scenario-driven
  - A range of specific external events leading to an ELAP should be considered; all other consequences of the initiating event on the evolution of the accident should be consistently determined
- If FLEX is indeed capable of dealing with anything that comes, then it should be able to pass any specific validation challenge

White paper and draft rule

- The staff white paper and draft rule appear to invoke FLEX as a panacea for nearly all the difficult issues the NRC faces with regard to the external hazard reevaluations
- This would put too much emphasis on mitigation and not enough on prevention
- As a practical matter, this could cause major delays in resolving situations with unacceptably high risks

More confusion

- From the preliminary proposed rule (can someone please explain this to me?):

(2) The equipment relied on for the mitigation strategies required by paragraph (b)(1) of this section must be reasonably protected from the effects of severe natural phenomena that are as severe as the design basis external events in the licensing basis for the facility.

(3) The equipment relied on for the mitigation strategies in paragraph (b)(1) of this section must receive adequate maintenance such that the equipment is capable of fulfilling its intended function following a beyond-design-basis external event.