

**NUCLEAR REGULATORY COMMISSION**

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✓ Subcommittee on Reliability and Probabilistic  
Risk Assessment and Subcommittee on Plant  
Operations - Joint Meeting

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
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JOINT MEETING  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
(ACRS)  
SUBCOMMITTEE ON RELIABILITY AND PROBABILISTIC  
RISK ASSESSMENT  
AND  
SUBCOMMITTEE ON PLANT OPERATIONS

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FRIDAY,

NOVEMBER 1, 2002

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Stephen L. Rosen, Acting Chairman, presiding.

PRESENT:

- STEPHEN L. ROSEN                      Acting Chairman
- MARIO V. BONACA                      Member
- THOMAS S. KRESS                      Member
- GRAHAM M. LEITCH                      Member

1 PRESENT: (CONT.)

2 WILLIAM J. SHACK Member

3 JOHN D. SIEBER Member

4 GRAHAM M. WALLIS Member

5

6 ACRS STAFF PRESENT:

7 MAGGALEAN W. WESTON

8

9 ALSO PRESENT:

10 PATRICK BARANOWSKY

11 WILLIAM BECKNER

12 TOM BOYCE

13 CINDI CARPENTER

14 BOB DENNIG

15 DAVID GAMBERONI

16 CHRIS GRIMES

17 DALE RASMUSON

18 NICK SALTOS

19 BOB TJADER

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C-O-N-T-E-N-T-S

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21  
22  
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24  
25

INTRODUCTORY REMARKS

Mr. Stephen Rosen . . . . . 5

RISK MANAGEMENT

Mr. Bill Beckner . . . . . 6

Mr. Bob Dennig . . . . . 7

A. INITIATIVE 1 - END STATE MODIFICATIONS

Mr. Bob Dennig . . . . . 23

B. INITIATIVE 2 - MISSED SURVEILLANCE REQUIREMENTS

Mr. Bob Dennig . . . . . 25

C. INITIATIVE 3 - MODE RESTRAINT FLEXIBILITY

Mr. Bob Dennig . . . . . 34

D. INITIATIVE 4 - INDUSTRY PILOTS ON COMPLETION

TIMES

Mr. Bob Dennig . . . . . 52

E. INITIATIVE 5 - SURVEILLANCE TEST INTERVAL

CHANGES

Mr. Bob Dennig . . . . . 65

F. INITIATIVE 6 - ACTIONS AND COMPLETION TIMES

Mr. Bob Dennig . . . . . 68

G. INITIATIVE 7 - SUPPORT SYSTEM OPERABILITY

IMPACT

Mr. Bob Dennig . . . . . 71

C-O-N-T-E-N-T-S

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
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25

RISK MANAGEMENT (CONT.)

H. INITIATIVE 8 - RELOCATION OF NON-RISK

SIGNIFICANT TECHNICAL SPECIFICATIONS

Mr. Bob Dennig . . . . . 75

INDUSTRY TRENDS PROGRAM

OVERVIEW:

Mr. Thomas Boyce . . . . . 81

IE PERFORMANCE INDEX

Mr. Dale Rasmuson . . . . . .113

GENERAL DISCUSSION: . . . . . .145

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

(8:33 a.m.)

MR. ROSEN: If everybody will take their seats, the meeting will now come to order. This is a meeting of the ACRS Subcommittees on Reliability and PRA, and Plant Operations. I'm Steve Rosen, serving today as Chairman of the Reliability and PRA Subcommittee in the absence of Dr. George Apostolakis. Mr. Jack Sieber is the Chairman of the Plant Operations Subcommittee. He's here. Other ACRS Members in attendance are Mario Bonaca, Tom Kress, Graham Leitch, Bill Shack, Graham Wallis.

The purpose of this meeting is to discuss the Risk Management Technical Specifications and the Industry Trends Program as it relates to the Initiating Events Performance Index. Mag Weston is the Cognizant ACRS Staff Engineer for this meeting.

The rules for participation in today's meeting have been announced as part of the notice of this meeting published in the Federal Register on October 23rd, 2002. A transcript of the meeting is being kept, and will be made available, as stated in the Federal Register notice.

It is requested that speakers use one of the microphones available, identify themselves, and

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1 speak with sufficient clarity and volume that they can  
2 be readily heard. We have received no written  
3 comments from members of the public regarding today's  
4 meeting.

5 Jack, do you have any comments before we  
6 proceed?

7 MR. SIEBER: Not at this time. Thanks,  
8 Steve.

9 MR. ROSEN: Thank you. We'll now proceed  
10 with the meeting. Bill Beckner of NRR will begin.

11 MR. BECKNER: Okay. Thank you. I'm Bill  
12 Beckner. I'm the Director of the Operating Reactor  
13 Improvements Program, and I'll apologize to people,  
14 Mr. Kress here and so forth, I'll only talk to your  
15 back very briefly. Okay? I just want to give a very  
16 brief introduction.

17 This is a result of a July 10th meeting  
18 where we talked about the PRA Implementation Plan.  
19 Our objection there was primarily to get you  
20 interested in the subject, give you a status report.  
21 I think we were very successful. We heard a lot of  
22 interest, a lot of support. We also heard a lot of  
23 questions, or at least a few questions, so hopefully  
24 we'll continue that, get some more support, and I'll  
25 also be able to address some questions you had.

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1 I want to point out that this is only a  
2 Staff presentation, but this is an effort we've been  
3 working with industry very closely with. I would  
4 point out that Biff Bradley from NEI is in the  
5 audience. I'm sure he'll be glad to answer any  
6 questions from the industry perspective, if asked.

7 Okay. With that, that's really all I want  
8 to do. Let me turn it over to Bob Dennig, who is my  
9 Section Chief of the Tech Spec Section. And I'll let  
10 him take over and point out the other people he has  
11 with him.

12 MR. DENNIG: Okay. Thanks very much,  
13 Bill. To my right I've got Bob Tjader from my staff,  
14 Tech Spec Section, Senior Engineer. And to my left,  
15 I have Nick Saltos, who has ably supported us in the  
16 area of Probabilistic Safety Assessment, as we go  
17 through these initiatives that we're going to talk  
18 about today.

19 The first slide, please. I very briefly  
20 wanted to kind of put today's discussion into context,  
21 in a historical context. We have been involved in  
22 Risk-Informing Technical Specifications and evolving  
23 toward a Risk Management, a configuration Risk  
24 Management approach for some time. At the very  
25 beginning, we start back in 1974 with a standard tech

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1 spec structure that basically has limiting conditions  
2 for operation and corrective actions, and completion  
3 times, and so on and so forth. They're predicated on  
4 random single failures and judgments, engineering  
5 judgments of repair times for these random single  
6 failures, and then we moved forward. And one of the  
7 seminal documents in this development was NUREG-1024,  
8 1983 Tech Specs, enhancing the safety impact, which is  
9 a document that contains a lot of the initial thoughts  
10 about applying risk information and risk techniques to  
11 technical specifications, mode changes, end-states,  
12 surveillance intervals, so on and so forth. You can  
13 trace what we're doing today back to that document in  
14 large part.

15 Moving forward, implementation of  
16 50.65(a)(4) in 2000. AS I mentioned, we started out  
17 with a structure that has completion times and  
18 correction actions premised on dealing with single  
19 random failures and repair times for those single  
20 random failures, into an era where we're doing on-line  
21 maintenance. We are taking numbers of equipment out-  
22 of-service at the same time. And in order to really  
23 do a good job of managing that kind of an environment,  
24 50.65(a)(4) was essential, and so we arrive at a  
25 structural -- we've got -- we have that in place

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1 largely for managing a configuration with technical  
2 specifications as a back-up. And in our Risk  
3 Management Technical Specification Initiatives, which  
4 the concept as a set of initiatives was first broached  
5 in 1998. But those initiatives largely look at  
6 getting 50.65(a)(4) and technical specifications to  
7 work together, and to not fight each other, and to put  
8 together a single framework that is premised on  
9 managing risk, and allows a licensee to have an  
10 integrated approach and programming methodology that  
11 will meet both technical specifications in  
12 50.65(a)(4).

13 Next slide, please. Principles is  
14 probably too grand a title. These are things that  
15 we've kept in mind as we've progressed through this  
16 development. Bill mentioned that we were here talking  
17 about coherence. We are very much aware of the  
18 importance of having what we do and the approaches  
19 that we take aligned with efforts, other risk-  
20 informing efforts going on. In particular, for  
21 example, in 50.69, Special Treatment, where we get to  
22 the point in technical specifications and talking  
23 about scope of specifications, and talking about  
24 equipment that is risk-significant, or significant to  
25 risk, we certainly want to have that concept aligned

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1 with, be coherent with how that terminology is being  
2 used in 50.69 and other Special Treatment areas.

3 Also, there are points in time in these  
4 initiatives, places in the initiatives where PRA  
5 Technical Adequacy becomes important, and we certainly  
6 want how we treat that Technical Adequacy to align  
7 with the effort that NRR and research are involved in.  
8 For example, in the Draft Guide 1.122 that we're now  
9 working on, to have the same ideas, the same  
10 principles are supposed to be consonant with that.

11 A second principle would be that we have  
12 a graded approach in these initiatives, as far as how  
13 we are crediting 50.65(a)(4) programs as supporting  
14 the changes that we allow licensees to make. We go  
15 from an approach where we have a submittal from an  
16 owner's group, and the Staff entirely reviews that.  
17 We have the entire basis for why something is  
18 acceptable, and those changes get hard writing  
19 specifications, and as long as the plant is covered by  
20 the topical, covered by the generic analysis, then  
21 they can have that change.

22 And then we have things that are more  
23 programmatic and discretionary, and rely on the  
24 licensee's capability, a demonstration of the  
25 capability, and where we're delegating discretion to

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1 the licensee. And in those areas, the licensee's  
2 50.65(a)(4) program has to be more robust, has to be  
3 at one end of the spectrum as far as quantitative,  
4 real-time, so on and so forth. So we have initiatives  
5 that run the gamut, from pre-analyzed hardwired to  
6 discretionary based on a program.

7 And finally --

8 MR. ROSEN: Before you get off that point.

9 MR. BECKNER: Sure.

10 MR. ROSEN: I think it's important. If a  
11 licensee does not have a PRA, and there's no  
12 regulatory requirement to have one that I know of, how  
13 do they -- can they get any credit in this area?

14 MR. BECKNER: I think everybody has a PRA,  
15 thought it's not required. Nick help out, others help  
16 out as needed. Those licensees have to have a basic  
17 capability in order to comply with 50.65(a)(4) to  
18 manage their maintenance. And maintenance is a very  
19 broadly defined concept, and it pretty much  
20 encompasses any time equipment is being taken out of  
21 service, or goes out of service, is forced out of  
22 service.

23 They have to have a rudimentary  
24 capability. Those capabilities, as described in the  
25 Guidance and my understanding is, at the rock-bottom

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1 can be derivative of some generic analysis that is  
2 then hardwired into somewhat prescriptive allowance or  
3 management approaches that they would then use to  
4 comply with 50.65(a)(4).

5 That same level of capability would be  
6 reflected in a generic analysis, such as I mentioned  
7 earlier, where there -- a notice group submits an  
8 analysis and says for our designs, this function is  
9 less important than this other function in this mode,  
10 and it applies to all our licensees. That becomes the  
11 basis of the safety evaluation, and the licensee with  
12 rudimentary capability would benefit from that, and be  
13 able to adopt the hardwired changes that go into the  
14 standard. They would not be in a position to take  
15 advantage of things, for instance, like mode changes  
16 for high risk mode shifts, or to extend completion  
17 times on the fly, if you will, which is Initiative 4.  
18 They would not be in a position to do that, so there's  
19 a graded approach. There are things that look a lot  
20 like the risk-informing that we've done for some time,  
21 extending an AOT or a completion time, particularly  
22 for diesel maintenance on-line. There's a generic  
23 analysis. It applies to a range of licensees. A  
24 licensee can come in and say I would like to adopt  
25 that change to my technical specifications, and point

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1 to the generic analysis and say it applies to me, and  
2 then they can have that. But that time is then  
3 hardwired into their specs, and to change that time,  
4 they would have to come in for another amendment. So  
5 the brief answer is -- is there a brief answer? All  
6 licensees are benefitting at some rudimentary level  
7 from what we're doing, but the degree -- you're not  
8 going to get the whole package. You're not going to  
9 be in the position to take advantage of the whole  
10 thing, the whole set.

11 DR. BONACA: I have some concern about,  
12 you a number of times repeated the expression  
13 "rudimentary capability", and that was a different  
14 understanding that we had here, depending on the  
15 number of components you are taking out of service  
16 simultaneously. We felt that, and we communicated  
17 that you may have a rudimentary capability to take one  
18 component out of service, use engineering judgment in  
19 some cases. When you would begin to pull out of  
20 service two components, three components or more, I  
21 wouldn't agree with your statement of rudimentary  
22 capability, I mean, because it takes some  
23 sophistication and analysis to understand the  
24 consequences of multiple components and different  
25 trains, for example, taken out of service.

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1 MR. ROSEN: Yeah, and it's not all  
2 voluntary. I mean, the devices, he may take one  
3 component out of service as a planned matter, but then  
4 another comes out of service -- emergent is found to  
5 be out of service, or doesn't work in the testing. So  
6 you could find yourself with a rudimentary capability  
7 in a situation you didn't anticipate. Then what?

8 DR. SALTOS: Okay. We have several of the  
9 initiatives, especially the ones we have worked on  
10 right now, we have pre-analyzed the conditions, both  
11 generically and on a plot-specific basis by comparing  
12 the design features and functions among plants. And  
13 for example, a change in the end-state from cold  
14 shutdown to hot shutdown is a comparison of risk.  
15 What is the risk in one end-state versus the other  
16 end-state? There are four -- we are not -- all the  
17 licensees would need is just have (a) (4) capability.  
18 They don't -- they would not need any more than that  
19 to apply this change.

20 MR. DENNIG: I think your question gets  
21 back more to the philosophy underpinning 50.65(a) (4)  
22 and its relationship to tech specs. Licensees still  
23 have to comply with technical specifications.

24 MR. BECKNER: Bob, can I try to help out.  
25 I've been listening here. I think the concern maybe

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1 is with your term "rudimentary". Right now absent  
2 these initiatives, just why technical specifications  
3 generally deal with one system at a time, they are  
4 generally very conservative on one system at a time.  
5 They don't deal with a multi case issue period. Tech  
6 specs simply do not prevent that.

7 What had happened is basically, as we  
8 started thinking about extending AOTs we recognized  
9 this, and we put something in called a "Configuration  
10 Risk-Management Program Tech Specs". When the  
11 Maintenance Rule came about, the Commission looked at  
12 that and said gee, that looks similar to the  
13 Configuration Risk-Management Program, and basically  
14 the Maintenance Rule is currently -- and the  
15 Commission told us that the Maintenance Rule was  
16 adequate to handle these cases. We should take out  
17 the Configuration Risk-Management Program in the tech  
18 specs, so the bottom-line is that this term that Bob  
19 used, I think "rudimentary", which may have caused a  
20 reaction, the Maintenance Rule is what in our  
21 regulatory space currently handles multiple equipment  
22 out of service. Tech specs generally do not, and  
23 that's absent these Tech Spec Initiatives at all.

24 When Bob is using the term "rudimentary",  
25 I think what he meant -- I use another term. I call

1 it (a) (4) Plus, is that in the current environment,  
2 the Maintenance Rule governs and hopefully is  
3 adequate. And what I've seen industry doing is  
4 adequate. They do a pretty good job at this, but if  
5 we want to start stretching the envelope, particularly  
6 with some of the initiatives where we're getting rid  
7 of fixed completion times, and getting completion  
8 times that are based on a program and analysis, why we  
9 want to strengthen (a) (4). So rather than called  
10 (a) (4) rudimentary, I call what we're going to as  
11 (a) (4) Plus, where we basically would be putting  
12 commitments and requirements for qualities of PRA,  
13 many criteria, and so forth. So again, that's my  
14 short answer. I hope that may have helped.

15 MR. ROSEN: Well, that's a glass-half-  
16 full, glass-half-empty argument.

17 MR. BECKNER: Right.

18 MR. ROSEN: I think it's more about  
19 semantics. And really what I'm concerned about is,  
20 how much discretion you give a licensee to run an  
21 (a) (4)-like program with a PRA that ends up being one  
22 piece of paper, effectively a matrix, which to me is  
23 so rudimentary that I wouldn't give it the word  
24 "rudimentary".

25 DR. BONACA: The thing that troubles me

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1 the most is the fact that, you know, in real life you  
2 know that when you project how many components you're  
3 taking out of service, you know, you have a certain  
4 projection number-wise. Then when you look back what  
5 happened in that period of time in which you had this  
6 component out of service, you discover that you had  
7 more components out of service, because somebody else  
8 took them out. I mean, they may happen to be out, and  
9 so you do have different configurations there that are  
10 not fully analyzed or understood at times. And that's  
11 the issue that --

12 MR. ROSEN: That's the issue on the low --  
13 I think we have two issues here. We have an issue on  
14 the low end, which we've been discussing, which is  
15 that there are some plants with such rudimentary  
16 capability that they're getting more credit, it's a  
17 potential they could get more credit than they  
18 deserve, than they can control and use. And on the  
19 other end of the spectrum, plants with very  
20 sophisticated analyses who want credit, the question  
21 is how good is the underlying analysis? Is the  
22 underlying analysis really good enough to support the  
23 kind of extensive dynamic tech specs that we're  
24 thinking about.

25 So with that bracket on the problem, which

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1 is goes from zero to a hundred plus percent, there are  
2 all the gradations in-between, so it's kind of a  
3 sophisticated question, as to where a given licensee  
4 in a given request, there needs to be a degree of  
5 conservatism here that we position along that spectrum  
6 that are appropriate.

7 MR. BECKNER: See, I think when they get  
8 to Initiative 4, I think you'll hear about the one end  
9 of the spectrum of what we're talking about as far as  
10 requirements for licensees to make maximum use of it.  
11 We'll hopefully talk about that. The other end of the  
12 spectrum are, I guess the status quo, what are  
13 licensees doing under the current Maintenance Rule and  
14 other requirements? That's an issue.

15 The Staff had some concerns too, and the  
16 only thing I can tell you is that we did have a  
17 workshop. How long ago was that, Bob? About six  
18 months ago, and basically, our objective was to try to  
19 figure out just what was -- for the Staff to  
20 understand better what the industry was doing under  
21 the existing Maintenance Rule absent these  
22 initiatives. And I'll say that we were impressed.

23 Now that doesn't say that every licensee  
24 is behaving as what we saw. And with that, Biff wants  
25 to make some remarks.

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1 MR. BRADLEY: Biff Bradley of NEI. I'm  
2 pretty familiar with the (a)(4) implementation  
3 guidance. I can say that all plants use PSAs for  
4 their on-line, you know, at-power maintenance  
5 equipment out of service. For shutdown, typically  
6 plants do use qualitative methods. We rely on NUMARC  
7 -9106 for most plants. Some plants have shutdown  
8 PSAs, but all plants use their at-power PSA. And even  
9 if you're using a matrix that's evolved from your at-  
10 power PSA, we do have quantitative risk metric  
11 guidelines in there. We have -- basically, it is a  
12 graded approach. If you're routinely taking multiple  
13 equipment out of service, there is an expectation for  
14 more quantification, more tracking of aggregate and  
15 cumulative risk. And we did go to some length to put  
16 on a presentation for NRC Staff last year in February,  
17 to explain how the industry was doing this. And, you  
18 know, I think it was pretty effective at helping to  
19 understand these questions.

20 I would say, you know, we talked a lot  
21 about the rudimentary or the bottom level. It's not as  
22 low as you might think. I mean, we do have -- in the  
23 (a)(4) guidance, if you take a look at that, we even  
24 have PSA quality expectations. This predated the  
25 standard, so we refer to the PSA peer review process

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1 requirements for that. But there's no plant out there  
2 that's not using their PSA as the basis for their at-  
3 power on-line maintenance.

4 MR. ROSEN: Well, that's very helpful,  
5 Biff, but I guess I would have to have seen the  
6 showing that a matrix, as you say, has properly  
7 evolved from a robust enough PRA to be more than  
8 simply a piece of paper that may or may not in any  
9 given circumstance be conservative.

10 DR. BONACA: I mean, I, for one, accept  
11 the graded approach in the sense that, you know, you  
12 take a component out of service. Maybe the matrix may  
13 be adequate, and I think when you go to two components  
14 or three components in different systems, then you  
15 need a level of sophistication in the PRA that is not  
16 necessarily rudimentary. In fact, it's not  
17 rudimentary at all. That was the point I was trying  
18 to make.

19 MR. TJADER: Let me reiterate --

20 MR. DENNIG: I wish the word "rudimentary"  
21 had never left my lips.

22 MR. TJADER: Let me just reiterate one  
23 thing that Bob had said, and that is, is that the  
24 different initiatives require different levels of  
25 sophistication. And the Initiative 2, the one that

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1 has been approved to-date, requires the most  
2 rudimentary level of sophistication. It can rely on  
3 its risk assessment, the (a) (4) that a plant may have,  
4 let's say a matrix system, if that's what a plant had,  
5 all that it had. But we also expect that the plant  
6 would take conservative actions, or conservative  
7 results from that matrix that they -- in other words,  
8 the less sophisticated it would be, the less, you  
9 know, relaxation per se that you have.

10 MS. WESTON: Bob, you say that the plant  
11 is expected to take -- is there anything here that  
12 requires that, or assures that that happens? You said  
13 that they are expected -- they have the most  
14 rudimentary --

15 MR. TJADER: Well, what I'm saying is that  
16 Initiative 2 can rely on an (a) (4) risk assessment as  
17 plants have out there now, without any additional PRA  
18 quality. For instance, eventually I think the  
19 Initiative 4 where there's going to be flexible AOTs  
20 will have to rely on the PRA Quality Initiative that's  
21 ongoing with industry, and the code or the standard  
22 that's soon to be promulgated. I think we're going to  
23 have to rely on that to implement -- of course, plants  
24 have a certain minimal level of capability or they  
25 meet that standard in order to implement a flexible

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1 Initiative 4 AOT.

2 MR. DENNIG: And as we go through these,  
3 I think we try to say in a summary fashion what the  
4 basis was for why something was acceptable from a risk  
5 perspective. And part of that picture is also how  
6 risky is the evolution or the action that we're  
7 talking about. And making up a missed surveillance is  
8 not a high-risk exercise, nor something that would  
9 happen frequently, and so the degree or control and  
10 detail, and specification of enforceable whatever is  
11 not, you know, it's not there. I mean, there's no  
12 need for that.

13 MR. ROSEN: Yeah, but I think you're  
14 trivializing the concern. Missed surveillance wasn't  
15 the concern, never was. It's about actions and  
16 completion times, and some of the other more  
17 substantive matters.

18 DR. SALTOS: For that, a good PRA would be  
19 required.

20 MR. ROSEN: Okay. I'm going to take the  
21 prerogative of the Chair to move us along here, and  
22 expunge the word "rudimentary" from the thing. But  
23 you can see the sense of the Subcommittee is that  
24 we're kind of like stirred up like fire ants. Down  
25 where I come from, when you stick a big stick in an

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1 anthill, they all come out, they sting.

2 MR. SIEBER: Biff would like to --

3 MR. BRADLEY: I'll make one more comment  
4 since a question was asked about the regulatory  
5 framework for (a) (4). Reg Guide 1.182 is the  
6 regulatory guide that references the applicable  
7 portions of NUMARC 9301, which is the Implementation  
8 Guidance. The Staff has also developed inspection  
9 procedures for (a) (4), so there is a pretty explicit  
10 delineation of what is expected for a (a) (4) program,  
11 and it is inspectible, and it is laid out and  
12 referenced in a reg guide that's, you know, available  
13 for you to look at.

14 I don't want to leave the impression that  
15 there's not a clear understanding of what the minimal  
16 requirements for these programs are.

17 MR. ROSEN: Well, we'll keep all that in  
18 mind as we go forward.

19 MR. DENNIG: Okay. Initiative 1 - End  
20 States. Objective, the affect of this change would be  
21 to allow repair time in hot shutdown, instead of  
22 automatically requiring transition to cold shutdown,  
23 which is what all the LCOs require at the present  
24 time.

25 We've reviewed Combustion Engineering

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1 Owners Group and a Boiling Water Reactor Owners Group  
2 generic analysis that deals with a support, a risk-  
3 informed support of a preferred mode for repair given  
4 that you've got equipment inoperable. And at the  
5 present time, we've just finished the safety  
6 evaluation for the CE Owners Group, and we're in the  
7 process of looking at the translation of that concept  
8 into markup of the actual standard specs. And BWR  
9 Owners Group just finished the safety evaluation, and  
10 the industry is working on the tech spec markup.

11 MR. ROSEN: Should I learn something about  
12 Westinghouse Owners Group by their absence from this,  
13 or know something about it?

14 MR. DENNIG: Well, maybe Biff wants to say  
15 something, but the Owner -- the way we've been  
16 pursuing these initiatives is basically by working  
17 with a consortium of owners groups, and they have  
18 decided amongst themselves whether to invest their  
19 money and effort into the topical analysis in this  
20 particular area.

21 MR. ROSEN: So Westinghouse plants  
22 wouldn't get this --

23 MR. DENNIG: Well, no. Until we see  
24 something similar to what we've gotten from the owners  
25 groups, no.

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1 MR. BRADLEY: The short answer is,  
2 Westinghouse is working on a topical to support this.  
3 They're just a little bit behind the curve, so they  
4 will be coming in in the same way that CIs and PWRs  
5 have.

6 MR. GRIMES: This is Chris Grimes. I  
7 might also point out that it's fairly typical to see  
8 that because of the diversity of plants that the  
9 Westinghouse Owners Groups have to represent, that  
10 they usually let Combustion Engineering or B&W, or the  
11 BWR Owners Group blaze a trail so they can find out  
12 what is the optimum level of effort that is required  
13 for them to invest in a proposed regulatory action.

14 MR. DENNIG: Initiative 2 - Missed  
15 Surveillance Actions. As Bob mentioned, we have this  
16 one out for licensees to adopt. Forty-seven plants,  
17 so far, twenty-one amendment requests in process.  
18 This change basically is an extension of an allowance  
19 that was first granted in Generic Letter 8709, gave 24  
20 hours to make up a missed surveillance. This risk-  
21 informs the 24 hours, allows you to go up to one  
22 additional surveillance interval, with the  
23 understanding that you will do that surveillance at  
24 the next available, or reasonable available time. The  
25 purpose of the extension is to make up the

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1 surveillance, not to delay it for operational  
2 purposes.

3 And why this is okay, infrequent use,  
4 likelihood equipment is operable. There's a  
5 commitment to put this into the Corrective Action  
6 Program should you use a surveillance, so that we can  
7 see it in the reactor oversight area.

8 MR. ROSEN: And also to correct the source  
9 of -- the cause of the missed surveillance.

10 MR. DENNIG: Sure.

11 MR. ROSEN: I think that's the most  
12 substantive reason.

13 MR. DENNIG: Sure.

14 MR. ROSEN: So you don't get recurrence.

15 MR. DENNIG: Right, which feeds back into  
16 making sure that this is infrequent, it doesn't happen  
17 very often.

18 DR. BONACA: If I remember, the only -- we  
19 had some concern about going the whole length of the  
20 full interval again.

21 MR. DENNIG: You have to justify that.  
22 You have to have a basis for doing that. That is not  
23 the -- it's not the automatic default. Oh, I missed  
24 it. I get to go another six months. I get to go  
25 another cycle. That's not the concept.

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1 DR. SALTOS: Although we had several exams  
2 where we calculated the risk, and the risk would not  
3 increase significantly by going --

4 MR. ROSEN: What exam? When you  
5 recalculate a risk of a missed surveillance, do you  
6 assume the components out of service?

7 DR. SALTOS: No, you assume the component  
8 -- you have the -- you calculate their unavailability  
9 based on increase in testing time, testing period.

10 MR. DENNIG: Yeah. One conservative  
11 approach would be to just assume that the thing is  
12 inoperable, can't perform its function, and enter your  
13 (a) (4) management space and look at the impact on CDF  
14 and ICCDP, look at those metrics and see where that  
15 brings you out, as far as how long you could postpone,  
16 or when you need to make that up.

17 The less conservative but -- well, still  
18 conservative, but a more sophisticated approach is to  
19 change the surveillance interval, rerun some  
20 calculations, and look at the impact.

21 MR. TJADER: And they are supposed to  
22 perform the missed surveillance at the first opportune  
23 time, not go to the extension that is permitted by --

24 MR. DENNIG: And all those thoughts, we've  
25 recently looked at the guidance that some owners

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1 groups have put together, and all of those thoughts  
2 were appropriately factored into the guidance to  
3 licensees as to how to implement this appropriately.

4 DR. KRESS: Do you have some idea of what  
5 is meant by the "first opportune time"? You know, it  
6 seems to me like --

7 MR. TJADER: Well, if something -- let's  
8 say a surveillance is required to be done at shutdown  
9 and, you know --

10 DR. KRESS: At shutdown you had --

11 MR. TJADER: At a fueling interval, let's  
12 say, and you missed it, and the risk assessment  
13 concludes that you can do it at the next refueling  
14 outage, well, if you a mid-cycle refueling, or mid-  
15 cycle maintenance outage or something, do it at the  
16 maintenance outage, and not go the full refueling  
17 cycle, that type of thing. That's a simple example.

18 DR. KRESS: What would be the criteria for  
19 surveillance on a piece of equipment that you could do  
20 without shutting down?

21 MR. DENNIG: Well, if it doesn't require

22 -

23 - well, the things that go into consideration are  
24 hazards to personnel, doses, those kinds of issues,  
25 accessibility. Do I have to have any special

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1 equipment? Do I have that available? Do I have to  
2 have any special configuration? Do I have to maneuver  
3 the plant? Do I have to do any realignment? If I  
4 don't have to do any of those things, and there is no  
5 personnel hazard, there's no issues, then when we  
6 reschedule it and we do it, we make it up.

7 The idea is just that commensurate with  
8 the safety significant, you do not have to drop  
9 everything you're doing and focus on making of this  
10 surveillance. And everything else is in second place.

11 DR. WALLIS: How many are you allowed to  
12 miss at the same time?

13 MR. DENNIG: Not many.

14 DR. SALTOS: As we said, each of those is  
15 printed as an imagined condition, put in their  
16 Corrective Action Program and their Oversight Process  
17 to take it out.

18 DR. WALLIS: So someone will notice --

19 DR. SALTOS: In order to increase the risk  
20 significantly you'd have to miss many. And if they  
21 miss many, they're going to be --

22 DR. WALLIS: If they miss many, it's  
23 indicative of a management problem.

24 MR. SIEBER: Yeah. That's a different  
25 problem all together. I think typically a plant would

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1 have one to three missed surveillances.

2 DR. BONACA: Yeah, but it's still a  
3 reporting requirement for a missed surveillance?

4 MR. DENNIG: No, there's no reporting  
5 requirement. What there is, is a stipulation that a  
6 missed surveillance, an instance of missed  
7 surveillance will be put into the Corrective Action  
8 Program.

9 DR. BONACA: That I understand.

10 MR. DENNIG: Okay. And that's where we  
11 would be able to see it.

12 MR. ROSEN: You're saying there's no  
13 longer a reporting requirement for a missed  
14 surveillance.

15 MR. DENNIG: I'm trying to think if there  
16 ever was a requirement for --

17 MR. BECKNER: No, it's been taken out.  
18 There used to be one, but it's no longer --

19 MR. REINHART: This is Mark Reinhart of  
20 the Probabilistic Safety Assessment Branch in NRR.  
21 One point I was thinking that might clarify some  
22 things. Generally, we don't find plants missing a lot  
23 of surveillances. When they do, it's not the whole  
24 surveillance. It might be they had to do an  
25 instrument channel, and there were 45 contacts, and

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1 they missed two of them, but they can't do those under  
2 the current operating conditions. Whenever they got  
3 to a position they could pick up those two contacts,  
4 they would have to do it at that time. But at the  
5 same time, part of this safety assessment or risk  
6 assessment would be, what do we think, based on the  
7 information that we know, do we have an expectation  
8 that this equipment is operating? So there's that  
9 thought going in also.

10 DR. BONACA: I really think it's a good  
11 initiative. The only thing I still question is, there  
12 is an interest on the part of the NRC in trending  
13 certain conditions or issues, and so on and so forth.  
14 If there is no reporting of this, how do you trend?  
15 You know, what -- if there is, in fact, a shift in  
16 trend in the whole industry, you have 100 plants out  
17 there. If you have a proliferation of situations like  
18 this, you would want to know.

19 DR. SALTOS: The Reactor Oversight  
20 Process, they configure a significant determination  
21 process --

22 MR. GRIMES: This is Chris Grimes. I'd  
23 like to take a shot at that. Reporting requirements  
24 don't necessarily provide us with good trending of  
25 industry performance. We actually look to the

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1 oversight process, overseeing the Corrective Action  
2 Program and the monitoring, and the record keeping  
3 that each utility has to do the trending. And we make  
4 an assessment through our inspection activities as to  
5 the effectiveness of the plant-specific trending  
6 activities, and the insights gained from those. And  
7 we would expect to see that revealed in a programmatic  
8 way, in terms of the effectiveness of the quality  
9 assurance process at individual plants.

10 DR. BONACA: Do you have a requirement  
11 that the licensee trends missed surveillances?

12 MR. GRIMES: We have a requirement that  
13 licensee trends all adverse conditions in the plant,  
14 which would include missed surveillances.

15 MR. ROSEN: I'm actually fairly  
16 comfortable with the idea that the Staff will pick up  
17 on a trend of missed surveillance at the plants,  
18 because my experience with plants is a missed  
19 surveillance is a big deal. And two of them is a  
20 convoy of missed surveillances, so this is something  
21 that becomes very, very high priority.

22 DR. BONACA: I have no doubt that within  
23 a plant is going to be surfacing. I'm just thinking  
24 about how all this is going to be pulled together for  
25 other plants, to where you have a perspective of

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1 whether or not the implementation of new initiatives  
2 of this type are going to be no detrimental to --

3 MR. ROSEN: Allowing a relaxation that's  
4 so extreme that a lot of plants begin missing a lot of  
5 surveillances.

6 DR. BONACA: So, you know, I'm sure --

7 MR. ROSEN: That would be the concern.  
8 And I guess I would say yeah, that's a concern, but I  
9 don't think it's likely.

10 MR. BECKNER: I think that's the whole  
11 portion, and like Chris said, it's infrequent now and  
12 the basis is how do we keep it infrequent. And that's  
13 the Corrective Action Program, and we will have to  
14 rely on oversight of the Corrective Action Program.  
15 That's the mechanism.

16 MR. ROSEN: You know, one of the things we  
17 talk a lot about here is safety culture. And this is  
18 one of those safety culture things that's so ingrained  
19 in the current fleet of licensees that I'm fairly  
20 confident that there would be an enormous reaction to  
21 a spate of missed surveillances both by the regulator  
22 and the licensees. I'm not too concerned with this.

23 MR. LEITCH: Is there any higher level of  
24 attention if one of these missed surveillances when  
25 eventually done fails? Does that raise any kind of

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1 flags, other than just with the corrective -- other  
2 than through the Corrective Action Program?

3 MR. BRADLEY: Well, the oversight process  
4 would -- you'd have to enter that into the oversight  
5 process and pick up the unavailability of that  
6 equipment over that period of time, so that would  
7 impact you on your performance indicators.

8 MR. BECKNER: I'm thinking out loud too  
9 here. Obviously, if you fail the surveillance and the  
10 equipment is inoperable, and again, depending on the  
11 reason you failed it, there may or may not be  
12 enforcement. And I'm thinking if this allowance had  
13 been grossly misused, it may well show up in  
14 enforcement space. On the other hand, it could have  
15 just been a random failure that happened to occur. I  
16 mean, it probably would not be picked up, other than  
17 like Biff said, you factor it into whatever your  
18 normal reliability.

19 MR. REINHART: You might also consider  
20 back on the Reactor Oversight Program in the  
21 Significance Determination Process, this would likely  
22 be a performance deficiency, so you would perform an  
23 SDP. And the exposure time would then expand to that  
24 whole time since the last known availability, and that  
25 would increase the significance.

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1 MR. LEITCH: Right. Thank you.

2 MR. ROSEN: Okay. Let's go on.

3 MR. DENNIG: Initiative 3 - Mode  
4 Flexibility. The impact of this change, the intent of  
5 the change is to allow to extend the flexibility first  
6 granted in Generic Letter 8709 to allow mode  
7 transition up in power with inoperable equipment while  
8 relying on compliance with the tech spec actions in  
9 the higher mode. The high-level summary basis for  
10 acceptability is infrequent use. It is on the order  
11 of two start-ups a year where this might come into  
12 play on average at plants.

13 Generic risk-analysis that Dr. Saltos has  
14 looked at in some detail. The need to perform a  
15 50.65(a)(4) risk assessment, manage the risk of the  
16 transition and oversight of 50.65(a)(4), which was  
17 mentioned previously in another context. Reg Guide  
18 1.182 referencing NUMARC 9301, and our inspection  
19 guidance on (a)(4).

20 At the present time, we're resolving  
21 comments that we got on the Federal Register notice  
22 that was published on August 2nd. We had a 30-day  
23 comment period, and basically at the moment, we're  
24 resolving issues of implementation logic and how  
25 things are worded in tech specs to get the concept

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1 clear, as far as the specific words in tech specs.

2 MR. ROSEN: Have you gotten any  
3 substantive negative comments from members of the  
4 public?

5 MR. DENNIG: Substantive? Well, we have  
6 gotten comments that express concerns about general  
7 enforceability of (a) (4) because of the connection to  
8 reliance on (a) (4) risk-assessment. We have got one  
9 comment about, what about a situation where a licensee  
10 would feel that it was beneficial to routinely return  
11 to power with inoperable equipment? In which case, we  
12 have said we do not understand any circumstance like  
13 that where it would be routine. And that's not the  
14 expectation for how this flexibility would be used,  
15 basically the same answer that was given when the  
16 flexibility was first extended under 8709 to change  
17 modes up in power. Anything else?

18 MR. TJADER: I think you got the --

19 MR. DENNIG: Yeah, those are the major  
20 ones.

21 MR. LEITCH: I'm a little confused here as  
22 to whether this risk-analysis is performed to allow  
23 this tech spec initiative on a plant-by-plant basis  
24 prior to granting this initiative? If you're a plant  
25 and you come up with a specific situation, do you do

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1 a risk-analysis for that specific situation on a case-  
2 by-case basis?

3 DR. SALTOS: No. What was done here was  
4 done a risk-analysis to identify the systems that  
5 would increase the risk the most, especially would  
6 increase the risk more than if the component or the  
7 system is taken out of power for the completion time  
8 we have for that system. Therefore, this flexibility  
9 is not allowed for these systems, and would be  
10 identified as more risk-significant.

11 For the other systems, it is allowed, but  
12 only if the licensee performs an analysis and more  
13 planning, and figures out that there's almost  
14 certainty that it is going to be fixed, without having  
15 to change power and come down again, which would be an  
16 unplanned power change, and could trigger a  
17 significant determination process, so they won't have  
18 any incentive in changing modes and going up in power  
19 and then come down again.

20 MR. DENNIG: So there was a generic  
21 analysis that was done that ruled out across the board  
22 for a given owners group certain transitions. You  
23 cannot go from four to three, you cannot go from three  
24 to two for the owners group based on a bounding  
25 generic analysis.

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1 MR. LEITCH: Okay.

2 MR. DENNIG: The decision criteria for  
3 that was that we've never parsed out these modes to  
4 look at risk-significance in given modes in tech specs  
5 before. We tend to treat one through four as  
6 monolithic. It doesn't matter. They're all the same  
7 as far as tech specs are concerned, so now we've  
8 looked at that, and parsed that out. And in going up  
9 in power, we disallowed some of those things because  
10 certain systems are more important in those lower  
11 modes than they would be at-power. So those are  
12 hardwired into specs as disallowed.

13 MR. LEITCH: Okay.

14 MR. DENNIG: Okay? Now a plant comes in  
15 and takes that situation, they are still required, all  
16 plants, to pick that up, to do a content sensitive  
17 risk-assessment under the (a) (4) Program to determine  
18 that it is appropriate for us to use this flexibility,  
19 even though it's allowed, so that's the second stage  
20 of review.

21 MR. LEITCH: And that stage would probably  
22 be done when the plant was facing a particular  
23 situation.

24 MR. DENNIG: Exactly. To put it in  
25 context, in the same way that we had the -- for

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1 extending completion times or AOTs under 1177, there  
2 is the requirement, was the requirement for a  
3 Configuration Risk-Management Program to look at more  
4 than just that component, to look across the plant  
5 configuration, and ensure that using that AOT was not  
6 inappropriate, given other equipment out of service,  
7 to give that multi-component across plant look.

8 So again here, we had a particular  
9 equipment out of service, going to make a mode  
10 transition. What does the rest of the plant look  
11 like?

12 MR. LEITCH: Right.

13 MR. DENNIG: What other things do I have  
14 out? I may not want to do that, given I've got  
15 another thing out. I shouldn't do that. And this one  
16 is kind of interesting in that the graded approach did  
17 come into play in deciding what to do with this  
18 initiative. The original desire was for plants to be  
19 allowed to use their (a) (4) Programs for all mode  
20 transitions without this prohibition on some  
21 transitions, and we said no, we're not ready for that  
22 yet. We're not ready to give that discretion entirely  
23 to plants based on our knowledge of what your (a) (4)  
24 Programs are. We're going to hardwire in the things  
25 that you can't do, the high-risk stuff, and not leave

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1 that to your discretion.

2 MR. LEITCH: If you use this particular  
3 flexibility in a specific situation, then the allowed  
4 outage timer, so to speak, starts running when you  
5 make that mode change.

6 MR. DENNIG: Yes.

7 DR. BONACA: I have a --

8 DR. SALTOS: It starts running when the  
9 equipment is unavailable.

10 MR. DENNIG: Well, once you change the  
11 mode you start the clock, and you've got to live with  
12 the clock for that mode.

13 DR. KRESS: Yeah, and I have a question  
14 about that. Could then they invoke Initiative Number  
15 4?

16 MR. LEITCH: That was going to be my --

17 DR. KRESS: Okay. You were coming to  
18 that. Okay.

19 MR. DENNIG: To extend the time. I  
20 believe that industry's concept is that yes, indeed,  
21 if I am smart enough to use 4, I should be smart  
22 enough to use it in combination with that. And that  
23 kind of remains to be seen.

24 MR. ROSEN: Well, I think what you're  
25 hearing, Bob, is that the Subcommittee is concerned

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1 with patterns of abuse that might emerge, and so the  
2 question to the Staff really is, have you thought  
3 about that? And how would you detect that kind of  
4 thing? Do you have enough information to detect  
5 patterns of abuse in each of these areas? I think  
6 there have been questions about what if the licensee  
7 started doing this? What if they started missing a  
8 lot of surveillances? What if they started making  
9 mode transitions, and then invoking the extensions  
10 after that? Basically, using this new-found freedoms  
11 as mechanisms to relax their licenses inappropriately  
12 across the board, in a way that the Staff in aggregate  
13 would become uncomfortable with. Do you have any  
14 system or thoughts in place about how you might gain  
15 ongoing confidence that that is not occurring?

16 MR. DENNIG: Well, I think in each one of  
17 the individual initiatives, especially talking about  
18 the less sophisticated ones, we have always considered  
19 about how would we know about the behavior? How would  
20 we get information about the behavior, so the  
21 Corrective Action Program was put in for Initiative 2.  
22 There are some trip wires in 50.72 reporting, and in  
23 the Reactor Oversight Program for mode changes, where  
24 things do not work out where they had to come back  
25 down. There is 50.65(a)(4) Oversight as far as the

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1 quality of the risk-assessments, so we have factored  
2 in oversight and how would we know as we've gone  
3 along.

4 We appreciate the feedback on the need to  
5 continue to do that, and to be sensitive to that, and  
6 recalibrate, perhaps, ourselves on how much emphasis  
7 we give to that, but that has been part of how we've  
8 tried to approach this.

9 DR. BONACA: And I think Mr. Rosen has  
10 well-described the concern on my part. For example,  
11 you made a statement before that a missed surveillance  
12 is a big thing in a plant today. It is. Is it  
13 because until now you have to report it and it was a  
14 measured issue, and you could have, you know, an  
15 action against you because of that, or that kind of  
16 thing? Or is it -- and so the concern here is, is it  
17 going to become less important just because there is  
18 no regulatory action? It just goes in the Corrective  
19 Action Program. That's something the plant lives with  
20 on a daily basis. There are many things going into --  
21 and more important probably than missed surveillance  
22 going into the Corrective Action Program, so the  
23 concern there is really an issue on impact on safety  
24 culture of the plant, you know, what will you tolerate  
25 as an acceptable condition on a daily basis? And

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1 certainly, the last thing -- I think, you know, I am  
2 supportive of all these initiatives. I think they're  
3 smart, they're important, they're necessary, but I  
4 believe also that we have to make sure that they don't  
5 result in a degradation of safety culture at the  
6 plants. And this surveillance will still be a big  
7 thing at the plant, even if you have a means of  
8 dealing with the Corrective Action Program.

9 MR. BECKNER: Let me just go back here.  
10 Let me see. I think we have to agree, and this is a  
11 new thought, I think. We have looked at oversight,  
12 and we've been very concerned with individual, but I  
13 think, Bob, I think we need to take it as an action,  
14 is what we haven't carried, I think you used the term  
15 "trends". Okay. Even if we may be looking at each  
16 individual licensee is going to be looked at through  
17 oversight as there's some big picture where licensees  
18 are starting to use this, I think as you pointed out  
19 here.

20 MR. ROSEN: I used the word "patterns of  
21 use".

22 MR. BECKNER: Pattern. Yeah. And I think  
23 that's something --

24 MR. ROSEN: People abusing their new found  
25 freedoms, it is not the intent of this thing to

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1 stretch it in every single way that you can. I don't  
2 know if there are any licensees out there like that,  
3 but if there are, or there become licensees like that,  
4 they need to be dissuaded from using the --

5 MR. BECKNER: I think we need to think  
6 about that. That's a good point we should look at.

7 MR. REINHART: This is Mark Reinhart  
8 again. In agreement with everything that's been said  
9 here, probably the area of most sensitivity is not  
10 (a) (4). That's where we've pre-decided additional  
11 time for allowed outage times, but (4) (b), which is  
12 still in development, where a licensee would have the  
13 more flexibility to operate the plant, a couple of  
14 things have to happen there. You need a mature  
15 licensee, and we have to be sure of that. And you  
16 need a very high quality comprehensive PSA, so the  
17 players that don't have that kind of PSA shouldn't be  
18 allowed this freedom. And part of developing, putting  
19 forth the initiative develop the PSA is going to show  
20 something about the maturity. But I think you brought  
21 up a good point, along with that oversight program,  
22 along with the maturity, along with the initiative, we  
23 have to really keep an eye on those licensees to make  
24 sure that this is being applied appropriately.

25 MR. GRIMES: This is Chris Grimes. I'd

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1 also -- I'd like to point out that as we looked at  
2 what are the elements of coherent risk-informed and  
3 performance-based regulatory program, one of the  
4 things that we've considered and the attributes of an  
5 effective regulator's perspective of what is risk-  
6 informed and performance-based is, how will the  
7 inspection program and the enforcement program evolve?  
8 And part of the sentiment underlying your concern  
9 about a potential for pattern of abuses really gets  
10 back to the effectiveness of our inspection and  
11 enforcement activities to reveal and embarrass  
12 utilities who might have the best PSAs in the world,  
13 and the best of intentions, but through sloppy  
14 programmatic activities, end up pushing the boundaries  
15 in ways that aren't too terribly risky on an  
16 individual basis, but end up showing these patterns of  
17 pushing the boundary too far. And that really gets  
18 back to our ability to be able to establish good  
19 performance measures that will reveal these  
20 programmatic weaknesses, potential patterns of abuse  
21 and, you know, in all of our experience regulating  
22 nuclear power plants, there's no malicious intent to  
23 be abusive. It usually ends up being trying to cut  
24 corners or save money, or work with limited staff, or  
25 overworked staff. And it is revealed in a

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1 programmatic way, and it usually is pretty revealing.  
2 But for us to be able to sit here and say that we can  
3 demonstrate that our inspection and enforcement  
4 activities are going to ensure that there's reasonable  
5 assurance that, you know, loose or regulatory  
6 standards are not going to be abused, I think that's  
7 something that we're sensitive to in terms of how is  
8 the NRC's performance going to be measured relative to  
9 revealing those circumstances.

10 MR. ROSEN: I think that's all useful  
11 comments, Chris. I think the simple matter, and just  
12 as an example, and as an example only since you have  
13 to decide how you monitor this, but if the inspection  
14 reports from the residents just simply catalogue how  
15 many times they were used and for what reason, then  
16 somebody in retrospect could go back and look at that  
17 over time and make a table up. And you found one or  
18 two, or three or four plants that routinely use these  
19 things, I think that would be a useful regulatory  
20 tool.

21 MR. BECKNER: I'm not sure how to do that,  
22 but I share your concern. This one, for example,  
23 licensees I assume legally, and probably even safely  
24 could routinely schedule the final maintenance on some  
25 piece of equipment as they're going up in power. They

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1 could actually put that into their schedule, I think,  
2 legally, and that would certainly not be within the  
3 spirit and the intent of this. Is that a fair  
4 assessment, Bob?

5 MR. DENNIG: Right.

6 MR. BECKNER: And I would consider that an  
7 abuse.

8 MR. ROSEN: Right.

9 MR. BECKNER: And if that was done  
10 routinely -- if it was done because they couldn't get  
11 a part in at the last minute, so forth, that's I think  
12 what the purpose is here. But if they were scheduling  
13 it like that, that would be an abuse. And I think,  
14 like I indicated, I'm not sure that we don't need to  
15 think about that a little bit more.

16 MR. ROSEN: There's a very big difference  
17 between scheduling it and having it happen to you  
18 under some emergent condition.

19 MR. BECKNER: And you're right. I think  
20 we need to say that we're going to think about this a  
21 little bit.

22 MR. SIEBER: On the other hand, if they  
23 did have that practice, there isn't anything you could  
24 do about it. Right? Other than say boy, I don't like  
25 those guys.

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1 MR. BECKNER: I think -- that's what I'm  
2 saying. I think it's legal and it's probably safe  
3 but, you know, how safe is safe when you start  
4 abusing, pushing the envelope? You know, that's the  
5 problem.

6 MR. ROSEN: There may not be anything in  
7 a formal regulatory sense that you could do about it,  
8 but there's clearly a lot of things that the Staff  
9 could do about that kind of thing, simply by having a  
10 talk with the Chief Nuclear Officer at the place, and  
11 say this is making us uncomfortable. And most Chief  
12 Nuclear Officers that I know would take that very  
13 seriously.

14 MR. SIEBER: Yeah, but there might be an  
15 occasional one that says here's what it says. Here's  
16 what we're doing. We're okay.

17 MR. GRIMES: Yeah. But we also have the  
18 mechanism to use peer pressure. In some cases, the  
19 regulator doesn't necessarily jump in and point out  
20 bad practices, but what we'll do is we'll share that  
21 information with INPO and then we'll say, you know,  
22 what are the rest of your -- you know, what do your  
23 colleagues think about this kind of behavior?

24 MR. SIEBER: Yeah, I know how that works.

25 MR. ROSEN: What we're saying is there are

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1 effective mechanisms to bring patterns of abuse that  
2 are making the Staff uncomfortable to the attention of  
3 people who can change the pattern.

4 MR. TJADER: And we have written into the  
5 SE that we don't expect routine use of it.

6 DR. SALTOS: Actually, it's supposed to be  
7 unintentional, and not used for operational  
8 convenience to extend the surveillance testing  
9 interval.

10 MR. ROSEN: Right. So doing what we're  
11 talking about here attacks the very foundation, the  
12 premise of the program.

13 DR. KRESS: I have a question. Perhaps  
14 this is for Biff. If the industry's peer review  
15 process for the PRA, would it come in and say now this  
16 PRA is acceptable for use for this purpose? Would  
17 that be one of the findings of that peer review  
18 process?

19 MR. BRADLEY: Currently, the peer review  
20 process per se just -- it does look at all the  
21 technical elements of the PRA. It doesn't make  
22 recommendations about specific applications, but part  
23 of the guidance we're developing for DG-1122, which is  
24 coming out -- which is going to invoke the ASME  
25 standard, and we have what we call a self-assessment

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1 process. Once that standard comes -- once the Reg  
2 Guide comes out final early next year, all plants will  
3 have to do the self-assessment to look at not only --  
4 you know, use their peer review results, and use those  
5 to look at the ASME requirements. And one of the  
6 conditions we have in that self-assessment is that you  
7 would develop a statement of applicability. So while  
8 it's not explicit now in the peer review process, we  
9 are moving to the point where we will have developed  
10 a statement of, you know, what applications will this  
11 support. So the issuance of a standard, I think will  
12 -- in the Reg Guide will provide more meat on the  
13 bones of these types of decisions.

14 DR. WALLIS: All this discussion about  
15 abuse seems to assume that the general industry view  
16 of what is abuse, or INPO's view of what is abuse is  
17 somehow consistent with what you think here is abuse,  
18 and this may be true at the moment. I'm not sure it's  
19 always going to be true.

20 MR. BRADLEY: One comment I might add is,  
21 even under the current system of tech specs, you know,  
22 you have an AOT, and there's really no prohibition on  
23 how many times you enter that in, other than the  
24 things we've been talking about like the oversight  
25 process which you the hit on unavailability but, you

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1 know, any system is potentially subject to abuse. And  
2 all we're really trying to do here is provide more of  
3 a risk management --

4 MR. DENNIG: You can game the existing  
5 tech specs if you wish. That's entirely possible.  
6 They do not prohibit all kinds of imprudent behavior.  
7 In fact, (a) (4)'s impart a creation to control things  
8 that tech specs don't do a very good job in.

9 DR. BONACA: I agree that an organization  
10 like INPO and NEI have it all to play here, because I  
11 mean, I just want to remind that, you know, the reason  
12 why we have such outstanding performance right now in  
13 reactors really wasn't driven by tech specs. They  
14 were driven by an INPO commitment to zero defect, and  
15 all committed to following that principle of zero  
16 defects. You could run these power plants with 100  
17 delpins really, if you really go by tech specs, and  
18 yet nobody is running these power plants if you have  
19 more than five or ten pin fails. So I'm saying that's  
20 an example where the industry set the standard for  
21 itself, and polices itself, and the standard is well  
22 beyond what a tech spec requires, so I am not  
23 skeptical the possibility of having the industry  
24 itself setting up certain standards of behavior that  
25 they're using judgment. And power plants care very

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1 much about INPO and NEI think.

2 MR. ROSEN: Yeah, I think individually --  
3 but also there's the mechanism that if the Staff finds  
4 that there have been patterns of abuse and neither  
5 INPO, nor NEI, or individual licensees want to do  
6 anything about that, the Staff is always capable of  
7 going back and revising the tech specs, change it back  
8 to the way it was. I mean, to simply say this hasn't  
9 worked for us.

10 MR. DENNIG: Okay. We make it to  
11 Initiative 4. Okay. Almost halfway through. Okay.  
12 Well, this is kind of like the -- this is the  
13 centerpiece of discretionary capability on the part of  
14 licensees, and has the strongest reliance on that  
15 capability and ethos of the initiatives.

16 In its essence, this would allow a  
17 context-sensitive extension of a nominal of a time  
18 that's in your specs for completion time, allow you to  
19 extend that up to a maximum based on your  
20 configuration risk-management assessment.

21 DR. KRESS: Now would that maximum  
22 represent some sort of a cap on the temporary CDF  
23 status, for example?

24 MR. DENNIG: The metric for that, I guess,  
25 is a temporary change to its ICDP.

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1 DR. KRESS: ICDP.

2 DR. SALTOS: Yeah. The ICCDP is going to  
3 control -- for its out -- the equipment that you take  
4 out is going to control how long you can stay. You  
5 can stay more than the current AOT, depending on the  
6 plant configuration. But also, will be the risk  
7 metric for the delta CDF and delta LERF that will make  
8 sure the overall plant, or the risk would not increase  
9 on an average basis, on a yearly basis.

10 DR. KRESS: I have a question about that  
11 when apply the PRA with that piece of equipment out of  
12 service for a given amount of time, and try to  
13 determine the risk implications of it. Do you use  
14 Lambda T over 2?

15 DR. SALTOS: No. You use that only when  
16 you extend the surveillance time, the testing time.  
17 But you use the -- you calculate the increases in  
18 risk, what the condition of risk times the outage,  
19 which is a probability --

20 DR. KRESS: Times the real time.

21 DR. SALTOS: Yeah. And this can be  
22 statewide, because systems can go out and come in  
23 under repair. And when you reach a certain limit, you  
24 can not go any farther. And still there is a backstop  
25 also which cannot go back beyond that anyway.

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1 MR. DENNIG: And --

2 MR. LEITCH: Would it be proper to think  
3 of this as almost eliminating the request for  
4 enforcement discretion? It seems as though many of  
5 the requests for enforcement discretion relate to  
6 extending out of service times.

7 MR. DENNIG: I'd have to answer that yes.

8 MR. LEITCH: Or are we just really moving  
9 that decision-making process back to the licensee,  
10 rather than having --

11 MR. DENNIG: I think that is one way to  
12 conceptualize this. This initiative and others  
13 address areas where there have historically been NOED  
14 situations. The missed surveillance one is another --

15 MR. LEITCH: Right.

16 MR. DENNIG: -- opportunity for an NOED.  
17 So yes, one way to conceptualize this is that rather  
18 than having a context-specific conversation usually  
19 late on Friday afternoon about a situation, wherein we  
20 get information from the licensee about exactly the  
21 same kinds of things, what's the rest of the plant  
22 doing? What corrective or compensatory actions do you  
23 have in place? Well, we've stopped doing all  
24 maintenance on this. We're quarantined that. We take  
25 that information then and make a decision. I think

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1 it's fair to say what we're doing is saying okay,  
2 you've demonstrated to our satisfaction that you have  
3 the capability to use that same kind of information in  
4 a decision mechanism that we understand with certain  
5 limits. And yes, then we don't have to have this  
6 phone call.

7 MR. LEITCH: Yes.

8 MR. ROSEN: Now one of the ways of dealing  
9 with the Friday afternoon thing I described was to go  
10 to four day weeks, so then we'd have it on Thursday.

11 MR. SIEBER: Six day weeks.

12 MR. DENNIG: Okay. I guess the other  
13 point to make that hasn't been made so far, I guess,  
14 with regard to this one is that we are going to use a  
15 pilot plant approach. Industry is rounding up  
16 volunteers for --

17 MR. ROSEN: The usual suspects.

18 MR. DENNIG: Yeah, the usual suspects to  
19 pilot this concept, and we have in the coherence arena  
20 made a linkage between piloting this flexible  
21 completion time concept, and piloting the PRA  
22 technical adequacy standard that's now in play. And  
23 the -- I guess the other interesting aspect of this  
24 one is that that piloting process is not a tabletop  
25 exercise. It's kind of a live fire exercise, in that

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1 we would be dealing with an amendment where we would  
2 be amending somebody's license in a pilot application,  
3 if you will.

4 We're not aware of anybody in industry who  
5 wants to run dual programs for a while so that we can  
6 see how those would work. From industry's perspective  
7 it's -- you know, they would like to propose an  
8 amendment, have us review an amendment, and then be  
9 granted that amendment.

10 DR. WALLIS: This backstop, there's a  
11 risk-assessment to determine the backstop limit. It's  
12 conceivable to me that that limit might turn out to be  
13 longer than any reasonable person would grant.

14 MR. TJADER: I think the backstop is, is  
15 because you find that the interval is so long that  
16 it's beyond what you're willing to accept. In other  
17 words, the backstop might be 30 days when it shows the  
18 system could be out for 180 days or something like  
19 that.

20 MR. BRADLEY: The backstop as we're  
21 envisioning it right now is really purely  
22 deterministic. It's a hard stop, regardless of the  
23 risk significance. Because you're right, certain  
24 components on an ICCDP could go out for many months  
25 without incurring a large risk delta, and the back --

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1 the risk part of this, the ICCDP accumulation is  
2 controlled through the (a) (4) Plus Program.

3 DR. WALLIS: Well, I'm just reading the  
4 sentence, and they look to me is that the risk-  
5 assessment actually determine the backstop limits, and  
6 the backstop into something independent of the risk-  
7 assessment stops you --

8 MR. BRADLEY: That's right.

9 DR. WALLIS: Okay. Because the way the  
10 sentence is written, it could be that risk-assessment  
11 itself influences the backstop.

12 MR. DENNIG: Yeah. That's something  
13 that's hardwired into the spec.

14 MR. BECKNER: I think, Graham, the answer  
15 is more of what you said, it's a reasonableness limit.  
16 Like 30 days, you can fix anything within 30 days.

17 MR. ROSEN: Well, it's also a reflection  
18 of the fact that some things that are in tech specs  
19 and have requirements for surveillance tests and  
20 allowed outage times are actually a very low risk,  
21 probably shouldn't have been safety-related in the  
22 tech specs to begin with. So in those cases, it's not  
23 surprising to find that the risk analysis calculated  
24 1121 days of operation is okay.

25 MR. DENNIG: Right. Which would get us

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1 into Initiative 8.

2 MR. ROSEN: So at that point we say yeah,  
3 but you're running a risk-informed circumstance --  
4 program, not a risk-based program, so we'll put a  
5 deterministic backstop.

6 MR. BECKNER: Right. And again, it's more  
7 of what's reasonable. You don't want to go out  
8 forever. You want to put some reasonable limit on how  
9 far you're going to let that --

10 MR. LEITCH: In a situation where a plant  
11 has been granted this initiative, is the intention  
12 that the present allowed out of service times would  
13 still appear in the tech specs, and you can only get  
14 through these risk-based calculations if it looked as  
15 though you were in danger of exceeding those?

16 MR. DENNIG: Yes.

17 MR. LEITCH: Excuse me?

18 MR. DENNIG: Yes. You keep your current  
19 time, and that's the time you play off of to either  
20 get it done by, or have the risk analysis performed  
21 by.

22 MR. LEITCH: Okay.

23 MR. DENNIG: And it's kind of interesting,  
24 that -- part of the reason for having that in there is  
25 an operator concern. They like to have something

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1 concrete to play off of.

2 MR. LEITCH: Right.

3 MR. DENNIG: Rather than have something  
4 that says equipment out of service. Go talk to the  
5 planning and risk assessment operation and find out  
6 how long you've got to get it back.

7 MR. LEITCH: So it still does nominally --

8 MR. DENNIG: Yes.

9 MR. ROSEN: Now talk to me a minute about  
10 what happens if you're in one of those circumstances  
11 where you're using the risk-informed approach short of  
12 your backstop, and something else, some other  
13 additional failure occurs in the plant.

14 MR. DENNIG: You have to re-analyze.

15 MR. ROSEN: And it may have no affect on  
16 what you're doing, or it may have a significant  
17 affect.

18 MR. DENNIG: Right. You have to re-  
19 analyze.

20 MR. ROSEN: Okay.

21 MR. DENNIG: You have to see if that  
22 determination still stands up.

23 MR. TJADER: When multiple systems are  
24 out, the AOT could be much less than what's hardwired  
25 into the specs.

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1 MR. ROSEN: So this says that here's a  
2 case where a rudimentary, I hate to use the word --

3 MR. DENNIG: No, this is not --

4 MR. ROSEN: This is not the place to have  
5 --

6 MR. DENNIG: No. Nobody is going to want  
7 to play in this arena that does not have a -- who has  
8 not internalized a risk-management approach to the way  
9 they run their plant, and has a very sophisticated  
10 capability.

11 MR. BECKNER: And I think one thing too,  
12 we've dealt with -- we've talked about expectations.  
13 We'll also -- this will be enforceable. We will have  
14 commitments to things that industry is doing right  
15 now, but this will be a tech spec required program,  
16 mostly likely with certain attributes.

17 MR. LEITCH: So if I understood what was  
18 just said a minute ago, I just want to hear it again  
19 and make sure I heard it right, where you have a  
20 particular system out of service and you calculated an  
21 allowable out of service time which is longer than  
22 that nominal time that's in the tech specs, and then  
23 something else -- several other things go out of  
24 service, and you redo your calculation. And you come  
25 up with an allowable out of service time that is less

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1 than that number in the tech specs, than that is still  
2 governing in the situation.

3 MR. ROSEN: You may find yourself in the  
4 position where you have -- you're in 3.0.3.

5 DR. SALTOS: Well, the risk calculation  
6 you make doesn't make -- it's mechanics here. Right?  
7 Unless many systems, very important systems come out  
8 at the same time, that will jump out --

9 MR. DENNIG: Right. But if it turns out  
10 in the emerging condition that the restoration time  
11 for a high importance piece of equipment is going to  
12 be longer than the time that you show is acceptable,  
13 then you're going to have to come down in power.  
14 You're just going to have to give it up and come on  
15 down.

16 MR. ROSEN: Well, yes. And I think but if  
17 you step back for a minute and think about that  
18 circumstance, that's the right thing to do. Your  
19 analyses have now actually reflected the fact that the  
20 plant is a degraded and an up condition that the  
21 prudent thing to do is to take it out of the modes of  
22 operation where that degradation can have a  
23 significant impact on its ability to withstand the  
24 effects of an initiating event.

25 MR. DENNIG: Yes, that's the -- right.

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1       Instead of having a set of limiting conditions for  
2       operation that have conceptualized individual  
3       component states and limited actions for a limited set  
4       of configurations, we have the ability to use a system  
5       that looks at many configurations and adjusts  
6       completion times based on those configurations, so  
7       we've gone from pre-scripted scenarios for a limited  
8       number of configurations, to the ability to look at  
9       real-time --

10               MR. ROSEN: This is fairly sophisticated  
11       dynamic regulation.

12               MR. DENNIG: Yes. Well, Bob was using the  
13       term --

14               MR. LEITCH: That very point though, some  
15       critics may say that risk-informed regulation is  
16       really just a euphemism for relaxing things, but in  
17       that example, for example, to use that as an example,  
18       that's a case where the risk-informed regulation  
19       matches the situation at-hand, and actually may  
20       prescribe a more severe action than what might  
21       otherwise be required.

22               MR. DENNIG: Yes. I don't have any proof  
23       of this, but the general idea is that tech specs are  
24       only very -- they are conservative and limiting for  
25       one component at a time situation.

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1 MR. LEITCH: Yes.

2 MR. DENNIG: And (a) (4) in multiple  
3 component-out configuration assessment is more  
4 limiting than the tech specs for multiple components.

5 MR. ROSEN: Right. So this will more  
6 clearly reflect that.

7 MR. DENNIG: Right. So this brings the  
8 tech specs --

9 MR. ROSEN: A degraded plant could  
10 continue to operate through this, potentially, under  
11 the existing tech specs, would not be allowed to  
12 operate under these new rules. Well, it's this two-  
13 edged sword business.

14 MR. DENNIG: Okay. Initiative 5. This is  
15 somewhat separable from the other initiatives. It  
16 works in another area. This is the first time --

17 DR. KRESS: I'm still a little confused.  
18 Let's go back to 4. If I want to extend an outage  
19 time for some piece of equipment and I go to my PRA  
20 and calculate -- what do I calculate, an absolute CDF  
21 or a delta CDF?

22 DR. SALTOS: Calculate the core damage  
23 probability and early release probability.

24 MR. DENNIG: But you're going to do the  
25 delta CDF and then apply a time to that.

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1 DR. KRESS: Those are deltas.

2 DR. SALTOS: It is conditional times AOT.

3 DR. KRESS: Times AOT.

4 DR. SALTOS: We will have a limit on that.

5 If you list that --

6 DR. KRESS: Okay. You're --

7 DR. SALTOS: And that limit cancels the  
8 configuration of the plant.

9 DR. KRESS: So you're actually limiting  
10 the delta.

11 MR. DENNIG: Yes.

12 DR. KRESS: Which goes back to an old  
13 issue we had, that tends to penalize the good plants  
14 more than the poor plants if you could have the  
15 demarkation.

16 MR. ROSEN: No, I don't think so.

17 DR. KRESS: If we're only dealing in  
18 deltas.

19 MR. ROSEN: I don't think so. If you're  
20 really using the PRA to calculate the delta, then the  
21 PRA, if it's a good PRA, reflects "good plant's" more  
22 robust configuration, and the incremental risk for  
23 unit time is less for a plant with more robust systems  
24 than one that's not as robust.

25 DR. KRESS: Yeah, but you might want to

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1 reward him for that by letting him have a bigger delta  
2 because his absolute status of risk is so much lower  
3 than these other plants. Whereas, this restricts him  
4 to the same delta, even though maybe he'll meet that  
5 delta, but --

6 MR. ROSEN: Yeah. I think that's where  
7 the benefit comes in. And maybe all plants have the  
8 same maximum delta, but when a plant with only three  
9 tires gets there quicker than a plant with four tires,  
10 and so with less allowable time in that  
11 configuration.

12 DR. KRESS: Yeah, I still think there's a  
13 penalty there for the good plants. There is a little  
14 offset doing that.

15 MR. DENNIG: Initiative 5, Relocation  
16 Surveillance Test Intervals. The concept is one where  
17 the surveillance requirement, the requirement to  
18 perform the surveillance in its nature to the extent  
19 it's described in the tech specs, stays in the tech  
20 specs and the frequency column then just says in  
21 accordance with licensee's program to determine  
22 surveillance test interval. And there is a program  
23 that's described in Section 5 of tech specs, that  
24 would describe the attributes of that program for  
25 calculating those surveillance test intervals.

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1 DR. KRESS: What does this do for the  
2 licensee, give him the ability to change it --

3 MR. DENNIG: Well, certainly it does that,  
4 and that it does not require license amendment to  
5 adjust the surveillance interval.

6 DR. KRESS: Yeah. He gets away from --

7 MR. DENNIG: Right. It's my understanding  
8 that the Maintenance Rule adjusts surveillance or  
9 testing intervals, maintenance intervals in general to  
10 keep equipment healthy and minimize the number of  
11 maintenance-related failures. And in essence, this  
12 would allow a licensee using approved reviewed  
13 methodology to merge the adjustment of surveillance  
14 intervals in the same way that they can adjust  
15 maintenance intervals under the maintenance program.

16 DR. WALLIS: Can they cherry pick here?  
17 Can they just sort of pick the intervals where they  
18 think they're going to gain something by using risk  
19 insights, because some of these risk insights might  
20 actually lead to shortening of the interval, but they  
21 may choose not to adopt those, or not to apply for  
22 those. Do they have to do it across the board, or can  
23 they just cherry pick the ones that benefit them?

24 MR. DENNIG: Well, the history of the  
25 program is that we allow selective implementation.

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1 That's a good question.

2 MR. TJADER: But I think if they adopt the  
3 program, that the program would have to be applied  
4 consistently to all surveillance test intervals.

5 DR. WALLIS: You would say that? Okay.  
6 That's okay.

7 MR. TJADER: Yes. You wouldn't adopt a  
8 program and say it only applies to half your  
9 surveillances.

10 MR. ROSEN: Well, I think in practice what  
11 happens, Graham, is you start going down this road.  
12 You set up a committee or a system to do it --

13 DR. WALLIS: You do the whole thing.

14 MR. ROSEN: -- and those folks do it  
15 system by system, and they adjust it, and some of them  
16 get longer, and some of them get shorter. And that's  
17 just the way it is.

18 DR. BONACA: And this is, you know, a  
19 great initiative anyway, because I mean, long time ago  
20 used to be some of these intervals, they didn't have  
21 a reliability-base or anything. I mean, they were  
22 just picked from other tech specs at some other  
23 plants, and so there was not -- and now this is an  
24 opportunity to risk-inform it truly.

25 MR. ROSEN: And performance-base them, as

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1 well.

2 DR. BONACA: Yeah. Performance-base too.

3 MR. ROSEN: The committee that decides  
4 this is also looking at the experiences that there's  
5 no risk, and every time we go take them apart it's  
6 been fine. We're really hurting the reliability of  
7 the component by taking it apart. You should leave it  
8 alone. That's one way to reduce risk, is to recognize  
9 that fact.

10 MR. DENNIG: Okay. This is another  
11 initiative where we have CE Owners Group is active and  
12 others are going to benefit from their experience.  
13 This addresses those situations and technical  
14 specifications that we refer to as 3.0.3. shutdown  
15 situations. The general spec for -- where 3.0.3 is  
16 invoked is -- there are a number of way it's invoked,  
17 but the shutdown track itself is to begin an orderly  
18 shutdown within an hour, be in mode 3 in seven hours,  
19 and mode 5 in 37 hours. And owners groups, in  
20 particular GE Owners Groups believe that for -- and  
21 this is for situations where there's a loss of  
22 function as defined -- as bracketed by what's in the  
23 LCO. And in those situations, they feel that they can  
24 provide an argument for why there should be longer  
25 times provided to repair that equipment before

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1 proceeding to mode 5. And the underpinning for that,  
2 I understand is fairly quantitative as provided in the  
3 CE Owners Group topical, and Dr. Saltos is looking at  
4 that right now. But that's the gist of it, that  
5 particular aspect.

6 MR. ROSEN: Well, it's still a little  
7 puzzling, I guess. Maybe Nick can talk about it, but  
8 the way you get into 3.0.3 is like an all-encompassing  
9 spec. There's a lot of doors into 3.0.3. You can get  
10 into 3.0.3 from a lot of different circumstances, so  
11 how are you going to do some sort of bounding oh, it's  
12 okay. I can extend 3.0.3, when what gets you into  
13 3.0.3 may be an individual circumstance is what really  
14 matters. See what I'm saying?

15 DR. SALTOS: What we have here is a  
16 generic analysis and is applied to specific cases. In  
17 other words, we know that most HPCI problems are found  
18 to be inoperable, so we -- according to current  
19 regulations we're supposed to start shutting the plant  
20 down within an hour, so what this is going to do, it  
21 will go from one hour to four hours, so they can give  
22 some time. Many, many times they believe that the  
23 plant -- the system is not really inoperable. They  
24 want to find the paperwork or something, that they one  
25 more time to -- before they start shutting the plant

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1 down. And that will avoid, of course, the transition  
2 risk to having to shut the plant down. That's an  
3 example. There are some other systems also that are  
4 involved. Most of them are systems for radiological  
5 control that don't impact the CDF or LERF.

6 DR. WALLIS: You assume that giving more  
7 time and gathering more information might lead to not  
8 having to shut down, and therefore, that would be a  
9 less risky course of action.

10 DR. SALTOS: Basically what they do, they  
11 use the risk-informed regulatory guides, like 174,  
12 4177 to assess the risk, and using those, and they  
13 show the risk is not significant, and then they  
14 consider defense-in-depth and some other systems might  
15 be performing the same function. And based on that,  
16 they recommend a certain extension of the time to  
17 start shutting down. From one hour up to twenty-four  
18 hour period.

19 MR. ROSEN: So when we're talking about  
20 risk-informing 3.0.3, you're talking about in the  
21 context-sense of the --

22 MR. DENNIG: Yeah. I'm going to have to  
23 reword the way we portray this. Basically what it is,  
24 is those places where this "LCO 3.0.3 shutdown track"  
25 is invoked, they're being examined and replaced with

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1 a shutdown track that is analyzed in the context of  
2 the affected equipment. This is not a monolithic  
3 let's change 3.0.3 to be forty-eight hours before you  
4 shut down.

5 MR. ROSEN: Right. As long as its context  
6 sets that --

7 MR. DENNIG: Right. We've got to change  
8 the way we do these slides.

9 DR. BONACA: And there are cases where  
10 you're better off not to shut down.

11 DR. WALLIS: Well, this risk has to be  
12 evaluated ahead of time. This is a pre-evaluation, so  
13 you don't do it on the fly. You say oh, now let's do  
14 a risk-analysis, you're not quite sure if you want to  
15 shut down or not.

16 MR. ROSEN: No. I think in this case what  
17 I understand you're talking about is doing all that  
18 analysis up front and allowing it for certain context-  
19 sensitive situations, but not for others.

20 MR. DENNIG: Right.

21 MR. TJADER: But if there are multiple  
22 systems out again, the risk-assessment would take that  
23 into consideration.

24 MR. ROSEN: Right. There's always got to  
25 be the emerging circumstance where you allow someone

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1 to stay out of 3.0.3 because the context is okay.  
2 Then something else happens, changes the context.

3 MR. DENNIG: Seven - Risk-informing  
4 support equipment impact. This one is kind of tied up  
5 in the way tech specs are done, and where the  
6 boundaries are drawn between equipment covered in tech  
7 specs and equipment outside of tech specs that affects  
8 the performance of the equipment in tech specs.

9 The basic thought is that there are some  
10 features like snubbers that provide seismic support,  
11 and barriers that provide flood protection, that in a  
12 strict interpretation of operability as it applies to  
13 tech spec equipment cause you to declare tech spec  
14 equipment inoperable, and enter completion times,  
15 action statements and completion times. And that  
16 under the circumstance, the degradation represented by  
17 the lack of the barrier, the removal of a snubber,  
18 that the provided completion time for the supported  
19 equipment in tech specs is too severe. It's not  
20 appropriate. It's not commensurate with the risk  
21 posed by the degradation of the supporting equipment,  
22 and so industry is proposing a -- basically so far  
23 just an approach that attempts to parse the risk  
24 looking at initiators that are involved and the  
25 importance of affected equipment, to demonstrate that

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1 there should be additional time permitted with  
2 supporting features outside of tech specs that are  
3 degraded beyond that what's just allowed by the  
4 completion time that's in the spec for the support  
5 equipment, so we're still working on that.

6 One way to think about this is that it is  
7 in some sense a risk-informing of operability, which  
8 is something we are conceptualizing for capital  
9 operability for stuff inside of tech specs, and this  
10 kind of starts with operability as it relates to  
11 supporting functions outside of tech specs. Sort of  
12 risk-informing that notion.

13 DR. BONACA: Those are the conditions that  
14 are normally called functionable but not operable.  
15 They're using that --

16 MR. DENNIG: That's part of the picture,  
17 is how to make those distinctions, and what does that  
18 -- and to better define that distinction.

19 DR. SALTOS: Basically, they are  
20 functional, except for very low frequency conditions,  
21 like a fire is going to start in the next room and  
22 propagating here an earthquake is going to --

23 DR. BONACA: Then the probability is tied  
24 to the --

25 MR. SIEBER: External flood or something

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1 like that.

2 DR. BONACA: Or a seismic event.

3 MR. LEITCH: So this would strike to the  
4 definition of operability then. In other words, I  
5 mean, there's a very sharp line now between systems  
6 that are operable and systems that are not operable.  
7 And this is sort of a quasi-operable status defining  
8 that, if I understand what you're saying.

9 MR. DENNIG: We've broached that subject  
10 before in this notion of degraded but operable, in  
11 terms of the equipment that's in specs, and as I said,  
12 we have, in another area we're revising some guidance  
13 on operability, and this is part of that whole re-  
14 view of what operable means, and how could one risk-  
15 inform that concept, should one risk-inform that  
16 concept.

17 MR. ROSEN: I think that's very good.

18 MR. DENNIG: Initiative 8 - Risk-informing  
19 tech specs. Comes in two flavors, short-term/long-  
20 term. One portion of this initiative seeks to look at  
21 systems that are, or LCOs that are currently in  
22 specifications, and refine arguments about whether  
23 they are or not risk-significant. There are certain  
24 things that are in tech specs, that as a result of the  
25 final policy statement in '93 were declared to be

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1 risk-significant, and are in technical specifications.  
2 That's RCIC residual heat removal, standby liquid  
3 control, recirculation pump trip, and remote shutdown  
4 instrumentation, that one might with refined risk-  
5 analysis somehow argue that those things are not risk-  
6 significant, and then have them relocated out of  
7 technical specifications. And as I say, that's a  
8 short term issue, but it does get into providing a  
9 better understanding of what it is -- how it is we  
10 decide if something is risk-significant or not in  
11 accordance with Criterion 4, which says that, "A  
12 structure, system or component which operating  
13 experience or Probabilistic Risk Assessment has shown  
14 to be significant to public health and safety." And  
15 this is where the coherence aspect comes in with the  
16 categorization schemes based on risk, and we want to  
17 make sure that we interpret risk in this venue as far  
18 as determining what equipment has to be in specs in a  
19 coherent way with how similar decisions are being made  
20 elsewhere. And that thought carries over into the  
21 more ambitious aspect of Initiative 8, which is where  
22 we conform the scope of tech specs to be the risk-  
23 significant SSCs. And somehow get away from the other  
24 criteria that are currently in 50.36 that relate to,  
25 I hate the term, but deterministic or design-basis

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1 reasons for why things are in technical  
2 specifications, installed instrumentation for  
3 detecting leakage, process variables, operating  
4 restrictions, and primary success paths that rely on  
5 some risk conceptualization to draw the boundary  
6 around those things that have to be in tech specs.  
7 And that's a rule making thing. And that's what I  
8 have.

9 MR. ROSEN: Very interesting.

10 MS. WESTON: I have a basic question, Bob.  
11 I assume that these initiatives have a starting point  
12 at the standard tech specs, that the assumption is  
13 that the licensee has the standard. Is that a fair  
14 assumption?

15 MR. DENNIG: No. That's an assumption for  
16 the formulation of the generic translation from the  
17 concept end of the specs.

18 MS. WESTON: Okay.

19 MR. DENNIG: Okay? But there is no  
20 prohibition on a plant that hasn't converted to  
21 picking up these initiatives. There's just additional  
22 work that we have to do. For example --

23 MS. WESTON: You will treat it on a --

24 MR. DENNIG: -- Initiative 2, we have --  
25 yeah. We have non-converted plants coming in to pick

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1 up Initiative 2, Missed Surveillance Flexibility. And  
2 we look at their formulation of how it's implemented  
3 in their specifications to make sure it has the  
4 attributes, the supporting attributes that are found  
5 in the standard. And if they don't -- if it's not  
6 there, then we tell them they've got to put it in, and  
7 Bob Tjader can speak to that. We look at every one of  
8 those and advise the PMs, Project Managers, on whether  
9 or not this particular plant's formulation of that is  
10 acceptable. And so yeah, there's more work. There's  
11 just more work if you don't have a standard.

12 MR. ROSEN: Now I understand, Mag, is that  
13 we're going to be asked to write a letter on this. Is  
14 that right?

15 MR. DENNIG: We weren't looking for one.

16 MS. WESTON: They aren't looking for a  
17 letter.

18 MR. DENNIG: No. We're just --

19 DR. KRESS: Is this on next week's agenda?

20 MS. WESTON: Yes, it is.

21 MR. ROSEN: Just for me to brief the rest  
22 of the Committee.

23 MS. WESTON: No. It's on for presentation  
24 from them.

25 MR. ROSEN: Okay. So there's no letter,

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1 and no briefing by me. It's just you guys come back  
2 and kind of shorthand this thing for the Full  
3 Committee.

4 DR. KRESS: Bob has to go every  
5 initiative. Question on a slide submission. Option  
6 2 uses risk-importance measures to determine risk-  
7 significant SSCs. In the past, the ACRS has had a  
8 little bit of difficulty with that. For example, how  
9 do you set the threshold, and do you thresholds, and  
10 how do uncertainties enter into that. You figure that  
11 that will get ironed out under Option 2 somehow, and  
12 then you're all right by using the same SSCs here. Is  
13 that --

14 MR. DENNIG: Frankly, the degree to which  
15 we've pursued that line of thought is - somebody else  
16 speak up if they're thought about it more than I have  
17 - is just that there has to be some conceptual  
18 coherence between how we're doing it in one place, and  
19 how we're doing it in the other, so we're not --

20 DR. KRESS: Oh, I understand that. Yeah.

21 MR. DENNIG: You know, that's really  
22 important, and you have to have special treatment for  
23 that. But oh by the way, it doesn't have to be in  
24 technical specifications.

25 MR. BRADLEY: I'll take a shot at it

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1 maybe. We are aware of -- we've had considerable  
2 dialogue with the Staff and with ACRS on the 50.69  
3 Guidance, sensitivity studies, importance measures,  
4 all of those issues. And we do believe in the course  
5 of finalizing that, we will resolve all those issues.  
6 And we see no reason that, you know, once that's done  
7 that the Guidance of 50.69 and the guidance for  
8 categorization wouldn't apply here, and that there's  
9 no need to go reinvent the wheel in tech spec space.  
10 We think we're going to have every aspect you need to  
11 consider for categorization in there by the time we're  
12 done with that.

13 MR. ROSEN: I think trying to do other  
14 than what this suggests wouldn't make any sense at  
15 all. It would create questions about the approach.  
16 Okay. Well, I see that the time is ten minutes after  
17 ten.

18 MS. WESTON: For our Full Committee we  
19 would ask that you limit the background information  
20 and introductory kind of information because we have  
21 limited time.

22 DR. KRESS: How much time?

23 MS. WESTON: One and a half hours.

24 MR. DENNIG: What we did -- we've done  
25 this before. We -- I don't think I mentioned at the

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1 beginning, but we briefed -- on April 28th, 2000, we  
2 briefed the combined Subcommittees on what we were  
3 doing in this area, and we came back on May 11th and  
4 reprised for the Full Committee. And what we did  
5 there was we reflected on what we had heard from the  
6 Subcommittees and fed that back to the Full Committee.

7 DR. KRESS: You know, this Subcommittee  
8 didn't take much longer than an hour and a half. But  
9 you know, you don't have to show it in this version.

10 MS. WESTON: No, we're still --

11 DR. KRESS: Because we've already asked  
12 our things. Now we just --

13 MR. ROSEN: Now Dana and George could take  
14 up as much time as this whole Subcommittee.

15 MS. WESTON: Right. You still have the  
16 same amount of time.

17 DR. BONACA: Is there a portion of that  
18 full meeting session in case --

19 MS. WESTON: No. The Industry Trends  
20 Program will not be presented at the Full Committee.  
21 No.

22 DR. WALLIS: I think they should.

23 MS. WESTON: Sorry.

24 MR. ROSEN: So you have to come back, and  
25 we'll look forward to seeing you again. Now we'll

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1 stay on break until 10:25. Thank you. 10:30.

2 (Off the record 10:16:53 - 10:42:49 a.m.)

3 MR. ROSEN: We are back in session now.

4 I remind you all that a transcript of this meeting is  
5 being kept, and will be made available as stated in  
6 the Federal Register notice, and it's requested that  
7 speakers use one of the microphones available,  
8 identify themselves, and speak with sufficient clarity  
9 and volume that they can be readily heard. And we are  
10 here to discuss the Industry Trends Program, and  
11 Integrated Industry Initiating Event Indicator, I  
12 guess. Mr. Tom Boyce.

13 MR. BOYCE: Good morning. I'm Tom Boyce  
14 of the Inspection Program Branch of NRR. With me  
15 today is Cindi Carpenter, my Branch Chief, and David  
16 Gamberoni, my Section Chief of the Office of NRR.  
17 I'll be opening up the presentation, and then turning  
18 it over to Dale Rasmuson of the Operating Experience  
19 and Risk-Assessment Branch of the Office of Research.  
20 And with Dale is Pat Baranowsky, the Branch Chief in  
21 Research.

22 The main focus of this presentation is on  
23 a developmental effort that research is doing in  
24 support of the Industry Trends Program. And what  
25 we're attempting to do is look at the most significant

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1 initiating event indicators and bring them together at  
2 the industry level into a single index. And we've  
3 tried to settle on an acronym, and I think we came up  
4 with IEP, although I think Dale's got another I on  
5 there, but that's the acronym you're going to see.

6 I thought I'd open up with an overview of  
7 the Industry Trends Program. You've seen this pitch  
8 before in the May time frame, and I've shrunk it down  
9 a bit, but it's to refresh your memory on where we are  
10 with the Industry Trends Program, and then I was going  
11 to turn it over to Dale to describe the IEPI.

12 Just keep in mind that this is a  
13 developmental program. We anticipate coming back to  
14 you on this and other aspects of the Industry Trends  
15 Program in the future. We've covered that slide. If  
16 I had more time, I was going to replace the eagle with  
17 a Jack-O-Lantern, but I couldn't do it.

18 MR. ROSEN: That's all right. Next year.

19 MR. BOYCE: Next year. Right. Well, it  
20 was going to be on -- the briefing was going to be on  
21 October 31st, and I got pushed back by one day so  
22 we'll do it next year.

23 Just to give you a frame work of where we  
24 are, I picked one of the indicators that we're using  
25 in the Industry Trends Program, and if you recognize

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1 this, it's one of the indicators that was used by the  
2 former office of AEOD as part of their PI program.  
3 The Office of Research picked up the indicator  
4 program, and it was in the Office of Research for a  
5 couple of years in Pat's branch, and then it shifted  
6 over to NRR, and I'll get to that in a second. But  
7 what you're looking at is automatic scrams while  
8 critical, and we've kept good data since about 1988.  
9 And as you can see, it's a downward trend. This would  
10 obviously not be an adverse trend. An adverse trend  
11 would be one that would be sloping slightly upwards.

12 This is what we're going to cover today.  
13 I'm going to give you some background. I'll go over  
14 the purposes and role of the Industry Trends Program,  
15 how we communicate with our stakeholders, some of the  
16 concepts that we used in developing the Industry  
17 Trends Program, our process for industry trends, and  
18 give you a snapshot of some of the development efforts  
19 that are currently ongoing.

20 MR. LEITCH: Back on the first slide,  
21 there's some equations there. Do those equations --  
22 does that describe the line?

23 MR. BOYCE: It describes the trend line,  
24 and I think it's simple linear regression.

25 MR. LEITCH: Uh-huh.

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1 MR. BOYCE: And the R value tells you the  
2 goodness of fit for the line on the data.

3 MR. LEITCH: Okay. Thanks.

4 DR. KRESS: Is there any reason why you've  
5 chosen exponential --

6 MR. BOYCE: Actually, I think you can.

7 DR. KRESS: It's because it'll never go  
8 zero. Is that one reason?

9 MR. BOYCE: Well, not explicitly, but --

10 MR. RASMUSON: If I could answer that for  
11 you, basically it's the model that fit the data the  
12 best.

13 DR. KRESS: Okay. You've got the best R  
14 out of the process.

15 MR. ROSEN: I think besides the fact that  
16 things are getting better, I think the other thing you  
17 should realize is they haven't gotten any better since  
18 1997. It's been five years.

19 MR. BOYCE: Yeah. Actually, that kind of  
20 jumps to one of the points I was going to make later  
21 in the presentation. But the point that was just made  
22 is if you look at about 1997, you could almost if you  
23 wanted to draw two lines. A line from here to 1997,  
24 and a line from 1997 on, and from 1997 on, you could  
25 draw a flat line. And I'll come back to that in just

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1 a second.

2 DR. SHACK: It's just the way the report  
3 has it.

4 MR. BOYCE: Oh, the research report? It  
5 gives you -- well, as background, improving industry  
6 trends contributed to the decision to revise the  
7 Reactor Oversight Process in 1998 and 1999. As you  
8 recall, we initiated the revised Reactor Oversight  
9 Process in April of 2000.

10 At that same time, the NRC Strategic Plan  
11 was revised, and it incorporated a new performance  
12 goal measure of no statistically significant adverse  
13 industry trends in safety performance. The NRC  
14 reports on these performance goal measures annually to  
15 Congress as part of its Performance and Accountability  
16 report, so partially in response to that, NRR  
17 initiated a formal Industry Trends Program to make  
18 sure we could report against that Performance Goal  
19 Measure, and also to monitor how conditions were  
20 continuing under the current Reactor Oversight  
21 Process.

22 We built on the work that was done by the  
23 Office of Research, and as I said, it was kind of a  
24 descendant of the work that was done by the former  
25 Office of AEOD as part of their PI program. NRR and

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1 Research provided an initial report in the first SECY  
2 listed, and we've provided our second annual report in  
3 SECY-02-0058, which I believe you've all been provided  
4 a copy of.

5 We briefed you in May. We also briefed  
6 the Commission as part of the Reactor Oversight  
7 Process in May. And the bottom line is we've  
8 identified no adverse industry trends to date.

9 MR. LEITCH: Over what -- it seems to me  
10 you have to have a time period which you're examining.  
11 Is there one particular standard time period that you  
12 looked at?

13 MR. BOYCE: Well, we report to Congress.  
14 We reported each of the last three years, I believe,  
15 and so we've looked at each fiscal year. And so we've  
16 made the call, there's been no adverse trends in each  
17 of those fiscal years. And what we use as our basis,  
18 if I could go back, and I'll be jumping ahead a little  
19 bit. We have eight indicators that we use to make the  
20 call of no adverse trends, and we draw that trend  
21 line. And if we're here, and we're looking back at  
22 fiscal year 2001, we would still -- we would say that  
23 in fiscal year 2001 there were no adverse trends  
24 identified based on the long-term downward slope of  
25 that trend line.

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1 MR. SIEBER: What if in 2002, the number  
2 came out .7. That, to me, over the last five years  
3 would be an adverse trend. Would you report it that  
4 way, or would you say well, you know, fifteen years  
5 ago we were really terrible, and so we look good now.

6 MR. BOYCE: Another really good question.  
7 What we did was define trends to be over a long period  
8 of time, and in this case, 1988 using this indicator.  
9 But what we were concerned about was if we do that, we  
10 will miss those short-term up-ticks, but we didn't  
11 want to get into knee-jerking to indicators that went  
12 up slightly, and so we actually developed a concept,  
13 a statistical approach where if it went above a  
14 prediction limit, as we call it, a statistical  
15 approach based on 95th percentile prediction, that if  
16 it went above this limit, something was occurring  
17 beyond random variation in the data. And that was  
18 articulated in both of those SECY papers.

19 In fiscal year 2001, we did have two  
20 indicators that did go up above the prediction limit,  
21 that turns out automatic scrams while critical was one  
22 of those. I think the prediction limit was 0.55 and  
23 we were at 0.57, so we did do an investigation. The  
24 results are in the SECY paper, but we concluded after  
25 going through it that there was nothing that was

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1 significant that we needed to comment or, or report to  
2 Congress. So I guess to rephrase that, we used a  
3 short-term approach called "Prediction Limits", but  
4 it's not an adverse trend. It's just a means to  
5 detect short-term up-ticks and detect them before they  
6 manifest themselves as adverse trends. Okay?

7 MR. SIEBER: Well, I think it's good that  
8 you're doing something about the short-term anomalies  
9 that occur. You know, I think that's the right thing  
10 to do.

11 DR. WALLIS: I think to define an adverse  
12 trend as deviation from the historical trend, which is  
13 not necessarily adverse. I mean, this is going to  
14 level off at some time, so you may at some time have  
15 to draw a horizontal line instead of the exponential,  
16 and use that as the baseline.

17 MR. BOYCE: I think you're correct. Let  
18 me try and walk through a couple of more slides, and  
19 we'll tell you how we're trying to approach that  
20 problem. This slide outlines some of the purposes of  
21 the ITP and how it fits into the existing framework of  
22 NRC process. It provides a means to confirm that the  
23 nuclear industry is maintaining the safety performance  
24 of operating power reactors, and we hope that by  
25 clearly communicating that performance, we will

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1 enhance stakeholder confidence in the efficacy of the  
2 NRC's processes.

3 It's not intended to replace the plant-  
4 specific oversight that's provided by the reactor  
5 oversight process. That really is how we're looking  
6 on a plant-by-plant basis at how safety is being  
7 maintained, but it is the picture from 10,000 feet.  
8 And if we see a problem at 10,000 feet, we would turn  
9 it over to our generic communications process, which  
10 includes a cost benefit-type of look at whether we  
11 need to expend resources on it, or we would turn it  
12 over to the generic safety issues process in the  
13 Office of Research.

14 MR. LEITCH: What concerns me is that you  
15 may not see a problem from 10,000 feet and draw the  
16 wrong conclusion. In other words, what we're really  
17 looking for I think in most cases is not the average,  
18 but the outliers, for example, just to use this data.  
19 And if you had one plant that was having ten scrams  
20 per year, the industry average might not be affected  
21 by that yet, but yet it is a significant issue, but it  
22 wouldn't be revealed with this program.

23 MR. BOYCE: That's right. And that's why  
24 this program actually compliments that plant-specific  
25 oversight. Assuming your example of ten scrams per

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1 year, Reactor Oversight, that would have tripped the  
2 green-white threshold, at least for the ROP, and so it  
3 would be addressed under the ROP on a plant-specific  
4 basis. And we are just trying to see okay, even if  
5 everybody's below all thresholds, do we still have a  
6 problem, and that's what this program is trying to  
7 pick up.

8 MR. LEITCH: Would you say that this is  
9 primarily directed towards outside? I mean, it seems  
10 to me it's -- I'm not real sure what the value of this  
11 program is with respect to internal NRC actions. I  
12 mean, so you make a report to Congress based on this  
13 data.

14 MR. SIEBER: That's a good reason to do  
15 so.

16 MR. LEITCH: Yeah. It's a very good  
17 reason to. Yeah. What I'm saying is, does this  
18 initiate any internal actions by the NRC?

19 MR. BOYCE: Well, we're still feeling our  
20 way through the issue. I mean, the Office of AEOD did  
21 not tie the indicators to specific actions. We are  
22 attempting to do that, and what we've said is that we  
23 would look at using generic communications. It may be  
24 something as easy as an information notice. You know,  
25 we would do some initial research on our own, and try

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1 and see if we could come up with some contributing  
2 factors. And if they were significant, we would  
3 publish some form of generic communications. We  
4 haven't done that yet. And the example that we've  
5 done so far is the investigation where we exceeded the  
6 prediction limits.

7 MR. SIEBER: Uh-huh.

8 MR. BOYCE: And that data is in, I  
9 believe, Appendix 3 to that SECY paper. And we took  
10 automatic scrams while critical, which went up  
11 slightly, and we broke it down into its constituent  
12 components, and we looked at whether it was manual or  
13 automatic scrams were changing. We looked at the  
14 causes of the scrams. We looked at the plant  
15 conditions at the time of the scram, you know, whether  
16 they were start-up, shutdown, at-power, low-power,  
17 high-power, that sort of thing. And then we tried to  
18 graph all those and look for trends there. And the  
19 bottom line is we didn't find anything, but that's the  
20 approach that we would take. And if we did find  
21 something, then we would probably consider publishing  
22 that information in an information notice. But we  
23 haven't gotten there yet, and so I don't have a good  
24 example to point to to say this is exactly how we'd  
25 approach it.

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1 MS. CARPENTER: This is Cindi Carpenter  
2 from NRR. That's one of the things that we need to  
3 be looking at as we continue the development of this  
4 program, is what action when they exceed different  
5 limits or thresholds, what action should the agency  
6 take, so that's going to be part of the development of  
7 those.

8 MR. LEITCH: Okay. And I guess really  
9 what concerns me is not so much -- well, that's one  
10 issue, what action do you take when you see a change,  
11 but we also have to be careful that we don't infer  
12 that everything is okay when we don't see a change,  
13 because the view can be lost in the many here, is what  
14 concerns me. But there are other programs, as you  
15 quite properly pointed out --

16 MS. CARPENTER: Exactly.

17 MR. LEITCH: -- that should focus on the  
18 few.

19 MS. CARPENTER: Right.

20 MR. BOYCE: And one of the things -- I'm  
21 actually well ahead of my slides now, but one of the  
22 things that we were looking at doing was although we  
23 have a subset of indicators that are at a high level  
24 that we're saying where we're going to make the call  
25 and report to Congress, there's nothing stopping us

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1 from taking a look at numerous indicators. And if we  
2 see something in those numerous indicators, we could  
3 pursue it. And you'll see that we are developing  
4 additional indicators, and we haven't, as we call it,  
5 qualified them for use for reporting to Congress. But  
6 I think we're up to on the order of 25 to 30  
7 indicators, so we hope that we have a relatively  
8 robust set of indicators by the time we're done, and  
9 we're always looking to develop additional indicators.  
10 Hence, the initiating event performance index that  
11 you'll see here, and also the sequeing a bit, in that  
12 SECY paper 02-058, there were ten indicators for  
13 initiating events that we included in one of the  
14 appendices, and we're rolling that up into a single  
15 indicator that we would hopefully foresee as our  
16 report to Congress, although we would monitor at the  
17 lower level.

18 MR. LEITCH: Thank you.

19 MR. BOYCE: Okay. This is how we  
20 communicate with our stakeholders. We communicate in  
21 a variety of ways. We provide status of ongoing  
22 development efforts to industry as part of an NRC  
23 industry working group on the Reactor Oversight  
24 Process. And I guess we've done this about quarterly,  
25 but I'd also characterize those discussions as still

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1 in the early stages. Every time I brief, I get a  
2 little bit more feedback, and a little bit more help,  
3 so I think we've got a ways to go there too.

4 We published the industry indicators on  
5 the NRC's website. They've been there for the past  
6 year. We've provided an annual review at the Agency  
7 Action Review Meeting, and we also provide an annual  
8 report to the Commission. I already told you we  
9 reported to Congress annually, and many of our senior  
10 managers use these indicators at various presentations  
11 at conferences with industry.

12 I've alluded to a lot of what's on this  
13 slide.

14 DR. WALLIS: I'd say I have used these in  
15 courses in university.

16 MR. BOYCE: Well, I just -- let me add  
17 that bullet. Well, thank you for that feedback.  
18 That's -- Senior Management. All right. We started  
19 by --

20 DR. WALLIS: It's the public, not  
21 management.

22 MR. BOYCE: Okay. To develop our initial  
23 set of indicators, we used the indicators in the  
24 former Office of AEOD PI Program. There are seven  
25 indicators. We also are using one of the indicators

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1 out of the ASP Program. To refresh your memory, what  
2 we're using is total counts of significant ASP events  
3 as our indicator, and that's also in that SECY paper.

4 We're developing additional indicators,  
5 which I alluded to before. We're trying to aggregate  
6 the information supplied by all plants as part of the  
7 ROP, and do single indicators. And that amounts to  
8 nineteen additional indicators that we're currently  
9 developing. We're developing PIs from operating  
10 experience, and you'll hear more about one of those in  
11 just a second.

12 I already alluded to this hierarchal  
13 approach, that means we have a qualified subset of our  
14 indicators we use for reporting to Congress, but if we  
15 do see a problem, we would break it down into its  
16 constituent components, and look for problems.

17 This is our current process for industry  
18 trends. Basically, we're trying to identify whether  
19 any adverse trends exist. If any did, we would  
20 evaluate the underlying issues and assess the safety-  
21 significance, and then we would take appropriate  
22 agency response in accordance with existing processes.  
23 And finally, the program is reviewed annually at the  
24 Agency's Action Review Meeting.

25 To come back to Mr. Wallis' question I

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1 think earlier, the way we identify adverse trends  
2 right now is we apply a statistically fit trend line  
3 to the data. I showed you that graph before on  
4 scrams. We apply that trend line. If the trend line  
5 is, as we call it, improving or flat, there's no  
6 adverse trend. And we don't say declining, but  
7 sometimes an improving trend could actually be going  
8 up, but we call it improving or flat. There's no  
9 adverse trend, and you're done as far as reporting to  
10 Congress.

11           However, if there is a degrading trend  
12 line, meaning the trend line in general would be  
13 sloping up, that is considered adverse, and we would  
14 report that to Congress and initiate an evaluation.

15           DR. KRESS: Now just a sloping up is all  
16 the criteria you need? You know, I would have thought  
17 you did this statistical analysis to get rid of some  
18 randomness, and require it to see a certain threshold  
19 or something.

20           MR. BOYCE: Yeah. And I think what we're  
21 saying is, is you've got to -- it's got to be a good  
22 fit. And I think we said like at the 95 percent  
23 confidence level, you can draw that trend line. Some  
24 of the indicators, not the ones -- some of the ones  
25 even in the AEOD PI Program, you can draw a trend

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1 line, but you won't get a 95 percent fit. And so  
2 actually, for that case, even if you had a trend line  
3 that would have been sloping up, if you could draw it,  
4 it's not an adverse trend because it's not  
5 statistically significant. Okay? But that's only one  
6 part of the answer.

7 If it's going up by .05, you know, degrees  
8 or something, whatever the right value is there. If  
9 it's only going up by .05, the quandary we find  
10 ourselves into is that's nearly flat, so how do you  
11 report to Congress that it's just that slight upward  
12 slope? And so what we're trying to do to solve that  
13 problem is go away from a trends-based approach into  
14 more of what we're calling a thresholds-based  
15 approach. And again, a description of that is in both  
16 SECY papers, but for scrams, for example, in 1988 we  
17 were at about 2.4 scrams per plant per year, automatic  
18 scrams per plant per year. And in 2001, we're at .57  
19 automatic scrams per plant per year, so even if the  
20 trend went from .57 to 1, which would be adverse, it  
21 still may not be significant from a safety  
22 perspective, so our challenge is to try and come up  
23 with a threshold below which - I hesitate to use the  
24 term it's below regulatory concern because of the  
25 connotation that that brings up - but below which we

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1 would not -- we would monitor, and we would look for  
2 emerging trends so that we could correct them before  
3 they became safety significant. But we wouldn't  
4 necessarily take action until it crossed that  
5 threshold, so we're trying to get to a threshold-based  
6 approach rather than a trends-based approach, and I  
7 hope that answers your earlier question about we're  
8 approaching it as --

9 DR. WALLIS: Well, that's very different  
10 though. I think that thresholds for agency action are  
11 one thing, but trends that you show the public are  
12 different. I mean, showing that all these indicators  
13 are improving exponentially is a very good thing for  
14 public relations, and if you start now saying ahh, but  
15 if it's going to go up to 1, which would be an adverse  
16 trend in that sense, we're not going to do anything  
17 because we have a threshold, that's changing your  
18 purpose of your trends program.

19 MR. BOYCE: Well, you're correct.

20 DR. WALLIS: In other words, changing this  
21 particular public use of the trends program.

22 MR. BOYCE: You're correct. We would have  
23 to consider the presentation, and hopefully, the trend  
24 line that we drew. And I'm jumping to where a  
25 threshold might be, but I hope the threshold might be

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1 at say three scrams or higher.

2 DR. WALLIS: Yes.

3 MR. BOYCE: Okay? And so any trends that  
4 we show would be underneath the threshold. I hope  
5 when we develop thresholds, we --

6 DR. WALLIS: Well, I think you need to  
7 have a trend which has a message, and then you need  
8 another message which is when do you take action, and  
9 that means where you bring in thresholds.

10 DR. BONACA: Well, as you pointed out, I  
11 mean when you look at the number of scrams, three  
12 probably would be the threshold because right now the  
13 ROP would suggest that. But the point is that if you  
14 didn't try to have a trend from 0.52 in 2000, and .057  
15 in 2001 to one and a half over a couple or three  
16 years, that would be very significant in so far as the  
17 trend. And I think if you go to the concept of  
18 thresholds, you should go into -- base what -- an  
19 amount of information?

20 MR. BOYCE: Well, again, the fact that you  
21 had a three year, or even a five year trend, we could  
22 still be monitoring that, and we could still be  
23 putting out information notices, but you still have to  
24 make some judgment as to the safety significance, or  
25 you should. Otherwise, you know, you're putting out

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1 information notices, and perhaps spending resources  
2 where it wasn't appropriate. So if it's possible to  
3 draw that threshold, you would do it.

4 DR. BONACA: We had examples of previous  
5 presentations of a number of I think risk-informed  
6 relaxations in the tech specifications, and there we  
7 all supported those kind of initiatives. This present  
8 concern about safety culture consequences of, for  
9 example, not reporting any more surveillances or  
10 whatever. And this -- the trending system to me is  
11 very significant, in that it's giving me some warning  
12 or some information that I know is comforting, that  
13 says, you know, we are going to risk-inform approach  
14 by using the ROP. We're always expressing some  
15 concern about look, the trends are good. There are no  
16 increasing trends, so the trending, I guess, is very  
17 significant to me, so I guess I'm making a pitch for  
18 the approach we're following right now.

19 MR. BOYCE: Okay.

20 DR. SHACK: There's this question of  
21 whether we're measuring safety or performance.

22 DR. BONACA: I understand.

23 DR. SHACK: I think the thresholds may  
24 tell you something about safety, but I think the trend  
25 lines tell you much more about performance.

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1 DR. BONACA: That's right. And, you know,  
2 it tells you something about the way you regulate the  
3 industry. It speaks about how the industry is being  
4 regulated, it seems to me, because if you go to, as  
5 we're doing now, a performance-based risk-inform  
6 approach, and you still have trends that actually are  
7 improving, that's a significant statement regarding  
8 the regulatory approach we have chosen. And  
9 conversely, should you have regular trends, then maybe  
10 you should question whether or not something that you  
11 are doing as you're regulating the industry is wrong,  
12 so I think this is a significant piece of information  
13 coming from that.

14 DR. SHACK: And you've also stacked the  
15 deck with 1988. I mean, your screenings are going to  
16 have to go up an incredible amount before you're ever  
17 going to turn that negative exponential expression.

18 DR. KRESS: Yeah. I think you've got to  
19 be careful with the exponential expression, but I  
20 think you shouldn't have instead is have a flexibility  
21 on the number of years you look at.

22 DR. SHACK: Just sort of a five-year  
23 rolling ---

24 DR. KRESS: Well, it doesn't have to be  
25 five. You can't do it with two, because you can't get

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1 a trend out of two, but three possibly. And what you  
2 can do is establish -- you can use statistics to  
3 establish the statistical significance of any line you  
4 draw through there. And the more data points you  
5 have, the better off you are but, you know, you can  
6 have flexibility --

7 DR. SHACK: Well, statistical significance  
8 is one -- but there's still a choice of periods over  
9 which you use it.

10 DR. KRESS: Yeah.

11 DR. SHACK: I mean, you should examine  
12 statistical significance of any slope, whether it's  
13 three or five.

14 DR. KRESS: Yeah. And the more data  
15 points you have that express a trend, the more years,  
16 the more confidence you have in the statistical  
17 significance of it. I mean, there's -- just use  
18 standard statistics to do that, but I think that's  
19 what they ought to do. I wouldn't look at a trend  
20 going all the way back to using that exponential item,  
21 because that's not a trend that's current. It's a  
22 trend that happened a long time ago, so you need to  
23 limit the number of years you look at, I think.

24 MR. ROSEN: Certainly, one year to me  
25 doesn't make a trend.

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1 DR. KRESS: One year doesn't. Two you  
2 can't do it. Three you might, but the statistical  
3 significance is only --

4 DR. BONACA: Five you really do have a  
5 trend.

6 DR. KRESS: Five would be much better.

7 DR. BONACA: Especially if you have a  
8 confirming trend in one direction or the other.

9 MR. BOYCE: Actually, again, where we  
10 started with the program is, we picked the year where  
11 we had good data that we thought we could rely on.  
12 Okay? We actually had data that preceded '88, but we  
13 weren't as confident that it was good data. So what  
14 we decided was, that'll be the year, and we'll make it  
15 uniform. And then as we get comfortable with the  
16 program, we'll take another look at it. And that's  
17 the thinking that you're seeing, at least in Dale's  
18 paper, where in 1997 it looks like there's a break  
19 point. And so what we're trying to do is perhaps go  
20 to, for that indicator, two different curves, and you  
21 can do that for each of the indicators. But it's not  
22 nearly as satisfying just to do it by looking, and do  
23 it by inspection almost, or even a statistical  
24 approach, because it doesn't have a physical basis in  
25 reality. It would be much more comforting if in 1997

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1 I could point to something in industry and said that  
2 is why that data is changing. Okay? And that's the  
3 -  
4 - that's why we're a little hesitant just to change  
5 based on a statistical approach, but our thinking is  
6 moving along those lines that you're describing.

7 MR. RASMUSON: If I could just interject  
8 here for just -- you know, looking at all your data in  
9 all of these, if you looked at the report there,  
10 you'll notice that some of the things we tried to --  
11 in there we defined the concept of a baseline, and  
12 I'll go through this in my presentation a little bit,  
13 but what we wanted was a period of time where the  
14 performance was basically flat, that we could call a  
15 baseline. And if you have something that's decreasing  
16 there, and you have a lot of data, you know, as you  
17 get down here to the end, your uncertainty limits  
18 here, you know, tend to be narrower and narrower, and  
19 that tends to penalize you. Where if you were taking  
20 a period where it's quiet, and so there's a lot of  
21 these different issues you have to look, and you have  
22 to weigh in the proper perspective of looking at all  
23 of these things. If we take some -- if we take the  
24 scam data, and I did this, you know, before, if I  
25 take that flat period, you know, then my prediction

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1 limits come out here, and I'm not penalized, you know,  
2 right here. You're talking about two scrams, you  
3 know, and --

4 DR. KRESS: That's not a trend.

5 MR. RASMUSON: And that's not really a  
6 trend. And that's one of the reasons you want to move  
7 to a threshold-type thresholds, you know, in a way  
8 that you can set up here, and there's ways, you know,  
9 lots of different ways of looking at these things  
10 here, but it's -- but, you know, you want to get  
11 things that characterize the baseline performance.  
12 And that's one of the issues that we need to discuss  
13 or, you know, that we're wrestling with, is do we use  
14 a period back here like in the ROP process where they  
15 use 95 to 97 as the baseline, or should we use the  
16 whole period here? Well, in some of these cases where  
17 we have the initiating events that don't occur very  
18 often, you know, you really have to use the whole  
19 period.

20 MR. ROSEN: The data is only useful to me  
21 if it imparts some information to me.

22 MR. RASMUSON: Right.

23 MR. ROSEN: And so when I look at  
24 something like this, what I'm trying to deduce is  
25 what's the information being imparted? And something

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1 that was changing from '88 to '96, stopped changing in  
2 '97.

3 MR. RASMUSON: Uh-huh.

4 MR. ROSEN: What was that something?  
5 Something was changing and improving the outcome  
6 between '88 and '97, and basically whatever that  
7 forcing function was that was improving the outcome  
8 abated in '97.

9 DR. KRESS: I don't think you can make  
10 that inference from here.

11 MR. SIEBER: Well, maybe they were just  
12 too good in '97 and '98.

13 DR. BONACA: Well, I mean, you can see the  
14 implementation of symptom-oriented procedures in the  
15 late 80s/early 90s, for example, and that could be the  
16 reason why you have less scrams, and you have much  
17 detailed and accurate trending positions.

18 MR. ROSEN: Well, Tom said well, you can't  
19 make that judgment. What I'm trying to say is that  
20 the data is more interesting to me, because I agree  
21 with him, I can't. The data is more interesting to me  
22 if someone offers me an explanation.

23 DR. KRESS: Oh, certainly. Certainly.  
24 But I --

25 MR. ROSEN: Rather than just showing me a

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1 piece of data.

2 DR. KRESS: Yeah. I would consider  
3 looking at something like a five-year rolling look at  
4 this.

5 MR. SIEBER: Let me offer a note of  
6 caution. I think the ROP has taught some of us, at  
7 least me, a lesson about thresholds, the use of  
8 thresholds for initiating events. If you look at the  
9 delta risk for initiating events, you have to have a  
10 massive increase in the number of initiating events to  
11 make a perceptible change in the safety risk of the  
12 plant. And so if you base the threshold on that delta  
13 risk, you're going to come out with a number that  
14 makes it look like we have very low standards as to  
15 what we will accept and not accept as a regulator, and  
16 as an industry. And I think that's a concern from a  
17 public perception standpoint, and particularly with  
18 Congress, so I think that you need to approach  
19 thresholds on initiating events performance indicators  
20 with that issue in mind. And so, as you move forward  
21 and try to decide what it is you're going to do with  
22 the data that you have, I think it's something we  
23 ought to think about.

24 MR. RASMUSON: I agree with you if we're  
25 just looking at scrams in general, but if we break

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1       scrams down into their constituent type, such as loss  
2       of feed water, loss of an AC bus and so forth, and we  
3       risk-weight them, then you get a different perspective  
4       on that.

5               MR. SIEBER: Perhaps, but then the  
6       indicator becomes so complex, that it's not useful for  
7       a report to Congress. Mitigating systems, however, I  
8       do think have a stronger basis for the use of  
9       thresholds, you know, because they play a more active  
10      role in the contribution towards --

11             MR. BOYCE: Well, let me try and use that  
12      as my excuse to get to the last slide here.

13             MR. SIEBER: All right.

14             MR. GAMBERONI: Tom, before we get to  
15      that, this is Dave Gamberoni from NRR. I had some  
16      information for Dr. Kress. Tom is not fundamentally  
17      saying to change the program so that we're not caring  
18      about the direction changing. What Tom is attempting  
19      to do with the changes to the current program are to  
20      evaluate the significance of the trends in the other  
21      direction. We don't want to call Congress and tell  
22      them hey, the scrams have turned around. We did the  
23      arithmetic. They're going in the other direction but,  
24      you know, they barely moved off of that asymptote that  
25      they got to. We want to know when is it significant,

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1 so Tom's use of thresholds is proposed to determine  
2 when has it moved enough in the negative direction  
3 such that somebody might want to take some action.  
4 And we've had preliminary discussions that you might  
5 allow it such that you've reached a certain threshold,  
6 like ROP, maybe industry is responsible to, you know,  
7 initiate action in that amount of change. When it  
8 gets to another level, NRC might have to take generic  
9 actions, and when it gets to another level, maybe you  
10 contact Congress.

11 The purpose for this is to give them a  
12 chance, if there is a major overall -- you still have  
13 ROP. You're dealing with all the plant-specific  
14 issues, did industry deregulation have an overall  
15 impact on safety and affect scrams? You know, we  
16 don't know now. If the graphs turns and changes, and  
17 changes, and changes, we want to use the thresholds to  
18 help measure significance, so don't we call Congress  
19 every time we just mathematically verify we have a  
20 change in direction.

21 That's what Tom is talking about current  
22 program. The next part of the presentation is going  
23 to cover, you know, different -- you know, sort of  
24 that same philosophy but a different way of doing it,  
25 as opposed to using, you know, the good old Pis that

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1 we've been using. Is there a better way or not to do  
2 it? So he's not proposing doing away with the  
3 methodology to tell whether it changed direction.  
4 He's proposing now how do I determine how significant  
5 it is.

6 MR. ROSEN: Just because you use the  
7 industry deregulation as an underlying cause of all  
8 this, as an example, I'm sure you don't mean to imply  
9 that. There are lots of other underlying causes that  
10 could be responsible if you found the trend. You  
11 don't get any information about the underlying cause,  
12 aging plants, aging people in the plants, retirement  
13 of the people.

14 MR. GAMBERONI: Exactly. That's why we  
15 would want maybe multiple thresholds such that you go  
16 verify that it is reasonable, and it's some other  
17 factor before we --

18 MR. ROSEN: You have to first establish  
19 that it's significant.

20 MR. GAMBERONI: Sure.

21 MR. ROSEN: That there has been a change  
22 before you start looking for what caused it.

23 DR. KRESS: Yeah. I basically have no  
24 problem with the use of thresholds the way you said.  
25 My main concern was I don't see a firm definition of

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1 what a trend is up or down. I think you need that.  
2 And if you're going to talk about trends, you need to  
3 define what you mean by trend, and what you mean by  
4 statistically significant trend. I just haven't seen  
5 that firm definition yet.

6 DR. BONACA: I have a curiosity, in fact.  
7 In 1999, what did you do with scrams that went up from  
8 .48 to .64?

9 MR. BOYCE: Well, that was before the  
10 Industry Trends Program so I defer to Research for  
11 their answer. I don't believe that we did anything in  
12 terms of hard action. I mean, what we're trying to do  
13 in this program is actually tie -- it's not enough  
14 just to look at indicators and, you know, we're  
15 actually trying to tie it to actions.

16 DR. BONACA: So, I mean, you wouldn't have  
17 called it a trend.

18 DR. WALLIS: Well, whatever you do, I  
19 don't think you should stop publishing this kind of  
20 picture. It's very useful to the public, and they can  
21 make the arguments that we've been making here and say  
22 is it significant or not, what does it mean? So  
23 don't, just because you've got a five-year average or  
24 something, just forget about this picture, because I  
25 think that's very useful --

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1 DR. SHACK: Show the bar graph, but don't  
2 put the exponential in.

3 DR. WALLIS: Well, we will fit the  
4 exponential in, in a homework assignment anyway, so  
5 it's --

6 MR. ROSEN: It's not much of a homework  
7 assignment now. Excel will do it for you if you push  
8 the right button.

9 MR. BOYCE: Well, here's a snapshot of  
10 what we're doing, and we're going to come back and  
11 talk to you about this. We talked about thresholds.  
12 We're going to try and do risk-informed thresholds  
13 where it makes sense. It might make sense in  
14 initiating events and mitigating systems. Right now  
15 the other cornerstones of safety, it's a lot tougher  
16 to get risk-informed thresholds, but we're trying  
17 statistical approaches to come up with those.

18 If we're successful, we're going to go to  
19 the strategic plan, and our performance plans and look  
20 at modifying the performance measure to one that's  
21 threshold-based vice trends-based. We're deriving  
22 additional indicators for the cornerstones of safety  
23 from the data we have from the ROP. We're going to be  
24 coming up with a framework guidance document, and if  
25 we still don't have a good definition when we develop

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1 that, shame on us.

2 We're going to try and lay out some --  
3 with more specificity the sorts of actions that we  
4 take in response to an adverse trend in our process  
5 there. If the MSPI for the ROP, which you've heard  
6 about before, is in a pilot phase, if it's successful,  
7 we would look at aggregating that MSPI into an  
8 industry-level PI. And by analogy, what you're about  
9 to hear is, we're jumping right to an industry-level  
10 performance index for initiating events. Okay? So  
11 we're actually moving ahead of the ROP in this regard.  
12 So if there's no further questions, I'll turn it over  
13 to Dale.

14 MR. RASMUSON: Okay. Thank you. I'm here  
15 to discuss our Integrated Industry Initiating Event  
16 Indicator that we are developing. Tom has told you  
17 about the Industry Trends Program. We will talk about  
18 the characteristics of performance indicators. We'll  
19 talk about the integrated indicator itself. We'll  
20 talk about its philosophies, what it is, give some  
21 examples of it, some other things like that. And then  
22 we will have some conclusions, and then describe what  
23 we feel are the next steps that we need to go through.

24 This slide contains characteristics of an  
25 integrated indicator, or of an indicator, and these

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1 are taken from the -- are basically taken from the  
2 SECY papers that have been written. We need something  
3 that can be used as a performance measure for our  
4 annual performance report to Congress. We need  
5 something that is complimentary to the plant-specific  
6 ROP. It provides industry information for an ROP  
7 cornerstone. It uses data that are available from  
8 current NRC programs. It's related to or tied closely  
9 to risk, and what we're looking at is CDF or delta  
10 CDF, and in some way we can utilize some risk-  
11 informing measures for assessing their significance,  
12 such as the Safety Goal or Reg Guide 1.174.

13           Currently, we have a lot of indicators  
14 that are floating around. In the first column, we  
15 have the cornerstone for safety. Then we have the ex-  
16 AEOD indicators and how they get into the various  
17 cornerstones. Next we have where the ROP Pis are and  
18 one of the things that Tom has been doing is he's  
19 starting to trend this now just to look at them, not  
20 necessarily to report to Congress. And where we are  
21 right now, in the last couple of years we've provided  
22 Tom or NRR with the ASP trend, and also we have  
23 provided trends for fifteen risk-significant  
24 initiating events, and you'll find those in one of the  
25 appendices in the SECY paper.

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1 DR. KRESS: Do these correspond to the  
2 initiating events that a normal PRA has?

3 MR. RASMUSON: They correspond so the most  
4 risk-significant.

5 DR. KRESS: The risk-significant ones.

6 MR. RASMUSON: Right. The real risk  
7 important ones. Right.

8 MR. BOYCE: Commenting on that. Research  
9 did a report which was briefed to you a year or so ago  
10 on risk-based Pis.

11 DR. KRESS: Oh, yeah.

12 MR. BOYCE: And the approximately ten to  
13 fifteen that contributed most to core damage frequency  
14 were in that report, were the ones that we used and  
15 pursued here, so there is a nexus to core damage  
16 frequency.

17 MR. RASMUSON: And here's the list of the  
18 ones for BWRs, we'll just go quickly through. And  
19 here's the one for the PWRs, we'll let you read that  
20 there. And those are coming from the risk-based  
21 performance indicator report.

22 Well, what's our philosophy for looking at  
23 this? If I'm trending items, it doesn't capture their  
24 risk-significance at all. I don't -- there's nothing  
25 in there that I -- you know, in the trend that relates

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1 to risk. And the other thing is, the more items I  
2 include in trending, the probability of seeing  
3 something significant increases. You know, my chance  
4 of seeing something that could be risk-significant or  
5 statistically significant, you know, it increases, you  
6 know, and so just by chance. So that's one of the  
7 things that we want to try to avoid.

8 The mitigating system performance  
9 indicator has provided a way for combining risk  
10 information and operating experience in a logical way.  
11 And that MSPI approach is applicable to initiating  
12 events, and so we have chosen to pursue that, and to  
13 explore that approach to see if it's feasible, and if  
14 it's worthwhile.

15 Pictorially what we're doing is we're  
16 taking operating experience in the forms of those  
17 initiating events that we showed you, breaking them  
18 down, classifying them in that way, taking appropriate  
19 risk information from PRAs and combining them into an  
20 indicator.

21 What is the integrated initiating event  
22 indicator? Well, it's nothing more than it's the  
23 average of the sum of products of the current  
24 operating experience value of the industry for each  
25 initiating event, and the appropriate risk-weight

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1 obtained from PRAs. It's related to core damage or  
2 delta core damage.

3 DR. WALLIS: I think it is the sum of the  
4 product.

5 MR. RASMUSON: It is the sum of the  
6 product.

7 DR. WALLIS: It's not the average of the  
8 sum, it's the sum itself.

9 MR. RASMUSON: Well, we're also taking an  
10 average of that.

11 DR. WALLIS: But you just duplicated the  
12 words there. The average is the sum of -- the  
13 weighted average is the sum of the products.

14 MR. RASMUSON: I am taking the --

15 DR. KRESS: No, they divided by N and that  
16 makes it an average.

17 MR. RASMUSON: We're dividing by the  
18 number of plants. But I'm also multiplying by a risk  
19 major and another term, so --

20 DR. WALLIS: You happen to average a lot  
21 of sums of products.

22 MR. RASMUSON: And this allows for  
23 combining an infrequent initiating event with the  
24 appropriate risk measures, and the risk measures on  
25 these things are different. And we are coming -- we

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1 are proposing to use one indicator for BWRs and  
2 another for PWRs because core damage frequency for  
3 PWRs is larger than that for BWRs.

4 MR. SIEBER: Is that just because of steam  
5 generators? That's the only difference --

6 DR. KRESS: It's because BWRs have a lot  
7 of sources of water.

8 MR. RASMUSON: There's a lot of ways of  
9 getting water to the core for the BWRs. This is our  
10 indicator then here.

11 DR. KRESS: Let me -- while you're on that  
12 one now, let me tell you a problem I have with it.  
13 Maybe you can think about it as you discuss it. It's  
14 related to the problem pointed out by Graham Leitch  
15 over there. This indicator is basically the average  
16 CDF for the whole fleet of plants. That's what it is.

17 Now you've got -- say it's PWRs. You've  
18 got 50 plants out there, just as a guess. There may  
19 be a few more, but each plant then is going to  
20 contribute at the most 2 percent to this average, so  
21 you've got a lot of plants that are doing nothing in  
22 terms of changing their status. And two or three poor  
23 plants that may be degrading considerably, which you'd  
24 see in the individual trends, but you wouldn't see  
25 this very -- this thing would not be very sensitive to

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1 those changes.

2 And what I think my problem with that is,  
3 and as a regulatory agency -- and in fact, what you're  
4 doing is letting the good plants that are decreasing  
5 say in CDF over time because of changing initiating  
6 event frequency, you're letting those compensate for  
7 plants that are increasing, and I don't think you want  
8 that as an indicator.

9 What you're -- in my mind, what you ought  
10 to be interested in, those plants like Graham said,  
11 that are degrading at points, so I would say a better  
12 indicator might be the number -- just ignore the ones  
13 that are decreasing, and say the number of plants that  
14 are increasing beyond a certain level, like a  
15 threshold, or the number -- or the sum of the rated  
16 change of those that are increasing as an indicator,  
17 just ignoring the decreases.

18 DR. WALLIS: But, Tom, you're addressing  
19 a different question. If I, as a member of the  
20 public, wanted to know how are the plants doing in  
21 general, what's the level of safety in the country,  
22 and I want an average of all the plants, and for  
23 regulatory purposes you may want to do some of the  
24 things --

25 DR. KRESS: I'm concerned that this loses

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1 the regulatory concern that you have.

2 DR. WALLIS: This will confuse the public.

3 DR. KRESS: No, I think what we're after  
4 is, is my regulatory system properly keeping things  
5 safe? And safe is an individual plant issue, not a  
6 fleet of plants. It's both.

7 MR. BARANOWSKY: Dr. Kress, could I  
8 address that?

9 DR. KRESS: Yeah.

10 MR. BARANOWSKY: This is Pat Baranowsky  
11 from Operating Experience Risk-Assessment Branch.  
12 You're right, but remember, this is -- since it's  
13 complimentary to the Reactor Oversight Process, we  
14 have essentially a corollary measure for each one of  
15 these cornerstones on a plant-specific basis. And  
16 what we're trying to do here is talk about what is the  
17 industry-wide perspective?

18 If you think back to the safety goal  
19 discussions that went on years ago where the safety  
20 goal was meant to be more or less an industry-wide  
21 measure, if you will, to judge the industry  
22 performance and generic issues against, we're really  
23 back to that thing again where we're saying how is the  
24 nuclear industry doing in general, and that's what  
25 this is meant to talk about. Are there generic

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1 performance things that we can't see on a plant-  
2 specific basis because we're focused so much at Davis-  
3 Besse that we're missing some bigger picture trend and  
4 some other things. We can get the Davis-Besse things  
5 because we've got a process in place that's working  
6 pretty well with regard to the reactor oversight, but  
7 what we don't have is, what can we say about the  
8 general industry trends in safety? So what we're  
9 trying to get away from is, every once in a while one  
10 of our sample of 110 plants has a problem in  
11 describing the industry's safety in terms of one of  
12 those sample, or two of those samples.

13           Every year we have 110 plants to sample  
14 from, and if we trend this information over a period  
15 of years, we get a bigger picture of what reactor  
16 safety is. That doesn't mean that the individual  
17 instances aren't looked at for their own risk-  
18 significance, much like we would look at an accident  
19 sequence precursor. We have individual precursors,  
20 and we have certain levels of precursor values that we  
21 think are so important we take actions on by their  
22 own. The other thing we do is we trend the occurrence  
23 of those things.

24           DR. KRESS: I understand all that, and I  
25 recognize that there are different programs looking at

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1 different things, but if I wanted an industry trend  
2 and let's say I had 50 plants I was concerned with.  
3 I don't know how many there are. And if 25 of them  
4 were decreasing in CDF, and 25 of them were increasing  
5 in CDF this trend would show no trend, but that's a  
6 trend to me.

7 MR. BARANOWSKY: Okay. I think I agree  
8 with what you're saying there. What you don't see and  
9 we haven't presented here is, but if was mentioned,  
10 decomposition of this information. This is meant to  
11 be the highest level of reporting that we would go to  
12 Congress with, say how is the industry's safety in  
13 general. We're going to decompose this down into  
14 different categories, and it could be there's a  
15 suggestion. We could look at how would we group  
16 plants together? It doesn't have to be by PWR and  
17 BWR.

18 DR. KRESS: Or I would have said, you  
19 know, you needed another measure like the number of  
20 plants that are the product of the sum of the number  
21 of plants that are increasing. How much of the sum,  
22 you know, some measure like that as a compliment, that  
23 captures this thing that I'm worried about.

24 MR. BARANOWSKY: Okay. So it could either  
25 be a complimentary indicator list or a disaggregation,

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1 but it would have -- and I don't think our intent is  
2 to hide that, by the way.

3 DR. KRESS: Yeah, I know it.

4 MR. BARANOWSKY: Okay.

5 DR. SHACK: It's just an issue of the  
6 slope. Show the whole damned thing.

7 MR. BARANOWSKY: Well, our plan is to  
8 show --

9 DR. KRESS: Well, that might be one thing,  
10 because --

11 MR. BARANOWSKY: -- is to disaggregate  
12 this down, and then probably to cross it with the ROP  
13 and see what that looks like, so that this whole thing  
14 would be covered.

15 MR. BOYCE: Yeah, and jumping in with  
16 perhaps an alternative approach, analogous to the MSPI  
17 where we're trying to get to each plant and looking  
18 for, you know, how each plant is doing. If this -- if  
19 we're successful at the industry level for the IEPI,  
20 we would look at implementing on a plant-specific  
21 basis, which would pick up what you're saying.  
22 Assuming we could get thresholds on a plant-specific  
23 basis, we would pick up the phenomenon you'd like, and  
24 there would be a parallelism to the ROP, without  
25 generating a new indicator like you're describing.

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1 DR. KRESS: Yes. I just didn't want to  
2 lose it in the integrated industry indicator, because  
3 I think --

4 MR. BOYCE: I understand the concern, and  
5 I appreciate the input. We're actually ahead of like  
6 automatic scrams or complicated scrams, which is our  
7 current indicators of initiating events. This is, you  
8 know, we're trying to be pretty ambitious here.

9 MR. ROSEN: Well, you could use for all  
10 Bs. You could use this expression for all Bs. You  
11 could use it for all Ps. You could use it for Region  
12 One plants only, Region Four plants only.

13 MR. BOYCE: Absolutely.

14 MR. ROSEN: You could create subsets of  
15 this.

16 MR. BOYCE: Absolutely.

17 MR. ROSEN: Which would be of interest to  
18 different stakeholders.

19 MR. BOYCE: Right. Agreed.

20 DR. WALLIS: It's just like -- this is a  
21 Dow Jones average, or an S&P, you know, and if you  
22 want -- if Kress wants number of advances, number of  
23 declines, you could get that too.

24 DR. KRESS: I want to know what my stocks  
25 are doing, not just the Dow.

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1 MR. RASMUSON: Okay. Back to the equation  
2 here.

3 DR. SHACK: I'd change the order of the  
4 sums.

5 MR. RASMUSON: Well, what we're doing is  
6 summing up overall the Birnbaum importance measures to  
7 get an industry total, multiplying that by the  
8 industry average, and then summing up over all those  
9 sums of products, and then dividing by the number of  
10 plants to get an average value.

11 DR. WALLIS: The intense of notation BUI  
12 Lambda implies the sum anyway.

13 DR. SHACK: So wouldn't you sum over the  
14 plant first?

15 MR. RASMUSON: No, because my initiating  
16 event is -- if I'm going to put parentheses, I'd put  
17 parentheses there, and do the sum over the -- it  
18 really doesn't matter. I can do it either way.

19 DR. SHACK: It doesn't matter.

20 MR. RASMUSON: It really doesn't matter,  
21 because I mean, I could calculate an average Birnbaum  
22 importance measure for the -- you know, for that  
23 particular initiating event an industry average, you  
24 know.

25 DR. SHACK: Mathematically it's the same.

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1 MR. RASMUSON: Yeah.

2 MR. ROSEN: Mathematically it's the same.

3 Yes.

4 MR. RASMUSON: Right. And N is the number  
5 of units, the BUI is the plant-specific Birnbaum  
6 importance measure, M is the number of initiating  
7 events, and lambda sub i is the current industry  
8 average for that, and however we define current.

9 Just for a sample calculation, suppose we  
10 have two initiating events, and I just picked two  
11 here, loss of a vital DC bus and general transients.  
12 And the integrated indicator for this would be the  
13 Birnbaum importance for one times the industry  
14 average, plus the Birnbaum importance for the other,  
15 times the industry average for that, and it came out  
16 in this case, divide by the number of plants, and here  
17 are the values.

18 This provides here an idea of we get a lot  
19 of general transients, but notice that, you know, the  
20 Birnbaum is very small compared to the general  
21 transient, or the loss of a vital DC bus, which does  
22 not happen very often, and so that has become more  
23 important.

24 And you can also go in and analyze which  
25 plants are contributing to some of these. Like for

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1 instance, for a loss of DC bus, most of the  
2 contribution is coming from four plants, and that's  
3 because of their design, so there's things that we're  
4 learning out of this.

5 Okay. The relevant risk information is  
6 what we would propose doing, and what we would be, to  
7 use the Rev. 3 SPAR models to generate these Birnbaum  
8 importance measures. What we've done right now in our  
9 study is we've used all the Rev.3 and the Rev.3(i)  
10 models for our -- but we know that there are problem  
11 -  
12 - the Rev. 3(i) models haven't all been -- aren't QA'd  
13 yet and so forth, and I don't want to get into that  
14 discussion, because we're not here discussing the SPAR  
15 models. But the approach is very feasible, you know,  
16 and it is -- we can do that.

17 MR. SIEBER: Would you define for me what  
18 a Birnbaum importance measure is, to bring me up to  
19 speed.

20 MR. RASMUSON: It is the partial  
21 derivative of the initiating event with respect to the  
22 core damage frequency equation. It's basically a  
23 partial derivative.

24 MR. SIEBER: All right.

25 MR. RASMUSON: Okay?

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1 MR. SIEBER: Okay. Thank you.

2 DR. WALLIS: It's a kind of measure of the  
3 influence, an influence factor or weighting factor.

4 DR. SHACK: Why didn't you use your  
5 Definition I in your report, your Equation 2, where  
6 you have the plant-specific frequencies, and the  
7 plant-specific important measures, and then you sum  
8 them up over --

9 MR. RASMUSON: Because one -- well, the  
10 main reason is, is we're focusing on industry trends,  
11 not plant-specific trends. That is a way of doing it,  
12 and my reason is, I don't want to get in -- there's a  
13 lot more working in trying to estimate those plant-  
14 specific frequencies. I mean, we can do it, you know,  
15 initiating event frequencies and so forth, but we were  
16 asked to do things for the industry trends, and so I'm  
17 doing it -- we chose that formulation.

18 DR. KRESS: Actually, that first  
19 definition is a true CDF average.

20 MR. RASMUSON: Right

21 DR. KRESS: These other things are not  
22 true CDFs. They have a one-to-one relationship with  
23 the CDF, and I don't know how you make that --

24 DR. SHACK: Plant-specific Birnbaum, and  
25 then --

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1 DR. KRESS: Yeah, I would have gone with  
2 Definition 1, because this is a true CDF, and I know  
3 what it is. These other things, I'm not sure what  
4 they are. They're related to CDF, but not exactly  
5 CDF, and so I would go with 1. But, you know, it may  
6 be easier to get these numbers. And I think there is  
7 a one-to-one relationship between each one of these.

8 MR. RASMUSON: But the reason we did it  
9 was because we're focusing on industry trends. I  
10 mean, there are those different formulations.

11 DR. SHACK: But I can certainly see why  
12 you do the average. There are different averages.

13 MR. RASMUSON: There's different averages  
14 too.

15 DR. WALLIS: Well, the problem is B is  
16 really plant-specific, where lambda is industry-wide,  
17 so you've got just a little bit inconsistency.

18 DR. KRESS: There's a weighting factor  
19 that comes in there that you're missing.

20 MR. BARANOWSKY: I think this issue is  
21 really still something that we're going to study, to  
22 make sure that looking at it one way versus the other  
23 doesn't have some significant difference, and  
24 understand why it might be different. If we can  
25 implement the simpler way and get what we need to know

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1 out of it, that's what we'll do. If we don't, and we  
2 have to go a more complicated route --

3 DR. SHACK: It seems that you have -- the  
4 information that you need is the same in either case,  
5 and when you get the industry average by summing up  
6 the individual --

7 DR. KRESS: Absolutely. It's the same  
8 information.

9 DR. SHACK: It's just a matter of how I do  
10 the sums, what order I do them in. And the one seems,  
11 as Tom says, I mean you understand exactly what it  
12 means, and the other one I sit here and I try to think  
13 of what does it mean to take the industry average  
14 initiating event and the Birnbaum plant-specific.

15 DR. KRESS: It's like trying to take the  
16 best estimate for the inputs --

17 DR. SHACK: Well, if I ran every plant  
18 with the industry average, I'd have this. And maybe  
19 that's interesting from some perspective, but --

20 DR. KRESS: Yeah. It hides information.

21 MR. BARANOWSKY: Yeah. I'm sympathetic to  
22 your point, so we'll look at it, because we're still  
23 in the phase of looking at a lot of things, and I  
24 don't know what the plans -- you're going to talk  
25 about the plans for when we're going to complete this.

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It's down the road.

DR. WALLIS: Well, in any case, I'm sympathetic to use of rigorous mathematics to reach conclusions.

MR. ROSEN: It has a certain appeal.

DR. SHACK: But then in the first one, I know why the sums are in the order that they're in.

MR. RASMUSON: Exactly. We can formulate this in two ways. We can do it in terms of an absolute value, or we could do it in terms of a base, you know, a deviation from some baseline period. And we sort of looked at it in both ways, and some people like the absolute formulation better than they do the other. That's one of the questions that we have, do we use the absolute formulation or do we use deviation from our baseline initiating event frequency, and what period do we use for our baseline initiating event frequency? If we do -- we don't need a baseline if we're doing the absolute formulation, but if we do a delta calculation and delta CDF-type, then you do need a baseline. And how should the initiating event, the current performance be estimated? There's lot of different ways of doing that. We can do a Bayesian update, you know, decide on a prior or which you would

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1 need a baseline performance in that case. We can use  
2 maximum likelihood estimator. We can use a one, two,  
3 or three-year period of time, and there's a lot of  
4 issues. And we're going to look at those things, and  
5 see what difference it makes on them, and things like  
6 that.

7 DR. KRESS: It's essentially the same  
8 issue as the trend and the --

9 DR. SHACK: If we use the absolute value  
10 we can still draw a trend line through them.

11 MR. RASMUSON: We can still draw a trend  
12 line through them. Right. So the trial baseline  
13 periods that we used in the -- we wanted to define the  
14 baseline over which performance was basically  
15 constant, and so it depended on the initiating event,  
16 and in some cases, you know, the period was short, in  
17 some cases it was the whole period where we didn't  
18 have very many occurrences. And so the intent was to  
19 get as short an interval as possible, you know, where  
20 we had a lot of event, but get one that would fit  
21 there. And we would use the P value.

22 The technique that we're using for our  
23 trends here is Poisson regression really. We're not  
24 -  
25 - since we're using counts data and time, we're using

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1 Poisson regression, not simple linear regression,  
2 which assumes that the data is normal and so forth,  
3 and so we are -- this is a very standard technique in  
4 statistical package nowadays, and so we're looking at  
5 -- and we looked at the significance of it. We also  
6 would look at the fit of the data, you know, if we  
7 overlaid it for different ones for the period of time  
8 you know, some of them -- you may have, you know, to  
9 get a starting time on some, the starting year.

10 DR. SHACK: So what you're really doing is  
11 a maximum likelihood estimate assuming these things  
12 are Poisson distributed. Is that what --

13 MR. RASMUSON: That's basically what it  
14 does, yes. For current performance, we discussed this  
15 already here. We can do that in a lot of different  
16 ways. And here are some results for using a three-  
17 year Bayesian update using the baseline periods that  
18 we did as a prior distribution, and then using the  
19 previous three years to -- so we would use '95, '96,  
20 '97 for this one, and the next three years updating  
21 that. Here's sort of what the trend looks like.

22 Here's what's going on here for the PWRs.  
23 If we look at these in terms of deltas, this is sort  
24 of the -- for the BWRs, and the PWRs.

25 DR. KRESS: Not very sensitive.

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1 MR. RASMUSON: Well, it is sensitive to  
2 certain things.

3 DR. KRESS: Well, you know, what you're  
4 actually looking at is a CDF, and I don't expect it to  
5 change.

6 MR. RASMUSON: No, I don't --

7 DR. KRESS: So it's not a very -- it  
8 doesn't seem like a very sensitive indicator. An  
9 average CDF at a plant is --

10 MR. RASMUSON: This is one of my backup  
11 slides, but if we take our baseline values and plug  
12 them in, this gives you sort of DC bus and small LOCA  
13 are the -- those are rare initiating events. And if  
14 we do get these things occurring in the same year, and  
15 if you get more than one in these areas, you know,  
16 these things then can influence that quite a lot. So  
17 these are the types of considerations we need to look  
18 at, and you need to understand the behavior of this.  
19 But, you know, this is giving us some insights into  
20 some of these things.

21 DR. SHACK: You know, if you do it this  
22 way, you're looking at the safety trend in a sense,  
23 but you mitigate a bad performance by saying okay, my  
24 performance is bad, but I've actually got mitigating  
25 systems that say well even though my performance is

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1 not good, it doesn't make all that much difference.

2 MR. RASMUSON: Right.

3 DR. SHACK: And if you really wanted to  
4 evaluate performance, you know, unweighting it, not  
5 taking into account, you know, all my mitigating  
6 systems might be a way to highlight the performance.

7 MR. RASMUSON: In our presentation back in  
8 May, we talked about having sort of a two-pronged  
9 threshold. One is, is that we're -- we want to have  
10 something that is simpler in concept, you know,  
11 reporting one or two numbers to Congress. This would  
12 be what would be used for reporting to Congress. We  
13 would still be doing the individual trends down here,  
14 and using those as a tool.

15 DR. SHACK: Well, to my mind, it's more a  
16 conceptual thing.

17 MR. RASMUSON: Okay.

18 DR. SHACK: Am I looking at trends in  
19 safety, or am I looking at trends in performance?

20 MR. RASMUSON: Okay.

21 DR. SHACK: And I might want to pick  
22 measures that sort of magnify the affect of  
23 performance.

24 MR. RASMUSON: Okay.

25 DR. SHACK: And not sort of hide

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1 performance changes, because I've got -- you know, I  
2 really designed these systems to try to make them  
3 sensitive to performance.

4 MR. RASMUSON: Okay.

5 MR. BARANOWSKY: Just to answer your  
6 question, for reporting to Congress we're looking for  
7 trends in safety. For the regulatory program, we're  
8 interested in both. Okay? So we -- I think we need  
9 to put together a conceptual picture which shows how  
10 you unroll some of these things and get both the  
11 performance and the safety information, and how it  
12 potentially fits into not only say the generic  
13 communications, or generic issues, but it could even  
14 fit into the inspection program, because there's a  
15 baseline inspection program which has some  
16 flexibility. And this information could be used to  
17 adjust that so that as Tom was talking, we get an  
18 early investigation into some of these things.

19 MR. BOYCE: Yes. And what I was  
20 struggling with is if we go with two different  
21 approaches, performance-based or safety-based, if I  
22 can call it that, you end up having two sets of  
23 indicators. And then people are confused because  
24 you've got two sets of indicators, and so I was just  
25 mulling over what the right approach was, and I'm not

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1 sure we can do that here, but I appreciate that input.

2 DR. SHACK: Well, even on the Committee  
3 you'll have differences of opinion.

4 MR. ROSEN: We actually have an n-plus-one  
5 opinion.

6 MR. LEITCH: If I was thinking about  
7 trends in safety with respect to scrams, I would be  
8 looking at the trends in the worst performing plant.  
9 How many scrams per year did the worst performer have?  
10 That's what the safety is, it seems to me.

11 DR. KRESS: Or the five worst performers.

12 MR. LEITCH: Yeah, maybe the five worst  
13 performers.

14 MR. GAMBERONI: And just another  
15 clarification too. We do have reports to Congress,  
16 abnormal occurrences, which is that significant thing  
17 in an individual plant, so this is a different, you  
18 know -- like Pat said, this is the overall safety  
19 report to Congress.

20 MR. BOYCE: Just one more comment on that.  
21 We also -- at NRR we track significant events, and one  
22 of the indicators from the AEOD program was a count of  
23 significant events. It kind of gets to what you're  
24 saying, and the problem is, we're at one to two, maybe  
25 three per year, and so we're very much, we think as an

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1 asymptote.

2 MR. ROSEN: That's not a problem. That's  
3 an outcome that's been muchly desired.

4 MR. BOYCE: That's true too. There is a  
5 lot of judgment involved in that, so at least one of  
6 the indicators tries to get at the count issue that  
7 you were describing. As an aside, we're looking at  
8 whether or not we should be changing the definition  
9 from the more qualitative to something more  
10 quantitative, such as, you know, the number of  
11 occurrences that exceed thresholds in perhaps the SDP,  
12 something consistent with the ROP to get a consistent  
13 definition of significant events. And that thinking  
14 is going on in NRR, but I can't tell you more about it  
15 than I just did today.

16 MR. RASMUSON: Okay. Of course, there's  
17 uncertainty in the indicator, and there's lots of  
18 uncertainties in the baseline frequencies, in the  
19 current frequencies. There's uncertainties in the  
20 Birnbaum measures. There's plant-to-plant  
21 variability, and there's the uncertainty in the plant-  
22 specific values themselves, and we certainly want to  
23 take these into consideration when we're looking at  
24 things.

25 DR. KRESS: Do you have a thought in mind

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1 of how you will incorporate those into the process?

2 MR. RASMUSON: Uh-huh.

3 DR. KRESS: Oh, you have some ideas then.

4 MR. RASMUSON: WE do have some thoughts,  
5 and we have actually done a little bit on it.

6 DR. SHACK: When you average over 100  
7 plants it gets better.

8 DR. KRESS: Yeah.

9 MR. RASMUSON: So there are some -- but  
10 our indicator significance, Congress has requested  
11 that we use performance goals and performance targets.  
12 And the performance goals and performance targets come  
13 right out of the GPRA, and --

14 DR. SHACK: What's that, GPRA?

15 MR. RASMUSON: The Government Requirements  
16 and Results Act. GPRA, and as I read that, targets  
17 really are thresholds. I sort of -- and a lot of them  
18 are -- in a lot of these agencies it's the other way  
19 around. Our's is safety, and we don't want to exceed  
20 something, but they want to get up to a certain point,  
21 you know, in their's. You know, they're below it, but  
22 they're trying to reach that, and that's why it's a  
23 target in a sense. But we don't want to exceed these  
24 things, so -- and the Commission has told the Staff  
25 that we should try to develop risk-informed thresholds

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1 as soon as practicable.

2           Thresholds for the integrated indicator,  
3 we can use the safety goal, or we can use Reg Guide  
4 1.174. We certainly want to look at the behavior of  
5 the indicator from the uncertainties and so forth,  
6 using simulations, looking at the contributors like  
7 I've showed you to understand what sort of -- going to  
8 contribute to that. Looking at the maximum values of  
9 things that come out of some simulations of things,  
10 and look at the consistency with the ROP, and use an  
11 expert panel where logical relationships and/or  
12 parameters are difficult to derive, or where pragmatic  
13 issues arise.

14           For instance, you know, the safety goal is  
15 ten to the minus four, you know, per reactor year.  
16 Well, what if in our simulations we show that maybe  
17 ten to the minus four is maybe like a 63rd percentile  
18 of our uncertainty distribution. Well, then maybe,  
19 you know, there needs to be people that come in and  
20 make a decision in setting that threshold. That, to  
21 me, is sort of like a pragmatic issue.

22           DR. KRESS: The safety goal says that ten  
23 to the minus four should be a mean. So the question  
24 I have is what confidence level do I need to have in  
25 that mean itself? That's basically what you're saying

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1 now.

2 MR. RASMUSON: Yeah. Well, we have  
3 described to you an industry-wide performance measure  
4 that has a logical relationship with CDF or delta CDF.  
5 It's relatable to the safety goal, or to Reg Guide  
6 1.174. It allows the rational combination of events  
7 with different risk importances and frequencies. We  
8 can establish early warning and agency action  
9 thresholds for it. Early warning are those that I  
10 prescribe to the individual trends themselves, and  
11 it's complimentary to the plant-specific performance  
12 indicator.

13 MR. ROSEN: Well, before we get too  
14 enamored of this goal, this industry-wide performance  
15 measure, I think you need to recognize that this is  
16 more an average of a number of shots on goal in any  
17 given time frame. It has nothing to do with the  
18 performance of the goal. The goalie is still there  
19 and he's, you know, the mitigating system. They're  
20 still there, and it's really the result of both of  
21 those --

22 MR. RASMUSON: That's right.

23 MR. ROSEN: -- that is from a policy  
24 standpoint is important. We want to know how many  
25 times we are challenged with the systems we've built

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1 and put in plants, but at the bottom line, we really  
2 want to know -- you know, we want to assess the value  
3 of the whole system, which is the shots on goal and  
4 how many times the goalie caught the shot, didn't let  
5 it get into the net. So it's really only half the  
6 question.

7 MR. RASMUSON: That's true.

8 MR. BARANOWSKY: In some regards, we get  
9 that more integrated picture from accident sequence  
10 precursor trends, which involves initiators and  
11 mitigating systems, but it's not as complete a picture  
12 as you could get if you took this indicator along with  
13 one, for say, mitigating systems, which by the way is  
14 down the road somewhere, but that would be where we  
15 would go perhaps in the future.

16 MR. ROSEN: Some day we'll have a  
17 presentation where you'll bring one guy in with the  
18 first one, and one guy with the second, then you  
19 multiply the two, and then you'll have a number or  
20 something --

21 MR. BARANOWSKY: We'll at least use  
22 Boolean algebra.

23 MR. BOYCE: That's where we'd like to get  
24 to, I mean if the MSPI at, you know, the pilot program  
25 succeeds, we could roll it up and then we would have

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1 two industry --

2 MR. ROSEN: If Dan Rather asks the  
3 chairman what does this number mean, when he tells  
4 them the number, the chairman, Chairman Meserve says  
5 something like well, have you got a day or two, Dan,  
6 to answer the question.

7 MR. BOYCE: I'm sure he could handle it.  
8 He's pretty good.

9 MR. ROSEN: Yeah, he wouldn't say that.  
10 But in reality, at a technical level, it would take a  
11 long time to describe what that all meant.

12 MR. BOYCE: Or as you described, using  
13 your hockey goalie analogy, that would work.

14 DR. KRESS: Good to use a football analogy  
15 so I'll understand it.

16 MR. RASMUSON: Well, my last slide here  
17 just sort of outlines our next steps, sort of what we  
18 want to do. We have developed an initial concept. We  
19 have a preliminary draft report. We're going to  
20 refine that report a little bit more, and release it  
21 for review to people. We'll get back comments, just  
22 as our normal process is within our branch of getting  
23 back comments. We'll resolve those comments. We'll  
24 develop a -- then go in and develop the trial product  
25 more. We will actually run a trial case on it, look

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1 at it and so forth, document that, and get comments on  
2 that. And then develop a final report, and issue it  
3 so that it can be used. And we're shooting to have our  
4 final report in September of this year, of '03, next  
5 year.

6 DR. KRESS: You wouldn't really have to  
7 use real data to see how this thing worked. You could  
8 just make up your own data, and plug it into the  
9 formulas and see how the trends would go, and how  
10 sensitive it is.

11 MR. RASMUSON: Uh-huh.

12 DR. SHACK: But you've got real data, why  
13 not use it?

14 DR. KRESS: If you got real -- yeah, but  
15 you have to -- I mean, you have to wait for -- you  
16 could do this over five years and change things  
17 arbitrarily, like the sensitivity analysis.

18 MR. RASMUSON: Right.

19 MR. BOYCE: We do have real data. I mean,  
20 there's initiating events NUREG that Research did,  
21 5750 I think it is, and NRR tasked Research to bring  
22 that initiating event study up-to-date, so I know  
23 we've got -- I think that had five years of data, and  
24 that was in 1995, so I think we've probably got ten  
25 years of data to work with as a rough estimate.

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1 DR. KRESS: Yeah. What I had in mind was,  
2 those are -- you know, if you were doing a sensitivity  
3 or uncertainty analysis, you vary your independent  
4 variables over particular ranges in such a way. And  
5 real data has got specific points, and you may not get  
6 -- and they varied simultaneously, and you may want to  
7 look at individual variations, how sensitive they are.  
8 You may want to vary over ranges that you never see in  
9 that data that you might expect to see, so that's why  
10 I say the real data is really interesting, and you've  
11 got to do that. But you may want to just make up some  
12 data and just --

13 MR. BOYCE: Does that go back to your  
14 earlier comment that the initiating event PI is not a  
15 sensitive enough indicator?

16 DR. KRESS: Yeah. Exactly. That would be  
17 one way to -- how sensitive is it?

18 MR. RASMUSON: We plan to run some  
19 simulations and --

20 DR. KRESS: Simulations is what I would  
21 want.

22 MR. ROSEN: Well, our agenda right now  
23 says that we've got about thirty minutes for something  
24 called general discussion. I've think we've been  
25 talking about general for some time now, but I would

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1 like to go around the table and ask if any of the  
2 members have any comments that they haven't already  
3 made that they would like to, Bill, Jack?

4 MR. LEITCH: Well, I realize you have this  
5 charge to develop risk-informed thresholds and so  
6 forth, but I guess my concern is that it violates, in  
7 my mind, the KISS principle. I don't know if you know  
8 about the KISS principle. Keep It Simple, I can't  
9 imagine what the last S is for. But I mean, I think  
10 it's an excellent mathematical treatment of the issue,  
11 but I think where the prime purpose of this is a  
12 report to Congress and the stakeholders, in my mind it  
13 just unnecessarily complicates what -- the message  
14 we're trying to convey here.

15 Like, for example, I can see scrams, you  
16 know, I would see two points, industry average and  
17 worst plant, and have bands, like lines that would say  
18 here's three scrams per year, and this is green down  
19 here. And then between three and whatever the right  
20 number is, that's white, and some other number, you  
21 know, for what the numbers are. I don't remember  
22 those numbers but they're pretty high, thirty or  
23 something like that for the next transition. And then  
24 down here I'd show here's what the industry average  
25 is, here's what the worst plant is.

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1 I mean, I think in a moment looking at  
2 that kind of a graph says to me how we're doing. This  
3 is certainly a more rigorous treatment, but it seems  
4 to me it really complicates the understanding by the  
5 average person as to what they're looking at.

6 MR. BOYCE: I appreciate that feedback,  
7 because that is, as you know, one of our purposes is  
8 to try and enhance stakeholder confidence. So, you  
9 know, what we could do is use a parallel. It doesn't  
10 mean because we have this initiating event performance  
11 index that we throw out the current indicators, which  
12 are scrams, complicated scrams and general transients.  
13 It would give us something else to look at that is  
14 perhaps more risk-informed. Like scrams is -- there  
15 is only a subset of scrams that are truly risk-  
16 significant, and so it gives you that -- it gives you  
17 operational level performance, not necessarily safety  
18 performance. Whereas, complicated scrams or scrams  
19 with loss of normal heat removal is considered much  
20 more risk-significant, that subset. So, you know,  
21 what we're doing, I think, is developing something in  
22 parallel that doesn't have to replace the current set.  
23 Scrams is just so well understood, I personally don't  
24 see us throwing that out, but just to give you the  
25 current thinking. I appreciate the feedback on the

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1 too complicated.

2 MR. SIEBER: I guess I should say that I  
3 disagree a little bit with Graham's situation, because  
4 I think the ROP singles out individual plants. And  
5 that's probably the appropriate place for that to  
6 occur, as opposed to a report to Congress with the  
7 media saying, oh, where is that plant?

8 DR. KRESS: Yeah. I think I agree with  
9 Graham, because if I'm a Congressman or even somebody  
10 else, I want to know what the trends are. And to me,  
11 a trend is not only this index with averages on  
12 plants, but I want to know if half of them are going  
13 one way, and half of them are going the other way. I  
14 want to know that too, and that's --

15 MR. ROSEN: Especially if one of them is  
16 in my district.

17 DR. KRESS: Yeah, especially if one of  
18 them is in my district, so that's a trend, that's an  
19 overall trend also, and it ought to be reported. And  
20 so I'm looking for another use of that index in a  
21 different way.

22 The other things I've already made some  
23 comments on, but I did want to say, least you think  
24 I'm negative on this, I think it's an innovative  
25 approach, and I'm glad to see you guys doing some good

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1 thinking along these lines. And I'd encourage you to  
2 keep going with it.

3 Not only that, the -- what was I going to  
4 say? Give me a second.

5 MR. ROSEN: Well, I'll give you another  
6 chance after Mario.

7 DR. KRESS: Okay.

8 MR. ROSEN: Think about it. Mario.

9 DR. BONACA: I think in general --

10 DR. KRESS: I know what I was going to  
11 say. Let me say it before I forget it again. Graham  
12 Leitch thought this was overly-complicated and I think  
13 part of that is because we're obfuscating a little bit  
14 with the Birnbaum thing, times this, times the  
15 summation, when all we're really dealing with is  
16 average CDF. And I think you would say this is an  
17 average CDF, and from that same standpoint, I would go  
18 back to Equation 1 or the first equation, rather than  
19 use the one you're using here. That's what I wanted

20 -

21 -

22 DR. BONACA: I think in general I can --  
23 I could criticize, you know, the approach taken and  
24 whatever, but that wouldn't be the point. I think I  
25 see value in having some integrating mechanism by

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1 which you can pass a judgment on the average  
2 performance of the industry, because we're always  
3 confronted with situations where we question the ROP,  
4 so we are left with a question, you know, are we  
5 really measuring right? What's the trend going on?  
6 And we are confronted with a situation like Davis-  
7 Besse, for example. That came in as a surprise to all  
8 of us. Is that the picture of what the industry is  
9 all about? When we have some integrated measures of  
10 this type that give us, you know, a measure of what's  
11 happening in average, I think that's meaningful.  
12 Because again, they add a dimension to what additional  
13 information we already have from the LOP and  
14 everything else. So we have a lot of information, and  
15 it's a good question, Graham, will the Congress look  
16 at the additional information? I think probably they  
17 do. I mean, certainly they asked questions about  
18 Davis-Besse, and I think, you know, this data here  
19 puts situations for an individual plant into context.

20 And I think also, to me it's an important  
21 measurement at a time when we have had a significant  
22 shift in regulatory approach. And I keep asking  
23 myself over the past two or three years, you know, is  
24 it degrading plant performance, average industry  
25 performance or not, the fact that we have so

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1 significantly changed the regulatory approach that  
2 we're taking right now. And I think these measures  
3 have to give me some insight into that, and so I think  
4 it's a valuable effort.

5 MR. ROSEN: Not right away obviously,  
6 because in my view, the fact that we changed the  
7 regulatory approach, which we certainly have, has a  
8 very long fuse on it.

9 DR. BONACA: Oh, I understand that.

10 MR. ROSEN: It's going to take a long time  
11 before it shows up. This is a good way to try to  
12 monitor whether it is showing up or not.

13 DR. BONACA: This may not be the best, but  
14 there are ways, but I think it's a way to look at it.  
15 And to me, I would be looking more for a judgment from  
16 the regulatory process than on the industry itself.

17 MR. ROSEN: But you recognize, Mario, that  
18 there are confounders in that analysis. If the  
19 performance goes down, you say therefore it's the  
20 regulatory approach, you can't make that judgment.

21 DR. BONACA: No, but I'm saying that then  
22 I would really like to jump into it, and then begin to  
23 question much more the ROP, and see if the ROP is  
24 continuing, or if for example, there's relaxation of  
25 the tech specs.

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1 MR. ROSEN: Well, risk-informed regulation  
2 may not be the cause. It may be deregulation.

3 DR. BONACA: Absolutely.

4 MR. ROSEN: And maybe some of the other  
5 factors.

6 DR. BONACA: I agree with you.

7 MR. ROSEN: Just because you see  
8 performance goes down, and during that time window we  
9 incorporated this informed regulation, doesn't mean it  
10 was risk-informed regulation.

11 DR. BONACA: But, you know, we came back  
12 from Berlin and we heard some of the criticisms that  
13 are being leveled to us indirectly as a -- even  
14 directly. And I think, you know, at a time in which  
15 you -- I think is important to have indicators that  
16 put Davis-Besse in context. You know, if we could  
17 confirm, for example, an improving trend for the whole  
18 industry average at a time when you have an event like  
19 that, that would say look, you know, again we make the  
20 point that stress corrosion cracking is not --

21 MR. ROSEN: If we could guarantee --

22 DR. BONACA: It's really that particular  
23 performance on a unit. Something happened there, and  
24 you know, the rest of the program is in good health.

25 MR. ROSEN: If we could show an improving

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1 trend to the industry, we could say imagine how good  
2 this industry could have been if you had not gone to  
3 risk-informed regulation. On that note, let me try  
4 and make a couple of points that I've been thinking  
5 about. One of them I just want to repeat, was the  
6 idea that this is an important indicator, but it is an  
7 indicator of shots on goal. It's a challenges  
8 indicator, not the whole picture.

9 DR. KRESS: It's the whole picture.

10 MR. ROSEN: Why do you say that?

11 DR. KRESS: It counts the shots.

12 MR. ROSEN: Well, not without the  
13 mitigating system performance indicator.

14 DR. KRESS: It's in there, because that  
15 shows up in the Birnbaum --

16 MR. ROSEN: Well, because of the PRAs.  
17 Okay. Let me think about that. I'd like to go on to  
18 the question that Graham Leitch raised earlier about  
19 it getting too complicated. I've also, you know,  
20 heard some threads that this over-simplifies, so what  
21 that debate raises in my mind, the old communication  
22 principle that you can understand what's going on on  
23 a number of different levels. And so to really  
24 communicate about what's going on, you really have to  
25 speak in the language of the listener, or else you

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1 don't get information transferred across the  
2 interface. So if you're talking to Congress, you have  
3 to talk in the language that Congress understands. If  
4 you're talking to technical people, well you have to  
5 talk about Birnbaum importance, but you have to always  
6 couch your message, if your interest is communication  
7 rather than obfuscation, you have to communicate in  
8 the language of the listener. So you think about your  
9 audience first -- you think about your subject matter,  
10 and then you think about your audience, and then you  
11 think about your vehicle across the interface. So I  
12 don't think there's one answer to the question of  
13 whether it's too complicated or it's over-simplified.  
14 I think it is what it is, and communicating you have  
15 to think about your audience.

16 MR. SIEBER: I think a corollary to that  
17 is that since the Congress asked for this information,  
18 you have to read exactly what they asked for as a  
19 refresher.

20 DR. KRESS: Yeah, but they didn't ask for  
21 NRC. They asked all the agencies --

22 DR. SHACK: I also assumed they weren't  
23 going to tell them anything about Birnbaum importance.

24 MR. SIEBER: Well, the question is --

25 DR. SHACK: You can take the Birnbaum with

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1 the SPAR models. I mean, that's the only way you have  
2 of getting to those --

3 MR. SIEBER: The question is, are they  
4 asking what's the effectiveness of the agency, or  
5 what's the effectiveness and safety in the industry?  
6 That's two different questions.

7 DR. KRESS: Yeah, I think they're asking  
8 the effectiveness of the agency.

9 DR. BONACA: There are two different  
10 questions in there now. I mean, they are, and they're  
11 not different questions, because I mean the two things  
12 are so complimentary. I agree they're different, and  
13 yet one is a window on the other.

14 DR. KRESS: The measure of the  
15 effectiveness of NRC is whether or not the plants are  
16 safe.

17 DR. SHACK: Well, as long as they're safe,  
18 in spite of the NRC, you get to the bottom line.

19 DR. KRESS: I know, but if they're not  
20 safe, it's the NRC's fault.

21 MR. ROSEN: Right. I think it's time for  
22 us to declare victory, unless there's anyone who wants  
23 --

24 DR. BONACA: Or declare defeat.

25 MR. ROSEN: We have one member in the

1 audience.

2 MR. DUBE: Don Dube from Research. I  
3 think one of the strengths that maybe wasn't discussed  
4 with this, is that this can be a very powerful early  
5 warning on industry trends, in the sense that if you  
6 think about it, there's probably ten initiating events  
7 that occur every month. And with the licensee event  
8 reports coming in in thirty to sixty days, in a period  
9 of a very short amount of time, let's say thirty, to  
10 sixty, to ninety days, one could begin to detect a  
11 trend. Granted it won't be as accurate as having  
12 plant-specific initiating events, and plant-specific  
13 mitigating system performance as you have with the  
14 ASP, but the ASP does have a time lag of twelve to  
15 eighteen months, perhaps. Whereas, this can be  
16 probably the most powerful early warning detection  
17 that one can have. And it will look at industry  
18 trends and initiating events in combination with the  
19 performance of the mitigating system, so granted, it  
20 will not be as accurate as say an ASP or a mitigating  
21 system performance index, and it's not intended to  
22 substitute for that, but it can compliment it, and can  
23 be probably the best industry average early warning  
24 detection. Just some thoughts.

25 MR. ROSEN: Thank you.

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1 DR. SHACK: That's where the rubber meets  
2 the road.

3 MR. ROSEN: Right. We are -- any  
4 questions? Adjourned.

5 (Off the record 12:21:12 p.m.)  
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Name of Proceeding: Advisory Committee on  
Reactor Safeguards  
Subcommittee on Reliability  
and Probabilistic Risk  
Assessment and Subcommittee  
on Plant Operations - Joint  
Meeting

Docket Number: N/A

Location: Rockville, Maryland

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**ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
RELIABILITY AND PRA AND PLANT OPERATIONS SUBCOMMITTEES  
RISK MANAGEMENT TECHNICAL SPECIFICATIONS  
AND  
THE INDUSTRY TRENDS PROGRAM AND PERFORMANCE INDICATORS  
ROOM T-2B3, 11545 ROCKVILLE PIKE, ROCKVILLE, MARYLAND  
November 1, 2002**

**- PROPOSED AGENDA -**

<u>SUBJECT</u>	<u>PRESENTER</u>	<u>TIME</u>
I. Introductory Remarks Subcommittee Chair	S.L. Rosen, ACRS	8:30-8:35 a.m.
II. Risk Management TS*	Bob Dennig, NRR Bob Tjader, NRR	8:35-10:25 a.m.
A. Initiative 1 - End State Modifications		
B. Initiative 2 - Missed Surveillance Requirements		
C. Initiative 3 - Mode Restraint Flexibility		
D. Initiative 4b - Industry pilots on Completion Times		
E. Initiative 5 - Surveillance Test Interval Changes		
F. Initiative 6 - Actions and Completion Times		
G. Initiative 7 - Support System Operability Impact		
H. Initiative 8a - Relocation of Non-Risk Significant Technical Specifications		
	****BREAK****	10:25 -10:40 a.m.
III. Industry Trends Program		
A. Overview	T. Boyce, NRR	10:40 - 11:05 a.m.
B. IE** Performance Index	D. Rasmuson, RES	11:05 - 11:50 a.m.
- Description		
- Technical Approach		
- Sample Results		
IV. General Discussion		11:50 -12:30 p.m.

\*Technical Specifications;      \*\*Initiating Events

Note: Number of copies of presentation materials to be provided to the ACRS - 35.

ACRS CONTACT: Ms Maggalean W. Weston, [mww@nrc.gov](mailto:mww@nrc.gov) or (301) 415-3151.

# Integrated Industry Initiating Event Indicator



Dale M. Rasmuson  
Operating Experience Risk Analysis Branch  
Office of Nuclear Regulatory Research  
U.S. Nuclear Regulatory Commission

ACRS Subcommittees on PRA and Operating Experience  
November 1, 2002

October 30, 2002

Integrated Industry Indicator

1

## Outline of Presentation

- Industry Trends Program (ITP)
- Performance Indicator Characteristics
- Current Performance Indicators
- Integrated Industry Initiating Event Indicator (IIIEI)
- Conclusions
- Next Steps

October 30, 2002

Integrated Industry Indicator

2

## Indicator Characteristics

- Be used as performance measures in the annual performance report to Congress
- Are complementary to the plant-specific ROP
- Provide industry information for an ROP cornerstone
- Use industry data available from current NRC programs
- Are related to or tied closely to risk (e.g., CDF or  $\Delta$ CDF)
- Utilize risk-informed measures for assessing their significance (e.g., safety goal, RG 1.174)

October 30, 2002
Integrated Industry Indicator
3

## Performance Indicators

ROP Cornerstone	Ex-AEOD	ROP PIs	Other
<b>Initiating Events</b>	Automatic Scrams Significant Events	Unplanned Scrams Scrams with Loss of heat removal Unplanned power changes	ASP 15 Initiating Events
<b>Mitigating Systems</b>	Safety System Actuations Safety System Failures Equipment Forced Outages Forced Outage Rate	Unavailability of HPCI, HPIS, RCIC, EP, RHR (BWR) HPSI, AFW, EP, RHR (PWR)	
Barrier Integrity		RCS Activity RCS Leakage	
Emergency Preparedness		Drill/Exercise Performance ERO Drill Participation Alert and Notification System	
Occupational Radiation Safety		Occupational Exposure Control	
Public Radiation Protection	Collective Radiation Exposure	Radiological Effluents	
Safeguards		Personnel Screening Personnel Reliability	

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4

## Initiating Events for BWRs

- Loss of Offsite Power
- Loss of Vital AC Bus
- Loss of Vital DC Bus
- Small / Very Small LOCA
- Loss of Feedwater
- BWR General Transients
- BWR Loss of Instrument Air
- BWR Loss of Heat Sink
- BWR Stuck Open Relief/Safety Valve

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5

## Initiating Events for PWRs

- Loss of Offsite Power
- Loss of Vital AC Bus
- Loss of Vital DC Bus
- Small / Very Small LOCA
- Loss of Feedwater
- PWR General Transients
- PWR Loss of Instrument Air
- PWR Loss of Heat Sink
- PWR Stuck Open Relief/Safety Valve
- Steam Generator Tube Rupture

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6

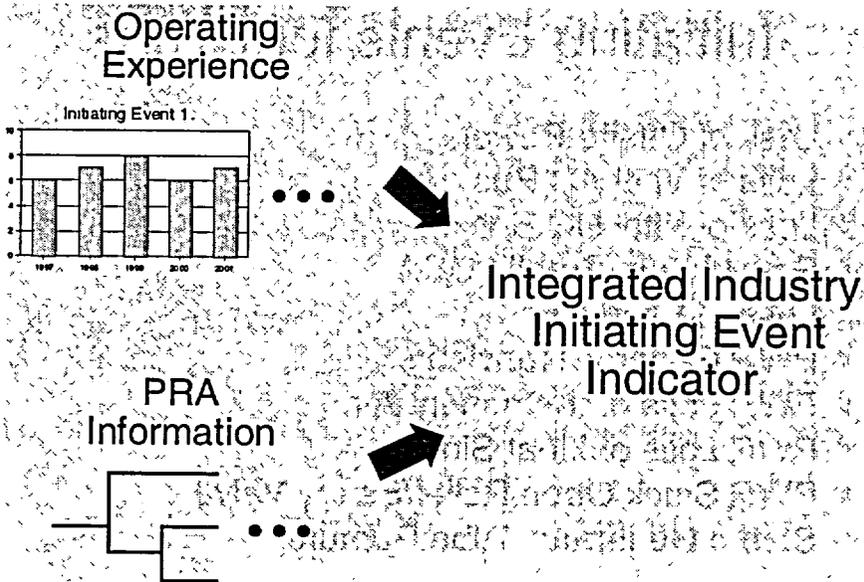
# Philosophy

- Trending individual initiating events does not capture the risk importance
- Mitigating systems performance indicator (MSPI) has provided a way of combining risk information with operating experience
- MSPI approach can be used for initiating events

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7



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8

## What is the Integrated I.E. Indicator?

- The integrated industry indicator
  - Is average of the sum of the products of the current operating experience value for each initiating event and the appropriate risk weight obtained from PRAs
  - Is related to core damage frequency
  - Allows combined trending of frequent and infrequent events with different risk importances
- One indicator for BWRs and one for PWRs

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9

## Integrated Industry I.E. Indicator Equation (IIIEI)

$$IIIEI = \frac{1}{N} \sum_{i=1}^m \sum_{u=1}^N B_{iu} \lambda_i$$

where

- $N$  = number of units
- $B_{iu}$  = Birnbaum importance measure for initiating event  $i$  at unit  $u$
- $m$  = number of initiating events
- $\lambda_i$  = current estimated industry frequency for initiating event  $i$

*Average CDF for the whole fleet of plants*

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10

## Sample Calculation

- Consider two initiating events - loss of a vital DC bus and general transients
- The integrated industry initiating event indicator for this sample calculation is calculated by:

$$III EI = (B_1 \lambda_1 + B_2 \lambda_2) / N = 6.09 \times 10^{-5}$$

where  $B_1 = 0.206$  and  $B_2 = 9.30 \times 10^{-5}$  are sums of the plant-specific Birnbaum importance measures,  $\lambda_1 = 1.67 \times 10^{-3}$ /reactor-critical year and  $\lambda_2 = 0.808$ /reactor-critical year are the industry initiating event frequencies, and  $N=69$

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11

## Risk Information

- The relevant risk information for each initiating event used in the Rev. 3 SPAR models
  - A measure similar to a conditional core damage probability (CCDP)
  - Birnbaum importance measure

(N.B. Rev. 3 SPAR models are plant-specific event tree/fault tree linked models that are being benchmarked against licensees' PRAs.)

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12

## Integrated Indicator Calculation

- Can be calculated in two ways
  - Absolute value
    - Related to core damage frequency
    - Results are always positive
    - Safety Goal
  - Deviation from a baseline
    - Related to change in core damage frequency
    - Results can be positive or negative
    - Regulatory Guide 1.174
- Both ways are equally valid

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13

## Some Issues

- Do we use absolute or difference formulation?
- What period do we use for baseline initiating event frequency?
- How should the initiating event current performance ( $\lambda$ 's) be estimated?

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14

## Trial Baseline Values

- Obtained from operating experience over an interval on which the trend is basically constant (trend parameter is not statistically significant)
- For initiating events with few occurrences, the interval is 1988-2001.
- For I.E.'s with more frequent occurrences, the interval is shorter, but includes at least 4 years

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15

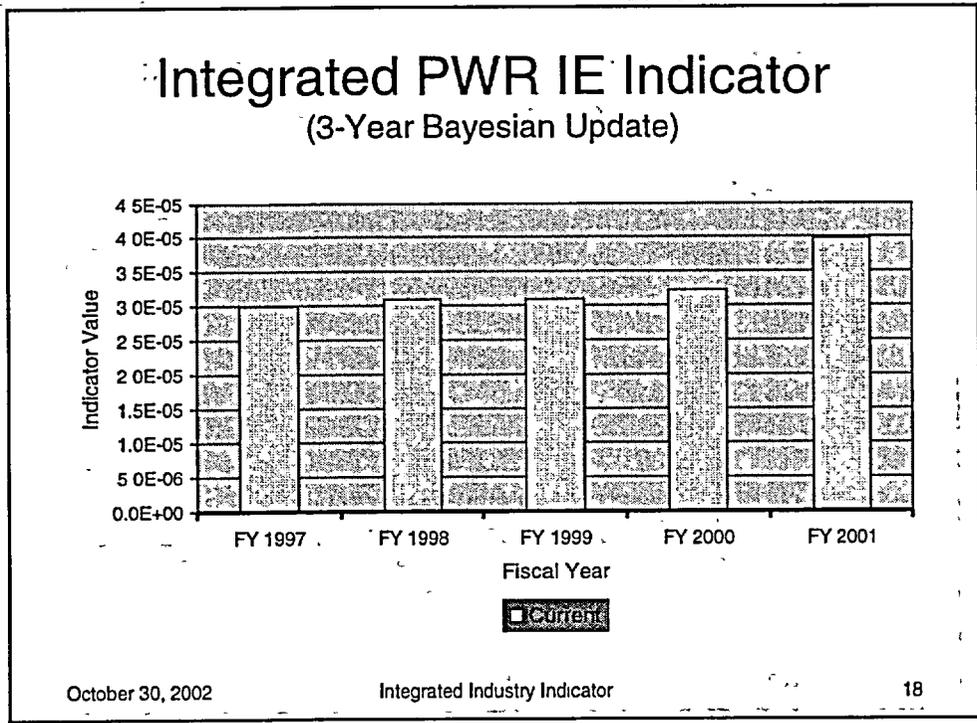
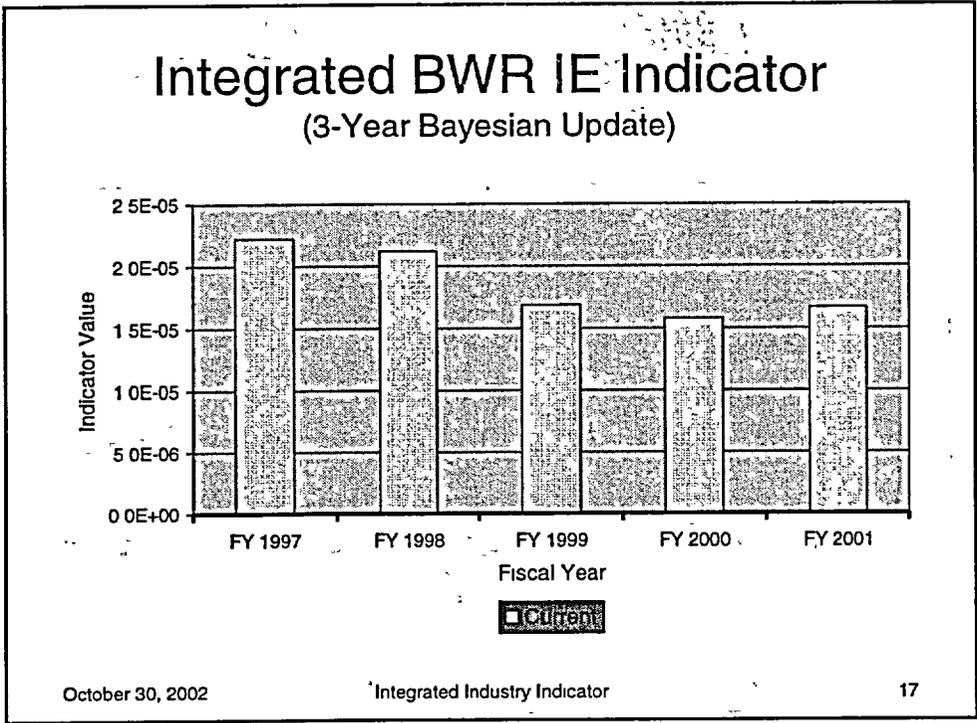
## Current Performance

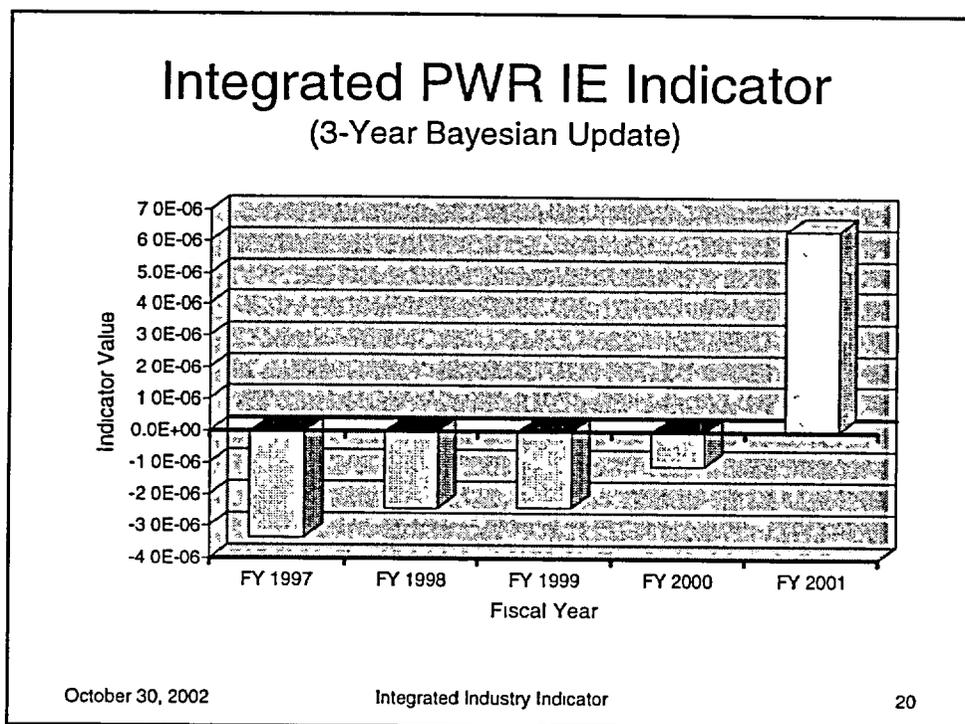
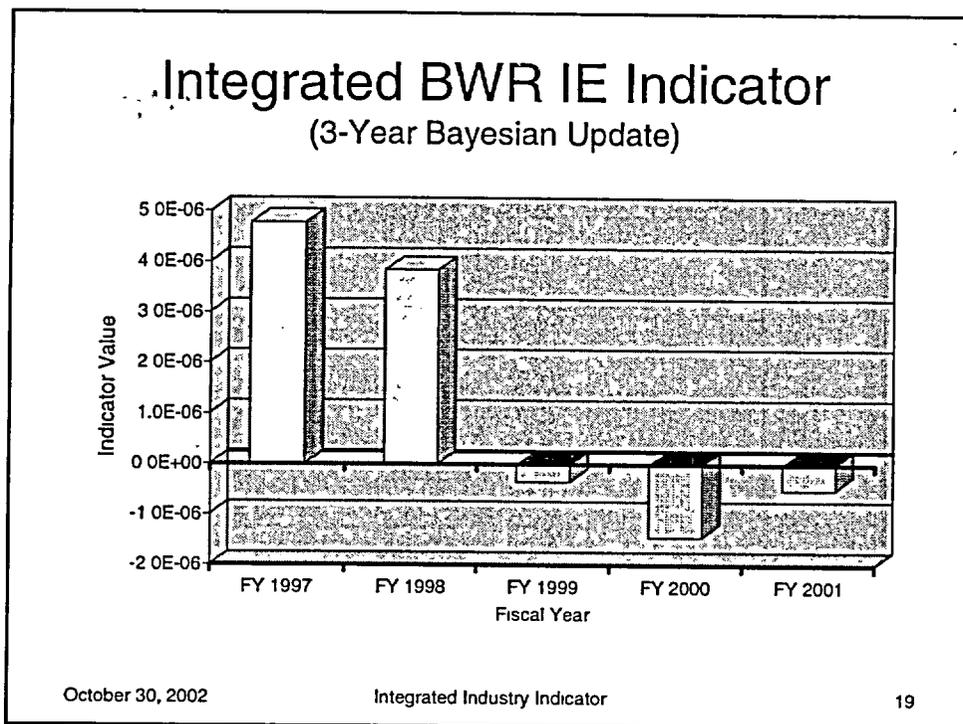
- Current performance is estimated using
  - Maximum likelihood estimator or
  - Bayesian update (A constrained non-informative prior distribution based on the baseline value)
  - One or more years of data (events and reactor critical years)
- The difference between the current value and the baseline can be positive or negative since the current value can be less than or greater than the baseline value.

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16





## Uncertainties in the Indicator

- Initiating event frequencies
  - Baseline frequencies
  - Current frequencies
- Birnbaum importance measures
  - Parameter uncertainty from the PRAs
  - Plant-to-plant variability

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21

## Indicator Significance

- Congress (via the GPRA) has requested that the NRC use performance goals and performance targets (thresholds) to assess the significance of the performance measures
- The Commission has told the staff to develop risk-informed thresholds "as soon as practicable"

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22

## Thresholds for Integrated Indicator

- Thresholds should be set using the following considerations:
  - Safety Goal and/or Regulatory Guide 1.174
  - Behavior of the integrated indicator
    - Simulations
    - Contributors
    - Maximum value
    - Past operating experience trends for initiating events
  - Consistency with the ROP
  - Expert panel where logical relationships and/or parameters are difficult to derive or where pragmatic issues arise

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23

## Conclusions

- Single industry-wide performance measure that has a logical relation with risk metrics (CDF or  $\Delta$ CDF)
- Potentially relatable to the Safety Goal
- Allows rational combination of events with different risk importances and frequencies
- Can establish early-warning and agency action thresholds
- Complementary to plant-specific PIs

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24

## Next Steps

- Develop initial concept
  - Review and comment by stakeholders
  - Resolve comments
- Develop trial product
  - Review and comment by stakeholders
  - Resolve comments
- Develop final product
  - Review and comment by stakeholders
  - Resolve comments
- Implement product

October 30, 2002

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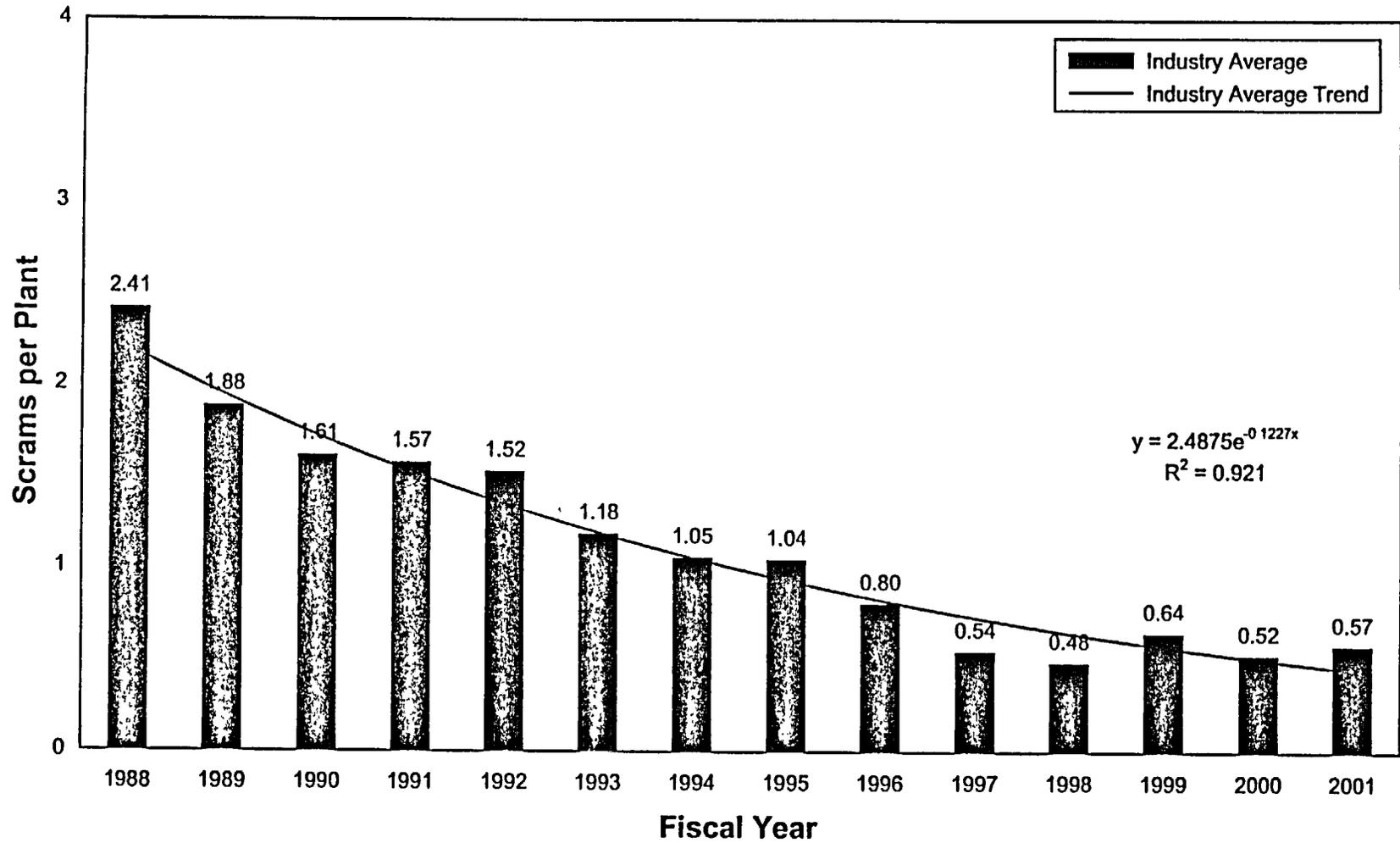
25

**ACRS BRIEFING ON  
INDUSTRY TRENDS PROGRAM (ITP)**



**November 1, 2002**

## Automatic Scrams While Critical



## Introduction

- Background
- Purposes and Role of ITP
- Communications
- Concepts and Approach
- Process for Industry Trends
- Development Efforts



## Background

- Improving industry trends contributed to decision to revise ROP
- Strategic Plan performance goal measure of “No statistically significant adverse industry trends in safety performance” - annual report to Congress as part of NRC’s Performance and Accountability Report
- NRR developed formal Industry Trends Program (ITP) in 2001, building on work by RES from former AEOD PI program
- Reports in SECY-01-0111 (6/2001) and SECY-02-0058 (4/2002)
- ACRS briefed in May 2002
- Commission briefed in May 2002
- No adverse industry trends identified to date

## Purposes and Role of ITP

- Purposes:
  - (1) Provide a means to confirm that the nuclear industry is maintaining the safety performance of operating reactors
  - (2) By clearly communicating industry performance, enhance stakeholder confidence in the efficacy of the NRC's processes
  
- Complements existing NRC processes:
  - (1) Plant-specific oversight by ROP
  - (2) Processes for addressing generic issues (i.e., generic communications process in NRR and generic safety issues process in RES)

## Communications with Stakeholders

- Status of ongoing development efforts briefed to NRC/industry working group on ROP
- Industry indicators published on NRC web site
- Annual review at AARM and report to Commission
- Annual report to Congress in NRC Performance and Accountability Report
- Indicators presented at conferences with industry



## Concepts and Approach for Development of Indicators

- Used existing programs for initial set of indicators
  - ex-AEOD indicators (7 indicators)
  - ASP program (1 indicator)
  
- Developing additional industry indicators for each cornerstone of safety
  - PIs derived from plant-level PIs in ROP (~19 indicators)
  - PIs from operating experience data (initiating events index combines 10 indicators into 1 indicator)
  
- Hierarchical approach to use of industry indicators
  - Qualified set of indicators used for reporting to Congress
  - Indicators may be “decomposed” into multiple indicators to investigate any trends

## Current Process for Industry Trends

- Identify any statistically significant adverse trends in industry indicators
  - Statistically significant fit of a trendline to each indicator
  - Improving or flat trendlines = no adverse trend => done
  - Degrading trendlines = adverse => report to Congress & initiate evaluation
  - In addition, to investigate short-term variations before they become trends, single data point above prediction limit => initiate evaluation
- Evaluate underlying issues and assess safety significance
  - Decompose indicators and look for outliers
  - If appropriate, review of LERs and inspection reports
- Agency response IAW existing NRC processes for generic issues
  - Early engagement with industry and assessment of issues
  - Responses could include industry initiatives and requests for information
  - NRC may conduct generic safety inspections
- Review at AARM

## Development Efforts

- Thresholds for PIs, risk-informed where possible; enables change to performance measure from trends-based to thresholds approach
- Indicators for cornerstones of safety derived from ROP PIs
- Framework/Guidance document
- Industry-level Mitigating Systems Performance Index (MSPI), depending on results of pilot program for individual plants in ROP
- Initiating Events Performance Index (IEPI)

# Risk Management Technical Specifications

Presentation to ACRS Subcommittees  
on Plant Operations & Reliability and  
Probabilistic Risk Assessment

November 1, 2002

# Development

- Standard Technical Specifications – 1974
- NUREG-1024 - 1983
- Interim Policy Statement - 1987
- Improved Standard Technical Specifications – 1992
- Implementation of 50.65(a)(4) – 2000
- Risk Management Technical Specifications Initiatives – 1998 to Present

# Principles

- Coherence with other risk-informed regulation development
- Licensee discretion commensurate with capability – graded approach to crediting 50.65(a)(4) program
- Involve staff with cognizance for inspection, maintenance, risk assessment and management

# Initiative 1- End States

- Effect: Allow repair time in hot shutdown instead of requiring transition to cold shutdown
- Basis: CEOG and BWROG generic analysis of preferred mode for repair given equipment inoperable
- Status: CEOG safety evaluation complete, reviewing TSTF translation into standard tech spec changes; BWROG safety evaluation complete, TSTF in preparation.

# Initiative 2 – Missed Surveillance Actions

- Effect: Extension of flexibility granted in Generic Letter 87-09, allow up to one surveillance interval to make up inadvertent missed/incomplete surveillance
- Basis: Infrequent use, likelihood that equipment is operable, entry into corrective action program, assess and manage risk of delay as extension of (a) (4) program (treat as emergent condition)
- Status: 47 plants have adopted, 21 requests in process

# Initiative 3 – Mode Flexibility

- Effect: Extension of flexibility granted in Generic Letter 87-09, allow mode transition up in power with inoperable equipment, relying on compliance with TS actions in higher mode
- Basis: Infrequent use, generic risk analysis ruling out some transitions, 50.65(a)(4) assessment and management of risk, oversight of 50.65(a)(4)
- Status: Resolving comments on FRN published August 2, 2002

# Initiative 4 – Flexible Completion Times

- Effect: Extend completion time from a nominal value up to a “backstop” maximum using configuration risk management
- Basis: Under development, to include requirements for PRA technical adequacy, real-time quantitative capability, configuration and cumulative risk metrics
- Status: Industry writing detailed guidance paper for staff review, identifying plants for pilot amendments.

# Initiative 5 – Relocation of Surveillance Test Intervals

- Effect: Requirement to perform surveillance remains in TS, frequency adjusted outside TS in licensee program using staff-approved methods
- Basis: Review of methods, PRA technical adequacy
- Status: Industry preparing guidance document and draft methodology, expect to use a pilot plant

# Initiative 6 – Shutdown Tracks

- Effect: Risk-inform LCO 3.0.3 shutdown completion times
- Basis: CEOG quantitative bounding risk analysis
- Status: CEOG topical under review

# Initiative 7 – Risk-Informing Support Equipment Impact

- Effect: Allow a TS train to be considered operable up to a maximum time with degraded non-TS design support features (barriers and snubbers)
- Basis: Generic calculation showing low risk due to low initiator frequency (internal flood, seismic event)
- Status: Staff reviewing draft proposal

# Initiative 8 – Risk-Informing TS Scope

- Effect: (a) Allow relocation of LCOs not meeting any 50.36 criteria, including criterion on risk significance, (b) Limit scope of TS to risk-significant SSCs
- Basis: Adaptation/adoption of categorization approach from Option 2, generic analysis, PRA technical adequacy
- Status: (a) Industry preparing paper for staff review, (b) Requires rulemaking, schedule TBD