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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

5 (ACRS)

6 + + + + +

7 REGULATORY POLICIES AND PRACTICES SUBCOMMITTEE

8 + + + + +

9 TUESDAY

10 MARCH 6, 2012

11 + + + + +

12 ROCKVILLE, MARYLAND

13 + + + + +

14 The Subcommittee met at the Nuclear  
15 Regulatory Commission, Two White Flint North, Room  
16 T2B3, 11545 Rockville Pike, at 8:30 a.m., John D.  
17 Sieber, Chairman, presiding.

18  
19 MEMBERS PRESENT:

20 JOHN D. SIEBER, Chairman

21 J. SAM ARMIJO, Member

22 SAID ABDEL-KHALIK, Member

23 HAROLD B. RAY, Member

24 JOY REMPE, Member

25

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NRC STAFF PRESENT:

GIRIJA S. SHUKLA, Designated Federal Official

DONALD DUBE, NRO/DSRA

LAURA DUDES, NRO/DCIP

TIMOTHY FRYE, NRO/DCIP

THOMAS KOZAK, NRO/DCIP

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

8:30 a.m.

CHAIR SIEBER: The meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguard, Subcommittee on Regulatory Policies and Practices.

My name is Jack Sieber. I'm Chairman of this Subcommittee. Subcommittee Members in attendance today are Harold Ray, Sam Armijo, Michael Ryan, Said Abdel-Khalik, and Joy Rempe. Mr. Girija Shukla, of the ACRS Staff, is the Designated Federal Official for this meeting.

The Subcommittee will hear presentations from the NRC staff regarding the New Construction Reactor Oversight Process program of Applicable Construction Oversight of New Plants.

And, I would like to point out that this applies to new plants being licensed under the Part 52 process, as opposed to the completion of Watt Bar, which is being conducted under the old construction oversight process, and that plant is being built under Part 50.

The subject for today is the cROP, which stands for Construction Reactor Oversight Process, and

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1 this is an information briefing. It's not intended to  
2 write a letter as a result of this briefing, but we  
3 will inform the full ACRS of the content of the  
4 material being presented today and the Subcommittee  
5 conclusions that we would have regarding the process.

6 This new version of the cROP has been  
7 jointly developed by the Office of NU Reactor  
8 Oversight and Region II personnel, and represents a  
9 risk-informed approach to construction inspection, and  
10 is similar to the current reactor oversight process  
11 that's applicable to currently operating reactors.

12 The cROP prototype started on January 1st  
13 of this year, and will run for one year, and will be  
14 applied to Vogtle 3 and 4 in the summer at new  
15 construction plants.

16 We have received no written comments or  
17 requests for time to make oral statements from members  
18 of the public regarding today's meeting. This meeting  
19 will be open to public attendance.

20 The Subcommittee will gather information,  
21 analyze relevant issues and facts, and formulate  
22 proposed positions and actions as appropriate for  
23 deliberation by the full Committee.

24 Rules for participation in today's meeting  
25 have been announced as part of the notice of this

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1 meeting, published in the Federal Register on February  
2 13, 2012.

3 A transcript of the meeting is being kept  
4 and will be made available as stated in the Federal  
5 Register notice. Therefore, we request that  
6 participants in this meeting use the microphones  
7 located throughout the meeting room when addressing  
8 the Subcommittee. Participants should first identify  
9 themselves, and speak with sufficient clarity and  
10 volume, so that they may be readily heard.

11 Please silence your cell phones, and we  
12 will now proceed with introductory remarks from Tim  
13 Frye, who is Branch Chief of the Construction  
14 Assessment and Enforcement Branch of NRO.

15 Tim?

16 MR. FRYE: Okay, thank you, Jack.

17 I just briefly wanted to introduce the two  
18 staff members who are sitting at the table. Tom  
19 Kozak, has had the project lead for developing and the  
20 construction oversight process, and for implementation  
21 for the cROP pilot which has started as of January 1st  
22 of this year. And, Dr. Dube also of the Office of New  
23 Reactors, has had the lead for developing  
24 methodologies and processes for risk informing the  
25 safety significance determination of construction

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1 inspection findings. And, they will be discussing  
2 those aspects of the cROP.

3 So, with that I'll turn it over to the  
4 staff.

5 CHAIR SIEBER: Thank you.

6 MR. KOZAK: Thank you.

7 As Tim mentioned, my name is Tom Kozak. I  
8 work for Tim in the Division of Construction,  
9 Inspection and Operational Programs, and I had the  
10 lead to develop new construction assessment  
11 enforcement programs within our Construction Reactor  
12 Oversight Process.

13 The purpose of the meeting today is we are  
14 going to discuss our new construction enforcement  
15 programs. We are required to brief the ACRS on the  
16 results of the pilot of these programs in the  
17 beginning of 2013, and that is, you know, something we  
18 received in an SRM from the Commission. So, we wanted  
19 to be proactive and introduce the ACRS to the programs  
20 that we've developed and the pilot that we are going  
21 to be conducting, so you can provide any type of  
22 comments or thoughts on them and be familiar with what  
23 we are doing for this year, so that when we come to  
24 brief you in 2013 you are already familiar with what  
25 we've developed and what we are implementing. So, we

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1 thought that this would be a good thing to do.

2 Much of our presentation today is going to  
3 focus on our construction significance determination  
4 process. So, I'll go over a background on how we got  
5 here, and Don will go over the significance  
6 determination process.

7 When we first developed our oversight  
8 process for new construction, Part 52 construction, we  
9 took a traditional enforcement approach, which is what  
10 we used for the Brown's Ferry Unit 1 recovery, and  
11 what we are using at Watts Bar Unit 2. We presented  
12 that to the Commission in October of 2008. And, at  
13 that time the Commission, in December, gave us an SRM  
14 that said that we should develop an oversight process  
15 and include in the objective elements of the ROP,  
16 including a significance determination process. And  
17 so, that's what kicked off all of the new assessment  
18 and enforcement approach that we developed.

19 We formed a working group, which was a  
20 multi-office working group, including members from  
21 each one of the regional offices, NRR, NSER, and I was  
22 the head of that group and we were -- you know, we  
23 were tasked with meeting the requirements of that SRM  
24 that I just mentioned.

25 NEI formed a cROP task force, which was

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1 led by Tom Houghton, who has since retired recently,  
2 but he put together a task force that included members  
3 from most of the utilities that have COL applications  
4 and Westinghouse members, Shaw members. And, there  
5 was pretty consistent membership on that task force,  
6 as well as on ours. We conducted numerous public  
7 meetings as we developed the new assessment and  
8 enforcement approaches.

9 There was really very little public  
10 interest in what we were doing, even though we put out  
11 Federal Register notices, we discussed this at the  
12 RIC. We really tried to reach out to our other  
13 stakeholders, but were unable to generate a lot of  
14 interest in this development, unlike the ROP when we  
15 developed the ROP, if you'll recall, there was a lot  
16 of public interest there. But, we couldn't generate  
17 the similar type of interest.

18 So, we pretty much --

19 CHAIR SIEBER: Did you try to have public  
20 meetings in, for example, the Augusta, Georgia area  
21 for Vogtle?

22 MR. KOZAK: Well, we did not have a  
23 meeting in the vicinity of Vogtle, but we did send  
24 letters to the State of Georgia and they did  
25 participate in one panel.

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1 CHAIR SIEBER: Right.

2 MR. KOZAK: But, we will be going out to  
3 Vogtle here on March 29th, I believe it is, as part of  
4 the Operator Reactor Assessment meeting that we have.

5 We are going to do the construction assessment  
6 meeting, because we have been assessing Vogtle up to  
7 this point under the process that we had developed,  
8 Vogtle Units 3 and 4.

9 CHAIR SIEBER: Right.

10 MR. KOZAK: And, we are going to discuss  
11 with the public on that occasion the new processes  
12 that we have developed, and see if we can get any  
13 input there, and tell them we are going to be doing  
14 the pilot that includes testing what we've done and  
15 look for any input there.

16 CHAIR SIEBER: Thank you.

17 MR. KOZAK: So, all that work culminated  
18 in the SECY paper that you see here in the first  
19 bullet, SECY paper 10-140, where we recommended to the  
20 Commission that we develop -- further develop an  
21 assessment program. We presented in that paper some  
22 approaches to the construction significance  
23 determination process. At that time, we had  
24 determined that it was a feasible approach that we  
25 could develop a significance determination process

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1 that we could use to evaluate the significance of our  
2 findings.

3 And, that was kind of a question going in,  
4 because there is, you know, the plant is not  
5 operating, you don't have radioactive material, you  
6 don't have the core, you don't have core damage  
7 frequencies, how are we going to develop an SDP to  
8 evaluate construction. So, a lot of our focus, as we  
9 developed it, both in our public meetings and  
10 internally, was on what is an SDP going to look like,  
11 can we really develop something like this.

12 We determined that we could, and we  
13 thought we should go forward. So, we recommended to  
14 the Commission, yes, we think we can do this. These  
15 are some of the approaches we have. And, in response  
16 the Commission and SRM told us to finalize the SDP,  
17 pilot it for a year, include in that a construction  
18 SDP and a construction action matrix.

19 CHAIR SIEBER: Now, the significance  
20 determination process for the construction program at  
21 Vogtle really depends a lot on the operating PRA.

22 MR. KOZAK: Correct.

23 CHAIR SIEBER: To determine how important  
24 each element is.

25 And, to what extent is the PRA finalized,

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1 and is it adequate for this purpose?

2 MR. DUBE: The answer is yes. What we  
3 want to do -- I'll get into it, but we wanted to, in a  
4 short answer, is keep it simple. We didn't want to  
5 have like senior reactor analysts on line, on a  
6 beeper, you know, responding 20 times a day to a  
7 construction defect. So, we kept it simple. We used  
8 the PRA license, Westinghouse's PRA for the AP1000,  
9 and our internal SPAR model, and we used it mainly to  
10 put SSCs, structures, systems and components, into  
11 buckets, four buckets, and use some judgment to move  
12 things around the buckets. And, you'll see, I'll  
13 explain that.

14 So, right now one can use it pretty  
15 statically. I mean, if the PRA changes a little bit,  
16 it's not going to change what bucket things are in.

17 CHAIR SIEBER: So, it differs from the  
18 Part 50 type of construction inspection program, in  
19 that you have, basically, safety-related and unsafety-  
20 related classifications in the old Part 50 system.  
21 Here you are relying more on the classifications that  
22 come out of the PRA.

23 MR. DUBE: Right.

24 CHAIR SIEBER: Which are more graded in  
25 scope.

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1 MR. DUBE: Exactly.

2 CHAIR SIEBER: Okay, and you'll explain  
3 all that to us.

4 MR. DUBE: Yes, I will, yes. I think  
5 you'll find it fascinating.

6 CHAIR SIEBER: Okay, thank you.

7 MEMBER ABDEL-KHALIK: Will you explain how  
8 you intend to handle the probably thousands of field  
9 changes that will come about?

10 MR. DUBE: Yes. Well, I think we'll show  
11 you the screening process.

12 MEMBER ABDEL-KHALIK: Okay.

13 MR. KOZAK: Well, the next slide,  
14 basically, states for you that the Commission approved  
15 our recommendation, and as we've already discussed  
16 part of the SRM requires us to brief the ACRS. I  
17 mentioned that in the opening, so you already know  
18 that.

19 One other requirement in the SRM is that  
20 this process should be applicable to oversight of  
21 plants that are under 10 CFR, Part 50 process, which  
22 includes applicability to potential small module  
23 reactors, and as you mentioned, and we discussed this  
24 with the Commission, this would not be applicable to  
25 Watts Bar Unit 2 because it is so far along in

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1 construction and it didn't make sense to implement  
2 this at this time at Watts Bar Unit 2.

3 But, if Bellefonte were to go like they  
4 say they are planning to do, we would adjust this to  
5 apply to Bellefonte, and either Don or I will tell you  
6 how we'll do that. I think -- we developed this so  
7 that it is adaptable to really just about anything  
8 that's under construction, as long as they have some  
9 type of a PRA.

10 CHAIR SIEBER: And, that includes small  
11 modular reactors?

12 MR. KOZAK: Yes.

13 CHAIR SIEBER: Okay.

14 MR. KOZAK: And, on the fifth slide I just  
15 -- the second bullet is probably the most important  
16 bullet here. The Commission directed the staff to  
17 assess risk using the risk important measures, with  
18 the thresholds that are comparable and technically  
19 consistent with the risk threshold levels used in ROP.  
20 So, that's kind of key to how we developed the SDP,  
21 and we'll get into that in just a minute.

22 So, on slide 6, I've already mentioned we  
23 developed the assessment and enforcement programs, and  
24 we are piloting. The way we decided to pilot this is,  
25 we issued a memorandum from Mike Johnson, the Director

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1 of NRO, to the regional administrators, stating that  
2 we were going to conduct a pilot, and describing draft  
3 versions of manual chapters that we developed.

4 We developed three manual chapters that we  
5 consider draft. They have a P designation on the end,  
6 for pilot. Manual Chapter 613 is our manual chapter  
7 that we use for screening and findings, which would  
8 kick you into the SDP, and also provides directions on  
9 how to write reports.

10 2505 describes our assessment program, and  
11 what we've done is aligned this with the agency action  
12 review meeting, and so we'll have mid-cycle reviews  
13 and end-of-cycle reviews, just like in the reactor  
14 oversight process. We didn't call them that before,  
15 we called them semiannual performance reviews, and it  
16 was a six-month cycle. So, we really tried to mirror  
17 the ROP as much as we could.

18 I think it's easier for the public to  
19 understand, it's easier for our inspectors that go  
20 from an operating site to a construction site, and it  
21 all made a lot of sense. So, we've changed a lot of  
22 our processes to line up with those in the ROP.

23 And then, 2519P is our construction SDP  
24 manual chapter. So, we issued those to the staff for  
25 use prior to January 1st. We trained Region 2 and

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1 Headquarters in October/November, actually, did a  
2 training in December for the Headquarters staff.

3 We also issued an enforcement guidance  
4 memorandum to provide interim enforcement guidance  
5 which allows us to use the same enforcement approach  
6 that is used in the ROP, assigning colors to findings,  
7 green, white, yellow and red, getting rid of severity  
8 levels for, you know, just calling it a violation,  
9 those types of things, because in the enforcement  
10 manual and policy without that EGM it describes that  
11 we use a traditional enforcement approach to  
12 construction. So, we needed to issue an enforcement  
13 guidance memorandum for the pilot.

14 We also have pilot guidance and criteria  
15 to evaluate the success of the pilot, pre-determined  
16 criteria that we are going to use after we do this for  
17 a year, to determine what was successful, what changes  
18 we might need to make, and then we need to inform the  
19 Commission, it's not a notation vote, it's an  
20 information paper on the results of the pilot and how  
21 we plan to go forward.

22 As we've mentioned already, we implemented  
23 the pilot at Vogtle on January 1st of this year, and  
24 will implement the pilot at VC Summer Units 2 and 3 as  
25 soon as the COLs are issued. There's not enough

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1 activity for us to do it right now.

2 On slide 7, this simply just repeats what  
3 was in the SRM and that I've already said in one of  
4 the bullets, that we should use thresholds that are  
5 similar to those in the ROP. This is just to remind  
6 you what the thresholds are for green, white, yellow  
7 and red, and we'll show you how we applied those in  
8 just a minute.

9 CHAIR SIEBER: Now, those look, perhaps,  
10 in order of magnitude more safe than currently at. Is  
11 that correct?

12 MR. DUBE: At least, yes, generally  
13 speaking, yes.

14 CHAIR SIEBER: Yes, and that's consistent  
15 with the fact that the new reactors are supposed to  
16 have more features that make them safer. What you are  
17 trying to do is to achieve the advertised safety of  
18 these plants through this construction program, is  
19 that correct?

20 MR. DUBE: Yes.

21 CHAIR SIEBER: Okay.

22 MR. KOZAK: Ensuring that it's built in  
23 accordance with the design.

24 CHAIR SIEBER: Right.

25 MR. KOZAK: Right. So, in our

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1 construction significance determination process,  
2 there's two different -- it's one SDP, but there's  
3 really two different categories, if you will, that we  
4 use to evaluate findings.

5 One thing that's different than the ROP  
6 is, in construction we are required to review the  
7 adequacy of programs, both construction programs and  
8 operational programs, and that means that they've been  
9 developed adequately with the appropriate criteria  
10 that are listed in the final safety analysis report.

11 That's a little different than the ROP.  
12 In the ROP, we go and we look at the implementation of  
13 programs. We don't do, you know, an evaluation of the  
14 adequacy of the program.

15 So, here we are just looking to make sure  
16 that licensees have developed both construction  
17 programs and operational programs that have the  
18 elements in there that they are required to have. So,  
19 there's no corresponding technical issue, if you will,  
20 when you look at the program. We just go and do, say  
21 we review their quality assurance program to make sure  
22 it has all the elements in it that they are required  
23 to have.

24 MEMBER ABDEL-KHALIK: So, how do you  
25 define findings in these two bullets.

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1 MR. KOZAK: Right. Well, a finding, we  
2 use the same terms as in the ROP, a finding has to be  
3 a performance deficiency that is more than minor  
4 significance. And, a performance deficiency is the  
5 failure to meet a requirement or a standard, which was  
6 within the ability of the licensee to identify.

7 And then we have minor screening criteria  
8 to determine if an issue we identify is greater than  
9 minor or not. So, first you have an issue of concern.

10 You determine if it is of more than minor  
11 significance, and you determine whether it was the  
12 failure to meet a standard or a requirement that the  
13 licensee is committed to meet. That's a finding.

14 MEMBER ABDEL-KHALIK: Ultimately, you have  
15 to translate that into a physical change that you can  
16 translate into, you know, a delta CDF.

17 MR. KOZAK: Not necessarily.

18 MEMBER ABDEL-KHALIK: Not necessarily?

19 MR. KOZAK: No. No. We'll get into that  
20 in a minute, but a finding for a program can simply be  
21 for quality assurance, the licensee has to have a  
22 corrective action program. And, it has to have  
23 certain things associated with the corrective active  
24 program, the ability to identify and promptly correct  
25 conditions adverse to quality.

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1 MEMBER ABDEL-KHALIK: Okay.

2 MR. KOZAK: So, if we go on and we look at  
3 their quality assurance program, we go to the  
4 corrective action program, and they do not have in  
5 place requirements to identify and correct conditions  
6 adverse to quality, that would be a finding. That  
7 would be the failure to meet a requirement for that  
8 corrective action program.

9 MEMBER ABDEL-KHALIK: But, you know that  
10 that will not happen. They will have a program, the  
11 question is, they may not have --

12 MR. KOZAK: As a matter of fact, that  
13 example came to mind because we identified at Vogtle  
14 that one of the contractors did not have provisions in  
15 their corrective action program to identify and  
16 correct conditions adverse to quality. It's an actual  
17 finding that we had, it's a program issue.

18 So, you have a program, and in our  
19 requirements, and in the FSAR they describe what that  
20 program should consist of, and if we go and we  
21 identify that that program does not contain those  
22 requirements, that would be a finding.

23 MEMBER ABDEL-KHALIK: But, that doesn't  
24 require a significance determination based on delta  
25 CDF.

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1 MR. KOZAK: That does not, that's a  
2 program finding. And, that's where we've used  
3 deterministic criteria. We have a flow chart right in  
4 our next slide that shows you how we screen program  
5 findings.

6 Now, the other type, the other -- so,  
7 that's the first bullet, that's the program, that's  
8 the deterministic SDP that we developed.

9 We also have a risk-informed construction  
10 SDP for technical findings, any finding that's not a  
11 program finding. So, that could be a design violation  
12 of some kind that, you know, we would put that into  
13 our SDP. It could be, you know, welding problems on a  
14 system, you know, where they are not following welding  
15 procedures.

16 MEMBER ABDEL-KHALIK: But, a field change  
17 that the licensee has evaluated and said it's  
18 equivalent, there is no --

19 MR. KOZAK: Right.

20 MEMBER ABDEL-KHALIK: -- risk associated,  
21 how do you check that?

22 MR. KOZAK: Well, you know, licensees are  
23 required to do evaluations if they are going to do a  
24 field change.

25 MEMBER ABDEL-KHALIK: Right.

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1 MR. KOZAK: And, if they do an inadequate  
2 evaluation, you know, we would -- we, you know, our  
3 inspectors are trained to determine whether or not  
4 their evaluation is adequate or not, if they've  
5 considered all --

6 MEMBER ARMIJO: You don't do 100 percent  
7 oversight on those field changes, do you? I mean,  
8 review of their --

9 MR. KOZAK: We wouldn't do 100 percent.  
10 It just depends. If the field change is such that it  
11 requires a license amendment, you know, obviously, we  
12 review those. If it's within the licensee's purview  
13 to change something that's not a design change, we  
14 probably wouldn't look at 100 percent of those.

15 MEMBER ARMIJO: But, they inform you of  
16 all of these changes.

17 MR. KOZAK: Right.

18 CHAIR SIEBER: Well, let me give you an  
19 example. Let's say that there was a weld defect in a  
20 safety significant pipe, and it was repaired. And,  
21 when it was repaired the final configuration of the  
22 weld, materials and treatment used to make that weld,  
23 are different than standard welding practice. That  
24 requires an engineering evaluation to evaluate that,  
25 and does that engineering evaluation fall under this

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1 program, or does that go back to the design program?

2 MR. KOZAK: That would fall under this  
3 program.

4 CHAIR SIEBER: Okay, and how would you do  
5 that?

6 MR. KOZAK: Well, maybe we could hold that  
7 question, and we can address it when we go through the  
8 -- when we get through Don's part of this, because it  
9 will be easier to describe once we've presented the  
10 matrix that we have and the table. And, I will  
11 definitely come back to that.

12 CHAIR SIEBER: Okay.

13 MR. KOZAK: Okay? So anyway, there's two,  
14 essentially, branches to our SDP, one for program  
15 findings, and one for what we refer to as technical  
16 findings. Those are really findings that are  
17 associated with, you know, that have an actual impact  
18 on the work activities that they are conducting.  
19 Okay.

20 The next slide 9, this is out of our  
21 manual Chapter 2519, and is provided for the  
22 inspector's use, and screening findings through our  
23 SDP. The first thing we do with the SDP is, we check  
24 to see, you know, if there's -- if the finding is  
25 programmatic in nature.

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1           So, I can kind of walk through this flow  
2 chart. As I mentioned earlier, you first have to use  
3 our manual Chapter 613, in order to determine that the  
4 finding is more than minor, and it has -- and it is a  
5 performance deficiency. So, we do that, and that  
6 kicks you into our significance determination process.

7           The first question we ask there is, is it  
8 related to an operational program, after the license  
9 condition implementation milestone, or is it related  
10 to security.

11           We do not handle security findings with  
12 this significance determination process. We kick  
13 those findings out to the security significance  
14 determination process.

15           In the license, we require, I believe  
16 there's 19 operational programs required in a license.

17           And, for each one of those programs there's a  
18 milestone in construction, that once that milestone is  
19 met they are required to have that operational program  
20 in place.

21           For instance, one of the milestones is  
22 when fuel is put into the protected area. The  
23 licensee has to have their operational security  
24 program in place. So, that's an example of a  
25 milestone. And, each one of the operational programs

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1 has a milestone such as that in the license.

2           Once that milestone is met, and that  
3 operational program is required to be in place, we  
4 will use the ROP significance determination process to  
5 determine the significance of findings.

6           So, those are, really, towards the end of  
7 construction.

8           So, if the answer to that first block is  
9 no, we ask, is the finding programmatic in nature?  
10 And, I've just explained to you what programmatic  
11 findings are. There's no technical issue associated  
12 with the finding. It's simply a requirement for a  
13 program that has not been met.

14           If it is only a programmatic finding, we  
15 ask, is the finding an omission of a critical  
16 attribute of the program? And, a critical attribute  
17 is defined as a requirement that is listed in the  
18 final significance -- or Final Safety Analysis Report,  
19 FSAR. Each program has in the FSAR a listing of  
20 what's required for those programs, and if it's not in  
21 the FSAR it's referred to ASME codes or something like  
22 that.

23           So, the inspectors have to go and look and  
24 see if one of those critical attributes has been  
25 missed. And, if the answer to that is yes, we ask the

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1 question, did we come out and review this before and  
2 identify this problem? If the answer is no, then that  
3 finding would be green. If the answer is yes, that  
4 indicates that there's a problem with the licensee's  
5 program in developing either construction or  
6 operational programs, we would call that a white  
7 finding, and we would follow back up and look at the  
8 extent of condition, if you will, of what went wrong  
9 and why they didn't get that critical attribute into  
10 the program after it was already identified as a  
11 finding.

12 MEMBER RAY: Let's be clear. This is an  
13 NRC finding, not a licensee finding.

14 MR. KOZAK: Correct, it would be an NRC-  
15 identified finding.

16 So, that's the purely deterministic branch  
17 of our SDP. You can only get up to a white finding,  
18 and in order to get a white finding you would have to  
19 have a repetitive finding for the same critical  
20 attribute missing in one of the programs.

21 CHAIR SIEBER: What's repetitive, two?

22 MR. KOZAK: Two, yes.

23 MEMBER REMPE: So, how does that relate to  
24 the color coding on slide 7, if it's just -- I mean,  
25 finding -- okay, it does not.

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1 MR. KOZAK: It's a purely deterministic  
2 approach, where we can assign a color, and it's  
3 similar to an approach that we would have in non-  
4 reactor safety SDPs in the ROP, something like  
5 radiation protection. You know, that's not based on  
6 delta CDF or anything like that.

7 So, it's not related to that.

8 MEMBER REMPE: Okay.

9 CHAIR SIEBER: Now, to follow up on my  
10 question, which is, is two enough? When a potential  
11 finding is made, does that prompt an inspector to look  
12 for more items of a similar nature?

13 MR. KOZAK: Sure, yes.

14 CHAIR SIEBER: That's part of your  
15 program, it's just not intuition for the inspector,  
16 right?

17 MR. KOZAK: Right. That's -- that's --  
18 well, that's kind of part of what --

19 CHAIR SIEBER: Inspection is all about,  
20 right?

21 MR. KOZAK: -- right, yes.

22 CHAIR SIEBER: Right.

23 MR. KOZAK: Okay. So, that's the  
24 programmatic area.

25 So, if you go back up to box three, and

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1 the answer is no, that it's not just a programmatic  
2 issue, there is some type of a problem that has,  
3 actually, resulted in an issue in the plant as part of  
4 construction, we ask the question again, does the  
5 finding involve a repetitive omission of a program  
6 critical attribute.

7 The reason we put that in there is, if we  
8 had a programmatic finding, and the licensee did not  
9 correct that. And then, we come back out and we find  
10 an actual technical problem as a result of not fixing  
11 the programmatic issue, we didn't want to just kick  
12 ourselves out of the SDP, we would get a white finding  
13 for that, because it was repetitive. And, we would  
14 process the actual issue, using our SDP. So, there is  
15 a chance to kick back, using a programmatic issue if  
16 it had been previously identified.

17 CHAIR SIEBER: Now, an instance like that  
18 may result in, in order to finally resolve it, rework  
19 of the systems or materials in the plant. And, I  
20 notice from looking at your manual chapters that it  
21 can take up to 90 days in order to turn that around  
22 within the Agency.

23 My memory of nuclear construction is a lot  
24 happens in 90 days, so that you may end up having to  
25 dismantle a good part of the plant, at least that part

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1 of that system in order to rework the finding that's  
2 90 days old.

3 MR. KOZAK: It's possible, but even though  
4 it takes us, you know, up to 90 days to finalize the  
5 significance of a finding, we, you know, have a goal  
6 of doing this as quickly as possible. Plus, we are  
7 communicating the issue to the licensee right away, as  
8 soon as we find it.

9 MEMBER ARMIJO: They keep building.

10 MR. KOZAK: Kind of at their own risk,  
11 right.

12 So, you know, even though our final  
13 significance could take up to 90 days, we are --  
14 hopefully, the licensee is going to be proactive in  
15 addressing the finding right away, entering into a  
16 corrective action program, determining their to their  
17 own extent, irrespective of what the final  
18 significance determination is.

19 CHAIR SIEBER: Okay. I recall during  
20 construction periods that these inspection meetings  
21 with the licensee would take place at a maximum time  
22 interval of one week. Do they still have the weekly  
23 meetings with the licensee, or if something serious  
24 comes up it's right then?

25 MR. KOZAK: My understanding is, right now

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1 our inspection exits are on a quarterly basis.

2 CHAIR SIEBER: Right.

3 MR. KOZAK: But, we are interacting with  
4 the licensee on a daily basis, and as issues come up  
5 they are discussing it with them.

6 I'm sure that -- or, I believe that the  
7 periodicity of our inspection reports will get smaller  
8 as construction activities pick up. I don't know that  
9 for a fact, but I'm pretty sure that's what we are  
10 looking at.

11 But certainly, there will be real time  
12 interactions with the licensee as issues come up, and  
13 they've been doing that in pre-COL inspections.

14 CHAIR SIEBER: Okay.

15 MR. KOZAK: Okay. So now we are over to  
16 block seven, can the finding be associated with a  
17 system or a structure? And, that's key, and we'll get  
18 into the system or a structure in just a minute.

19 The key is, if we cannot associate the  
20 finding with a system or a structure, and that would  
21 be a commodity type of a finding, in other words, the  
22 licensee is ordering 50 valves, or whatever, and they  
23 haven't specified the correct critical characteristics  
24 for the valves. But, they are not associated with a  
25 specific system.

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1 CHAIR SIEBER: Right.

2 MR. KOZAK: We consider that to be early  
3 on that the licensee can address that, and that would  
4 be a green type of a finding, because it hasn't been  
5 put into the plant, you know, part of construction,  
6 and it hasn't really affected the construction of the  
7 plant.

8 However, if it can be associated with a  
9 system or a structure, then we would go further on  
10 into the SDP.

11 MEMBER ABDEL-KHALIK: Is there any  
12 interface between this process and the ITAAC closure  
13 process?

14 CHAIR SIEBER: Yes.

15 MR. KOZAK: Yes, there is.

16 MEMBER ABDEL-KHALIK: Where does it appear  
17 on this diagram?

18 MR. KOZAK: It doesn't appear on this  
19 diagram.

20 The ITAAC closure process is a separate  
21 process that we.

22 MEMBER ABDEL-KHALIK: I understand.

23 MR. KOZAK: Right, and it's in that  
24 process that it directs the people that are evaluating  
25 the ITAAC closure notifications to back and look at

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1 our inspection program results to determine if there  
2 are any open findings or not.

3 MEMBER ABDEL-KHALIK: So, it appears  
4 there, but not here.

5 MR. KOZAK: Correct.

6 But, in the overview -- we have a manual  
7 chapter that's No. 2506 that's our guidance and basis  
8 document. It's a real -- the idea of that manual  
9 chapter was to provide an overview of all of our  
10 construction oversight activities. And, in that  
11 manual chapter it describes the interface of those two  
12 programs.

13 And, this is more specific to finding  
14 significance determination.

15 CHAIR SIEBER: Yes, but I think somewhere  
16 in the slides you talk about that briefly, and I think  
17 what it does is distillate the level one. When we get  
18 to it you can talk about it.

19 MR. KOZAK: Yes.

20 CHAIR SIEBER: Tim wants to add something.

21 MR. FRYE: Yes, Tim Frye. I just wanted  
22 to add that, you know, as we are closing an ITAAC if  
23 we identify a deficiency that causes the ITAAC to not  
24 be closed properly, that possibly could be caused by a  
25 performance deficiency by the licensee that's probably

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1 in Appendix B, Performance Deficiency, and that would  
2 be an input into this, that would be a finding that  
3 could be input into this process. So, that's one of  
4 the ties.

5 CHAIR SIEBER: Right.

6 MR. KOZAK: Yes, that's a good point.

7 Okay, so you want to go now, Don?

8 MR. DUBE: Okay, thanks, Tom.

9 I'm Don Dube. I'm going to give you a  
10 little background.

11 Two years ago, maybe even three years ago,  
12 someone came to us and says, can we develop  
13 construction SDP like the reactor oversight process  
14 for current reactors. And, the quick answer was yes,  
15 but then all of the details had to be filled in.

16 So, what we decided to do was to develop a  
17 program or process that kind of parallels the  
18 construction ROP, but it's not exactly identical.

19 I'm showing on here, I mean, this is a  
20 rich colorful graph, and I'll go through blocks at a  
21 time. The first thing it's important to note is that  
22 there's no such thing as change in core damage  
23 frequency for your plant under construction.

24 I mean, the immediate concern when we had  
25 the meetings with stakeholders, they say, how can you

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1 equate risk for a plant under construction with a  
2 plant that's operating with fuel in the core, so on  
3 and so forth.

4 So, that's important to get to. Once you  
5 set that aside and say, there's no real risk here  
6 equivalent to a plant under operation, then we can  
7 explain the color scheme and what the purpose of this  
8 color scheme would be.

9 So, what we've shown here is, really, a  
10 graded approach to ranking the significance of  
11 construction inspection findings. Okay, so that is  
12 the ultimate goal. The ranking approach, there are  
13 findings on low importance systems that are minor in  
14 nature, or just barely more than minor in nature.  
15 And, there can be significant inspection findings on  
16 very high risk important systems which are the other  
17 end of the spectrum.

18 And so, what we have here is a two-  
19 dimensional rated approach, and the best way to  
20 describe it is on the x-axis is shows system or  
21 structure risk importance, going from the left, which  
22 is very low, to the low, to the intermediate and high.

23 So, I'm going from left to right.

24 The importance of the SSC increases from  
25 very low in nature, to low, to intermediate, to high,

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1 and then we'll talk about the mathematical  
2 quantification. So, that's one degree of freedom, if  
3 you will. That's one measure of the graded approach.

4 And then, from going from row one at the  
5 bottom, to row two, to row three, to row four, we call  
6 it quality of construction, but another way of viewing  
7 it is, what's the extent of the impact of the finding.

8 How significant, is it a trivial inspection finding  
9 that impacts one component in a particular system, or  
10 it could be a finding be so significant that if left  
11 uncorrected it would have had a significant impact on  
12 the overall performance of either a train or an entire  
13 system.

14 CHAIR SIEBER: Now, that appears, at least  
15 what I've read and what I see, a judgment call more  
16 than, you know, let's say that there's construction  
17 defects in putting together a system that has a  
18 relatively high risk acceptance worth, and determining  
19 where you are in that quality of construction --

20 MR. DUBE: Is a little more judgmental  
21 than the x-axis, correct.

22 CHAIR SIEBER: -- yes, that's right.

23 MR. DUBE: But, we do have some  
24 guidelines, and we'll go through them.

25 CHAIR SIEBER: Maybe you could just tell

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1 us a little bit about what those guidelines are.

2 MR. DUBE: Yes, we'll do that. Yes.  
3 There's so much information on just this one slide,  
4 and it takes a long time to sink in.

5 So, let me go -- so the basic principle is  
6 that --

7 MEMBER ABDEL-KHALIK: Does the  
8 determination of which row you fall in require a  
9 detailed root cause?

10 MR. DUBE: No, it should not.

11 MEMBER ABDEL-KHALIK: Well, how would you  
12 determine the extent of the condition?

13 MR. DUBE: Well, we'll give you an  
14 example, but --

15 MR. KOZAK: Can I?

16 MR. DUBE: Yes, go ahead.

17 MR. KOZAK: In the manual chapter, in  
18 2519, we provided system and structure design function  
19 definitions. We pulled those straight out of the DCD.  
20 And so, what we have instructed the inspectors to do  
21 is to determine -- you know, take what finding they  
22 have, and compare it to the system design function  
23 definition. For instance, if the finding affects the  
24 system, and determine if that finding, if left  
25 uncorrected, it could affect that design function, a

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1 design function of that system.

2 And so, it's not a detailed root cause  
3 analysis, it's meant to be a relatively quick  
4 determination. It may take some, you know,  
5 discussions with the licensee, knowledge of what the  
6 system is supposed to do, but it shouldn't be a root  
7 cause. It should be, if this weld, you know, would  
8 this system have performance design function if this  
9 weld was inadequate, you know, if it wouldn't hold,  
10 that sort of thing. It wouldn't be a complete root  
11 cause analysis on why the finding happened, what's the  
12 extent and condition of the finding, that sort of  
13 thing.

14 So, the focus is, the inspectors identify  
15 a problem, they go to the definitions in 2519 for that  
16 system that it's associated with, or the structure,  
17 and they take that definition and determine whether or  
18 not their finding would have affected --

19 MEMBER ABDEL-KHALIK: So, the rows one  
20 through four do not reflect extent of condition.

21 MR. KOZAK: They do to the extent that it  
22 would affect one or multiple trains, or the whole  
23 system. One train of a multi-train system, for  
24 instance, the definition for row one is, as it affects  
25 one train, but not all trains of a system. Row two

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1 is, it affects multiple trains, but not all trains of  
2 a system. Row three is it affects the entire system,  
3 including if it's a single-train system, it affects  
4 one train. So, your system would not -- so, the idea  
5 is, row one, it affects one train of that system. One  
6 train of that system could not do its design function.

7 It's an isolated thing.

8 Row two is, this finding has affected  
9 multiple trains, so the extent of condition is more.

10 MR. DUBE: Two parallel valves.

11 MR. KOZAK: And then, row three is, the  
12 whole system would be unable to do its design function  
13 definition.

14 MEMBER ABDEL-KHALIK: But, could you also  
15 imagine an issue related to the construction of a  
16 specific system that may be equally valid to other  
17 systems?

18 MR. KOZAK: Yes, it could.

19 MEMBER ABDEL-KHALIK: So, how would that  
20 fall into your --

21 MR. KOZAK: In that case, we would take  
22 the most risk significant system and bound it by  
23 whatever the finding color was for that system.

24 But, it would encompass everything, and it  
25 would affect all those other things, and the licensee

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1 would have to fix all those things, you know, whatever  
2 the extent of condition is.

3 And then, row four, just for complete  
4 disclosure, it's -- the only way you can get to row  
5 four is if you had one system that's not able to do  
6 its design function, and we have a repetitive  
7 significant condition adverse to quality.

8 Okay?

9 MEMBER ABDEL-KHALIK: Yes.

10 MR. KOZAK: Good.

11 MR. DUBE: So, there's a lot of  
12 information I know on this slide. It's a snapshot,  
13 but again, the emphasis here is the graded approach,  
14 and there's several principles.

15 First of all, green is not good. Green  
16 still means they have to enter the corrective action  
17 process.

18 But, going from significant increases when  
19 you go from green to white, yellow to red, when we  
20 developed this matrix, you know, we played around,  
21 should it be a 3x3, a 2x3, a 4x whatever. In the end  
22 we decided that 4x4 will do what we wanted.

23 Pretend that you don't see these delta  
24 CDFs there on the top row, and pretend you don't see  
25 the risk achievement worths. The principle here is,

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1 as you go from left to right the risking points of the  
2 system or structures were increasing, and as you go  
3 from the bottom to the top the extent of the impact of  
4 the finding goes -- increases as well. So then, you  
5 go from the bottom left to the top right, you go from  
6 green through white, through yellow to red.

7 This is a very common kind of a plot that  
8 has been developed for like ranking motor-operated  
9 valves, or risk importance of service inspection of  
10 finding. You kind of see these in kind of two-  
11 dimensional plots. So, I won't claim creativity here.

12 Some of those concepts were taken from that.

13 The idea here is, again, there's several  
14 principles. First, the graded approach. Second, a  
15 minor impact on an important system, to determine  
16 should it be screened to green. I mean, there's going  
17 to be multiple minor or just barely more than minor  
18 issues that we felt, you know, we don't want to clog  
19 the system with whites, and yellows and red, and these  
20 should just screen to green. So, as a result, row one  
21 is always green. So, there's some level at which we  
22 say, you know, the corrective action process is going  
23 to take care of it. We don't want to, you know,  
24 exercise the staff, and so there's always going to be  
25 a green bottom row.

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1 Or, you know, the other situation, there  
2 could be a large impact, but on a very low risk  
3 important system, and that idea concept should screen  
4 to green, and so the column to the left with very low  
5 risk significant systems is always green, regardless  
6 of the row. So, you have always green at the bottom,  
7 always green on the left column.

8 But then you see where if you had a major  
9 impact, with repetitive significant condition adverse  
10 of quality on a very high risk important system, that  
11 would be your upper right or red. That's the worst  
12 that you can have, and it's a very rare situation.  
13 It's -- there's only a half dozen or so high risk  
14 significant systems involved. It involves failure of  
15 an entire system, and, you know, a repetitive  
16 significant condition adverse of quality. I mean, you  
17 would hope no one ever enters the red. You would hope  
18 no one even enters the yellow, but it's there.

19 MEMBER ABDEL-KHALIK: Okay, let's look at  
20 a situation. Programmatically, you are checking the  
21 corrective actions program, and you find that people  
22 just don't really have the propensity to write  
23 condition reports, regardless of what the severity of  
24 the deviation or the condition might be.

25 The worst that you can give them is a

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1 white.

2 MR. DUBE: Well --

3 MEMBER ABDEL-KHALIK: How does that match  
4 with this?

5 MR. KOZAK: I think that it's different  
6 than that, because the program finding is the program  
7 not containing guidelines for doing what the program  
8 is supposed to do.

9 What you've described is the program would  
10 have those guidelines in it.

11 MEMBER ABDEL-KHALIK: Right.

12 MR. KOZAK: But, people --

13 MEMBER ABDEL-KHALIK: People aren't using  
14 it.

15 MR. KOZAK: -- aren't following it. That  
16 would be this part. That's not a programmatic  
17 finding. That -- say the people are not reporting, or  
18 not following their corrective action program, is I  
19 believe what you are describing.

20 MEMBER ABDEL-KHALIK: Well, right, they  
21 aren't writing condition reports.

22 MR. KOZAK: Right. So, they are not  
23 writing it, there can be little to no impact there,  
24 and that would be a green finding, because we don't  
25 have, you know, it hasn't affected a risk significant

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1 system, that sort of thing.

2 But, say they don't write a corrective  
3 action document for a work process, a work activity,  
4 and subsequently construction activities result in a  
5 system not being able to meet its design function.  
6 That could be a criterion 16 violation for failure to  
7 follow the corrective action program, with a  
8 significance of white, yellow or red, depending on the  
9 outcome of, you know, what happened.

10 So, I think it's a little different  
11 somehow. You know, that's not a programmatic finding,  
12 it can't be greater than white, because in this case,  
13 I'm assuming they have an adequate program in place,  
14 they are just not using it. That's different. So,  
15 that wouldn't be a program finding, that would be a  
16 finding that has impact that we would evaluate based  
17 on the results of them not writing that issue.

18 I mean, that's one way we could approach  
19 it.

20 MEMBER ABDEL-KHALIK: But, you would only  
21 find it after something goes wrong.

22 MR. KOZAK: Right. You know, but we have  
23 other means of looking at that type of thing. We have  
24 a similar inspection to the PI&R inspections that we  
25 have in the ROP. So, we are looking at that

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1 routinely. We have a routine review of their  
2 corrective action program. We try to identify, you  
3 know, we question people if they are -- you know, if  
4 they feel comfortable in reporting problems, if they  
5 are reporting problems. We have inspectors in the  
6 field that notice if problems go wrong, and if they  
7 don't write the corrective action document for that,  
8 that would be, you know, a violation that we would  
9 document and we would evaluate.

10 So, we have a lot of different means to  
11 find that, but if it slips through all those, you are  
12 right, it would have -- you know, maybe something went  
13 wrong during a test that, you know, we look back and  
14 say, well, what happened here, and, you know, you can  
15 put all those pieces together. That would be  
16 something we would evaluate on this matrix.

17 MEMBER ABDEL-KHALIK: Okay.

18 MR. DUBE: Okay, thanks, Tom, for filling  
19 me in.

20 So, again, repeating, it's a graded  
21 approach with two dimensions. On the x-axis the  
22 dimension is how risk important is that system or  
23 structure, going from very low, to low, to  
24 intermediate, to high. And then on the y-axis is,  
25 it's called the quality of construction, but what's

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1 the extent of the impact of the finding from, again,  
2 relatively low impact, going all the way up to  
3 affecting, perhaps, a system, and then, ultimately, if  
4 it's repetitive and significant condition adverse of  
5 quality you can kick it up a row.

6 So then the question was, okay, so how do  
7 we draw the boundaries, and I'll talk about how do we  
8 draw with the columns. And, this is where the SRM  
9 that the Commission sent us, that said -- it's on  
10 slide 7, for the SDP and the cROP staff should assess  
11 risk using risk importance measures, with selected  
12 thresholds that are comparable and technically  
13 consistent.

14 Again, recognizing that plants under  
15 construction there's no public risk, but how do we  
16 decide these columns. And, the way to do it was, to  
17 go back to the fundamental idea, which is red was  
18 always for operating reactor if delta CDF was greater  
19 than  $10^{-4}$ , yellow was  $10^{-5}$  to  $10^{-4}$ , white  $10^{-6}$  to  $10^{05}$ ,  
20 and green  $10^{-6}$ . And, I'll show you the math.

21 So, systems or structures, or components,  
22 if they were in a completely failed state, and the  
23 plant had been -- it were operating at full power,  
24 what would the change of core damage frequency B, and  
25 that's just used to decide how important is that SSC.

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1 Is it -- should it be in the very low bucket, the low  
2 bucket, the intermediate bucket, or the high bucket.

3 And, the corresponding risk achievement  
4 worth, and I'll show you some math on the next page,  
5 it's, you know, 9th grade algebra, I think they learn  
6 this now, but the risk achievement worth for a system,  
7 if one assumes the system was completely in a failed  
8 state, if it's less than 4 it would be in the very low  
9 column. A risk achievement worth between 4 and 40  
10 would be the low, 40 to 400 intermediate, and greater  
11 than 400 would be high.

12 So, you already see here the robustness.  
13 We are only talking -- we are talking orders of  
14 magnitude. I mean, we don't need to have calculated  
15 this risk achievement whereas the three orders -- you  
16 know, three significant figures. We are just trying  
17 to decide in a gross sense, you know, which of these  
18 columns should the system lie in.

19 And, the whole idea is to -- and it was  
20 agreed with the stakeholders, we don't want senior  
21 reactor analysts, you know, on the fly, tied to a  
22 Blackberry, doing calculations, you know, like they do  
23 for operating reactors. You know, it's a big thing  
24 when an SDP calculation greater than green is done for  
25 operating plants. So, we wanted to keep it simple, so

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1 we have determined -- pre-determined structures and  
2 systems ahead of time, which column they fit in, so  
3 there's no calculations being done. Where there is  
4 some judgment is determining what's the extent of the  
5 impact.

6 And again, remember green is not  
7 necessarily good. You still have to enter the  
8 corrective action program and make a repair if  
9 necessary.

10 So, any questions on this? There's so  
11 much information in this one.

12 MEMBER ARMIJO: I'd like an example, and  
13 I'll just pick one that I'll just make up. Let's say  
14 somebody bought some carbon steel elbows that were  
15 supposed to be resistant to flow-accelerated  
16 corrosion, but they were the wrong composition, didn't  
17 have a lip in them, but they were installed all over  
18 the plant.

19 MR. DUBE: All over the plant?

20 MEMBER ARMIJO: Nobody checked when they  
21 came in, the chemistry requirement. Where would that  
22 be? To me, that's an important thing, people could  
23 get killed.

24 MR. DUBE: If it was in the reactor  
25 coolant system, it would be on the far right column.

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1 MEMBER ARMIJO: All right.

2 MR. DUBE: Now the question is --

3 MEMBER ARMIJO: How far up the rows.

4 MR. DUBE: -- how far up it is. It would  
5 probably -- if there's only one train, it would be a  
6 green. If it was, you are saying it's all over the  
7 plant, that means all over the system, you are at  
8 least a yellow, and if it's repetitive significant  
9 condition adverse to quality that could be a red.

10 MEMBER ARMIJO: It could almost be a red.  
11 Okay.

12 MR. DUBE: Right?

13 MR. KOZAK: Yes, it's a big oversight.  
14 Somebody missed it, and --

15 MR. DUBE: That's the logic.

16 MR. KOZAK: Right, if that would the  
17 logic, that would be a significant issue.

18 If you have bad material installed in the  
19 plant, and you miss the critical characteristics for  
20 that material, that's a big deal.

21 MEMBER ARMIJO: Yes.

22 MR. KOZAK: and I think it reflects, you  
23 know, you can see kind of how we would get to a yellow  
24 relatively quickly if it was installed in a high risk  
25 system, and that system would be determined to be

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1 entirely unable to perform its function.

2 MR. DUBE: If the plant was operating,  
3 yes.

4 MEMBER ARMIJO: Yes. The assumption would  
5 be that it's resistant to this phenomenon, and nobody  
6 would be particularly worried about it, it failed.

7 CHAIR SIEBER: But, if some engineer  
8 specified the material, and the material, actually,  
9 matched the specifications --

10 MR. DUBE: That's even worse.

11 CHAIR SIEBER: -- the specification was  
12 inadequate for the application, hopefully, you would  
13 have caught that prior to its being installed in the  
14 plant.

15 MR. KOZAK: You would hope.

16 CHAIR SIEBER: Because you are supposed to  
17 be examining the design, and I consider that a design  
18 defect.

19 MR. KOZAK: Right, but in that case if it  
20 had gotten into the plant, that would be a procurement  
21 violation that would still result in whatever the risk  
22 significance is.

23 CHAIR SIEBER: So, if you do catch it in  
24 the design phase, you are going to catch it here,  
25 provided your inspector look that far.

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1 MR. KOZAK: Right. You would hope that  
2 somebody would be looking at the design specs for that  
3 system, to say this material needs to contain --

4 MEMBER ARMIJO: It's supposed to be  
5 resistant material, it's just carbon steel.

6 MR. KOZAK: And, it's not.

7 CHAIR SIEBER: Well, those issues,  
8 actually, occur on construction projects.

9 MEMBER ARMIJO: Yes, that's the problem.  
10 A few years ago there were a number of, I believe they  
11 were valves or some other component that was purchased  
12 in China or something like that, and they were really,  
13 what do you call these things that are knock offs?

14 MR. KOZAK: Frauds.

15 MEMBER ARMIJO: Yes, but it was -- it was  
16 even the code material.

17 CHAIR SIEBER: That's happened in a number  
18 of cases.

19 MEMBER ARMIJO: So, that was fraud. They  
20 were never installed, as I understand it.

21 MR. KOZAK: So, in that case it would be a  
22 low significance, because it wasn't installed, but  
23 they'd still have -- you know, still document it.

24 MEMBER ARMIJO: There'd be a brief  
25 somewhere.

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1 MR. KOZAK: Right.

2 CHAIR SIEBER: Okay.

3 MR. DUBE: So again, a lot of information  
4 on this, and it took a long time to derive this. But  
5 again, the principle is a graded approach, two  
6 dimensionals. One is how risk important is this  
7 system? The second is, what's the extent of the  
8 finding?

9 Slide 11 is just the math, but we were  
10 directed by the SRM to make it consistent, technically  
11 consistent with the current reactor oversight process.

12 And you say, how do you do that, you know,  
13 because the plant is not even constructed. It's not  
14 real risk.

15 So, I put qualifiers here. I said  
16 recognizing that the ROP delta CDF threshold represent  
17 calculated risk levels at power, how would we  
18 determine these thresholds? And, I went through one  
19 example of the high column.

20 So, you have to, you know, for a given new  
21 reactor design with internal events, core damage  
22 frequency, and here we kept, again, the whole idea is  
23 we kept it simple. Yes, we could have had external  
24 events, but we wanted to keep it simple and we could  
25 equate the range from the ROP to a system level risk

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1 achievement worth, the sole purpose of categorizing  
2 the risk importance of each system.

3 So, this map is just to decide, you know,  
4 of all the systems and structures and components,  
5 which of those four columns does it go in, and here's  
6 the math. It's simple. If internal events, core  
7 damage frequency for the AP1000, I rounded it off  
8 because  $2.5 \times 10^{-7}$  gave me a real nice answer.

9 The red threshold, and the red threshold  
10 is greater than  $10^{-4}$ , you do the math on the bottom of  
11 the page, and  $10^{-4}$  divided by  $2.5 \times 10^{-7}$  means greater  
12 than 400.

13 MEMBER ABDEL-KHALIK: So, you translated  
14 the words comparable and technically consistent to  
15 identical.

16 MR. DUBE: Pretty close to identical.  
17 Yes.

18 MEMBER ABDEL-KHALIK: Is that just to get  
19 them off your back?

20 MR. DUBE: No.

21 MEMBER ABDEL-KHALIK: Or, is that to sort  
22 of logically --

23 MR. DUBE: It's logical, because before  
24 the SRM came, we were toying around with the idea of  
25 having other -- looking at other importance measures,

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1 Fussell-Vesely or risk achievement work. And, we had  
2 like, you know, and/or if the SSC has a Fussell-Vesely  
3 of greater than such and such, or risk achievement  
4 work rate of such and such put in these buckets.

5 The SRM made it convenient to just settle  
6 upon risk achievement work, and it helped settle the  
7 issue.

8 MR. KOZAK: We did a logic test on this,  
9 too. We tried to look at what the systems were when  
10 they ended up into the columns, and did it make sense.  
11 Was there a system that was in the low column that we  
12 think should be in the high column, you know,  
13 logically.

14 And, quite frankly, this passed the smell  
15 test on that, too. It made sense, the outcome made  
16 sense.

17 And, this also allowed us --

18 MEMBER ABDEL-KHALIK: Does that tell you  
19 that the design is so fragile that any change would,  
20 actually, cause -- result in a relatively large RAW  
21 value?

22 MR. DUBE: If it's in a failed state, we  
23 are talking about the entire system in a failed state.

24 MEMBER ABDEL-KHALIK: Right. Is that true,  
25 the smell test that you apply.

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1 MR. KOZAK: What I meant was, you know,  
2 when we got our results with the calculations, we went  
3 back and looked at what are the most, you know, risk  
4 significant systems in the plant, and looking at the  
5 plant -- you know, those systems and their effect when  
6 it's operating, it seemed like everything ended up in  
7 the right column.

8 MR. DUBE: I mean, we made some -- we will  
9 talk about it, we shifted things one column usually to  
10 the right, but we did do some manual adjustments.  
11 We'll talk about that.

12 In fact, like I said, we were -- we had  
13 done some pre-assignment to column before the SRM said  
14 make it consistent, and we almost made no change to  
15 the right-most column. Intermediate changed a little  
16 bit, but they fell in line reasonably well.

17 So, this was the math to assign -- that we  
18 used to back off, back calculate what the risk  
19 achievement worth for a system would be in deciding  
20 which column it would lie in.

21 This is one sample calculation. This is  
22 getting to PRA, you know, you might want to move over  
23 to the other -- the subcommittee in the other room,  
24 but I'll give you an example. These are basic events  
25 in the AP1000 SPAR model. The SPAR model is NRC's own

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1 Standardized Plan Analysis Risk Model, but these are  
2 common cause events.

3 The risk achievement worth is, if you set  
4 that basic event to true, by what factor would the  
5 core damage frequency go up. And, you see there's  
6 some round-off error, but for two basic events in the  
7 core make-up tank you get risk achievement worths of  
8 250-260. You choose the higher number, that means that  
9 system, as a first cut, would be in the intermediate  
10 column.

11 The in-containment refueling water storage  
12 tank, we picked as many basic events as we could find  
13 that would fail the whole system. These are common  
14 cause failures of check valves, of explosive valves,  
15 motor operated valves, and strainers that would fail  
16 the whole system. And, you got pretty consistent risk  
17 achievement worths. You choose the highest number,  
18 and it's clear, this is a clear example of being in  
19 the high column.

20 So, you do this for all the systems, and  
21 as a first cut decide is it the very low, the low, the  
22 medium, or the high.

23 Now, I only showed you two examples here,  
24 but we did this for every system.

25 So then, we did, I'll call it,

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1 verification and adjustments. The staff took its  
2 predetermined assignment of systems to a workshop. We  
3 used the AP1000 SPAR models. Then Westinghouse came  
4 and they had their AP1000 PRA model, as documented in  
5 the design control document. And, we had, I'll call  
6 it an expert panel, because we had staff, NRC staff,  
7 we had Westinghouse representatives, and we had  
8 representatives from NEI, as well as the major COL  
9 applicants for the AP1000, and said, let's go through  
10 this, compare Westinghouse quantitative PRA results  
11 with the SPAR model, see if we can make sense and  
12 agree to what systems would go in what column.

13 That turned out to be the easy part. The  
14 more difficult part was the structures. But, this was  
15 the process that we went through. It's very similar  
16 to an expert panel, and maintenance rule, or 5069 or  
17 any of the other risk informed, which is, it's risk  
18 informed in that you use the PRA quantitative results  
19 as a starting point, recognizing that, you know, you  
20 may need to make some adjustments.

21 We reviewed the design reliability  
22 assurance program list. This is in the design control  
23 document Tier 1, and then we made manual adjustments,  
24 primarily, usually moving from the left-most column to  
25 the right-most, because we started just with internal

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1 events that power PRA. But, there are other concerns,  
2 post 72-hour safety function, examples of these that  
3 we ended up moving from the left-most columns to the  
4 right-most columns, where the ancillary diesel  
5 generators, these provide post 72 hour function. The  
6 ventilation of the nuclear island, which didn't lend  
7 itself very well to quantification of PRA, but we felt  
8 that this was a post 72 hour, so we tended to move  
9 that as much as two columns, but usually one column to  
10 the right.

11 Since we used a PRA that was at power, we  
12 wanted to make sure we captured shut down, significant  
13 shut down equipment, and this would, typically, be for  
14 the AP1000 service water, component cooling water, and  
15 then the normal residual heat removal system. We  
16 wanted to make sure we had the containment function  
17 and subsystems, so large early release frequency/large  
18 release frequency we took that into consideration.

19 And then, other important severe accident  
20 mitigation. For example, in the AP1000 they had the  
21 capability for severe accident mitigation of in-vessel  
22 retention, which is flood up the lower cavity,  
23 surround the lower head of the reactor vessel and cool  
24 it externally. It's an important function for severe  
25 accident mitigation.

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1           The real tough ones were pipings and  
2 structures. I mean, there was a lot more -- it was  
3 less risk-informed aspects of this and more  
4 performance based, or more deterministic, if you will,  
5 but it was concluded by all parties that reactor  
6 coolant piping should be assigned the high category,  
7 because of the risk significance, the fact that, you  
8 know, it's a pressure boundary. It's one of the  
9 barriers to release. It should be assigned high.

10           And then, the structures were assigned  
11 based on the equipment that was within it, and some  
12 degree of judgment. So, the clear case would be if  
13 you had a very important system, and that system was  
14 in a structure, we would assign -- if that system  
15 within that structure was high risk important we'd  
16 assign the structure as well to high risk importance.

17           Or, the other extreme case, you had  
18 turbine building, the system, which was balance of  
19 plant system, to, generally, speaking, low, very low  
20 risk significant. The only thing that that structure  
21 contained was very low important systems, and by  
22 default that would be very low.

23           MEMBER RAY: Don, you guys were talking  
24 about programs earlier. What effect is this going to  
25 have on the scope of a program like an Appendix B

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1 Quality Assurance Program?

2 MR. DUBE: Well --

3 MEMBER RAY: In other words, you know, it  
4 was -- what you are describing now has all the  
5 sophistication of the PRA involved in it. And yet,  
6 the classical Appendix B program has got a very bright  
7 line, applies to some things, doesn't apply to other  
8 things.

9 What is the effect of doing this when it  
10 comes to that bright line?

11 MR. KOZAK: I'll take a shot at that.

12 MR. DUBE: Yes, okay.

13 MR. KOZAK: Are you referring to like  
14 Appendix B being applicable to safety related?

15 MEMBER RAY: Of course.

16 MR. KOZAK: Okay. Since we've introduced  
17 the performance deficiency concept here, which means  
18 that a licensee, you know, a performance deficiency is  
19 failure of a licensee to meet either a requirement or  
20 a commitment, you know, a standard, it allows us to  
21 bring in issues into our --

22 MEMBER RAY: Yes, clearly, I can see that.  
23 But, the question that I'm trying to ask is, when you  
24 are evaluating programs do you expect then that the  
25 programs will include all the things of interest, not

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1 just those that are safety related. You know, I've  
2 been around AP1000 for a while, and people really do  
3 believe that there's a difference between the  
4 emergency diesel generators in AP1000 and those in an  
5 existing plant. And, from a safety standpoint there  
6 certainly is.

7 But, they believe that difference is going  
8 to translate into something tangible when it comes to  
9 building the plant, the scope of the safety-related  
10 complements is less, the procurement of stuff outside  
11 that scope is easier, and so on and so forth.

12 But, it's not clear to me that from a  
13 programmatic standpoint it isn't going to be,  
14 necessarily, the case that you have the same gradation  
15 in programmatic application to reflect the safety  
16 significance of things outside the safety realm.

17 I mean, we had Westinghouse sit right here  
18 and tell us, no, no, that's not safety related. Okay?

19 They are right.

20 But, what difference does it make in the  
21 world that you are describing?

22 MR. DUBE: Well, I'll show an example.

23 It is possible for a non-safety system to  
24 be in an intermediate column.

25 MEMBER RAY: Of course, we all know that.

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1 I'm just asking, still the question, what effect does  
2 having this systematic oversight have on the programs  
3 that the licensee is required to implement.

4 It seems to me, I'll tell you the answer,  
5 it seems to me now that you are about to give it, that  
6 you'd better have something that allows you to assure  
7 that the commitments you've met, safety related or  
8 not, are still met, right?

9 MR. DUBE: Yes.

10 MEMBER RAY: All right. Now, do you think  
11 the other side, I'll call it, not meaning to be  
12 pejorative, understands that?

13 MR. KOZAK: Yes, I do. You know, they  
14 were --

15 MEMBER RAY: What do they think about it.

16 MR. KOZAK: The other side being?

17 MEMBER RAY: The licensee, the  
18 manufacturers, constructors and so on, because they  
19 certainly have taken a lot of pains to try and avoid  
20 imposing programmatic quality requirements outside the  
21 much narrower scope that's now considered safety  
22 related.

23 MR. DUBE: Well, I think, you know, one of  
24 the answers to that question has to do with, you know,  
25 the ITAAC. ITAAC applied both safety related and non-

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1 safety related they have to meet the acceptance  
2 criteria for all of them, whether they are or not.

3 And so, even if they are inclined to not  
4 apply as much of their quality assurance, quality  
5 control, to the non-safety related part of the plant  
6 they still have to meet the acceptance criteria. And  
7 so, they are going to have to bring that in.

8 MEMBER RAY: Yes, but Appendix B is part  
9 of the regulations. It's not optional whether you  
10 have an Appendix B program, right?

11 MR. KOZAK: Yes.

12 MEMBER RAY: You must have it. And, as  
13 far as I know the regulations haven't been changed to  
14 say, well, it can exist in gradations that attract  
15 this more sophisticated way of looking at the  
16 construction of a plant, procurement and all the other  
17 things that go into that.

18 And, it seems to me like there's a  
19 disconnect between the regulatory requirement, as it  
20 still exists, which is the same when Jack and I built  
21 plants in the past. I was a QA manager for some time,  
22 so I have a very clear vision of what Appendix B does  
23 and doesn't apply to.

24 And, what is going to be called for here,  
25 and I'm looking at this not so much, are they aware of

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1 this, but do we all understand what it means given  
2 that we haven't bothered to change the programmatic  
3 requirements of the regulation when it comes to  
4 quality.

5 MR. KOZAK: You know, it's hard for me to  
6 speak on behalf of -- you know, I'm not going to speak  
7 on behalf of the licensees, but they were, you know,  
8 full participants in developing this process. They  
9 understand that, you know, the ITAAC requirements,  
10 they have to meet them whether or not they are safety  
11 related, whether or not Appendix B applies to them.

12 And, we are trying to determine the  
13 significance of a finding that we have, and if it  
14 happens to be a non-safety related, you know,  
15 component --

16 MEMBER RAY: But, are you still going to  
17 only, from a programmatic standpoint, I mean, what I'm  
18 trying to figure out is, you are going to assign a  
19 white finding, let's say, to something that isn't  
20 covered by Appendix B, because they didn't have some  
21 other program that effectively assured that the  
22 requirements were all met. And, it just seems to me  
23 like there's some kind of a disconnect here, because  
24 it was very easy to say you've got 18 criteria in  
25 Appendix B, and you didn't meet No. 17. God knows

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1 what we are going to say now.

2 MR. DUBE: There has to be a performance  
3 deficiency.

4 MEMBER RAY: Understood, but I'm talking  
5 about just the programmatic aspect of what you are  
6 saying. Yes, you can go and say, you said you were  
7 going to do something, it doesn't matter whether it's  
8 safety related or not, you didn't do it, and so it's a  
9 deficiency. Here's your finding.

10 But, I'm just trying to look at this from  
11 the standpoint of the programmatic requirements that  
12 we do apply, and I don't see how you can say somebody  
13 didn't have an adequate program to assure things were  
14 met outside of the scope of the safety related, the  
15 narrower safety related scope.

16 And, I don't know, it's just something  
17 that, you know, I make an observation here that the  
18 industry may think it's fine, or they don't know what  
19 to make out of it, or they are not about to build a  
20 plant so they don't care. I don't know.

21 But, you know, I go down to Vogtle, and  
22 you go down there, and at some point you say to the QA  
23 manager, what's your responsibility here. I did that,  
24 and their responsibility is the trunk and scope, and I  
25 guess they just sort of hope that all the other

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1 requirements are going to get met.

2 I'll leave it at that. It just bothers me  
3 that we are, in effect, calling for some graded QA  
4 program, and that's not the first time you ever heard  
5 that word used. We talk that way lots, but we don't  
6 have any requirements that define it, other than the  
7 results, you know. We are going to have performance-  
8 based compliance. I guess.

9 I'm done. Thank you.

10 MR. DUBE: Well, you're right. I mean, it  
11 is a paradigm shift, because if the Commission in an  
12 SRM said develop a non-risk informed, non-performance  
13 based approach, we would have just continued what we  
14 are doing on Watts Bar 2, and, perhaps, Bellefonte and  
15 Browns Ferry 1.

16 But, with the SRM emphasizing risk  
17 informed, performance based, this is one end of the  
18 double edge sword, which is, some safety significant  
19 -- some safety systems that have low risk importance  
20 may end up being column two, and you'll see a couple  
21 examples where DC batteries, though they are non-  
22 safety for an AP1000, are very important, and they end  
23 up in column three, intermediate.

24 MEMBER RAY: Yes, I don't have any problem  
25 with any of that. You understand my point.

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1 MR. DUBE: Yes.

2 MEMBER RAY: My point is, you've got  
3 Appendix B, and it just says safety related, and what  
4 else do you have? All you have is what you didn't  
5 succeed. So, something is wrong.

6 MR. DUBE: Shall we move on to the next?

7 CHAIR SIEBER: Well, let me ask a question  
8 about this slide. This slide, overall, describes a  
9 collaborative effort between the staff, the NSSS  
10 supplier, the licensee, industry groups, in order to  
11 develop, basically, this structure.

12 Is that unique to this prototype program?

13 MR. DUBE: No. The RO, reactor oversight  
14 process itself was -- had a high degree of input from  
15 stakeholders, yes.

16 CHAIR SIEBER: Who has the final decision  
17 and what's it based on.

18 MR. DUBE: Well, we do. The staff  
19 developed this. We have developed this. We listened  
20 to and considered input from our stakeholders.

21 CHAIR SIEBER: Okay.

22 MR. DUBE: And, got a lot of it, and it  
23 was helpful. But, ultimately, we didn't agree on  
24 everything.

25 CHAIR SIEBER: Okay.

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1 MR. DUBE: And, we -- when we didn't, we  
2 explained what our position was, and sometimes had to  
3 agree to disagree. But, it was, ultimately, our  
4 program and we developed it.

5 CHAIR SIEBER: And, you used their PRA,  
6 which the staff had gone through and decided that it  
7 correctly represented the safety consequences for that  
8 plant.

9 MR. DUBE: Well, we used the AP1000 SPAR  
10 model, so we started with the staff's own PRA.

11 CHAIR SIEBER: So, you started with your  
12 own.

13 MR. DUBE: Yes, and then we --

14 CHAIR SIEBER: Was that adequate for all  
15 the detail that is needed for construction inspection?

16 MR. DUBE: It's only good for those  
17 systems modeled in the PRA, and that's why I said we  
18 had to do some judgment.

19 CHAIR SIEBER: That's part of my question.

20 MR. DUBE: Yes. We had to do judgment,  
21 especially on the structures. But, I think, I mean, I  
22 explained the process.

23 CHAIR SIEBER: Right, okay.

24 MR. DUBE: For assigning structures.

25 MEMBER ABDEL-KHALIK: Now much of --

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1 nearly all of what you've talked about pertains to the  
2 AP1000. When you try to apply this to other designs,  
3 including SMRs, is it just a simple scaling based on  
4 the --

5 MR. DUBE: It will work. It should work.

6 Now, the threshold on a risk achievement worth may  
7 shift.

8 MEMBER ABDEL-KHALIK: Based on the  
9 baseline CDF.

10 MR. DUBE: Yes, they may shift.

11 MEMBER ABDEL-KHALIK: It's just a simple  
12 scaling.

13 MR. DUBE: Well, I don't know if it's  
14 simple, but it -- you could, on some plants, have more  
15 things in the intermediate and high column, because  
16 the risk achievement -- because of -- go through the  
17 mathematics of what's the baseline core damage  
18 frequency, and what's the impact of a component. A  
19 diesel generator at a plant with active safeguards,  
20 like advanced pressurized water reactor, EPR, is a  
21 heck of a lot more important than in a passive plant  
22 that has no reliance whatsoever on large diesel  
23 generators for mode of power, because you don't have  
24 big problems. You don't have typically motor-operated  
25 valves.

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1           But, on the other hand, DC power is very  
2 important.

3           MEMBER ABDEL-KHALIK: Well, I'm concerned  
4 about the opposite extreme, where your core damage  
5 frequency, the baseline core damage frequency, might  
6 be  $1 \times 10^{-8}$ . Would you still be happy with a RAW of  
7 1,000?

8           MR. DUBE: You'll find that there's still  
9 a number of systems, even on that kind of a plant,  
10 where it's going to fall in the high range, high and  
11 important, but we didn't go through it yet. There  
12 could be some shifting, I acknowledge that.

13           But, for the AP1000, the next high made  
14 sense to us, because we had, before we even chose the  
15 boundaries we had this thought, why wouldn't it make  
16 sense for the distribution of high, intermediate, low  
17 and very low, we didn't call it that back then.

18           CHAIR SIEBER: Okay. Maybe we can go to  
19 the next slide.

20           MR. DUBE: Next slide.

21           So, this is the follow. Let me start on  
22 the easy one. Upper right high systems. Again, going  
23 back, these are systems with a risk achievement worth,  
24 parental and -- powers greater than 400, yet the  
25 protection and safety monitoring system. This was

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1 high in the AP1000 SPAR model, and Westinghouse's own  
2 model, both confirmed this.

3 You had the IDS, which is the DC -- the  
4 Class 1E DC power system, and again, in an AP1000 DC  
5 power is extremely important, because it actuates lots  
6 of things.

7 Again, the Westinghouse model and SPAR  
8 model had this. You had the refueling water storage  
9 tank. PXS is the big passive heat removal system.  
10 IRWST is a subset. Both classified them as high.

11 We said we put the reactor coolant system  
12 piping in here for high, and said that was a judgment  
13 call, but because of the importance.

14 The containment sump recirculation, again,  
15 both the SPAR model and Westinghouse model had it in  
16 the high.

17 So, we had unanimous -- unanimous --  
18 complete consensus on what went in the high.

19 The systems part was easy, so I'll  
20 continue on the system and then we'll get to the  
21 structures.

22 In the intermediate, we had the core make-  
23 up tank portion of the PXS, the passive heat removal.

24 The passage residual heat removal system, the PLS,  
25 which is the non-safety control, the EDS, which is the

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1 non Class 1 EDC power. Again, DC power is important  
2 because this also provides back up to the safety  
3 related or Class 1 EDC power. And, here we went with  
4 the higher category, so we shifted some, in some case,  
5 from the low to the intermediate.

6 On the low, we have the accumulator  
7 portion of the passive heat removal system, the  
8 diverse actuation system, that's the DAS. ECS is AC  
9 power, and again, in a passive plant like AP1000 or  
10 ESPWR they do not have large safety-related diesel  
11 generators necessary to power large pumps and large  
12 load, because it's passive in nature and they rely  
13 more importantly on DC power. So, it kind of passed  
14 the smell test.

15 The containment isolation function, here  
16 we used large release frequency, and we show the delta  
17 CDF here, we used delta LERF differed by an order of  
18 magnitude. So, were consistent. So, instead of delta  
19 CDF in assigning, we used delta LERF.

20 We have the passive containment cooling  
21 system, that's PCS, RNS is the normal residual heat  
22 removal system. Component cooling water is CCS,  
23 service water. VLS is the hydrogen igniters. IVR is  
24 in vessel retention, and the VBS is the post 72 hour  
25 fans. Some of these quantitatively in the PRA were in

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1 the very low column, but because we didn't have a  
2 shutdown PRA we moved them over in to the low column.

3 MEMBER ARMIJO: Where are the reactor  
4 coolant pumps? Are they part of the RCS, in the high?

5 MR. DUBE: Yes, reactor coolant system  
6 Barry integrity, yes. The answer is yes.

7 CHAIR SIEBER: But, the pumping --

8 MR. DUBE: What's left is --

9 CHAIR SIEBER: -- the pumping function is  
10 not. It's the boundary.

11 MR. DUBE: The boundary would be.

12 MEMBER ARMIJO: The boundary, but the pump  
13 itself?

14 MR. DUBE: I would say that that's  
15 probably very low.

16 MEMBER ARMIJO: It doesn't feel good to  
17 me, but go ahead.

18 CHAIR SIEBER: The plant is safe, it just  
19 doesn't produce anything.

20 MR. DUBE: So, everything else would be  
21 very low. That's start-up heat water system, well,  
22 whatever is left. It's a whole slew of systems.

23 The difficult one, more difficult aspect,  
24 was structures, and here we had to use judgment. Our  
25 first cut was the intermediate and high were seismic

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1 category one structures. The low were seismic  
2 category two structures, and the very low were non-  
3 seismic structures that met -- basically, meet  
4 universal building code, if you will.

5 But, we wanted to further refine category  
6 one structures. We went to -- we decided to put in  
7 the high category, in the design control document,  
8 Tier 1, Section 3.3 there's a whole table there of a  
9 very specific list of SSCs, mainly structures or sub-  
10 structures, with structural integrity required to  
11 ensure functionality of systems. And, those are  
12 spelled out in Tier 1, so there's no questions asked.

13 Those are in the high category.

14 In the intermediate category would be the  
15 rest of containment not in the high category, if you  
16 will. The shield building, the auxiliary building,  
17 the nuclear island, basemat, and 1E cable raceways.

18 The low category would be the Cat 2  
19 buildings and the annex buildings is really the only  
20 example. This does -- this, among other things,  
21 contains the ancillary diesel generators, which are,  
22 typically, post 72 hours.

23 And then, all other structures are in the  
24 very low.

25 So again, there's some judgment call here.

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1 We can argue one column or the next, but I think we  
2 tried to use a systematic approach in the assignment  
3 of structures to the columns.

4 MR. KOZAK: And, the idea here was to pre-  
5 solve these things ahead of time. We used that expert  
6 panel, so that the inspectors and licensees aren't,  
7 you know, having to debate over where things belong.  
8 It's clear cut.

9 As part of the pilot, we are going to  
10 evaluate the assignment of structures and systems to  
11 the various columns. Depending on what comes up,  
12 there may not be a lot that comes up in the first  
13 year, but we'll do what we can.

14 We wanted to eliminate a lot of the time  
15 that's taken, for instance, in the ROP to do  
16 significance evaluations when you are debating the  
17 risk numbers and that sort of thing. So, it's all  
18 pre-solved. It is what it is. We'll take feedback  
19 after, you know, we come up with issues. And, if we  
20 determine, you know, we would probably have another  
21 expert panel, if we needed to move things one way or  
22 another, but this is our -- we think we have -- at  
23 least we have a sound foundation going in. We have  
24 logic on how we got here, and we tried to make it as  
25 simple for the inspectors that use the SDP, so that it

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1 could be clear cut and we don't have a lot of debate,  
2 and we can move quickly on these issues, as, you know,  
3 construction moves quickly, like you mentioned  
4 earlier. We want to get these things out as fast as  
5 possible with as little debate, and try to bound them.

6 So, that's kind of what our philosophy  
7 going in was, and why we did it this way.

8 The next slide, slide 15, I've already  
9 pretty much gone over this earlier. It just -- this  
10 is a flow chart that we provide to the inspectors that  
11 they can follow for the technical finding SDP. WE've  
12 already -- we have some pre-screening criteria, where  
13 you don't even have to look at the design function.  
14 Those are all listed on slide 16. Those would screen  
15 to green, and then you ask is it a system in the risk  
16 importance table, or a structure in the risk  
17 importance table, and then you assign to rows one, two  
18 or three, and escalate one row if you have a  
19 repetitive significant condition adverse to quality.

20 And, slide 16, as I mentioned, is our Step  
21 9, it's just a step in our SDP that has screening  
22 criteria of what would go to green. That makes it a  
23 little bit easier for the inspectors, so they don't  
24 have to go and determine if the design function is  
25 affected if the finding is going to be green anyway.

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1 I won't go through all of those.

2 This is our last slide. As we, you know,  
3 we tried to portray that the approach is technically  
4 consistent with the ROP. We've already talked about  
5 reactor designs with a lower CDF, would have fewer  
6 structures in the right columns, and with the higher  
7 CDF may have more. But, we will go through the same  
8 process we did for the AP1000 for future designs, and  
9 not only use the numbers, but also use other  
10 information like Don went over to try and get the  
11 right mix of where the most important systems are.  
12 And, if nothing ends up in the furthest right column,  
13 then nothing ends up there.

14 MR. DUBE: Well, reactor coolant system  
15 will probably always be there.

16 MR. KOZAK: You are right, and we did  
17 that, but anything else we may not have anything else  
18 there. If we have a really -- you know, maybe the  
19 small modular reactors, I don't know what their PRAs  
20 are going to look like, but it may dictate that only  
21 the reactor coolant system is in the right-most column  
22 on this.

23 One thing we didn't mention earlier is, we  
24 reviewed numerous old findings of violations from the  
25 first round of construction, and applied it to this,

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1 and seemed to get the right results. We don't -- we  
2 know we haven't probably covered everything. We tried  
3 to think of as many things as we could, but we are  
4 going to identify some holes.

5 This is a living process, we may need to  
6 adjust it as we go, but we used -- we also used Watts  
7 Bar findings. We used Browns Ferry findings. And, we  
8 applied it to this, and it seemed to get the right  
9 regulatory outcome.

10 So, we are confident that we have a pretty  
11 robust system going in, but we, you know, will be  
12 analyzing it as we go. As we get input, we are going  
13 to make sure we are getting the right outcome, we are  
14 getting the right inspections. We want to make sure  
15 that the plant is being constructed in accordance with  
16 its design, and we think the more risk significant  
17 systems should warrant more attention from us. And,  
18 if they are not getting those right, what are they  
19 doing on the other systems? That's kind of the  
20 philosophy we've used.

21 CHAIR SIEBER: As I understand it, a plant  
22 like the AP1000 consists of not as much field  
23 construction as there used be, where everything was  
24 put together out in the field, but you have modules  
25 being shipped to the plant.

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1 MR. KOZAK: right.

2 CHAIR SIEBER: Now, the licensee doesn't  
3 take possession of that until it's shipped to the  
4 plant, right? And so, does your vendor inspection  
5 process have to go to the module constructor and apply  
6 all these principles to the module itself, depending  
7 on its risk significance? And, can you tell me how  
8 that process works?

9 MR. KOZAK: For that process, the vendor  
10 inspectors are using traditional enforcement. We  
11 don't have our assessment program applied to vendors.

12 So, if there is a vendor finding at the  
13 modular, you know, facility, we would handle that  
14 using traditional enforcement.

15 However, for Appendix B licensees are  
16 required to provide oversight of those activities.  
17 And, if the vendor is working on, you know, a module  
18 that can be tied directly to a licensee, we would  
19 consider that type of a finding associated with that  
20 part of the licensee's oversight function per Appendix  
21 B, and could apply this process to that finding, even  
22 if it's not on site.

23 So, it's kind of a judgment.

24 CHAIR SIEBER: It could go either way,  
25 though.

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1 MR. KOZAK: Right, it could.

2 CHAIR SIEBER: Particularly, if they were  
3 building lots of AP1000s.

4 MR. KOZAK: If they are building lots of  
5 those modules --

6 CHAIR SIEBER: You would not be able to  
7 tell which box goes to which licensee.

8 MR. KOZAK: -- right, if you can't tell,  
9 if you can't tie it to a licensee in all likelihood it  
10 will go to a vendor. And, we've had a lot of internal  
11 discussions about how we are going to handle this.  
12 And, I think it's going to be more of a we are  
13 learning as we go.

14 CHAIR SIEBER: Yes, but the licensee has  
15 got a problem, too, because he doesn't know which box  
16 is going to be his. And so, what he gets is the box  
17 and a pile of paper, okay, and you can rifle through  
18 all the paper and, frankly, you can say everything was  
19 signed off just perfect, you know. I really don't  
20 know whether that box is perfect or not.

21 So, is there a requirement then to go  
22 through and reinspect all kinds of stuff that's inside  
23 the module? And, if not, are we all relying on this  
24 paperwork from the Vendor Inspection Branch for a  
25 feeling of security that this module will perform its

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1 function as expected?

2 MR. KOZAK: Well, the Vendor Inspection  
3 Branch is, you know, it comes under NRO. CCI, the  
4 Center for Construction Inspection Region 2, are  
5 working very closely when it comes to the vendor  
6 inspection, say, at Shaw Modular Solutions. And, any  
7 findings that the vendors have will be communicated to  
8 CCI, and also the Region 2 inspectors can, and will  
9 be, accompanying vendors on what have traditionally  
10 been vendor inspections.

11 So, we have a really integrated inspection  
12 approach for the modular construction. But, it is a  
13 challenge to us, you know, to make sure that we  
14 communicate those types of findings, you know, to one  
15 another.

16 CHAIR SIEBER: Okay.

17 MS. DUDES: I was only going to add, I  
18 mean, to the extent -- sorry, this is Laura Dudes,  
19 Director of Division of Construction Inspection and  
20 Operation Programs. We have -- it is challenging, as  
21 you said, but in particular with modular construction,  
22 the geography, I think too often geography of these  
23 locations comes into play where it really shouldn't.

24 The licensee has a license, and so there  
25 are inspections that are done against that licensing

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1 basis. So, CCI could very well be at a modular  
2 facility, and executing this exact program in a  
3 different location, if they are inspecting something  
4 that's directly related to their licensing basis.

5 Now, you raised an issue that makes it a  
6 little more complicated. At a facility like Shaw  
7 Modular Solutions, they do know, and they have  
8 identified which, you know, components are there. So,  
9 that could be a direct inspection of the licensee in  
10 the paper trail. But, when there are broader  
11 components or things where the components, system  
12 structures or components could be constructed for a  
13 variety of the licensees, in that case we call those  
14 generic type vendor inspections, and that's where we  
15 do send our vendor team in. They don't use this  
16 program, but those findings will be fed in and that  
17 information will be captured.

18 It may not -- but, I think, I just want to  
19 be clear that regardless -- there are locations where  
20 our regional inspectors can do an entrance, and it's  
21 really with the licensee, regardless of where they  
22 are, if they know that they are inspecting direct  
23 components that are in the license.

24 I don't know if that helps or confuses  
25 things.

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1 CHAIR SIEBER: That reminds me of the old  
2 days when you would go to some pump manufacturer. You  
3 would do an inspection at that plant, but you didn't  
4 know which pump was going to which licensee. And, you  
5 relied a lot on the receipt inspection, but half of  
6 the receipt inspection was, actually, just going  
7 through all the paper to make sure you got the right  
8 paper, it's signed off, dated, stamped and that kind  
9 of stuff.

10 So, I was hoping, and I think at this  
11 stage in the process you are probably in pretty good  
12 shape, and I was hoping that we could overcome some of  
13 the fuzziness of the past back in the days when you  
14 were building 20 or 30 plants at one time.

15 MR. KOZAK: Yes, right.

16 CHAIR SIEBER: I have another question.  
17 In my construction experience, one of the things that  
18 I thought personally was very important, which you put  
19 at low safety significance, or relatively low  
20 relatively low safety significance, was the ground  
21 fill on which you build the plant, how you excavate,  
22 and what kind of foundation you put under it, because  
23 that determines what the seismic response is, and to a  
24 great extent how much settlement you get, how much  
25 misalignment inside the plant.

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1           And so, I wonder a little bit about  
2 classifying that as low safety significance.

3           MR. KOZAK: I don't think that's the case  
4 here. Intermediate, the nuclear island basemat was  
5 intermediate significance, and we'd have to -- a  
6 nuclear island basemat is, you know, intermediate.

7           CHAIR SIEBER: Yes, is that good enough?  
8 Yes, I guess that's a judgment call, but to me it was  
9 important, particularly, some of the sites aren't the  
10 world's greatest about remediation.

11           Okay. Does this conclude your --

12           MR. KOZAK:           This concludes our  
13 presentation.

14           CHAIR SIEBER: -- presentation?

15           I'd like to ask the members if they have  
16 any additional questions or comments that they would  
17 like to make.

18           Joy?

19           MEMBER REMPE: You said you've implemented  
20 at Vogtle. What kind of findings, have you had any  
21 green findings, any white, any findings at all yet?  
22 How is it going?

23           MR. KOZAK: Well, unfortunately, you know,  
24 the COL just recently got issued. We implemented this  
25 January 1st. We haven't run any findings through VSBP

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1 yet. We haven't had any inspection reports come out.

2 So, we are still pretty early in the process. So, we  
3 don't really have any experience yet, but we can't  
4 wait until we do.

5 CHAIR SIEBER: I'm sure they can't wait  
6 either.

7 MR. KOZAK: Yes, they can't either.

8 MR. DUBE: Do you want to bring up the  
9 Watts Barr?

10 MEMBER REMPE: I want to hear.

11 MR. DUBE: No, CJ, are you on the phone?  
12 I can only say in very broad terms, and I believe it  
13 was Watts Bar 2, there was an issue and a question,  
14 and they didn't know how to go about it. They used a  
15 process similar to this to make sense of whether the  
16 issue was of great significance or not.

17 I mean, I just can't get too much more  
18 specific than that.

19 MR. KOZAK: Yes, I don't know if there's a  
20 file or not, I think there were some receipt  
21 inspection issues at Watts Bar, and the feedback we  
22 received from the staff is, they were using  
23 traditional enforcement to determine the significance.  
24 That's what we are using at Watts Bar, as you know.

25 And, the guidance and the enforcement

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1 policy resulted in the staff having to do a lot of  
2 internal deliberations on whether or not it was severe  
3 level 4 or 3. And, the feedback they provided us was,  
4 that if this was in place at Watts Bar it would have  
5 been clear what the color was, based on, you know, on  
6 the guidance that we have.

7 So, it was very positive feedback we  
8 received, because, you know, these types of new  
9 programs, when you roll them out to inspectors, aren't  
10 always received with open arms. And, we got some, you  
11 know, what I consider very positive feedback.

12 I don't know how that issue ended up.  
13 We'll certainly run it through our process after it's  
14 final, but to directly answer your question, we  
15 haven't -- we haven't had any findings yet.

16 CHAIR SIEBER: Any other questions from  
17 members?

18 Sam? Said?

19 Well, I guess in conclusion, I want to  
20 thank you for your presentation. I also, having been  
21 involved in this structure for many years, I think  
22 your process is pretty well founded.

23 I think that I like the structure of the  
24 program. I think we have to wait until the prototype  
25 is complete before we can make a final decision as to

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1 whether it's effective or not, but I think the  
2 groundwork has been laid, and I think you have done a  
3 lot of work, and I think it's been good work.

4 So, I congratulate you for that, and I  
5 also thank you for informing us of where you are and  
6 the progress you are making, and I look forward to  
7 hearing from you at the end of the prototype.

8 So, thank you very much.

9 MR. SHUKLA: And, public comments?

10 CHAIR SIEBER: No public comment? Okay.

11 With that, the meeting is adjourned.

12 (Whereupon, the above-entitled matter was  
13 concluded at 2:56 p.m.)  
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# **Construction Reactor Oversight Process**

## **A Risk-Informed and Performance-Based Approach to Construction Oversight**

Donald A. Dube, Division of Safety Systems & Risk  
Assessment, Office of New Reactors

Thomas J. Kozak, Division of Construction Inspection  
and Operational Programs, Office of New Reactors



## **Meeting Purpose**

Provide the ACRS an introduction to new construction assessment and enforcement programs, including the construction significance determination process

# Background

- In SECY-10-0140, the staff recommended the development of a construction assessment program that includes a regulatory framework, the use of a construction significance determination process (SDP) and the use of a construction action matrix (CAM) to determine the appropriate U.S. Nuclear Regulatory Commission (NRC) response to degrading licensee performance.
- The new construction assessment program includes:
  - Regulatory Framework
  - Construction Significance Determination Process (SDP), and
  - Construction Action Matrix
  - Pilot new program for 1 year

# Background

- Commission SRM SECY-10-0140 approved the staff's recommendation
- The Commission directed the staff to provide the pilot results to the ACRS for review.
- The Commission directed the staff to ensure that the cROP is also applicable to construction oversight of plants that are under the 10 CFR Part 50 process, including applicability to potential small modular reactor activities.
- Due to the stage of Watts Bar Unit 2 construction, the new process is not applicable to this site.

# Background

- The Commission directed the staff to appropriately characterize and publicly communicate the potential risk significance of a construction finding
- The Commission directed the staff to assess risk using risk importance measures with selected thresholds that are comparable and technically consistent with risk threshold levels used in the ROP

# Pilot Plans

- Issued pilot guidance document including evaluation and acceptance criteria
- Issued pilot versions of IMCs
  - IMC 0613P
  - IMC 2505P
  - IMC 2519P (Construction SDP)
- Trained staff in October and November
- Issued Enforcement Guidance Memorandum 11-06
- Implemented pilot at Vogtle on January 1, 2012; Implement pilot at Summer when significant construction activities begin

# SRM on SECY-10-0140

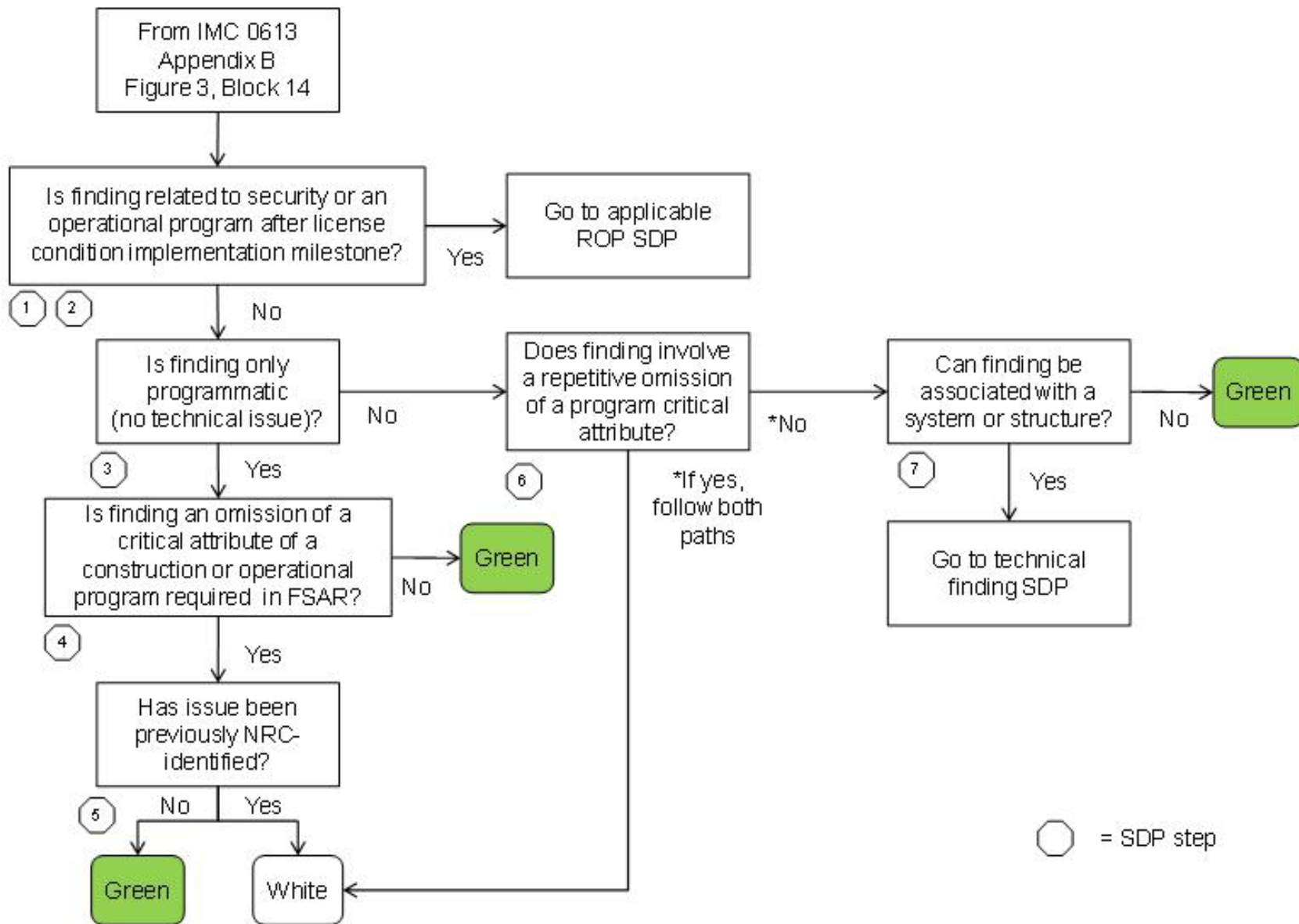
“For the SDP in the cROP, the staff should assess risk using risk importance measures with selected thresholds that are comparable and technically consistent with risk threshold levels used in the ROP.”

|  |
|--|
| <b><math>\Delta\text{CDF} &gt; 1 \text{ E-}4</math></b>                    |
| <b><math>1 \text{ E-}5 &lt; \Delta\text{CDF} \leq 1 \text{ E-}4</math></b> |
| <b><math>1\text{E-}6 &lt; \Delta\text{CDF} \leq 1 \text{ E-}5</math></b>   |
| <b><math>\Delta\text{CDF} \leq 1 \text{ E-}6</math></b>                    |

# Construction SDP

- The staff developed a deterministic construction SDP to evaluate findings associated with licensees' construction and operational programs
- The staff developed a risk-informed construction SDP to evaluate all other findings identified during construction

## Construction Programmatic SDP





**AP 1000 Construction SDP Matrix**  
**Assumption: AP1000 internal events baseline CDF ~ 2.5 E-7/yr**

|                                |              |   |                                |                                       |                              |
|--------------------------------|--------------|---|--------------------------------|---------------------------------------|------------------------------|
| <b>Quality of Construction</b> | <b>Row 4</b> | <b>ΔCDF<br/>&lt; 1 E-6</b>              | <b>ΔCDF<br/>1 E-6 to 1 E-5</b> | <b>ΔCDF<br/>1 E-5 to 1 E-4</b>        | <b>ΔCDF<br/>&gt; 1 E-4</b>   |
|                                | <b>Row 3</b> |   |                                |                                       |                              |
|                                | <b>Row 2</b> |   |                                |                                       |                              |
|                                | <b>Row 1</b> |   |                                |                                       |                              |
|                                |              | <b>Very low<br/>RAW &lt; 4</b>          | <b>Low<br/>RAW 4 to 40</b>     | <b>Intermediate<br/>RAW 40 to 400</b> | <b>High<br/>RAW &gt; 400</b> |
|                                |              | <b>System/Structure Risk Importance</b> |                                |                                       |                              |

# Determination of Risk Importance Thresholds

Recognizing that the ROP  $\Delta$ CDF thresholds represent calculated risk levels at power, for a given new reactor design with an internal events CDF, equate the range from the ROP to system level risk achievements worth (RAW) for the sole purpose of categorizing the risk importance of each system, e.g.:

CDF (IE)  $\sim 2.5E-7$ /yr

“Red” threshold  $\Delta$ CDF  $> 1E-4$  /yr

System RAW for rightmost column  $> 1E-4/2.5E-7$   
 $> 400$

# Example Determination of System Risk Importance (X-axis)

| Pilot Effort - Risk Matrix Column Assignment                 |                     |                      |                           |                              |
|--|---------------------|----------------------|---------------------------|------------------------------|
| AP1000 SPAR Model, Revision 302, February 2010               |                     |                      |                           |                              |
| System   | Basic Event Name    | RAW<br>(same as RIR) | System or Function<br>RAW | Risk<br>Importance<br>Column |
| Core Makeup<br>Tanks (CMT)                                   | CMT-CKV-CF-16AB17AB | 265                  | 265                       | Intermediate                 |
|  | CMT-TNK-CF-02AB     | 254                  |                           |                              |
| In-Containment<br>Refueling Water<br>Storage Tank<br>(IRWST) | IRW-CKV-CF-122124   | 1351                 | 1442                      | High                         |
|  | IRW-EPV-CF-ALLHP    | 1442                 |                           |                              |
|  | IRW-MOV-CF-V121AB   | 1413                 |                           |                              |
|  | IRW-STR-CF-AB       | 1420                 |                           |                              |

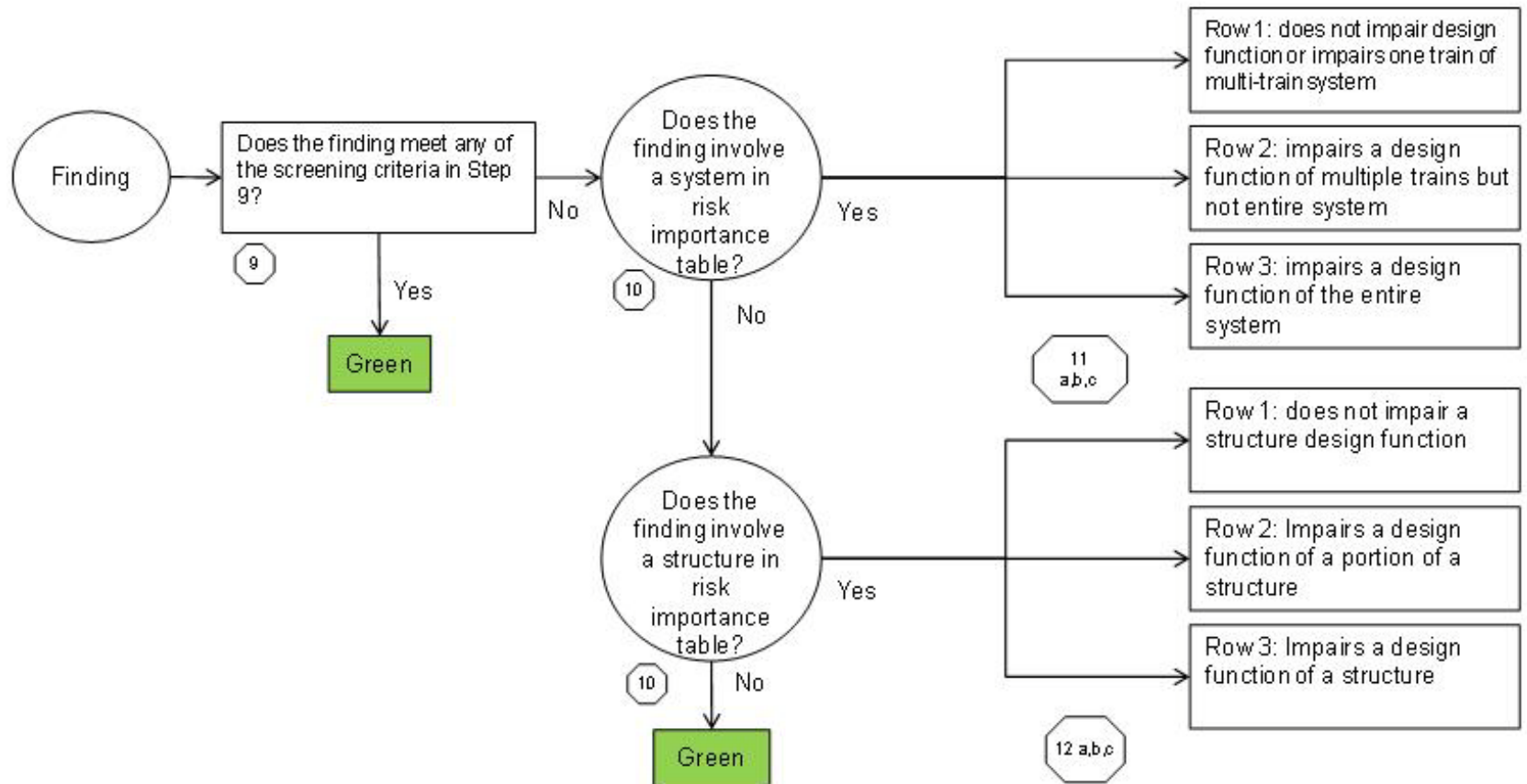
# Verification and Adjustments

- **Expert panel including Westinghouse PRA staff**
- **Review of D-RAP list (DCD Tier 1 Table 17.4-1)**
- **Manual adjustments**
  - **Post-72 hour safety function**
  - **Safety significant shutdown operations**
  - **LERF/LRF**
  - **Importance for severe accident mitigation**
- **Piping / structures**
  - **RCS piping assigned HIGH**
  - **Structures assigned based on equipment within and judgment**

# System/Structure Assignment for AP1000 Pilot

| SYSTEMS  |                 |                        |   |
|--|-----------------|------------------------|---|
| VERY LOW   | LOW             | INTERMEDIATE           | HIGH  |
| ALL OTHER SYSTEMS:<br><br>SFS, SGS, ETC...   | PXS (ACC)       | PXS (CMT)              | PMS   |
|  | DAS             | PXS (PRHR)             | IDS   |
|  | ECS             | PLS                    | PXS (IRWST)   |
|  | CNS (ISOLATION) | EDS                    | RCS   |
|  | PCS             |                        | PXS (Containment sump recirculation)  |
|  | RNS             |                        |   |
|  | CCS             |                        |   |
|  | SWS             |                        |   |
|  | VLS             |                        |   |
|  | PXS (IVR)       |                        |   |
|  | VBS (FANS)      |                        |   |
| STRUCTURES   |                 |                        |   |
| VERY LOW   | LOW             | INTERMEDIATE           | HIGH  |
| ALL OTHER STRUCTURES:<br><br>Turbine Building, EDG Building, Rad Waste Building, Yard, Site Grade, Non 1E Cable Raceways | ANNEX BUILDING  | CONTAINMENT            | STRUCTURAL SECTIONS LISTED IN AP1000 TIER 1, SECTION 3.3, TABLE 3.3-7 OR WHOSE STRUCTURAL INTEGRITY IS REQUIRED TO ENSURE FUNCTIONALITY OF SYSTEMS IN THE HIGH COLUMN |
|  |                 | SHIELD BUILDING        |   |
|  |                 | AUXILIARY BUILDING     |   |
|  |                 | NUCLEAR ISLAND BASEMAT |   |
|  |                 | 1E CABLE RACEWAYS      |   |

## Construction Technical Finding SDP Matrix Quality of Construction Y – Axis Flow Diagram



○ = SDP step

Finding will be escalated 1 row if a repetitive significant condition adverse to quality (SCAQ) is identified

# Construction SDP Step 9 Screening

- If the finding is associated with a system or structure in the very low risk column of the risk importance (RI) table, its risk significance is GREEN.
- If the finding is associated with a system or structure in the low risk column of the RI table and is not a repetitive significant condition adverse to quality (SCAQ), its risk significance is GREEN.
- If the finding is associated with receipt and storage, its risk significance is GREEN.
- If the issue associated with the finding has been dispositioned as use-as-is or it appears that this determination can be made without a detailed analysis, the significance of the finding is GREEN.
- If the licensee demonstrates with reasonable assurance that the design function of the applicable structure or system would not be impaired by the deficiency, the significance of the finding is GREEN.

# Summary

- Approach is technically consistent with current ROP
- Reactor designs with lower CDF will tend to have fewer systems/structures in the rightmost columns, while designs with higher CDFs may have more systems/ structures to the right
- Pilot has been implemented at Vogtle and will be soon at Summer