NRC PUBLIC MEETING SUMMARY REPORT

Date: October 6, 2011

Meeting Contact: Gary L. Stevens
RES/DE/CIB
301-251-7569
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Subject: CATEGORY 2 PUBLIC MEETING – DISCUSSION OF NONDESTRUCTIVE EXAMINATION ASPECTS OF REACTOR PRESSURE VESSEL INTEGRITY ISSUES FOR OPERATING NUCLEAR POWER PLANTS

Meeting Date/Time: Thursday, September 15, 2011 / 09:00 am

Location: U.S. Nuclear Regulatory Commission
One White Flint North, 1st Floor, Room O1F16/O1G16
Commissioners' Conference Room (also called "Hearing Room")
11555 Rockville Pike
Rockville, MD 20852-2738

Purpose: The purpose of this meeting was to have technical discussions related to nondestructive examination (NDE) that might be performed and applied to evaluation of irradiation effects on RPV ferritic materials for operating plants, with particular focus on 10 CFR 50.61a and 10 CFR 50 Appendix G evaluations.

Summary: The announcement and draft agenda for this meeting were posted on the NRC web site on August 24, 2011. They are available via ADAMS at Accession No. ML112350511.

The revised final meeting agenda is included in Attachment 1.

Meeting attendance is included in Attachment 2.

The meeting was transcribed and the transcripts are included in Attachment 3. A summary of the meeting follows below; detailed discussion of each item summarized below can be found in Attachment 3.

Material presented at this meeting and referred to in the discussion below was previously posted in ADAMS at Accession Nos. ML112500032

(Westinghouse Presentation) and ML112510335 (ASTM Presentation). No other material was presented at the meeting.

Gary Stevens (NRC) opened the meeting at 0900 with introductions, followed by statements summarizing the efforts being undertaken in the NRC Office of Nuclear Regulatory Research. These efforts include additional research being performed on reactor pressure vessel (RPV) integrity issues. This public meeting is a continuing effort by the NRC to solicit relevant input from interested parties on this subject. The specific purpose of this meeting was to have technical discussions related to the NDE aspects of evaluation of the structural integrity of RPVs in operating plants, which was an area identified in the last public meeting held on this subject on July 26, 2011 as an area where additional discussion and information exchange would be useful. The NRC's research efforts on RPV integrity relate to several documents, and this meeting included technical discussions related to these research activities, with particular focus on 10 CFR 50.61a and 10 CFR 50 Appendix G.

Bob Hardies (NRC) provided clarification on the NDE aspects of 10 CFR 50.61a and 10 CFR 50 Appendix G (refer to the discussion beginning on p. 13 of the transcripts, Attachment 3). Bob clarified the following three points:

1. In a 10 CFR 50.61a assessment of flaws in a vessel, the NRC's goal remains to gather reasonable assurance that the number of flaws in the vessel and the distribution of flaw sizes are bounded by the flaw distribution used in the NRC's probabilistic fracture mechanics (PFM) analysis that provided the technical basis for 10 CFR 50.61a.
2. The NRC recognizes that there may be difficulty in quantifying the smaller flaw sizes referred to by 10 CFR 50.61a. As identified in the Statements of Consideration for 10 CFR 50.61a, allowance is made for licensees to use various approaches that provide alternatives for parsing flaw data between different flaw-size bins, as long as these approaches are supported with a sound technical basis. The NRC expects that licensees may have to modify their NDE approach from current practice, and it is recognized that RPV exams may actually take longer and need to gather more data than is currently the norm in order to adequately assess compliance with the requirements of 10 CFR 50.61a.
3. There is a requirement in 10 CFR 50.61a for an examination for surface-breaking flaws in some instances. The NRC expects that whatever techniques are used to do this have an adequate technical basis.

Mike Anderson of the Pacific Northwest National Laboratory (PNNL) led a discussion intended to provide clarification on the NDE re-analysis and reporting needs associated with 10 CFR 50.61a and 10 CFR 50 Appendix G (refer to the discussion beginning on p. 22 of the transcripts, Attachment 3). Significant discussion ensued. The discussion concluded with a consensus understanding of the NDE issues related to 10 CFR 50.61a that would allow licensees to define the examination requirements needed to comply with 10 CFR 50.61a for their NDE vendors. This discussion was summarized near the end of the meeting (refer to the discussion beginning on p. 190 of the transcripts, Attachment 3).

Steve Byrne of the American Society for Testing and Materials (ASTM) provided a presentation (ADAMS Accession No. ML112510335) proposing the use of the latest ASTM Standards relevant to RPV integrity (refer to the discussion beginning on p. 99 of the transcripts, Attachment 3). ASTM desires to continue dialogue between ASTM and NRC in order to provide advice on incorporating new ASTM Standard No. E2215 into 10 CFR 50 Appendix H, on establishing an optimum surveillance capsule withdrawal schedule, and on defining the RPV material surveillance program needs for new plants. In addition, ASTM would like to perform a similar effort on other ASTM Standards, as appropriate.

Bruce Bishop (Westinghouse) provided a presentation (ADAMS Accession No. ML112500032) on 10 CFR 50.61a flaw limit implementation recommendations (refer to the discussion beginning on p. 119 of the transcripts, Attachment 3).

Steve Sabo (Westinghouse) provided a presentation (ADAMS Accession No. ML112500032) on NDE Capabilities (refer to the discussion beginning on p. 165 of the transcripts, Attachment 3). The presentation included discussion of WesDyne's use of the flaw proximity rules for the combination of flaws, WesDyne procedures for scan index size, default depth sizing versus demonstrated flaw depth sizing, surface examination requirements, and the actual inspection areas. Feedback was also obtained from other NDE vendors that attended the meeting.

There were no other presentations offered, nor were there any comments from any members of the public (refer to the discussion beginning on p. 190 of the transcripts, Attachment 3).

Gary Stevens (NRC) summarized the meeting action items (refer to the discussion beginning on p. 208 of the transcripts, Attachment 3). The following actions were identified:

- EPRI to identify if there is any information available that summarizes how many layers of cladding were deposited during the fabrication of U.S. nuclear plant RPVs.
- NRC will provide a response to a question from Chuck Wirtz regarding BWR RPV circumferential weld examinations and whether there will be a need to revisit the work performed to eliminate examination of those welds.

Gary Stevens announced that the NRC is tentatively planning to hold another RPV integrity public meeting during the ASME Boiler and Pressure Vessel Code meetings in St. Louis, MO in November (refer to the discussion beginning on p. 213 of the transcripts, Attachment 3). The NRC requested input from interested stakeholders so that these meeting plans could be finalized. Subsequent to the 9/15 public meeting, and based on feedback from interested stakeholders, the NRC decided that the next meeting will be held on Wednesday, November 9, 2011 in St. Louis during the ASME Code meetings. A public meeting announcement will follow in the near future through the normal NRC Public Meeting Announcement process.

The meeting was adjourned at approximately 3:45 pm.

Attachments: The following attachments are included with this report:

Attachment 1
AGENDA

DISCUSSION OF NONDESTRUCTIVE EXAMINATION ASPECTS OF REACTOR PRESSURE VESSEL INTEGRITY ISSUES FOR OPERATING NUCLEAR POWER PLANTS

Thursday, September 15, 2011
9:00 a.m. – 3:45 p.m.

Purpose of Meeting:
The purpose of this meeting is to have technical discussions related to nondestructive examination (NDE) that might be performed and applied to evaluation of irradiation effects on RPV ferritic materials for operating plants, with particular focus on 10 CFR 50.61a and 10 CFR 50 Appendix G evaluations.

Agenda:

Time	Topic	Organization	Coordinator or Presenter
9:00	Welcome and Introduction	NRC	Stevens
9:05	Brief Summary of NRC Research Activities on 10 CFR 50.61a and 10 CFR 50 Appendix G	NRC	Stevens
9:15	Clarification on the NDE aspects of 10 CFR 50.61a and 10 CFR 50 Appendix G	NRC	Hardies
10:15	**BREAK**		
10:30	Clarification on NDE re-analysis and reporting needs associated with 10 CFR 50.61a and 10 CFR 50 Appendix G	Pacific Northwest National Laboratory	Anderson
11:15	ASTM Use of Latest Standards	ASTM	Byrne
11:30	Discussion	All	Stevens
12:00	**BREAK FOR LUNCH**		
1:30	10 CFR 50.61a Flaw Limit Implementation Recommendations	Westinghouse	Bishop
1:50	NDE Capabilities	WesDyne	Sabo
2:45	**BREAK**		
3:00	Discussion	All	Stevens
3:30	Public Comments	None	None
3:35	Summary and Review of Action Items	NRC	Stevens
3:40	Next Meeting	NRC	Stevens
3:45	**ADJOURN**		

Attachment 2
ATTENDANCE LISTS

The individuals listed on the following 3 pages attended the meeting in person.
Several others, as reflected in the attendance listed on pp. 2 – 3 and 9 - 10 of the meeting transcripts (Attachment 3), also participated via teleconference.

ATTENDANCE LIST
for
Public Meeting

DISCUSSION OF NONDESTRUCTIVE EXAMINATION ASPECTS OF REACTOR PRESSURE VESSEL INTEGRITY ISSUES FOR OPERATING NUCLEAR POWER PLANTS

Thursday, September 15, 2011
9:00 a.m. – 4:00 p.m.

Location: U.S. Nuclear Regulatory Commission
One White Flint North, 1st Floor, Room O1F16/O1G16
Commissioners' Conference Room (also called "Hearing Room")
11555 Rockville Pike
Rockville, MD 20852-27388

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Name	Organization	E-mail
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Name	Organization	E-mail
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MARK KIRK	NRC	MARK.KIRK@NRC.GOV

Attachment 3
MEETING TRANSCRIPTS

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Discussion of Nondestructive Examination Aspects of Reactor Pressure Vessel Integrity Issues for Operating Nuclear Power Plants

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Thursday, September 15, 2011

Work Order No.: NRC-1114 Pages 1-214

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NUCLEAR REGULATORY COMMISSION

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OFFICE OF NUCLEAR REGULATORY RESEARCH

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DISCUSSION OF NONDESTRUCTIVE EXAMINATION ASPECTS OF REACTOR PRESSURE VESSEL INTEGRITY ISSUES FOR OPERATING NUCLEAR POWER PLANTS

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PUBLIC MEETING

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THURSDAY,

SEPTEMBER 15, 2011

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The meeting was convened in Hearing Room O1F16/O1G16 of One White Flint North, 11555 Rockville Pike, Rockville, Maryland, at 9:00 a.m., Gary L. Stevens, Moderator, presiding.

NRC STAFF PRESENT:

GARY L. STEVENS, Moderator, NRC/RES

MICHAEL BENSON, NRC/RES

AL CSONTOS, NRC/RES

STEPHEN CUMBLIDGE, NRC/NRR

STEPHEN DINSMORE, NRC/NRR

CAROLYN FAIRBANKS, NRC/NRR

NRC STAFF PRESENT: (cont.)

ERIC FOCHT, NRC/RES

ROBERT HARDIES, NRC/NRR

MARK KIRK, NRC/RES

WALLACE NORRIS, NRC/RES

CAROL NOVE, NRC/RES

JEFF POEHLER, NRC/NRR

IOURI PROKOFIEV, NRC/RES

PAT PURTSCHER, NRC/NRR

ROBERT TREGONING, NRC/RES

RACHEL VAUCHER, NRC/NRO

INDUSTRY REPRESENTATIVES PRESENT:

MICHAEL ANDERSON, Pacific Northwest Nuclear Laboratories

JANA BERGMAN, Scientech, CWFC

BRUCE BISHOP, Westinghouse

MICHAEL BRILEY, Entergy

ROY BROWN, Entergy

STEVE BYRNE, ASTM International

SARAH DAVIDSAVER, AREVA

GUY DEBOO, Exelon

PAUL DEEDS, Entergy

MARK DENNIS, EPRI

ROBIN DYLE, EPRI

INDUSTRY REPRESENTATIVES PRESENT: (cont.)

KATIE GRESCH, Exelon

MICHAEL HACKER, AREVA

ROBERT HEALEY, GE-Hitachi

JOE KOURY, ASTM

CARL LATIOLAIS, EPRI

DUNCAN MACLEAN, IHI

DAN NOWAKOWSKI, FPL

STEPHEN PARKER, Westinghouse

STEVE SABO, Westinghouse

GREG SELBY, EPRI

JACK SPANNER, EPRI

KEVIN THERIAULT, GE-Hitachi

CHARLES TOMES, Dominion

CHARLES WIRTZ, First Energy

A-G-E-N-D-A

P R O C E E D I N G S

9:00 a.m.

MR. STEVENS: Welcome everybody and thank you for coming. This is a public meeting, Category 2 public meeting, Discussion of Non-Destructive Examination or NDE Aspects of Reactor Pressure Vessel Integrity Issues for Operating Nuclear Power Plants. The purpose of the meeting is we're going to have some technical discussions related to NDE that might be performed and applied to evaluation of the radiation effects on RPV ferritic materials for operating plants. We'll discuss a little bit more about that in a minute.

I'm Gary Stevens, NRC Office of Research. A couple of housekeeping items first. Number one, there is a bridge line and I had the great fortune of getting this room which I hope will make things much more conducive to the folks on the phone to hear. Also, we are having the meeting transcripts recorded and so between the two I hope to retain a lot of useful information for future reference and all that. And I encourage everybody to contribute, speak up, whatever you have to say, and for those in the audience step up to a microphone so the folks on the

phone can hear. Restrooms, out this door to my right just to the left. There's also a cafeteria just to the left, although there is no food or drink allowed in this room. Someone asked me about water, bottled water, and the instruction I have is no food or drink so I think the answer is no. And the only other rule of all the rules I've been given I'll say is the dark chairs around the corner here belong to the commissioners and we're not allowed to sit in those chairs. I don't know what happens to you if you do that, but please don't. Actually, if anybody does sit in those chairs chances are it's supposed to be the commissioner, so.

What we'll do is we'll go around the room for introductions and then we'll talk about the agenda. If there's any additions or members from the public that have anything they'd like to add we'll get that and then we'll talk a little bit about why we're here and then get into it. So we'll start over here.

MR. CSONTOS: My name's Al Csontos. I'm the chief of the Component Integrity Branch in the Office of Nuclear Regulatory Research.

MS. NOVE: Carol Nove, NRC.

MR. BYRNE: Steve Byrne. I'm representing ASTM International.

MR. BISHOP: Bruce Bishop representing Westinghouse.

MR. SABO: Steve Sabo, Westinghouse.

MR. SELBY: Greg Selby, Electric Power Research Institute, Director, NDE.

MR. HARDIES: Bob Hardies, NRR, NRC.

MR. ANDERSON: Mike Anderson, Pacific Northwest National Laboratory.

MR. TOMES: Chuck Tomes, Dominion, and representing EPRI/MRP.

MR. NORRIS: Wally Norris, Research.

MR. DYLE: Robin Dyle, EPRI.

MR. LATIOLAIS: Carl Latiolais, EPRI.

MR. HEALEY: Bob Healey, GE-Hitachi.

MR. NOWAKOWSKI: Dan Nowakowski, Florida Power & Light, also representing the MRP Inspections Committee.

MR. BRILEY: Mike Briley, Entergy.

MR. PARKER: Stephen Parker, Westinghouse.

MR. MACLEAN: Duncan MacLean, IHI.

MR. DENNIS: Mark Dennis, EPRI.

MR. THERIAULT: Kevin Theriault, GE-Hitachi.

MR. WIRTZ: Chuck Wirtz, First Energy, also representing the BWR VIP.

MR. SPANNER: Jack Spanner, EPRI.

MR. PURTSCHER: Pat Purtscher from NRR.

MR. DINSMORE: Steve Dinsmore, PRA Branch, NRR.

MS. BERGMAN: Jana Bergman, Scientech.

MR. BENSON: Mike Benson, NRC Office of Research.

MR. POEHLER: Jeff Poehler, NRC, NRR.

MR. TREGONING: Rob Tregoning, NRC Office of Research.

MR. FOCHT: Eric Focht, NRC Office of Research.

MS. FAIRBANKS: Carolyn Fairbanks, NRR.

MR. CUMBLIDGE: Stephen Cumblidge, NRR.

MR. PROKOFIEV: Iouri Prokofiev, Research.

MS. VAUCHER: Rachel Vaucher, Office of New Reactors.

MR. STEVENS: Okay, thank you. The two mics here on the podium or the steps are also live for folks in the audience.

MR. KIRK: Mark Kirk, NRC.

MR. STEVENS: Good timing, Mark. Oh, okay. Can you sing for us? By the way, in case -- we're not expecting any but if there is any kind of an emergency or evacuation out the door, out the lobby,

take a right to Marinelli Road and I will -- look for me out there. I'm kind of tall so I'm easy to see and I'll use the sign-in sheet which I wanted to also tell you about to inventory everyone out there. I don't expect that to happen.

MR. HARDIES: There is a reasonable chance it will happen today.

MR. STEVENS: You said this at the last meeting. Is that true? Okay.

MR. HARDIES: We have to do it once a year.

MR. STEVENS: Okay. So if that happens --

MR. HARDIES: The end of the fiscal year so we're going to -- sometime in the next two and a half weeks we're going to do it. We don't do it on Mondays or Fridays.

(Laughter)

MR. ANDERSON: It won't happen today, it's not raining.

MR. STEVENS: Okay, so now that you've lost my train of thought here. Okay, that's right. I forgot. Folks on the bridge line we'll try and do this one at a time. If you would introduce yourselves.

MR. HACKER: This is Mike Hacker with

AREVA.

MS. DAVIDSAVER: This is Sarah Davidsaver also with AREVA.

MS. GRESCH: Katie Gresch with Exelon.

MR. DIBOU: Guy Dibou with Exelon.

MR. STEVENS: Anyone else on -- sorry. Can you repeat that? I cut you off.

MR. DEEDS: I'm sorry, Paul Deeds with Entergy.

MR. BROWN: Roy Brown with Entergy.

MR. STEVENS: Anyone else? Okay, thank you for tuning in. We do have microphones so I hope the audio is vastly superior to the last meetings we've had. Sorry, say that again?

MR. BROWN: It's wonderful so far.

MR. STEVENS: Good deal.

MS. GRESCH: I agree, much better.

MR. STEVENS: Okay, so the agenda is there's copies of the agenda up front. There's two, actually there are four or five folks listed on the agenda but as far as presentations I have two, one from Westinghouse and one from ASTM. Are there any other presentation material -- is there any other presentation material to be presented? And are there any members of the public that wish to speak at the

meeting? Okay. We have a slot for that. We'll call it out again but. So I don't anticipate the meeting to go all day. I do expect that we will have some amount of activity after lunch but I do expect and hope that we'll adjourn by the break, the afternoon break.

So to start Mr. Mitchell was called at the last minute so he is not going to be in attendance and Mr. Hardies over here is filling in for him.

MR. HARDIES: Matt's in Japan.

MR. STEVENS: As most of you know the NRC is conducting some research activities in the area of RPV integrity and specifically we're working on regulatory guidance with respect to 10 CFR 50.61a, Pressurized Thermal Shock Alternate Rule. And as we've stated before we are working towards having something out for public comment sometime next year and that reg guide out in 2013. We're also working on a revision to 10 CFR 50, Appendix G and Appendix H which we've previously stated would be out in the 2014 time frame.

We've had meetings, several meetings earlier this year. We in discussions with the public and industry earlier this year determined that it would be fruitful to all organizations to have

periodic dialogue on a continuing basis. The last meeting, public meeting, was held here at headquarters on July 26th. We did discuss basically the same subjects and at that meeting and in other conversations that have ensued it was identified that it would be highly useful for the next periodic meeting which we're having today to focus on NDE aspects of RPV integrity. I do appreciate the NDE vendors in particular for showing up today. I understand that outage season has started and time is premium for you and I appreciate your input. And also those that helped orchestrate this meeting. It was difficult as with all meetings to pick a time where everyone's available but I do appreciate the sacrifice of your time to come and I look forward to those conversations we'll have.

So this meeting, we are trying to emphasize on the NDE aspects of it. We will be talking about the analytical side of things as well with a slant towards how the analysts interpret the NDE data. We have a slot at the end to talk about when the next meeting might be. So with that, with that the first agenda item, that concludes the first one which is a brief summary of our research activities. Are there any questions or clarifications

anybody would like to hear on that?

Okay, hearing none. And I encourage everybody to speak up anytime. This is not, you know, we're trying to keep it informal so that everyone can contribute. I look forward to that. Mr. Mitchell was up which I'll say is Mr. Hardies. And there's no presentation here but we were just trying to clarify, or the intent of this slot was to clarify the NDE aspects of these two items in the regulation that we're working on at least. And so Bob?

MR. HARDIES: Good morning. Thanks, everyone, for coming. We really appreciate it. I was sitting at my desk and Matt said can you take over for me this morning or fill in, I've got to go to Japan for the day. And I said sure, but I didn't know I was on the agenda. So that's just the way it goes.

(Laughter)

MR. ANDERSON: I'll help you, Bob.

MR. HARDIES: I'll work my way through it. We wrote an alternative PTS rule after years and years and years of very good work. And found that the risk of failure had, you know, we were able to calculate a lower risk of failure at the same embrittlement metric with the alternative PTS rule as opposed to the old PTS rule. Really most of that

reduction in risk came from a lower number of flaws that were used in the analysis. I mean, there were a lot of other contributors but the lower number of flaws used in the alternative PTS analysis risk was the primary driver for this reduction in risk and really the relaxation of embrittlement, the embrittlement metric limits in the alternative PTS rule.

The flaws that were used in that analysis were derived from analysis of pieces of vessels that had a lot of NDE done on them at PNNL and then were sliced and diced, cut up metallographically, looked at and the flaws were counted. From that flaw files were developed and so each time you'd do a FAVOR run in each loop, one of the loops, I forget whether it's the inner or the outer loop you go grab a vessel and the vessel has flaws in it. You grab a flaw file. So recognizing when we were creating the new rule that most of the reduction in risk was coming from this new flaw set, a good portion of it, we decided to -- it was the location of them. Well, I don't really care.

(Laughter)

MR. STEVENS: That point isn't relevant to the point you want to make.

MR. HARDIES: The point I wanted to make

is we wanted to ensure that the flaws distribution in a vessel that was going to use the alternative PTS rule was, we wanted to require some kind of reasonable assurance that it was adequately represented by what was used in the FAVOR analysis for the alternative PTS rule. And in order to do that we wanted and require utilities to look at ISI data and compare that ISI data to tables that are in the rule that limit the number of flaws you can have of various sizes. And if you find out that your vessel has fewer flaws than all those bins then we can conclude that the flaws size distribution use in the FAVOR code used for the new rule adequately bounds or fairly represents the vessel.

When we came up with those tables we did vet it through public comment. We gave it to the MRP specifically so there was a pretty good look at the ability to do those exams and the ability to categorize the flaws and the ability to parse them into the appropriate bins, at least at that time. We weren't aware that there were remaining issues.

Our goal remains that in that assessment of flaws in a vessel that we want to gather reasonable assurance the number of flaws in the vessel and the size distribution of them are not worse than the

typical distribution that was used in the FAVOR code. That's point one.

Point two is we did understand that at the small sizes there was difficulty sometimes. We understood there was difficulty in parsing out the sizes at the lower, the smaller bins, in the smaller flaws. And so we put in the rule and the statement of considerations, we allowed applicants to do some sizing correction. And so we provided an avenue that you can parse flaws if you could, you know. If your detection capability really isn't good enough to separate the smallest two bins of the flaws we allow you to come forward with some kind of a technical basis that would provide some kind of alternative parsing of that data rather than just pure NDE parsing of it.

We did expect that utilities might have to modify or use a different approach to ISI, may have to be more careful in your approach to doing the exams. It may actually take longer and need to gather more data. We did anticipate that.

And finally, the other point I want to make is there is a requirement for an examination for surface-breaking flaws in some instances. And our concept there, we certainly would expect that whatever

techniques were used you'd have an adequate technical basis for it. We don't really know at this point what applicants are considering, whether it's an eddy current approach or something else, we just don't know. We're interested in hearing what you have to say today and that's it. Any questions?

MR. STEVENS: Actually, I have a couple of things to say first. And then just to welcome kind of everybody in the fold because I know that we have folks from the BWR community here and they're probably asking why are you telling me all this? PTS doesn't apply to me. In earlier meetings this summer it was brought out that for the BWRs who are doing exams in accordance with BWRVIP-05, some of the provisions that are being identified for 50.61a might be appropriate for use for those that want to apply risk-informed Appendix G. That brings the whole fleet in with respect to some of the NDE issues we'll be discussing today because the staff has stated previously that when Appendix G is revised and we're looking at risk-informing part of it that it's likely some of the same NDE provisions that are linked to PTS would also apply to that. So, the discussion you hear, there will be a lot of reference to 50.61a and PTS and all that, but it really does, it's relevant to risk-informing

Appendix G which is forthcoming.

The other thing I was going to say, it kind of bridges to the last meeting. There was a lot of questions prior to and during the last public meeting in July trying to clarify whether the rule was asking for something beyond an Appendix VIII exam. And I think it was answered and clarified. And I'm kind of looking at Bob and sort of, I'm going to make the statement and you can nod your head and agree, but in the last meeting it was stated that in Appendix VIII it was always intended that an Appendix VIII qualified exam would be sufficient for use with the rule.

MR. HARDIES: Yes, that's correct.

MR. STEVENS: I mean, the words are --

MR. HARDIES: -- in the statements of -- for want of consideration.

MR. STEVENS: Okay. So I wanted to -- that, we tried to clarify that at the last meeting. That led to quite a bit of discussion. I imagine we'll have more today but I wanted to kind of float that out there. And there was a second point which I've now lost, I'm sure I'll remember it later, for bridging from the last meeting. But as we get into the discussion I'm sure I'll remember that and bring

it up. So with that any other questions, discussion while we're on the? Trying to clarify the NDE aspects of these two regulations. Wow. Thank you for clarifying.

So the question was how does this apply to the 20-year extension. Thank you for that. That's one item I left out. It would also apply for that approach as well. So when I meant to expand the discussion beyond just 50.61a I meant to try and bring the BWRs in as well as the 20-year interval extension that the PWRs are working on for their RPV welds, reactor pressure vessel welds. Any other questions?

MR. WIRTZ: Yes, Gary, since it is likely going to be extended to BWRs under the risk-informed Appendix G with regard to BWRVIP-105 and the relief requested all the BWRs have on record, not doing their circumferential welds any further in the future. They had to have done the weld at one time but would there be any expectations for going back and gathering more recent data on those welds?

MR. STEVENS: Thank you.

MR. WIRTZ: My name is Chuck Wirtz. I'm First Energy and I'm also here representing the BWRVIP.

MR. STEVENS: Robin is going to answer

this.

MR. DYLE: This is Robin Dyle with EPRI. When this topic was discussed in the June meetings and Matt discussed this at some extent. He did, the question was asked how would this apply to BWRs. And his answer was at that time if I'm accurately framing it was that it doesn't affect the relief request that the BWRs have. There is no requirement going forward that they would have to add the horizontal weld exams. It's simply the vertical weld exams for the vessel would be that data set that would populate the table. So there was no intent to change what was in place, you just use a smaller data set for coming up with your flaw distribution to use.

MR. BISHOP: This is Bruce Bishop. I will be addressing a little bit the contribution of circumferential flaws in PWRs this afternoon in my presentation.

MR. SELBY: I'd like a little clarification of Carl's question about 20 years. I can think of going from licensing from 60 to -- 40 to 60, or 60 to 80, or maybe it was about the 20-year coding intervals, I'm not sure.

MR. STEVENS: This is taking a 10-year inspection interval on reactor pressure welds and

extending that out to be a 20-year interval.

MR. SELBY: Okay, thanks.

MR. STEVENS: So I got the question noted that -- I don't know that we've given an answer to that so I'll have to take that as a homework item. The question, I mean Robin obviously gave a position from the earlier meeting but as far as the NRC goes I've noted the question on the BWR circ welds and whether there would be a need to go back and revisit those. Gee, I thought everybody would be jumping to have something to say on this subject, so. Okay, that was the other subject actually I wanted to -- now that I remember. I looked at the agenda and you know, leading in to the next item which I have Mike Anderson down for and this wasn't a formal presentation either. But this whole discussion I think is really not going to compartmentalize itself into what's shown on the agenda. I was hoping we'd get the conversation going.

The other issue I think that was discussed at the last meeting and clarified was that the, I believe the staff made statements to the effect that Appendix VIII exam was adequate. It might, however, require some amount of reevaluation of the collected data, and we had some discussion on what that meant. And maybe not sufficient discussion on what that

meant. That was one of the items we took as an item to table and discuss in fact at this meeting. And that's really what we have Mike down on the agenda for was to just kind of lead a discussion on clarifying what do we mean by re-analysis of Appendix VIII data. And then we also would like to hear from the NDE vendors and the utilities as to whether that's feasible, that's possible, that's not possible and get clarification on that. So Mike, anything to start with?

MR. ANDERSON: Yes, I wanted to say that I really want to solicit input from the people who own the procedures. I think it's very important that we hear from the vendors about what the capabilities of their technologies that are Appendix VIII qualified can do. And to help with that I've got a series of kind of open issue questions. And I'm going to ask each of the NDE vendors in succession at least to start with to get some input on this issue if that's okay. That way we're guaranteed to get some input from the gallery this way.

During the last meeting there was this -- to continue Gary's thought on. There was a discussion about existing data, Appendix VIII qualified exams that had been performed and whether or not it would be

possible to take that data and through some method re-analyze, reevaluate it to some extent in order to help with the PTS rule binning process. I'm assuming everybody knows what that means in this room.

MR. STEVENS: And actually I was going to jump in here because I stole a slide from Bruce's presentation here. But this, so what is up on the screen and for those on the phone, I don't think I got everybody but I did try to forward the presentations out to most of you. I'm looking at page 6 of the Westinghouse presentation. And what this page really shows is Table 2 from 50.61a which is the allowed number of flaws for welds. There's another table that's very similar that's for allowed flaws in plates but I wanted to show this one.

And this shows the allowed number of flaws per thousand inches of weld in several different, what's been designated as bin sizes that are sized based on the through-wall extent or the depth of the flaw. And these are cumulative type of bins so. But if you look in the first column there you'll see the increment in through-wall extent size. In the first bin, there's no limit on the number of flaws in the first bin which basically is less than 0.075 inches in through-wall extent.

So the flaws that require detection in terms of populate these bins start at 0.075 inches and go up in 0.05 increments roughly here. And I believe, I'm going to make another statement that the 0.075, these bin sizes were selected to line up with Appendix VIII qualifications. So, what the rule would imply from examinations is that the NDE exams done in accordance with Appendix VIII can detect and size flaws such that these bins could be populated.

Now, we have some information from Westinghouse and their presentation later, and we can, I'm sure the discussion now will start to bring some of that out that maybe suggests or indicates that given the physics behind the techniques used there might be difficulty in populating some of these bins. And that's the kind of conversation we kind of want to have here.

And I think what we were going, what we were aiming after here on the re-analysis angle was if you were doing an Appendix VIII exam lined up in accordance with ASME Code Section 11 which might be looking for flaws of different sizes than what's shown in this table is there a processing or some reevaluation of that data that could be done if you went back and looked at it that would be more, you

know, give you flaws more in line with these tables. And that's kind of I think my simplistic statement of what reevaluation meant, given a prior exam that may have been focused on flaws of different sizes. You could go back and reevaluate that examination data somehow and get flaw information that would line up more directly with these tables in the rule. And the question is is such evaluation possible and what information would be gained from such reevaluation. Now, you want to ask your questions?

MR. ANDERSON: Well, the first question was I would have asked it a little bit different, but before I do I see Carl waving his hand and mouthing me something back there so come to the microphone and express what it is that you want to say, Carl, because I'm a very bad lip-reader. Yes, actually we have a seat if you'd like to sit.

MR. LATIOLAIS: I'd rather stay back here.

MR. ANDERSON: Okay.

MR. LATIOLAIS: This is Carl Latiolais. I'm with EPRI. I manage the performance demonstration program, the Appendix VIII program. And I'm in charge of the blocks we were going to be talking about and the test and Appendix VIII and all the other stuff. I think that we need to focus, what I was trying to tell

Mike and I think Gary tried to do it just now is that many of the vendors aren't -- the NDE people with the vendors don't have the same background on the PTS rule. They haven't been talking PTS rule for two, three, five years. So it's very beneficial, I think it would be very beneficial to give them a condensed overview of really what you're looking for. What are you expecting from them when they do these examinations, the re-examinations. If you get confused in these tables in Appendix VIII you know they know, they read the code also, they know what's in Appendix VIII and they also know that they developed their procedures to be able to satisfy the requirements of Appendix VIII.

And they also know that the smallest flaw sizes that are in these bins are, they're not required to find and it's not in every region within that test. And then for GE-Hitachi's benefit, you know, most of the focus on the NDE has been discussed from the ID, PWR exams from the inside surface. GE performs their exams from the outside surface. So the difficulty of finding a 0.075 flaw from the opposite surface is, you know, when you hear the presentations later on from Westinghouse they're looking at relative to inspection from the ID. It could be even more difficult from the

OD. So that needs to be considered.

And we understand from the last meeting that the expectation is Appendix VIII qualified exams is what we're going to perform. So I think you need to be very clear and encourage the vendors to ask very detailed questions on what is expected from them when we do these exams, what's your definition of reasonable assurance, what is good enough. Because you're going to, you know, you have to make a decision. Is the old data going to be sufficient? Do you need to take new data? Can you just re-analyze? Do you remove thresholds? Do you take -- do you do another exam? So those things are very difficult questions to answer so I think we need to have candid discussions. I encourage the vendors also to ask those detailed questions. My understanding, the NUREG is supposed to provide guidance on how to implement the rule. And the most important portion of it in my mind is how do you collect the data to implement the rule. I know that's a little long-winded but I think that's the important. If I was a vendor that's the questions I would want to ask in this meeting and walk away with some clarity.

MR. STEVENS: Thank you, Carl. Bruce?

MR. BISHOP: I just want to say this idea

of the small flaw is a very important issue, okay, and it's one of the reasons we requested to speak. Because I think it's important like Gary said in terms of the PTS analysis using the FAVOR code which by the way stands for, I'm not sure, flaw or fracture analysis of vessels, Oak Ridge. Failure? Oh, okay. But that's the probabilistic fracture mechanics analysis code that was used as the technical basis for the alternate PTS rule, specifically version 6.1 of that code. And going back and looking at some of the results from the FAVOR code it was -- found some very interesting results in this regard. On the average for every vessel simulated it simulates 550 flaws, 0.0888 inches deep, all right? They're all 0.0888 inches deep. The contribution of all those 550 flaws is less than 2 percent to the total frequency of failure. So I think that's a very useful piece of information to know and it supports why we have no limit on that because it's not really necessary to have a limit on something that only provides 2 percent. So I just wanted to make that point.

MR. STEVENS: Okay, thank you. So I'm going to, and I appreciate Carl's lead-in to try and say let's get the conversation going and be candid and frank and all that because that would be our wish and

desire too. So I'm going to try and with help from my comrades here I hope, I'm going to try and in less than five minutes try and simply explain a very complicated issue which is what is the PTS rule from an NDE point of view asking folks to do.

The first thing is it's an optional, a voluntary rule, it's not a requirement. So it's only -- the whole discussion that we're going to have on this is only applicable to those plants that decide they want to use the rule. And that will be also true with risk-informed Appendix G if that's going to be in the rule in the sense that at least right now what's in ASME code, the risk-informed option for PT curves is not a requirement, it's a voluntary option.

MR. BISHOP: It's also a requirement for the 10- to 20-year too. We have to satisfy these flaw limits.

MR. KIRK: Okay, so -- well, what you're saying, Bruce, I think is there's one precedent where NRR made it a requirement.

MR. BISHOP: That's right.

MR. KIRK: Yes.

MR. BISHOP: And we've actually applied it 20-some times.

MR. STEVENS: Okay. So what you're saying

there on the 20-year, everybody plans to use that and as a part of that these kinds of issues we're discussing are required.

MR. BISHOP: I'm not sure that everybody will be doing it, but there certainly are more people interested in that that have to use it for the old PTS rule.

MR. STEVENS: Okay. Thank you for that clarification and thanks for jumping in because like I said, it's complicated and it's hard to summarize in five minutes or less. So the bins you see up here, and again there's one for welds and one for plates, and some of the discussion we should have is how do you decide if a flaw is in the weld or the plate. I know that I've heard that question from several folks in previous conversations. They look the same. How you determine the number is a bit different. The flaws for the welds is on per linear length of welds whereas the plate is on a per-volume of plate. There's bin sizes you see here based on through-wall extent with a number of allowed flaws in this case per thousand inches of weld. So simplistically the rule would say given an Appendix VIII exam of the vessel belt line the flaws you detect in size and I think we clarified at the last meeting, you're doing your exam

in accordance with Section 11 and you apply proximity to those results and you would take what comes out of that evaluation after proximity, and you would populate these bins with what you found.

Number of flaws of each size divided by the length of weld you examined in the belt line area. This table would suggest that you need to find flaws down to 0.075 inches in through-wall extent. And you would be able to size such flaws and populate these bins accordingly. Even though there were smaller flaw sizes in the analysis the smallest bin which is below the Appendix VIII threshold has no limit. In other words, you can tolerate an infinite number of flaws. An did think that is consistent with what Bruce just said, that the contribution of those flaws to risk was generally insignificant. Anybody want to clarify what I just said?

MR. KIRK: Yes, yes, and that Bruce is correct in his reflection of the probabilistic fracture mechanics results. That's, in fact in our technical basis it was, that specific statement was made that we allow no limit on the flaws less than 0.75 specifically because overall they were a small contributor to risk even though there were lots and lots of them simulated in the FAVOR runs. However, I

just did want to point out that once we get into the bin sizes where there are numeric limits in Table 2 of 10 CFR 50.61a you very quickly get to the even for the small, for example, I'm bumbling. The three smallest bins, 0.075, 0.125 and 0.175 collectively represent about one-third of the total calculated risk. I mean, I can show a histogram if you like but the point is that the smallest walls we've discounted and that's why there's no limit. But once you get into the table it becomes, the analysis suggests that it's important to find those flaws because they contribute a significant part to the total risk. Not being an NDE person myself that's real easy to say because I don't know how hard it is to do that, but that's what we're here to learn today is finding flaws, say, between 0.075 and 0.175 within the realm of current technological capabilities or what else would need to be done to enable that.

MR. STEVENS: And then a couple other things to finish off here real quick. One is these bin sizes are cumulative in the sense that you'll see for example in the 0.075 bin while the through-wall extent max value is the same down the table the number of flaws in that bin includes the number of flaw sizes for all bins below it as well. Did I say that right,

Mark? It's a cumulative total for everything in the table below it.

The other thing is I guess we should talk about is regarding depth into the vessel wall that the rule is requiring these comparisons. These tables are intended for use for flaws detected on the inner 10 percent of the thickness or 1-inch, whichever is greater. And then the rule also states that any flaws detected within the first three-eights T which is 37.5 percent of the wall thickness, if there's any detected the through-wall cracking frequency needs to be determined. And I'm sure there's a ton of questions as to how do you do that and that's one of many things we will be addressing in a regulatory guide.

MR. BISHOP: Gary, I don't think that -- the requirement is that you have to satisfy ASME Section --

MR. STEVENS: You're correct.

MR. BISHOP: Section 3 or Section 11 requirements for those flaws.

MR. STEVENS: Well, I think you must satisfy Section 11 for all flaws. That's -- and --

MR. BISHOP: There is a specific requirement in the PTS rule though if you find any flaws in the inner three-eighths T they have to

satisfy the ASME code requirements. And that means you have no reportable flaws.

And the other thing is is that even if you violate the number of flaws it doesn't mean that you've failed, okay, it just means that you have to do an evaluation and there's where I think you have to make some sort of assessment of what the effect might be on the failure frequency.

MR. STEVENS: That's right. In our guidance we intend to provide guidance on how to do that which we hope will be short of -- unless the situation warrants doing a full-blown probabilistic fracture mechanics evaluation.

MR. HARDIES: Carl, you asked a couple of other questions, didn't you? You asked a whole bunch. If I remember right. Mike asked a question and you got up and in answering his question you asked a bunch of questions. But I'll forgive you for one of them. You did ask, I think I got the flavor that you were wondering whether the NDE vendors needed to do something different for application of the PTS rule. The application of the alternative PTS rule, we envisioned there would be a relatively low number of utilities who elect to use this alternative rule. And they're going to have to submit the bins, the

technical basis behind it, and we're going to have a lot of questions about how the data was generated and how it was evaluated. And we're going to look very closely at it. So I would expect that a licensee who intends to use the alternative PTS rule will have very detailed discussions with their ISI vendor before they do the vessel exam that gathers this information for an alternative PTS rule. We did originally anticipate that licensees would be able to use an existing ISI exam and we're still exploring that, but if a licensee has an ISI between, you know, now and when they're going to do the PTS rule you know we're going to expect that that's the data that's used for the submittal and we're going to expect that that's an exam that was performed with this goal in mind. So you ask what the vendor should expect, they should expect to, you know, tailor the exam to get this information.

MR. DYLE: Bob, this is Robin Dyle. I just wanted to ask a clarifying question. You said that you expected there would be a limited number of utilities using this for the alternate PTS rule.

MR. HARDIES: Correct.

MR. DYLE: However, going back to the beginning of the meeting because this will also be

used for the 20-year extension and for any plants that would be attempting to use risk-informed Appendix G once that's in the regulations that population grows significantly. So I just wanted to make sure we weren't looking at a small sample of plants, this could be broadly applied. So we all need to understand the issue.

MR. HARDIES: Well, let me --

MR. BISHOP: I just wanted to point out --

MR. HARDIES: We're nesting questions just like you're nesting FAVOR loops so you're going to just have to sit there calmly for a little bit. Because now I'm talking to Robin but I thought I was talking to Carl. With respect to Appendix G we haven't written a new Appendix G yet. We don't know what risk level ultimately is going to be -- well, we kind of know what the risk target is but we don't know what the -- right now there's a proposal and you could adjust the proposal a little bit and achieve a lot lower risk values. We don't know what it's going to look like. So, we don't know what targets are going to be in Appendix G. We will learn, I will guarantee you that we will learn from our experience in 50.61a and apply that learning when we write Appendix G. So, Appendix G just may look different. And with respect

to the ISI interval extensions I really don't know, I don't know what we're doing there.

MR. BISHOP: I just wanted to make a comment about that, Bob. Just recently we sent a list of 13 sets of data, ISI data, to Gary from the work that we had done on the ISI interval extension from the Appendix VIII qualified. And typically every time you get a recordable indication you do an evaluation of it. If it's in the inner 10 percent or 1 inch, you know, and how big is the through-wall extent compared to the bins just like you said you would do. Okay, so we've done that. Some of the plants didn't have any recordable indications in the inner 10 percent or 1 inch so we didn't have to include those, but we do have 13 sets of data that we've done the evaluation and we've provided that to the NRC for their consideration.

MR. STEVENS: Yes, and I did receive that just last week. I have an ML number I'll provide you momentarily but I want to make sure Mr. Hardies has all his questions before I take us on another tangent.

MR. HARDIES: Well, I guess I just want to sum it up is the kind of theme is the detail with which we'll look at the ISI, your ISI information is with all things that we do it's sort of related to the

risk of the application. And there's a difference in the ISI 20-year interval extension isn't that big a delta risk. Letting a plant get an additional 20 or 30 years of embrittlement is a big risk in comparison and so we'll pay attention accordingly. And since Appendix G isn't written yet it's hard to talk about Appendix G. So I'm done. You can go on unless Carl wants to continue asking questions.

MR. LATIOLAIS: This is Carl Latiolais again. It's not the same question, but on the subject of reportable and -- reportable and recordable flaws. I'm asking this for the vendors, not for my knowledge on any of this. There's a unique difference in terminology when you're speaking to the vendors and you say give me a list of reportable indications. Reportable means it met some threshold that they had to do an evaluation on it and turn it over to the licensee for review. Recordable is a much lower, at times a much lower threshold where they record it. Sometimes it's recorded in the electronic data if it's an automated exam. It may be listed on a report, it may be noted there, but it's not reportable. So I think you need to be clear in your NUREG what your expectations are in filling these bins. Is it only reportable indications that exceed some threshold that

had to be evaluated in 3500 tables or is it a specialized exam where you want to basically know the density of flaws of this size within the volume you're specifying in the rule. Because you may end up getting different sets of data. You may end up with a vessel with one flaw and then another exam performed may have 30. Because if they give you recordable versus reportable the numbers can vary quite a bit.

MR. STEVENS: Can you clarify in what you're saying now, can you define for us reportable and recordable more specifically?

MR. LATIOLAIS: Reportable would be a flaw that has a dimension they can size, upper and lower dimension, length. They would take that flaw and they would go to the 3500 tables and say does it meet the in-service tables, yes or no. You may have other flaws of any size, the procedures basically say any flaw you see you have to evaluate. And they may record them but they don't -- they may not have a measurable depth they can measure because of the limitations of the technique, they may be spot indications. They all have thresholds. They may not be seen on two consecutive scan lines or other things that they will record those, they have them recorded, but they're not reportable to the licensee. They

don't have to do any additional evaluation. But they're in the data.

MR. ANDERSON: Let me see if I can help shed some clarification on this, Gary. Mike Anderson. I understand what you're saying, Carl, and I think I heard Bob say we want the reportable but in terms of PTS if you look at these bins you want anything that comes out of the noise. That's recordable because there's no other way you're going to get, you're going to populate these bins for the purpose of this rule. If you look -- this is beyond what Appendix VIII, I should say Section 11 reportable rules are asking you to do. This is asking you to put the numbers of flaws in the bins as small as shown in this table right here. So reportable and recordable, when your procedures from the vendors say that we have to evaluate whether they are or not that evaluation should lead you to this bin right here, whether it's recordable or reportable.

MR. HARDIES: Let me just, I really think Carl and Mike, you're using different versions of the word "recordable" aren't you?

MR. ANDERSON: No.

MR. HARDIES: You weren't talking about Section 11 recordable, you were talking about

something different weren't you, Carl?

MR. LATIOLAIS: The purpose of the in-service examination is to look for flaws that exceed a certain size, and size is really dictated by the 3500 exceptions tables.

MR. STEVENS: So you're specifically saying anything that exceeds ASME Code Section 11 acceptance standards.

MR. LATIOLAIS: Yes, or has to be evaluated to it.

MR. STEVENS: Is reportable.

MR. LATIOLAIS: That's reportable.

MR. STEVENS: And anything that would be used to apply those standards would be recordable.

MR. LATIOLAIS: You may record many flaws but you don't have to report them because they don't exceed a given size.

MR. BISHOP: But you evaluate them to see if they are reportable.

MR. STEVENS: Okay, so Bob, given those --

MR. SELBY: And you record. You know, if you identify everything that comes above the noise level and record them it doesn't mean they're flaws. They're indications, they're ultrasonic responses but there can be many tiny ultrasonic responses not

associated with discontinuities in the metal.

MR. BISHOP: In the PTS rule if you have a reportable indication I think the alternate PTS rule said you could not use the alternate PTS rule. If you had a recordable indication without doing some additional evaluation or adjustment.

MR. STEVENS: That's correct. We -- well, so I was going to make a statement given those definitions to just start the conversation, Bob, which is that whatever you're going into the IWB-3500 acceptance standard tables with, which with the definitions I just heard would be recordable, with ASME proximity applied that's what would be lined up with the PTS bins.

MR. HARDIES: Say that again.

MR. STEVENS: Okay. Whatever defects, no, not defects. Whatever indications --

MR. HARDIES: Responses, indications.

MR. STEVENS: Whatever indications that I get from my exam I apply ASME proximity rules to and I go into the IWB-3500 acceptance standards with, those are the recordable indications I want to line up with the rule.

MR. SELBY: I don't think so. Because the rule up there, the table that you're displaying isn't

number of indications, it's number of flaws. It's not the same thing.

MR. HARDIES: Yes, I think it's any UT indications that are determined to be flaws that would be evaluated to see whether they're acceptable or unacceptable flaws. Because there are false indications, or there's indications that aren't flaws.

MR. KIRK: I think it would be, well, as a member of the committee that drafted that table I think I can safely say that our use of the word "flaws" does not carry the same precise definition as it does in ASME and NDE land. So anything you see --

MR. STEVENS: Are you agreeing with my definition?

MR. KIRK: I believe I'm agreeing with your definition and disagreeing with Greg's.

MR. BISHOP: I just wanted to say I know it's a different risk threshold, okay, but that's consistent with the interpretation for the ISI interval extension and the data we sent you shows those evaluations.

MR. KIRK: I think to place Table 2 in a more precise nomenclature it should say number of indications.

MR. SELBY: Again, Mark, I disagree

because some of the indications as I said before are not necessarily associated with the discontinuity with the separation of the metal. If the ultrasonic response is coming from say an acoustic mismatch between the base metal and the cladding it's not going to fail.

MR. KIRK: Okay, then I need to better understand what -- and maybe this is something better done offline -- what is the definition of "flaw" in an NDE inspection.

MR. ANDERSON: How about relevant indications? I mean, that's what we want to talk about here. I don't think we're talking about metallurgic or geometrical reflections that everybody can tell from relevant indications. I think we're talking about relevant recordable indications. Whether you go to the flaw tables with them or not you're going to have to have them if you're going to populate these bins right here. Now, we can argue about whether if something can tell whether they're relevant or not, you know, based on the procedures that are qualified. And that's a question you'll have to pose to the vendors. But I think it's a disservice to only go to a handful of flaws that are reportable that have been evaluated in IWB-3500 and apply that to

this because it's missing the point of the PTS alternative which is to compare your fabrication flaws to what has been analyzed through FAVOR. And so you need to see everything that's a possible or relevant fabrication flaw in these welds and do that comparison as far as bins are concerned.

MR. SELBY: I think whether the term is you know relevant indication or flaw or defect, it's important not to burden those bins with indications that aren't associated with anything that has a stress intensity factor. If it's a geometric indication. If it's not a physical separation in the material it doesn't belong there.

MR. ANDERSON: I agree. Such as geometry, metallurgical interfaces, those type of things you're talking about I completely agree, those are not fabrication flaws as we would --

MR. SELBY: Correct. The danger arises if you become very sensitive. If you start recording everything with a signal-to-noise ratio greater than 1.1 you'll get large numbers.

MR. STEVENS: Robin?

MR. DYLE: Yes, just a point of clarification. And this is Robin Dyle from EPRI. Mike, you've used relevant indications, we've talked

about reportable, recordable and all the other stuff, but if you go back to the rule, the rule in Paragraph E says examination and flaw assessment requirements. So you're required to assess flaws and those flaws in the next paragraph are to be identified based on the use of Section 11 as currently required in the existing rules. So that seems to define what you're going to use to bin the tables. What else we might want to have we can have a discussion, but if you're going to ask the entire industry to go follow the rule, the rule says you evaluate flaws and you're using ASME Section 11 Appendix VIII and 50.55a, b, 15, to do those examinations. So that's the data set from which you work and everywhere in the rule it says flaw assessment, it uses the term "flaw." So it seems for consistency you would be expecting the vendors and all the licensees to use the definitions in Section 11 to determine whether something's a flaw or not. And then from that bin the table and do the appropriate evaluations.

MR. KIRK: And I retract my disagreement with Greg and thank you, Robin, for reading what we wrote five years ago. My apologies.

MR. ANDERSON: One of the reasons though that -- Robin, I agree with what you're saying, but

one of the reasons we're here today is because there are uncertainties associated with the NDE as applied in Appendix VIII to populate these bins or we wouldn't be having this meeting. So if we go blindly down the reading of the rule and the use of the Appendix VIII then the question is are we going to get the results that were intended. Regardless of the words, are we going to get the results that were intended so that we can do a comparison with the flaw density and distributions that are the basis for the PTS rule. And that's why we have some questions. I think we'd like, if it's okay, I'd like to specifically ask the vendors --

MR. STEVENS: One thing first. So I'd like Mark now to clarify my definition.

MR. KIRK: I got in trouble with this before, so.

MR. STEVENS: What was your definition?

MR. KIRK: I had a definition I stated and then you agreed with it and we've had some discussion.

MR. HARDIES: I disagreed with it right in between. And it is flaws, we wrote the rule with respect to flaws, we used the word "flaws" and in the statement of considerations we talked about what a flaw was.

MR. KIRK: So I think it's flaws. Is that what you said?

MR. STEVENS: No.

MR. KIRK: Oh darn, then I disagree with you.

MR. STEVENS: I said recordable indications which later got clarified potentially by Mike to be relevant recordable indications.

MR. KIRK: As Robin so clearly pointed out, we -- and I'm not saying things can't change, but we've been through this before. We defined the meaning of the word "flaws" in that table to mean flaws in an ASME and flaw evaluation sense. And so I think my personal view is if we want to change from that we should be quite clear about it.

MR. STEVENS: And flaws would line up with Carl's definition of reportable indications. Is that correct?

MR. HARDIES: Reportable indications are flaws that don't meet the --

MR. ANDERSON: Acceptance criteria. They're not acceptable per Section 11.

MR. HARDIES: Right.

MR. STEVENS: So the change to my definition would be to remove relevant indications and

replace it with flaws and say any flaws that you take into IWB-3500 acceptance criteria after having applied proximity rules is what we're looking for to populate the bins.

MR. DYLE: Gary, this is Robin again. If I could I would say that you would use Section 11 and say any indication that you've determined to be a flaw is what you would use. That flaw may be acceptable to the standards of IWB-3500 in being an acceptable flaw by the table. It might exceed that table and require an IWB-3600 fracture mechanics evaluation to accept it for continued service. It's those flaws that exceed the 3510 tables that require additional through-wall frequency calculation work. So that's how you would characterize those.

MR. ANDERSON: Robin, I think that's a good clarification. I think, I don't have a problem with the way that you've clarified that statement but now we need to hear the vendors weigh in on what the capability to determine an indication from a flaw is. That's good, I don't have a problem with that, it's the ones you take to determine if -- into the 3000 area to determine if they're acceptable or not. I have no problem with that. But that infers an interpretation of the indications and we need to

understand is that possible to do. And so are we ready to go that way?

MR. STEVENS: Yes. Actually I thought you asked the question.

MR. ANDERSON: I kind of did. What I would like to do is ask the individuals at the -- who own these procedures at the UT suppliers organizations. And if you don't mind Steve I'll start with you. I mean, first question, it's two parts. One is if you have existing Appendix VIII qualified UT data can you go back with your thoughts of binning in PTS and use that data successfully to bin the tables?

MR. SABO: Well, currently the way -- this is Steve Sabo at WesDyne -- all of the indications are recorded down to noise in our procedures. And I'm not sure how everyone else's procedures work but ours are recorded down to noise. And so we are -- and the procedures have definitions of what is geometry, what is bing redirection, load conversion, other signals. So we are recording all valid flaws. So they are there.

There are two questions, can you detect the smallest flaws you need to detect and how accurate is your sizing. And I think that's what you're asking. We know that we can size to the requirements

of Appendix VIII. Whatever the actual smallest flaw size in the test sample, we don't know obviously. We know that anything that's smaller than 0.125 there can be a problem sizing with tip-to-fraction sizing. Sometimes you see separated tips, sometimes you don't. In the case you don't we have a default, we give it a 0.125 size. So we could have very small flaws that we can detect but per our procedure and the way we qualify it they would automatically become 0.125 through-wall and go into the third bin or the second bin as a requirement. So you may have smaller flaws going into that larger more severe requirement.

MR. ANDERSON: Okay.

MR. SABO: But I think all the procedures define -- for all the vendors define what is a valid flaw, how you determine it.

MR. STEVENS: So I know we have GE, IHI, AREVA on the phone. Can any of you comment as to do you agree, do your procedures agree with what Steve just said?

MR. HEALEY: This is Bob Healey with GE-Hitachi. Our procedures are the same way. We record everything all the way down to noise. It's recorded over 100 percent of the capabilities of the system. Anything below one-eighth of an inch I don't know if

we can accurately size. We have not been required to and we've not really had any luck trying to do that. We do have the capability to go back and re-review all of our previously recorded data. The early Appendix VIII qualifications was with an acquisition system that we're no longer using but we have the capability to look at that with the new analysis software. So our capabilities are pretty much the same I would estimate as the rest of the vendors.

MR. ANDERSON: How about AREVA? I'm sorry? Yes, hey Mike, are you still there? Mike Hacker?

MR. STEVENS: Let me get a clarification from GE. Are you doing your exams from the inside of the vessel or the outside?

MR. HEALEY: We do probably 90 percent of our exams from the outside. There are some access limitations in some of the BWRs that we can't get the system in there. We have an ID system. And all of this data is recorded to either hard drive, it's digital data that's recorded either to hard drive or in past exams to optical disk.

MR. STEVENS: Okay. Any comments from IHI or AREVA?

MR. SELBY: One thing on GE. Some of the

BWRs do some of the exams with manual techniques. I wonder if it's applicable.

MR. STEVENS: And that would apply to the belt line regions?

MR. SELBY: I don't know. Bob? I was raising the BWR vessel exams from the outside surface that are done manually. Gary was asking if any of those are in the belt line area. Okay. I've got a BWR owner sitting back here saying no, that doesn't happen.

MR. STEVENS: Okay. So the clarification for the folks on the phone was that those exams that might be done manually in the BWRs are not in the belt line region.

MR. ANDERSON: The clarification here is that there wouldn't be recorded data to go back and look at if they're done manually.

MR. STEVENS: Anyone -- I think --

MR. ANDERSON: Well, we have a question for IHI Southwest, right? Yes, there's a microphone over here too.

MR. MACLEAN: Good morning. Duncan MacLean, IHI. Basically we conform the same as everybody else's standards, what's laid down in Appendix VIII. We carry out our exams from the

inside.

MR. STEVENS: Inside?

MR. MACLEAN: The vessel, yes. And we can go over the old previous data too. We record 100 percent, same as everybody else. Hard drive-based. A lot of hard drives.

MR. SABO: Mike, we can evaluate our data again but it would be with the same parameters and I don't know that anyone would evaluate the data differently than they did the first time. So you could re-look at it. You may see something you missed, something, you know. I would have sized this differently. But essentially you're not reprocessing the data.

MR. ANDERSON: Okay, that's an important distinction. We had heard during our last meeting that it might be possible to approach the data at least somewhat differently in order to populate the bins in the PTS rule. But so I'm hearing you say that's probably not -- if you reevaluate you probably get the same results that you got the first time.

MR. SABO: You would.

MR. STEVENS: But in regards to that I have a question because it's my understanding in having seen some of the NDE reports at least that go

to the utility, perhaps the only information they might be privy to are any flaws that exceeded IWB-3500 acceptance -- well, let me finish because I'm thinking of more than Westinghouse. But flaws that exceeded IWB-3500 acceptance standards and required evaluation in accordance with IWB-3600. I've personally seen NDE reports in the past that those are the only indications that were reported in those reports. Now granted they might have been some kind of summary reports and there was other reports that had more detail, but I've personally seen NDE reports for vessels that only reported in those reports flaws that required IWB-3600 evaluation. So I guess my question is in those instances is there another report that would give all of the flaws that went into IWB-3500 evaluation or would that require some kind of reevaluation to go back and get that information which may not be readily available to the licensee?

MR. BISHOP: Gary, I just wanted to say in the ISI interval extension we looked at other vendors besides WesDyne, okay, and I agree. Some of the summary reports were fairly sparse but there were backup reports that we could go at. They actually had an indication or they just showed you where the indication was and what size and how they did it all.

All that information, when we started to do the ISI interval extension we asked for that information from the vendors and so far all of them have been able to provide that information to us that had all the details that we could do that sort of evaluation.

MR. STEVENS: So the reports I'm thinking of, and it's been a few years I admit, that I can say were BWR inspection reports. So I don't know, I think what you just reviewed to would be PWR reports. So I don't know. Chuck's coming up to the microphone, maybe he can speak to that.

MR. WIRTZ: Yes, my experience would be that what you said may be correct for pre-Appendix VIII exams.

MR. STEVENS: Okay.

MR. WIRTZ: Okay. Early on in my career and I won't say how long I've been doing ISI but it's been quite awhile.

MR. STEVENS: Fair enough.

MR. WIRTZ: It was, it might not have been uncommon to get a report that what the owner would get would be a report that's only going to talk about indications that exceeded acceptance criteria. If you've met the acceptance criteria there wasn't anything clear in the code that said you had to report

all that. But my experience over the past 10 to 15 years since Appendix VIII has been applied to vessels is that all that data is supplied. Anything that had to go into the IWB-3500 tables.

MR. STEVENS: Great, thanks for that clarification. At least in my mind I know part of what was wrapped into the reevaluation question was that issue. Chuck.

MR. TOMES: I have a follow-up question that I'd like to ask Westinghouse. For the old UDRPS type of information that's been collected are the signals -- originally they were probably gated I suspect to assist in the analysis. That's my impression. Do you have the raw data stored as raw data or is it manipulated data that's been stored, and can you go back to the old files from the UDRPS data that we have today and look at the raw data all the way down to the signal-to-noise ratio? And is that useful?

MR. SABO: Yes, we could look at that. That's all raw data that was recorded and it wasn't gated either. So the analysis was done, it's just the criteria was different. You know, it was amplitude-based criteria. Some of -- reevaluations were done of a couple sites, I think Beaver Valley we had a

reevaluation, Dave Curic went in and looked at the data that was pre-PDI as though it were a PDI exam recording everything down to noise, et cetera, and I don't know Bruce, were you involved in the results of that? I think Jack Spanner was involved in that and he may have some insight into what was seen. I'm not really aware of the results of that, the exact results.

MR. TOMES: While Jack's coming up I have a follow-up question. So it's my impression and I'd like you to clarify if it's approximately true is that with all the UDRPS data that we've collected we have the capability from the files to go back and look at that not in terms of amplitude-based techniques but using current sizing techniques today and repopulate the bins.

MR. SABO: I would say for detection you could use it. For the sizing of this you probably wouldn't be very accurate because, just because of the angels that were used. It was a 70-degree trans this or then using the reg guide 1150 techniques and now you're doing things with tip-to-fraction using 45 degrees. So a lot different. The sizing wouldn't -- there may be some sizing information there but it might not be as accurate as you could get now. But

something could be done with the data.

MR. TOMES: But we may not get the same answer.

MR. SABO: True.

MR. TOMES: Thank you for the clarification.

MR. SPANNER: Yes, this is Jack Spanner from EPRI. And like Steve mentioned I had a project where we went with Westinghouse that re-analyzed the Beaver Valley data. And basically what I asked Westinghouse to do was to write down every flaw, every indication they saw that they thought was a flaw. So it had to be relevant and at that time it would not necessarily have been recordable to the UT procedure. So that's something we haven't really mentioned yet is the procedures, when the analyst goes through the procedure he follows it and when he gets done he ends up with a relevant indication that he thinks is a flaw that's been service-induced and he may or may not think it's planar or volumetric. And that's what's recorded and in my mind that's what you go -- you use those indications and you compare them to IWB-3500 to see if they're rejectable or not, and/or reportable. So when the vendors get done doing these exams, I used to do them at Diablo and we would have a list of

indications that the vendor thought was flaws and we would review all that. And it was always up to the utility to report flaws to the NRC. So that's the distinction. Anyway, so the Beaver Valley flaw, I can't remember the exact numbers. I know the NRC has results, but we went through and counted up all the flaws and there was maybe, what, 120 flaws or something that we saw. So when you go down to really low recording level, irregardless of how long the flaw was, that's the key thing. If the flaws are short sometimes you don't record them. That's how we used to do it. I'm not sure, I'm not that familiar with the UT vessel procedures nowadays but that's another thing. If they're really short, they're just a spot flaw you don't even record them.

MR. BISHOP: Speaking of short flaws, in your definition, Gary, you said the proximity rule. The proximity rule that's currently in the ASME code was not the same as the proximity rule that was used to develop the flaws that went into the FAVOR code. There is a difference there.

MR. STEVENS: Yes, and I know you have that in your presentation and I'll just say we'll -- we had a break at 10:15 so we'll pick that up when we get into your presentation. Let's take a 15-minute

break and we'll continue the conversation.

(Whereupon, the foregoing matter went off the record at 10:23 a.m. and went back on the record at 10:39 a.m.)

MR. STEVENS: Okay, so where to start. Well, we didn't talk about and I'm not going to bring it up now but we didn't talk about when I was giving my 5-minute summary of the rule we didn't talk about surface flaws, surface. So I guess I'll say quickly now that if there's a flaw that's identified by Section 11 criteria to be a surface flaw, it would be classified as surface flaw, the rule requires that that be verified not to be surface-connected. Did I say that right, Bob? And there was some -- and I'll just leave it at that for now. I'm sure we'll have more conversation on how somebody might do that. And I know Westinghouse's information or slide in their presentation on available techniques one might use to do that. But I neglected to mention that before.

The other thing I wanted to say and I'm going to use this to ask a question to pick up the conversation where we left off and hopefully instigate more conversation. Bruce had mentioned that Westinghouse provided us with inspection data and actually there was a public meeting in January of this

year with the PWR Owners Group here at the NRC and at that meeting the NRC staff had asked the industry that it would be very helpful to provide inspection data of vessels that we might use in our work here. And I have to thank Westinghouse and the other supporting organizations, they did provide that. I just received the final last week. It is in ADAMS. The ML number which I will also include in the public meeting summary is as follows. It's ML-112560145. Again that's ML-112560145. And I have, I'm going to bring that up now because I'm going to ask a question about it related to this flaw table. And then Carol Nove actually said do we have the flaws from the Shoreham vessels and all that that were actually used in the rule and that's also included on page 5 of the Westinghouse presentation which I put up here now. But anyway, that document that I just gave you the ADAMS number for, Westinghouse went through past RPV exams, all Appendix VIII exams over the last decade or so and summarized those results in tabular form. Plant names and vendors who performed the exams are not included. And I'm going to bring up a page from that if my computer will allow me.

MR. BISHOP: Gary?

MR. STEVENS: Yes.

MR. BISHOP: The detailed information on the Shoreham and PVRUF vessel is in a NUREG document CR-6817 revision 1 which is the basis of the flaw approach, or the approach that was used to generate the thousand flaw distributions that go into the FAVOR code. And all that information is in that document. And there is an ML number for it but I don't have it off the top of my head right now. Okay, it's -- hold on just a minute, I've got to find my slide here. 6817, revision 1.

MR. ANDERSON: 6817, revision 1.

MR. BISHOP: Right.

MR. ANDERSON: But there's an update of that and I'm working with Wally right now to update that NUREG. Because that was really kind of a, it hasn't been published, it's just been put in ADAMS. It has no published date. It says --

MR. BISHOP: Revision 1?

MR. ANDERSON: Yes. As in ADAMS it doesn't say published. So that's being worked. I don't expect any of those, anything to change in the populations.

MR. BISHOP: I hope not.

MR. ANDERSON: Yes.

MR. STEVENS: Okay, so I'm going to flash

between two tables here on the screen. One is slide 5 of the Westinghouse presentation which is the -- it shows the limits, the flaw limits in the rule and compares them with the Shoreham flaws that were used in the work that went into the rule. And the other one I'm going to bring up is one page, this happens to be page 3 of 47 of the Westinghouse letter that I just read off the ADAMS number for. And this just shows a summary of the Appendix VIII exam performed for a plant identified as Plant A. This was performed in 2005 and the intent of this summary is the results of exams performed which were performed on belt line welds. And what this shows is there's a couple of things you can glean from this table. First off at the top is an overall summary of the coverage obtained and which welds were inspected. And at least what I gleaned from this is, okay, there were two circ welds examined which are given here, 100 percent coverage obtained on both and each one had one recordable indication. I further concluded that this was probably a forged ring plant. There were no axial welds listed. I think that's a correct assumption. I'm not -- I haven't read this final report in detail to know if it tells me that.

MR. BISHOP: It'll tell you on the first

part of the table. It shows you all --

MR. STEVENS: Thank you.

MR. BISHOP: If there are axial welds it'll show.

MR. STEVENS: Yes, there are other plants in this, you know, other tables in this report that have many other welds, axial welds. It's clear from the information. And then below is a summary of each of the in this case two welds, two indications and below is a summary of those two indications. Another observation about this table and actually it's true with all tables in this report, all indications that all plants passed -- there's a column here called ASME code disposition which means it met ASME code acceptance criteria. And so it has the entry is allowable which means it met the criteria and was determined to be an allowable flaw. And I noted that there's roughly 13 plants I think summarized in this report. All of the flaws detected were acceptable per ASME code.

MR. BISHOP: Gary, I think the reason for that is I think this came from our work that we were doing on the ISI interval extension because that's where we were using the PD qualified exams. And that was one of the requirements that it's a requirement

for the PTS rule. It was also a requirement for us that we had to satisfy that they had. If you had a reportable indication you couldn't use the ISI interval extension.

MR. STEVENS: And so all of these are in fact PWR plants.

MR. BISHOP: Right.

MR. STEVENS: And again, the exams go by, I think the earliest one I saw was around 2000 but they're all Appendix VIII exams. And the question I have is, okay, so I really have two questions. I'll start with this one. I look at this exam and I see there was a total of two flaws, two indications recorded. And then I go to this table and I see a significantly larger number of flaws, number one that's in the rule, but number two that was found by destructive evaluation of the Shoreham vessel. So why is there such a large disparity in the quantity of flaws?

MR. BISHOP: Good question and I will do my best to answer that. I think the primary purpose of this table is that the people that developed the flaw rules sort of wanted to do a sanity check. So would the Shoreham vessel, and the Shoreham vessel, there were four vessels that were evaluated, all

right? On the 48 in the fleet that have axial welds and other 11 that have -- in the domestic PWR flight that don't have axial welds. So that's what this was being evaluated against. The Shoreham and the PVRUF vessels were the ones that were evaluated in detail. There were two other plants that had some limited amount of data evaluated. But the idea is, and if you go back to the meeting in July when we were talking about surveillance capsule data. One of the things we pointed out is when you're taking a few points and projecting it to a much larger population you have to make some allowances on the uncertainties, basically what the uncertainties and the mean values are transferring to the population. And that was done. In this NUREG report I was talking about, there's a lot of discussion about that and Dr. Lee Abramson was the statistician that was responsible for a lot of those uncertainties. Because there was some expert elicitation data that was used directly from an expert panel and there was also this prodigal code which is really based on artificial intelligence based on expert elicitation that was originally developed in the UK and then was modified at PNNL to address, specifically address our fabrication processes in the United States for vessels.

All that being said is that if this is right you would expect that the population should be worse than any one vessel you've looked at because that's only one data point. It turns out, okay, the Shoreham vessel, I've heard it referred to as like sort of a dirty vessel from a flaw standpoint. It had a lot of flaws. It had a lot more than PVRUF. And one of the things they did when they came up with the flaw distribution is they used the density for the Shoreham vessel with the PVRUF flaw sizes because the PVRUF actually had some larger flaw sizes than Shoreham. But typically you have more smaller flaws. And the other thing is they said since we were only looking at you know basically four plants, to extrapolate that instead of having just one distribution we're going to have a thousand distributions with lots of variability. So really this is sort of saying it worked.

On the average, and again where the number of flaws per bin comes from is from the FAVOR output which is the average of those thousands of distributions sampled many times and then you compare that with what was really measured in the Shoreham vessel and it's showing that it's much larger. And that's the way you want it to be, that's really the

way you want it to be because the attempt was is you didn't want to just match the Shoreham vessel, the PVRUF vessel, you wanted to extrapolate that to the fleet and in doing that you had to add some additional uncertainties. And so that's a reflection of what you're seeing in that slide.

MR. STEVENS: So my question then, and the real question I wanted to ask now that we've got a little bit of background linking back to the conversation before the break. So now this picture here, this slide 5 reflects what was evaluated for the PTS rule and was used to establish the limits on the bin.

MR. BISHOP: Right, this was what was basically became Table 2 in the PTS rule.

MR. STEVENS: So does our previous definition from NDE reports, what we should be using to line up with a bin, is what's coming out of those exams, is it in alignment with these assumptions that were built into the rule? Are we getting the information from those examinations that's consistent with what was built into the evaluation?

MR. BISHOP: Now my understanding was is I think, and Mike you can help me on this a little bit, okay. But I thought what they did is that PNNL did

like a detailed UT I think using the SAF techniques to try to simulate what a vendor would do if they were doing that same UT exam.

MR. ANDERSON: No.

MR. BISHOP: No?

MR. ANDERSON: No, no. We did weld normal. We cut the welds out and examined them from the sides.

MR. BISHOP: But I think these numbers of flaws weren't -- I mean, you didn't examine that much material that you would have had that many flaws. I think you had to do some sort of UT or something to come up with that many flaws.

MR. ANDERSON: We examined ultrasonically a lot of material.

MR. BISHOP: Right.

MR. ANDERSON: But we didn't destructively examine every single one or we'd still be doing it today.

MR. BISHOP: I know, I know. And again, for example, I know you destructively examined the PVRUF, the biggest flaw in the repair weld and it actually showed that it really wasn't a flaw at all.

MR. ANDERSON: Right.

MR. BISHOP: And so, but what I'm saying

is I think these numbers, and in the NRC memo it's not completely clear exactly, but my impression was is that was meant to be, to sort of match up with the UT that you would do to -- that you would evaluate the limits against.

MR. ANDERSON: No.

MR. BISHOP: Okay.

MR. ANDERSON: The UT that was done to -- at PNNL on the actual PVRUF and Shoreham vessels you cannot do in the field because you -- we oriented the sound at the most optimum angle to the weld fusion zone, in other words, perpendicular. Well, you can't get sound perpendicular to the weld fusion zones in the field. We cut the welds out and polished the surfaces adjacent to the weld and examined the weld fusion zones with SAF processing. So it's a much more detailed examination than one could ever expect to get from a field exam. It was done to develop a flaw density and distribution. It wasn't done to -- as a correlation to what might be done in the field at all.

MR. BISHOP: So there's a lot of conservatism there and then there was additional conservatism to account for the difference between a limited population of vessels versus the sample, a limited number of vessels in the sample versus the

larger size in the population. Because I know, one of the reasons I know this is that industry did some V&V of a lot of the work that was done in the FAVOR code and one of the things I did was do a V&V of the V-flaw calculations in that NUREG report as part of that V&V exercise. So that's the reason I know a little bit about this than maybe other people.

MR. LATIOLAIS: This is Carl Latiolais. I've just got a question. Mike, I remember when you guys were doing that. And at the same time the Shoreham plates came to EPRI and we did conventional automated UT on many of those plates and provided that information I think to you guys and then you guys went further and did all the rest of the NDE. In that report, didn't that report, did it compare the number of flaws detected from the conventional work that we did based on the advanced work that you guys did and the destructive testing? Did it touch on that extra data?

MR. ANDERSON: I don't know, Carl. I'll have to take a look and see. There's a lot of information.

MR. LATIOLAIS: That may, if you look at that data --

MR. ANDERSON: That actually could have

been a different NUREG. There was a three-volume NUREG 6471 that was published that had all during the NDE and destructive analysis that was going on that catalogued everything. The report that you talk about, Bruce, 6817 is basically a synopsis of the results of all that. But the three-volume report probably would shed some light on whether or not we were able to compare --

MR. LATIOLAIS: That may give you an idea of the number of flaws reported during the conventional examinations.

MR. ANDERSON: At that time.

MR. LATIOLAIS: That may align better with what you're seeing from the plants.

MR. ANDERSON: Agreed. Yes. I don't know the answer to your question there.

MR. BISHOP: Gary, one of the things that you also asked about was surface-breaking flaws. Now, the way surface-breaking flaws are treated in the FAVOR code is that they have to go all the way through the cladding because the cladding does not embrittle the same way as the carbon steel-based metal. So the way they are handled, okay, and we actually, in the PTS work they did look at one plant, the Oconee plant for the BMW fleet did have surface-breaking flaws

modeled. This for the PTS-type transits which are more rapid, it didn't seem to have a significant effect but they were modeled. But the idea was is that in the FAVOR code everything is treated as a percentage of the wall thickness. So it went all the way through the cladding and into the base metal up to the next 1 percent, percent of wall thickness. That's the way the surface-breaking flaws were modeled and our position was since Reg Guide 1.150 was specifically geared to look at that cladding-base metal interface that chances are you could, if you would have seen a surface flaw going on within the base metal you probably would have found it if you'd done a Reg Guide 1.150 examination which is not quite as good as the qualified Appendix VIII examination.

MR. ANDERSON: Well, now that's a good segue way into a question I have if you don't mind me exploring that a little bit.

MR. STEVENS: Are you going to ask about cladding surface flaws?

MR. ANDERSON: No, I'm going to ask about the NDE relative to a Reg Guide 1.150 high-angle refracted L wave examination which is what you're talking about for near-surface flaws and detecting those. And what's done today if that's being applied

under Appendix VIII? I don't know. So I think we need to ask that question. That might shed a light onto whether the NDE techniques that are being done are equivalent to what you're saying, that were geared for that purpose.

MR. SABO: For the Westinghouse procedures we don't use the same technique. We use a 45-degree dual element. I'm sure everyone else uses something else. I don't know if any of the other vendors use a 70 but we've found using the 45 we can still detect and have the bonus that we can size with the same transducer.

MR. ANDERSON: That's a shear wave exam?

MR. SABO: No.

MR. ANDERSON: It's an L wave.

MR. SABO: Refracted L.

MR. ANDERSON: Okay.

MR. SABO: Dual element. We found that the work with the 70, the detections may be easier for the analyst but you still detect everything with the 45 and have the bonus of sizing, so. So any other vendors might have other comments.

MR. ANDERSON: I'll ask again is Mike Hacker still online with AREVA?

MR. HACKER: Yes, I'm here.

MR. ANDERSON: Mike, are you paying attention to what we're saying about the high angles and near-surface exams and stuff? What are your comments?

MR. HACKER: Well, we've been using the 70-degree high-angle L since about the mid-'90s. We actually transitioned it from Reg Guide 1.150 into the PDI qualification and continue to use it.

MR. ANDERSON: Okay. How about IHI?

MR. MACLEAN: We currently use phase array for all our vessel work. I think we sweep 30 to 70, or 30 to 80 degrees.

MR. ANDERSON: GE?

MR. HEALEY: Most of our exams are done from the OD so. I believe we do use it with our ID tool though.

MR. ANDERSON: Okay.

MR. STEVENS: So I have a -- well, I have more questions but let me go to this one first. I'm back to the Westinghouse tables and I'm going to kind of flash through plants here. And it's not -- I don't want you to have to read each table but there's Plant A which had two flaws, here's Plant B which had, sorry, indication, two indications. Here's Plant C which has one indication. Here's Plant D which has

two indications. Plant E which has four indications. Okay, I'm going to kind of skip now here. Here's Plant F which has four indications. So I'm going down through this and I'm saying okay, the findings seem to be consistent. I'm seeing two, three, four types of indications. And actually on Plant F I'll say no, there's actually 18 indications. But I wanted to get down here to one plant in particular that all of a sudden I said hmm, things don't seem so typical anymore. And it's this one where I don't know what the addition is. It's approaching 100 or more flaws. So then my question became so why is there -- and let's just say, you know, we don't know the plant, we don't know the vendor, but we do know that this exam was performed in 2001. They're all Appendix VIII exams. I don't know if -- how much influence the year might have on it but my question is why is there such a large disparity in the number of flaws detected at this plant versus all the others?

MR. SELBY: I remember we looked at that during a previous meeting, Gary, and found that that many of them were -- well, they were reported all through the thickness of the plates. So many of them were not relevant to the tables.

MR. STEVENS: That's correct.

MR. SELBY: If you take those out the number is still significantly higher than for the onesies, twosies that you mentioned before. But I remember we looked at it and we found that quite a few of them really didn't belong in the table.

MR. STEVENS: Yes, you're alluding to the inner 1-inch three-eighths T versus beyond that. And this is just the information from the ISI report. It's in no way, you know, there's no alignment made with the PTS rule on it. But my question though gets back to the reevaluation question or maybe the -- whatever you want to call them, the settings of an Appendix VIII examination. Related to those questions and the discussion we had earlier are those influencing what -- I mean, can I go and adjust nobs somewhere and take it from 2 up to 150? Or what's triggering the fact that this plant has so many other indications? Is there adjustments to an Appendix VIII procedure that would be done? And I think Bob made the point, so do I look at this plant that has 150 indications and say maybe their exam was done with some adjustments to put it in tune with the rule whereas the other ones weren't? Is that what I'm saying or what is that?

MR. BISHOP: I don't think that's the

case. I know it was a different vendor and I'm sorry. It was, I think this one was a different vendor. I think when we got it it was a lot more work for us to go through all that. But again, it was just, I don't know that we've thoroughly investigated but you know, they were qualified to Appendix VIII the same way the other vendors were. And you know, I don't know if there had been something wrong with the fabrication, you know, I just, we didn't know. But again, we happened to see this.

MR. ANDERSON: There's at least one other plant, and I don't know what this plant was, maybe it's the same plant, I don't know. But there's an MRP report on the work that was mentioned earlier that was done on pre-Appendix VIII data where the numbers of flaws are similar to this as opposed to two or four or whatever that we saw on some of the other tables. Yes. So there's, I don't know if it's the same plant but you're right. I mean, given that there's some discrepancy between data sets somehow.

MR. BISHOP: Well, are you speaking about the Beaver Valley plant?

MR. ANDERSON: Yes, I was.

MR. BISHOP: Okay, the Beaver Valley plant doesn't have any indications in the first 1-inch.

MR. STEVENS: Actually in the -- I don't agree with that. Well, let me think about this a minute. Based on the assessment that we've done with data I don't think that's true. The numbers are consistent with what's here, a hundred and some odd flaws and there was maybe a couple of dozen of those that were excluded. But the vast majority of them in the comparison we did with the rule were within the inch. And that number was greater than a hundred.

MR. BISHOP: Was that the old Reg Guide 1.150 examination? Or was that --

MR. ANDERSON: It was that data but it was a re-look that was funded by EPRI.

MR. BISHOP: To go back and look --

MR. ANDERSON: Go back and look down to the noise if you will and look for flaws.

MR. BISHOP: But for the recent Appendix VIII examination, okay.

MR. ANDERSON: Oh no, the recent Appendix VIII I can't speak to. But the flaws didn't go away.

MR. BISHOP: Well, the --

MR. ANDERSON: Or did they. Therein lies the question we're having.

MR. BISHOP: I know Barry Elliott was really shocked when we went back and compared some Reg

Guide 1.150 and Appendix VIII because he was expecting the numbers to go up and in many instances they've gone down. So.

MR. BISHOP: And therein lies the thrust of our NDE uncertainty.

MR. STEVENS: Yes, I was just going to say from my perspective that it's not -- so I ask the questions not as so what else can't NDE do. I look at it more as what are the capabilities. So we need to understand what those capabilities are so that when we do comparisons in our work up against the rule we understand what those are and we can apply it consistently. It's not, at least from my perspective not an attack at all on NDE. I think NDE is real good. So that's why we're asking these clarifications because in the work we're doing when we see these kind of disparities and all that we ask questions and we need to understand where those disparities are coming from. And also in our evaluation, our analysis, we need to be able to treat those disparities and the uncertainties appropriately so that when we do our evaluation it's consistent and we can align things and explain it. And we also understand that the Beaver Valley information we were looking at was pre-Appendix VIII so we might be doing a little bit of comparisons

of apples to oranges there. But and we need to be consistent. We understand that and recognize that and appreciate that. And that was one of the reasons why we requested this information. But even within this information there's still some questions we have again to try and understand what the capabilities are so we can explain these things we're seeing that are different. And this is just one that caught our eye. Then we see, and there's been some discussion maybe all vessels aren't created equal and at some level we believe that but given this information what is leading to this and are there differences in how the exams are being performed that may be better aligned with applying this rule or not. That's what we're trying to get at.

MR. SELBY: Well both modern exams and the Reg Guide 1.150 pre-Appendix VIII exams were done down to the noise level. So nothing should be missed in either case. Everything should be available in the data. The reason for widely differing populations of reported indications for vessel-to-vessel could be a reflection of what's actually in the vessel or it could be -- there are a number of things you'd have to look at. You'd have to look at the written procedures, what do they say to record, what do they

say to report. It's kind of difficult to give a definitive answer just based on seeing the tables.

MR. LATIOLAIS: This is Carl Latiolais again. I think that's what we -- why we wanted to have this meeting, so the vendors and the licensees can understand what reporting criteria is needed to be consistent when applying the rule to avoid a table with a whole bunch of flaws and a table with just two. Everybody knows what they're supposed to go do and what they're supposed to report to support this rule. That may be part of what you're seeing here.

MR. STEVENS: The other thing I noted in this table but I think I understand. You might want to comment on this. But I noted the number of 500-plus inch indications. I did have to go check Section 11 myself to see because it shows that those indications are allowable and they're basically in-filling along flaws that are very, very shallow. And at least I understand with a lot of the smaller defects that might get called why that with proximity applied. That gets called up to a 500-inch indication. But there's a large number of those in this table and that was -- it was noteworthy to me. But okay, so now we're going to get into that issue which is -- so I have a question and this may be a

dumb question, it may be very basic, but on the 0.075-inch with Appendix VIII clarification on that. Is that a depth in the base metal only? And all the depths we're talking about exclude cladding. And I'm looking at Steve because he's nodding his head and answering but I welcome anybody to chime in here.

MR. BISHOP: And the through-wall extent is that two-way column up there. I can't read some of the numbers but really they look a little.

MR. STEVENS: They're very small.

MR. BISHOP: No, it's the two-way number, 0.09.

MR. STEVENS: Two-way is this column here.

MR. BISHOP: That's the through-wall extent right there.

MR. STEVENS: In inches. So I'm seeing --

MR. BISHOP: So 0.151315.

MR. STEVENS: Right, they're all -- I mean, the largest I'm seeing here is 0.33 inches. And over here in this column that has the INF in it is the aspect ratio and it's showing infinite which is a very, very long, very, very long shallow flaw.

MR. BISHOP: So this vessel may have been susceptible to under-clad cracking.

MR. SELBY: Well, most of these have S

values that put them well away from the ID.

MR. STEVENS: But the other question I was leading to on the 0.075, there's actually several. So you, at least WesDyne has answered the first question which is the 0.075s in the base material. My understanding at least of your information is an examination in accordance with Appendix VIII you could theoretically detect flaws down to 0.075 but you're probably not going to be able to size them. And at least with your system your minimum call would be 0.125 inches. And that has the tendency in the rule to potentially bump the flaw. If you detected a small flaw and you called it by that minimum size you would potentially bump it up or down in the table which tends to be conservative from a number of flaw perspective because there's fewer flaws allowed there. Did everything I just say, is that true?

MR. SABO: Yes. You could conceivably see some flaw tips of smaller but the physics says about two wavelengths is where you're going to get a separation of the tips and that's about an eighth of an inch for the frequencies at least that we use.

MR. STEVENS: So I'm curious from the other vendors if that's consistent, that 0.125-inch sizing from GE and IHI and AREVA if that's a

consistent kind of sizing default. Maybe I did but I wanted to make sure in this context. Is it fair? And you guys can nod your head at least that are here. Maybe you said that earlier. The 0.125-inch is consistent with what you find? And then I don't think we heard from Mr. Hacker from AREVA on the phone about that before. Mr. Hacker, are you still on?

MR. HACKER: Are you there?

MR. STEVENS: Yes, gotcha.

MR. HACKER: Okay. I guess to summarize our procedure we don't have a default value for that lower threshold. All we can say is that we've demonstrated the sizing to within the accuracy limits required by Appendix VIII for Supplement 4. So we'll measure whatever the value is and report that. And it's to be considered within the RMS value of the demonstration.

MR. ANDERSON: Hey, Mike? This is Mike Anderson. What if you can't find defracted tip patterns, what do you do?

MR. HACKER: Well, then we would default to a minimum size. Something on the order of 75mls.

MR. ANDERSON: Okay. Okay.

MR. STEVENS: The other related question I would have is for a hypothetical surface flaw that

started from the inside surface of the clad, breached the clad and went just into the base material would the depth into the base material -- what depth into the base material before you could reliably detect? Is that still 0.075?

MR. HACKER: That's what's been demonstrated through the PDI program I believe. Carl can tell me if it's different than that but anything that extended up into the clad layer itself would only add to the amplitude response and make detection easier. Sizing of the lower tip below the clad would still be the same as if it had started at the clad base metal interface.

MR. SELBY: Appendix VIII flaws are under-clad.

MR. LATIOLAIS: That's correct.

MR. SELBY: They don't go through the clad.

MR. LATIOLAIS: There's no flaws that go through the cladding in those tests. They all start at the clad-base metal interface. So they're more conservative than like Mike was saying, than one that went all the way through the clad and into the base material.

MR. STEVENS: So all the Appendix VIII

0.075-inch sizing or size of flaw, all that, as you get to the clad-base metal interface that still all that applies equally in that region. I mean, you can still detect -- the fact that you're so close to the clad doesn't make things any different than if you're away from the clad.

MR. SELBY: Yes, I think that's right. The metal gets really quiet. The base metal is a lot quieter ultrasonically than the clad. And when you look at the very small under-clad cracks and the images probably from many of these automated systems you just see that sharp indication hanging out of the noisy area.

MR. ANDERSON: Again, we're talking ID exams as opposed to OD exams.

MR. SELBY: Scanning on the inside, yes.

MR. ANDERSON: Yes.

MR. SELBY: Now, if you have that same tiny defect in the clad metal detection would be a much greater challenge because it's in that noise instead of adjacent to it.

MR. STEVENS: Okay. Per the agenda we had an ASTM talk. I didn't want to -- okay, are there any other questions related to the thread we just pulled here on this? And then I wanted to let Steve do his

presentation which is -- no, according to the agenda I had them down for 15 minutes and you after lunch.

MR. ANDERSON: Did we satisfactorily resolve your question about discrepancies of numbers of flaws?

MR. STEVENS: Well, actually, nothing to do with being happy. No, I would say no, I still have a question as to why. I still need to understand some of those disparities in order to evaluate the problem correctly. I understand --

MR. HACKER: This is Mike Hacker. I've got a comment on that. Over the years of examinations of several vessels we've, at least I've come to form an opinion that if I know who the vessel manufacturer is I can almost predict whether that's going to be a clean vessel or one with lots of indications. I think the answer is that not all vessels are created equal, some vendors create cleaner welds than others and that's I think contributing to the result of what we see with high numbers of indications in some vessels and not in others.

MR. CSONTOS: I guess that's what the question is, is it subjectivity of the NDE personnel and the techniques or is it something that's variability of manufacturing techniques. If it's the

latter it's a little easier to swallow than the former.

MR. HACKER: I believe it's the latter and one way you could kind of evaluate that is if you were to pick a vendor and looked at all the examinations they've done you would expect the results to be consistent exam to exam. And if you compare that and I think you would find some vessels are just a little trashier than others.

MR. SELBY: It would be interesting to look at that Plant A, B, C, D, et cetera, data with some fabrication information attached. I don't know if it's available but that would be, that would add a dimension to our understanding of it I think.

MR. STEVENS: Yes, so I think what I'm hearing you say is so the one thing we don't have necessarily in the table is a comparison of two different vendors doing the same vessel. But what we might have if the comment is the results seem typical perhaps if you took into account who manufactured the vessel and when.

MR. HACKER: I would think you would see some correlation there.

MR. SELBY: Mike? Mike Hacker, this is Greg Selby. You've been doing this a long time.

Would you say you've looked at most of the PWR vessels in the U.S.?

MR. HACKER: A good number of them, yes.

MR. SELBY: Yes.

MR. STEVENS: Yes, I was -- I mean, I understand. I was working with Nathan Palm at Westinghouse and there was reasons to keep the data anonymous but I don't know if, you know Bruce, I guess I'll be following up unless you can answer it. But if there's -- if any of that information on fabrication might be available for some of this information to help with this issue.

MR. SABO: Yes, and I think we need to take it a step further and look and see the distribution from the PTS rule that was actually fed into the PTS rule, how those vessel fabrications occurred and determine the relevance there as well. I mean, you know.

MR. BISHOP: Again, if you go back to that one slide that Gary showed before, the comparison of the Shoreham vessel which was considered I think one of those dirty vessels up through 0.075 they had like 228 flaws. I mean that's a lot. Again, that was -- this is cumulative. I'm going up, okay, and in the next category they had about 47 flaws. So.

MR. ANDERSON: So what I'm saying is from a trending point of view if we think that it is about fabrication as opposed to NDE capabilities we should be able to see that kind of trend in the same fabricators and vintages of the vessels that are the same as Shoreham. Right?

MR. SELBY: You probably want to look at not just who made it but when they made it, what welding processes they used, et cetera. And the data would get a lot less anonymous when you put all that kind of detail in it.

MR. BISHOP: Well, Gary, the reason the data took some while to get to is we had to get releases from the -- basically from the vendors and the utilities to release all that data to you.

MR. STEVENS: Right.

MR. BISHOP: And the way they agreed to do it is to keep it anonymous. And so we have to abide by that. But we can certainly work with you as best we can.

MR. ANDERSON: There was also a material change at one time, the 508 to the 533. I think there are big differences there.

MR. STEVENS: Well, let me ask this information because I think it's all readily

available. Shoreham was a combustion engineering manufactured vessel early vintage BWR-4. So from the folks that understand vintage and all the different vessel manufacturers would that fit into the dirty vessel category?

MR. BROWN: This is Roy Brown. I spent several years in manufacturing in the '60s and '70s and managed the NDE inspection for a lot of those vessels. Just to comment, what you may see different in the different vessels is some of them had a lot of laminar indications that when circle seams or long seams were welded even though those laminar indications might have been sealed in the actual plate itself it produced a reflector that got recorded sometimes and sometimes not, but certainly you may be seeing some of those in what you're calling a dirty vessel now. The other things that may play into here is the manufacturing process and whether or not they used a backing ring on the inside surface or not. And also the cladding process, depending on whether you're seeing the flaws near the inner surface or mid-wall. So those are several little things that play into how many indications get recorded. I can certainly remember some that had -- because of the laminar indications had many, I'll just use the word many

indications recorded during manufacturing process that were not considered necessarily relevant to Section 11 criteria. So I don't know if that helps or hurts, but I personally, having done many, many baseline inspections have seen a significant difference between some vessels and others.

MR. SELBY: And when it comes to the laminars in the plates themselves there's plate to plate variation within vessels which might affect, you know, the table we've been looking at is the weld indication or the weld flaw table, but if they're very close to the weld then it can be hard to tell which box to put them in.

MR. ANDERSON: I think more importantly you hit on the fact that the welding process, if there was a significant back-gouge associated with it on the ID this is in the very area that we're talking about having to evaluate here. That's basically having a large weld repair all the way around 360 degrees. So if that was part of the process then that could contribute to the number of flaws in this area as well.

MR. SELBY: Well, if the back-gouge went deeper than 10 percent of the wall then --

MR. ANDERSON: Yes.

MR. SELBY: -- many of the indications that might be associated with the back-gouge wouldn't get into the table.

MR. ANDERSON: That's true. If they were in the root, that's true.

MR. SELBY: Yes. If you had a shallower back-gouge then you could have a more densely populated table because of it.

MR. STEVENS: Okay. I'm going to let Steve present but I think Bruce, you know, I understand the sensitivity of the licensees for some of the information. I know that in, I think the fabrication history of most vessels is public information. I think, and I'm reading between the lines here, but the reluctance has been the tie-in of specific NDE results to any one licensee. But anything you guys could do to help us align the fabrication details up with some of these ISI results would be helpful. And you know, I can --

MR. BISHOP: You know, all this NDE data is sent to NRC. It's just that it's so voluminous I'm not so sure that everybody looks at it. It's probably, you may already have it.

MR. STEVENS: We actually checked into that and we actually don't have access to reports.

And Bob, you looked at this I think. We --

MR. HARDIES: We only get reportable indications. So we get none.

MR. ANDERSON: They get NIS-2 forms is what they get.

MR. STEVENS: Another way to state is given the 47-page report you sent us nothing was reportable. So if we had anything from those 13 plants it would say nothing about flaws other than it might say in the summary we found two indications or something. But we wouldn't get any detail on that. We checked into that and that was the reason when we came to that meeting in January we requested the information because we didn't have those details ourselves.

MR. HARDIES: So in order for us to understand the difference between these sets of data you've suggested that we should understand something about fabricating the vessels, like whether they're a subvert weld, or you know, what the welding process is, a double U or a single V. And we can see how that works. So in order for us to understand that we'd have to have that information, and in order for you to give us that information you'd have to make it so that we would be able to figure out what plants they are

and give up the confidentiality. So I don't know how we make this work. You got any ideas?

MR. TOMES: It's my understanding that we've published an EPRI report that details the fabrication practices used for all of the vessels in the United States.

MR. HARDIES: Yes, but we don't know how to match up the data set to the fabrication. So I would just ask you to figure this out, some way to explain it to us without causing you to violate your agreement with your licensees. I don't know how to do it, but we'd appreciate knowing it.

MR. BISHOP: And again, Fred Simonen and Lee Abramson are both retired, okay? So I can't just call them up and ask them, okay, but I know the intent was. And again, Shoreham's a prime example. The flaw limits, the average number of flaws that the limits are based on versus the Shoreham vessel is quite a bit larger. And that uncertainty was, the intent was to try to bound some of that plant-to-plant vessel-to-vessel variability. That was the intent. Now how well they did it, I don't know, but that was, I know that that was the intent and that's why you were seeing such large differences between the actual measured results and the results that were used in the

FAVOR code. The intent was to make it very conservative. I know for example they took the PVRUF sizes, flaw sizes which were bigger and applied them with the Shoreham densities which were larger because they knew, okay, they knew that they had only looked at a small sample and we needed to include that.

MR. HARDIES: Yes, I think we've got that, we're just trying to figure out, sort of understand these data sets. And you made some arguments that seem to be plausible. If you'd just like to get them in a -- some of them sound sort of speculative. It might be this, it might be that. Love to know if it really is in some way that you can tell us.

MR. BISHOP: Well, in those plot, in that table there were plots that showed where the indications were, didn't it? And I remember seeing one plot that came down that --

MR. STEVENS: They were just pictures, profiles of the weld. It didn't show indications on top of it.

MR. BISHOP: Where they were located.

MR. STEVENS: Yes.

MR. BISHOP: Okay. All right, okay.

MR. STEVENS: They were just showing -- and the reason for that was given the flaws that were

located and I think there was an Azimuth and an elevation and then given the profile of the weld one could use that information to determine whether they were weld or plate flaws. And so that's why it was provided in there. But they're not mapped, the flaws aren't mapped onto those pictures.

MR. BISHOP: Okay.

MR. STEVENS: Okay, so I think we'll pick up Steve's quick presentation here. Might have a little bit more conversation. We'll break for lunch. We'll come back and hear Bruce's presentation and then pick up this conversation again. So Steve.

MR. BYRNE: Okay, thank you, Gary.

MR. STEVENS: And let me just say for those folks on the phone I also, for the majority of you I sent out this presentation. It's the ASTM presentation.

MR. BYRNE: Thank you, Gary. Steve Byrne representing ASTM International and for those, my coauthor or co-presenter is Joe Koury from ASTM who's sitting over here on the left, my left. And he also has copies, full-size copies or larger size copies of the presentation if you'd like to see it later on in addition to what Gary's put out available.

On the second slide is where I'm going to

spend most of my time, but the principal comment here is that ASTM is participating in this NESCC effort to come up with the standards and the technologies that's needed to support both operating plants and for new plants. NESCC is an organization that was, I'm not sure I'm going to say this exactly right but it was born out of an effort within DOE and subsequently implemented by NIST and other organizations to gather up the resources within standards and codes group bodies like ASTM, ASME as well as industry efforts, organizations like EPRI, national labs like Oak Ridge. But again the focus is how can we best support the currently operating plants. So that's very germane to what's being done within 10 CFR 50.61a as well as Appendix G as well as how this is going to be implemented in new plants. So it's trying to focus on a very broad area, try to bring in the expertise from all these various organizations. This NESCC has a series of task groups that have been organized to address specific areas within the nuclear industry.

Specific to ASTM there's two areas I just wanted to highlight. Number one is in January of this year there's a survey that was sent out to the executive committees on various ASTM committees. And to try to get from the membership what they identify

as potential areas needing new standards, development activities or new technology to be generated. And then in June of this year there was a workshop organized in conjunction with the ASTM meeting in California. And at that meeting there was a series of presentations by NIST, NRC with NRR, RES, and I'm sure those acronyms no longer applicable but and also with the new plant organizations. And the, well one thing that I got particularly out of that meeting was Al Hiser made a good presentation on exactly where NRC is looking for support going forward. And a lot of it was dealing with new plants as well as currently operating plants. So the other part, the rest of this presentation is probably not exactly applicable to the whole NDE area but I do want to emphasize that it's probably a good indicator of what could be done through organizations like ASTM to help the efforts for operating plants.

And the specific instance -- I can't even talk, sorry. There was an effort, has been an effort ongoing within ASTM Subcommittee E10.02 to generate some proposed changes to 10 CFR 50 Appendix H which is on reactor vessel surveillance program requirements. And I'll let you read the details in that at your leisure but primarily the issue here is that there's a

-- Appendix H of 10 CFR 50 has requirements that are based on a 1982 ASTM standard and most of the rest of this has been addressed in a letter that was submitted from ASTM to NRC with the recommendation to look at ASTM E185 and its sister standard ASTM E2215 and to work with ASTM as Subcommittee E10.02 to find out where the ideal, the optimum changes could be made to the current regulations in Appendix H. And that's in the subsequent slides.

But the biggest thing here is that E2215 was newly created. It has not been directly referenced in Appendix H. It talks about the implementation of the post-irradiation testing requirements for reactor vessel surveillance data whereas E185 specifically handles the design of surveillance program for a reactor vessel. And the reason this was done was primarily to match up better with the requirements in Appendix H and to make changes in Appendix H accordingly to separate these two standards so they can be better managed by both the NRC and industry. But, and also there were a lot of new techniques, new recommendations on how to design and implement reactor surveillance programs. And like I say, without dragging this through, out too much longer, it's pretty well detailed in the

presentation.

So really the next steps at this and really skipping to I think the second to last slide, Gary. The next steps. So what we're basically looking for here is we want, ASTM wants to continue the dialogue with NRC to move this forward. I know we've got a fairly ample time to accomplish this but we want to acknowledge the dialogues that have already been had on this subject and urge the continued dialogue to make sure that we get it right and any resources you need from ASTM E10 we'd be glad to try to facilitate that process. And then the open-ended comment there, the last bullet is is there any other ASTM standards where this is needed. And I think Al Hiser pointed to some as well as other areas that we could go into going forward. So without further ado if there are any questions at this time on this I'd be glad to try to address it.

MR. STEVENS: I have a couple, just clarification. So you, well ASTM had sent NRC a letter earlier this year and we responded and you did receive that letter which is I think why you're here. Basically, and I'll put this in the meeting summary, those letters, but it basically was, that's what led to this presentation. And as I understand it you're

kind of asking for really three things here, that you want to dialogue with NRC on incorporating certainly later if not the latest standards into Appendix H when it's revised rather than a standard that's now 30 years old. You would like to dialogue on establishing optimum surveillance capsule withdrawal standards, and also on defining surveillance needs, surveillance program needs for new plants.

MR. BYRNE: That's correct.

MR. STEVENS: And certainly you have the ear of the folks I think here in the room on the first two. I'm not sure we have anybody from the Office of New Reactors in here. So we'll make sure that we pass the meeting summary and that word on to them. Do we want to say anything in response to Steve?

MR. HARDIES: We've consistently prioritized the change of Appendix H as a low priority rulemaking. So it hasn't even actually been put forward. It is supposed to be packaged with Appendix G and the new Reg Guide 199 rev 3. That's our intent. We've been telling you that for a long time. But if you're really interested in getting traction on getting these incorporated into Appendix H I would suggest you submit a request for rulemaking.

MR. BYRNE: The message is really twofold.

Yes, we've been hearing that response that Appendix H is not of the same priority as Appendix G and so it's going to be done in parallel. The other aspect of this though is that there are a lot of resources within ASTM that could be brought to bear to support, to help interpret, help defend changes to other parts of the regulations. And so I'd just encourage you to, pretty much like Al Hiser I think presented to us, just encourage you to make use of that whether it be through the NESCC or directly.

MR. HARDIES: We appreciate that. We've worked with E10 for a lot of years. Continue to work with them. We have, there's a law that requires us to work with the consensus standards. The name escapes me, maybe it's the National Standards and Technology Act? Okay, you guys know. So we appreciate that.

MR. STEVENS: And actually that was identified in the letter back to ASTM, what you just said.

MR. HARDIES: But if you want to help raise the priority a request for rulemaking has a little bit of impact. I don't know whether you can justify in your own organization writing such a letter. And you know, and that tells us kind of what your priorities are too.

MR. BYRNE: Okay, thank you.

MR. STEVENS: Thank you, Steve, for that. We have about 15 minutes before lunch so I got a question from my colleague here which I think is a good one to go back onto the conversation of NDE capabilities. And the question really is, so we've had some discussion here on definitions for the rule and we've had some discussions on capabilities of Appendix VIII exams. We've seen some results. Are the vendors comfortable that your current Appendix VIII procedures can provide data sufficiently to populate these bins in the rule? Are we like answering questions here or are we creating more questions? So have we answered the question -- somebody asked me a question a couple of weeks ago about so is the NRC requiring a new vessel exam to be performed. And so hopefully you have the answer to that. We could have a test, I could put that down, see how many people answer it the way I would answer it. What's that?

MR. SELBY: Who are you asking?

MR. STEVENS: Anybody, everybody.

MR. SELBY: Well, at the previous meeting it was made clear that you're not asking for a separate examination of the pressure vessel.

MR. STEVENS: And then what's the comment regarding to that. So your existing examinations, or the existing examinations are being performed. How comfortable are you that they can populate these bins -- I'll put them back up -- sufficiently?

MR. SELBY: Well, when you asked the question your eyes were pointed at me so I'll go ahead and answer.

(Laughter)

MR. SELBY: The only thing that worries me is the sizing capability. As several people have pointed out and is widely known, the smallest bin, the smallest bin that has a limit on size, it's the second from the top, is very small compared to the size of the wavelength as Steve pointed out a little bit earlier. And there's physical limitations on being able to accurately size the flaw that's comparable to the size of the wavelength. So the possibility is if you have a high density of defects of that true size that you could accidentally through a conservatism such as Steve pointed out in his procedure inadvertently place those into a less tolerant bin. So that's my concern, has been for awhile.

MR. STEVENS: Now, would your procedures and techniques allow you to have any information that

you could provide with sufficient technical judgments and all that to, knowing those limitations to -- so what we're talking about here is, okay, bin number 1 is the one that there's no limit on. Bin number 2 is the one where you're saying I think, my interpretation of what you're saying is, okay, we can detect those but the problem is when we size them we're going to push them in potentially to bin number 3 and because of that conservatism we may over-populate bin number 3 and not be able to show acceptability with the rules.

MR. SELBY: That's my concern.

MR. STEVENS: So my question is do you have enough information, knowing what you know about your procedures and techniques and all that with sound technical judgments or reasoning or arguments is there something you could do to unpopulate bin 3, put them back into bin 2 with sufficient technical justification to support that?

MR. SELBY: Well, it's not easy. There's not a rigid, fixed, 4-decimal figures number of flaw size, true flaw size below which a certain wavelength of ultrasound is going to lose its ability to size. There's going to be a variety of factors, flaw-specific factors. Steve Sabo pointed out earlier today that his procedure defaults to a flaw size of

0.125 if it's obviously small and they can't specifically resolve the top and bottom tips. Steve's probably wishing that he had written 0.12499 because then you wouldn't be putting it in that third bin, you'd be putting it into the second bin and it's a more tolerant bin. As far as additional data to go get, the only thing that occurs to me, just one guy speaking, is reduce the wavelength which you probably would not want to do going into your pressure vessel qualification because it's simply more data, it's you know, to scan finer, et cetera. It's a step that you don't need to take in order to pass an Appendix VIII examination. I don't know, perhaps a vendor would want to think about being ready to scan with a higher frequency if they had a licensee customer who was interested in a 61-alpha examination and ran into a real high population of flaws. That would be a considerable additional preparation and cost and they probably would want to have some confidence that you would accord some consideration to the result. But it would be outside, you know, the 50.61a plainly says you should populate these bins with your qualified procedure, and that would be an exception to the qualified essential variables. So you know, before the licensee took that step and took that expense it

would have to have some understanding with you I presume that you'd credit the results.

MR. PARKER: Hi, this is Stephen Parker with Westinghouse. I've been working with Nathan Palm and Bruce Bishop on these ISI 20-year extensions and in the work that we've done in the tables we presented to you that you were showing earlier, I mean this may not be directly related to the concerns that we're talking about here but we're looking over the number of allowable flaws in these smaller bin sizes. Out of all the exams we've done we've never come close to exceeding those flaws so I guess my question is if we're really concerned about being able to detect flaws that are of like 0.075 through-wall extent, I mean I've never seen any inspection reports that would lead me to believe that we'd ever even get close to exceeding those flaw sizes. So I guess my question is, I mean we're putting a lot of focus on being able to detect these sizes of these small flaws, but what is the overall concern there I guess.

MR. STEVENS: Well, the real -- okay. So I have a response to that and then you guys can chime in. And thanks for that question. My question is is that because the flaws weren't there or because you didn't see them?

MR. SABO: Well, I don't think the detection is the problem. I think the measurement, the through-wall sizing measurement is the problem. Two different questions. The sizing is what we're talking about, which bin does it go in. We're assuming we're going to detect down to, I don't know what size we're assuming we can detect down to. The first bin says zero.

MR. STEVENS: This one, well, that's why it has a no limit but I think it was set up to be the 0.075.

MR. SABO: Right, and I'm sure those can be detected. It's just the accurate measurement. Sometimes when the stars align themselves correctly you can get tip-to-fraction sizing down to those sizes but generally you don't, so.

MR. STEVENS: And to me in a way what the three of you just said aligns in some way in that, you know, so Steve just said we're going to detect flaws for all these bins. And Greg said but we're going to end up populating the lower bins because we're going to over-size them based on our capability, right. Lower based on this table I'm showing. And then that may also lead to your observation which is we never see anything down in that lower bin that's anything

close to allowable because we're pushing them down the table. So is that consistent with the other vendors? I mean that's kind of where this question was coming from. So given all that's been stated today and clarified hopefully, are the vendors comfortable with their exams and their ability to apply what the rule is trying to tell you? Or have we raised a concern or an issue or a question, other questions in your mind?

MR. SABO: I'm comfortable with the exam as is, but there are other questions that are going to bring up in a presentation this afternoon that we need some guidance on.

MR. STEVENS: Yes.

MR. SABO: Related to the technique specific to the Westinghouse technique. Some of them do relate to other vendors and some are specific to ours, but.

MR. STEVENS: So I think in particular we, some of the things we'll discuss this afternoon there like scan index, sizing accuracy. I think I saw a number there that was -- and you're saying some of these numbers are larger than the bin sizes and what does that do. And we are going to get into that discussion as well.

MR. ANDERSON: I wanted to say something

and seldom do I get to say I completely agree with what Greg said. But --

(Laughter)

MR. ANDERSON: -- so I wanted to say I completely agree with what he said. The thing is though --

MR. SELBY: You should work on that.

MR. ANDERSON: I should. As he's pointed out, if there's a, let's call it a trouble plant so to speak. Knowing ahead of time that they're going to run into issues, maybe not with detection but sizing the flaws adequately to apply the binning procedure, they may necessarily need to consider techniques that haven't been through performance demonstration. Now, let me look at my counterpart over here, Bob, and say is that okay?

MR. HARDIES: I'm going to ask a question, a couple of questions. First of all, Steve, you're quite confident you can detect flaws at 0.075 you said. Why is that? Explain to me. Indulge me.

MR. SABO: Should I leave with my face, Carl?

(Laughter)

MR. SABO: Because of the size. We've done work where we can, you know. You can even see

holes at that size which have a smaller reflective area. We've done various work that sizing, even -- or detection even smaller than that. That's just, and if you do the physics, the calculations for the wavelengths you're using, the mode of propagation you're going to see those things. So I don't think that anyone, any of the vendors would say they have a problem detecting something at that size. And larger.

MR. HARDIES: Does that apply to OD exams also?

MR. SABO: I'd say yes.

MR. HARDIES: Well, do you think so or would that apply?

MR. BISHOP: Gary, I just wanted to make a -- but I just wanted to make a comment. I don't know that the other vendors have actually had to use these flaw limits as much as we have because we were doing them for the ISI interval extension and right now we're working on our first submittal for the alternate PTS rule. So I'm not so sure that the other vendors have had to do what we've done already. That's the only comment I wanted to make.

MR. HARDIES: So we picked, we took the Shoreham vessel and actually, you know, you're going to talk about it later but increased the number of

flaws and evaluated that. So we really truthfully never expected the vessels to have anywhere near those number of flaws. We just didn't. If you go into an exam and you come out and you have everything in lower bins crammed into a higher bin, right? And I'm going to pick bin 3. Heck, I'm going to pick bin 4. If you have 20, you know, if you cram everything from bins 1, 2, and 3 and 4 into bin 4 and you have 20 flaws you're done, you're finished. You don't need to distinguish between those lower groups. So consistent with what you were saying it's not surprising that these exams are going to come up with results that don't populate, if you combine bin 2 and 3 don't populate bin 3 above its level. So you would pass. If you don't though then there's a number of things you can do because we allowed you to make sizing corrections. And at that point you come in with some kind of evaluation. Perhaps some of them you can size really accurately and you know they're in bin 3. You take the remaining ones and you know that they're distributed somehow between bin 2 and bin 3 and you come to us with some kind of argument about how that distribution should be. And you can make that argument with a lot of ways. You can say probably half of them, I don't know how we would evaluate that. Maybe --

(Laughter)

MR. HARDIES: But you could come up with some ratio. Maybe you create a mock-up with little ones that you can't size appropriately and you know the sizes of them and you do an exam and see what you get. Maybe you scan a portion of the vessel with a higher frequency and get the answer and apply it to the rest of the vessel. So there's a variety of ways to do it. But the solution to that problem is in the sizing error correction. And it's in the rule, you're allowed to do it. You just have to come to us with a good story.

MR. SELBY: Yes, you're right, when I answered the question a minute ago I forgot that you had put that in the rule. That's a good allowance.

MR. ANDERSON: So you kind of answered my question in a roundabout way which you always do. But the sizing correction doesn't preclude you from applying some technology that's not necessarily been through performance demonstration.

MR. SELBY: That's what I was thinking. If you wanted to go back and scan to 5mhz or something, if the evaluator of the submittal whoever that is says yes, that's an okay way to do the sizing correction.

MR. HARDIES: I gave you the one example of sizing correction where you can size the ones that you know are in bin 3 and then you have these other ones and you say well, half of them are in one bin, half is in the other. That's not a PDI technique.

MR. ANDERSON: No, no, I know. I understand, but that's not even an ultrasonic technique.

MR. HARDIES: Well, and it doesn't need to be an ultrasonic technique.

MR. ANDERSON: Okay, but here's what I was getting at is if another place in the rule says you will use Appendix VIII qualified UT. So you would have to look at this as an exception to that, what's stated in the rule there. If you use a different UT technology.

MR. HARDIES: I would have to get a lawyer to say when it says you will do this that means you will not do that. And generally lawyers don't -- well, lawyers. Well, I'd have to get 10 lawyers.

(Laughter)

MR. ANDERSON: Okay.

MR. HARDIES: I don't think we precluded when we said you could do a sizing error adjustment we just, we tied you to a methodology for doing that

adjustment.

MR. ANDERSON: I understand what you're saying, it's just that we've heard questions before in our previous meetings about the rule says thou shalt use an Appendix VIII qualified technique.

MR. HARDIES: To find the flaws.

MR. ANDERSON: To find and populate these bins. What I'm hearing you makes perfect sense that if someone wants to apply another, say a better frequency or whatever they want to at their particular vessel they don't have to go down through qualification in Appendix VIII. To demonstrate that. If it's for sizing error correction. Is that correct?

MR. HARDIES: Yes, because they can -- an analytical technique that's not an ultrasonic technique at all.

MR. STEVENS: So that sound was my stomach grumbling. So we'll pick up the conversation after lunch. By the agenda I did allow a little bit more than an hour for lunch, 1:30 we'll pick it up and Bruce, we'll have your presentation. And I know that'll spur some more of this conversation because of what you have in the tail end of it. I think so. I think it's okay to leave things in here. If you have

anything really valuable I'd suggest you take it.

(Whereupon, the foregoing matter went off the record at 12:04 p.m. and went back on the record at 1:30 p.m.)

MR. STEVENS: Okay, I have 1:30 so let's get started. Where's my agenda. Okay, the next up is Flaw Implementation Recommendations, Bruce Bishop, Westinghouse. Let me get your presentation up here. There we go.

MR. SELBY: Gary, can I say just a little something first?

MR. STEVENS: Absolutely.

MR. SELBY: During lunch a licensee mentioned to me, I asked him you know how is this for you, is it worth the trip. And he said what I'd like to come out of here with, would really make this useful is if somebody would tell me what to write in my contract specification for my vendor to do that will get the job done and whoever's inspecting it will accept it.

MR. STEVENS: And I'm glad you brought that up because more than one person asked me that the last couple of months.

MR. SELBY: Yes, just tell me what to do.

MR. STEVENS: And so what I'm sort of

figuring here on this is maybe we don't have all the information on the table yet because I think Bruce and Steve have some other information from this. So what I'm thinking, that's a good question to answer and I was going to bring up some of the previous questions that I think were voiced and were never answered after this discussion. Get everything on the table and then let's just kind of have at it.

MR. BISHOP: Okay.

MR. STEVENS: It's all yours.

MR. BISHOP: Next slide. All right, I'm going to -- yes.

MR. CSONTOS: Bruce, it says up on the upper left corner, it says Westinghouse Proprietary Class 3.

MR. BISHOP: Yes.

MR. CSONTOS: Is it proprietary?

MR. BISHOP: That's not -- class 3 is non-proprietary.

MR. CSONTOS: Oh, it says non-proprietary. Okay.

MR. BISHOP: If you read close, okay.

MR. CSONTOS: That was cut off on the top.

MR. BISHOP: Yes, it's non-proprietary, this is all non-proprietary.

MR. CSONTOS: Great. Okay.

MR. BISHOP: And actually this is not Westinghouse work, okay, this is really Westinghouse's involvement with review of the FAVOR code and its use in the PTS rule and our using it for the ISI interval extension. The primary purpose as I see it is we wanted to make sure that the flaw limits were consistent with the FAVOR PFM code and how those flaws were used. Now that doesn't mean that that necessarily agrees completely with the table but that was the intent. And actually it was a best effort. But it's a very complicated topic and there are some things I think that we've learned, and part of that learning came from, I mentioned this before, the V&V experience we actually had for verifying the VFLAW code that it was doing all the calculations correctly and so forth. And then the other thing is that we've actually applied these flaw limits to about 20 plants. And from that, and I'll talk about that but we really have not ever had any problems with the number of flaws. The only problem we ran into was the size limits on the plates, all right. And so what -- and that prompted us to take a look at what we were doing and to see if maybe there was something that we could be doing better. And what we went back and looked at

is we came up with some proposals and one of them on the plate flaw limits is we're not going to use them right now because that's not what we're inspecting. We're inspecting the ISI volume and that is by definition weld material. And my recollection was that -- and we'll talk a little bit about more of that later.

The other thing is the application of the weld flaw limits. We're going to recommend that you apply those limits to axial flaws only. You don't apply them to circ. And then we came up with proposed evaluation procedures if you exceed the limits and it takes into account information that comes out of the FAVOR code. It says the contribution of the through-wall cracking frequency which is the failure metric that we're using in the risk evaluation, it says what's the contribution of each different flaw size. And that's what we're going to use as the basis of this evaluation procedure. And based on my experience and just playing around with some numbers I would expect that that would have less than a factor of 2 effect on the through-wall cracking frequency. And most of the plants are like two orders of magnitude less than the through-wall cracking frequency and that's one of the things we found out about the PTS

rule. And even the worst plant is at least an order of magnitude below the PTS screening limit, the risk limit, you know, of the 1 x 10^{-6} per year. So if you exceed those limits it's not like exceeding the ASME code. The risk goes up but it's still, it would be acceptable.

Now, Jack's going to -- or Steve's going to talk a little bit -- I'm sorry Jack couldn't be here, but Steve's going to talk a little bit about some of the slides that actually Jack Lareau put together. And the only thing that I see that might be of some concern is that this proximity rule has changed from the way that the technical basis for the flaws that went into the FAVOR code, that was based on the old proximity rule and now there's a new proximity rule in the ASME code 2004. And that's about it.

Now, to just go on to the next slide. Again, and we've pointed this out before is that this is not really only for the alternate PTS rule but we've said this before, it also applies to Appendix G and the ISI interval extension. And again the way we sort of thought about this is if -- what the PTS rule, alternate PTS rule requires is if you exceed these limits you're supposed to send an evaluation to the director of NRR for approval. So it doesn't mean that

you can't use the rule, it just means that you have to do something to evaluate violating those rules. And like I said, we're going to provide something to do that. And again, we have some funding that the work that we did, you know, on the -- if you exceed some of the, you know, the surveillance capsule requirements. And here again some of the work that we've done on the flaws we will be providing a white paper through the EPRI MRP to document these in more detail. You know, in the 20 minutes I've got I really can't go into a lot of detail. I tried to provide some information and maybe we'll go over a few of the backup slides very briefly, okay, but we will try to document in much more detail in this white paper all the rationale and justification for what we're proposing. Again --

MR. STEVENS: Is there a schedule for that report or that work? The MRP report, this white paper?

MR. BISHOP: We don't actually have the contract in hand yet, okay, but they keep telling us it's coming. But the idea is we realize that you're on a tight schedule but to get it done as soon as possible. And I'm hoping within the next, I would hope by the end of October, no later than the end of

October, something like that. But we'll see. But one of the things that we wanted to avoid is having to make plant-specific FAVOR runs or FAVOR runs with plant-specific flaw distributions just because FAVOR uses a thousand flaw distributions. And I know Terry Dickson did in fact do that for one of our, when NRC was reviewing one of our submittals for the interval extension, but he only did it for one flaw. So to do it for multiple flaws it gets very difficult and time-consuming. And I really think there's better ways that we can do that.

Now, to the next slide just gives a little bit of background information. I thought you know that there was a peer review of the alternate PTS rule and I thought my recollection was is that one of the reviewers asked that, you know, that the FAVOR flaws shown to be what would be consistent in the qualified ISI results. And I think Bob provided some additional clarification on that this morning and so forth. So I'm not going to speak to anymore of that. There was a memorandum on the development of the flaw distribution tables and I've got the ADAMS ascension number on this slide. It was in April 2007. Now, we did in fact get a chance to talk a little bit with Stephen Long who was one of the primary persons

involved in this but since it was a rulemaking proceeding he really couldn't talk about the technical basis or anything, or the justification or anything like that but he -- we were asking him for clarification because they wanted us to use that in the ISI interval extension and we weren't quite sure how to. Some of the questions we're asking right now we were asking right then. You know, how do we take -- how do we take basically the ISI reports and bin them and evaluate them. And he did provide some clarifications but he since then has gone on medical leave and retired from NRC. But there were a couple of things I mean, and one of the things we asked about was the circ flaw versus axial flaw and things like that. My understanding was is there actually have been some changes made to the later versions of the FAVOR code to address that. But again, as a result of this memorandum Table 2 and 3 in the -- were incorporated into the -- directly into the PTS rule, Table 2 on the weld flaw and Table 3 on the plate flaws.

Okay, now the next -- we've already talked about this one. I don't know that I really have much more to say on that except that it is pointed out, okay, it's a cumulative going from the bottom up. And

the nominal bin size is sort of misleading because they sort of developed the limits within the bins and then sort of at the end sort of accumulated them up. So there is a little confusion about that. But if you go to the next table which is the Table 2 in the PTS rule this is the correct interpretation. Although I'm not sure if it's 0.075 for the first non-bin, if it's 0.075 or 0.076 might be better. It's something a little bit better than 0.075 but that's just neither here nor there. But this is in what is in the PTS rule and it's based on what was in that memo.

Going back to why Westinghouse is -- has some comments on that is that Jack Lareau actually was one of the members of that expert panel on the fabrication of the vessels and he was there primarily for the inspections that had been done and so forth. That was some of that input was factored into the development of this VFLAW model from this NUREG report. Like I said, I performed the V&V of that VFLAW. I think that was for the V&V report for FAVOR 2.4. Again, and we also mentioned that we've applied the flaws to more than 20 plants for ISI interval extension. And again, I wanted to clarify, we never had any problems with the flaw welds, weld flaws. And I mean in using basically the PTS rule the way it was

written, okay. I'm not talking about any of the changes I'm proposing. Even using it the way it was we never had any problems with the weld flaws. The only problems we had on a few plants is that we exceeded, and again not with the number of flaws but we did exceed the maximum size limit on the plates in a couple of places and that was the one that actually we had, Mark and the Oak Ridge people do a specific FAVOR run to look at that. And again, what that showed was that -- okay, I'm sorry. And then Jack and Steve are going to talk about some of the work we've done in terms of the qualified ISI for a number of these plants that have used the ISI interval extension and the one plant that we know of that's planning to make an alternate PTS rule submittal. We're working with them, well, we talked a little bit about that at the surveillance capsule meeting.

Okay. We had a number of concerns with the technical basis but it's not as bad as it looks. There's some good, there's some bad and I'd just like to go over it just a little bit. One of the things is that the flaw limits in that memo from NRC looked at the FAVOR output. The FAVOR output is the average of the thousand input distributions that were input into it. And I don't even know that if Stephen was aware

of this VFLAW program that prints out okay, what, the maximum, the 95th percentile, the 50th percentile and the mean values of all those distributions, those thousand distributions that were input. But that's a very useful piece of information. And the thing that bothered me is that when you're trying to set a limit on something you want to make sure you've covered it and really the way it's doing now, actually the median distribution and the mean distribution are very similar. And for every thousand flaw simulations about 500 of those would exceed those limits for the mean distribution. And to me using an average value to bound things I don't think is quite the way to go. All right.

Now, if you jump down, I'm going to jump down a couple of bullets, okay, and I'm going to go to this one about no distinction between the axial and circ flaws. All right. We know that the axial flaws are the source of the through-wall cracking frequency, and the circ flaws even though they initiate they don't fail. So really we should be concerned with the axial flaws. Now, luckily if you take the maximum for those thousand distributions and compare it to the mean, over the range of where the limits are applied it's about a factor of 2 to 1 from the maximum to

mean. And if you go down and look at the axial flaws to the circ flaws it's about one-half, about half the flaws, not quite half, but around one-half of the total flaws are axial and about half are circ. So if you put those two together we sort of lucked out and they tend to compensate. But I think the thing that -- what we're going to say is -- I'll talk about it a little bit later.

The conversion of the flaw size from all the FAVOR results as I said before are reported in 1 percent of the wall thickness. And we used, you know, and that's the width of the bins. And actually they used, they didn't use like any distribution through the bin, they just used the max, a lot of times they'll use like the middle value if you're doing a numerical integration. But the FAVOR code always used the highest value in the bin for all the calculations. There was no distribution within the bin. So, but the bin size and the flaw limits is about half of that, 0.05 versus about 0.09 that was used in the FAVOR code and those two tend to sort of compensate for one another. What it's saying is, okay, instead of using the uniform code we're using the stair step, but if you half the size then you sort of half the size of the step so it gets more close to uniform

distribution. So those two sort of cancel out.

One other thing, and this is just about neglecting the limits above the truncation limit, the maximum size limit, which is the 0.475. They actually simulate flaws all the way up to about 1.92 inches. And those flaws above that truncation limit of about 4.75 actually count for about 50 percent of your failures if you go look at the through-wall cracking frequency. So that's conservative. And then the one FAVOR run we did do for a plant that violated the plate limit did in fact, you know, gave many orders of magnitude below the risk limit. And typically while this is -- it was sort of a flag to us to look at maybe what we were doing because again, the plant we were looking at was, actually it was a low embrittlement zone where we had the plate flaw. And we were using a very strict interpretation of the plate flaw. I mean, it was actually very close to the weld, okay, and we believe that that was really a weld flaw. But it should have been categorized as a weld flaw. But when they took a look at it they got very, very low probabilities of through-wall cracking frequency. Now, typically what happens in general is that the small flaws normally fail because you're in a highly embrittled region. The bigger flaws though can

fail because they're so big and much less embrittled regions. So because we, even though we were looking at a low embrittlement region I wouldn't have expected that the through-wall cracking frequency for that limiting flaw to be so low. And I mean it was like down around 10^{-10}, something like that, very, very low. I wouldn't have expected that. So we went back and started looking a little bit at the basis for the plate flaws and that's the next slide to do this. And again, like I mentioned before, we used a very strict definition of the -- what was a plate flaw and we went back and the technical basis for the plate flaw model was actually a weld flaw model with different factors on the density and the size truncation limit. For example, the -- it was a factor of 10 on the small weld flaws and a factor of 40 on the large weld flaws. The large and small was about 6mm was the separation between the two sizes. The truncation limit on the normal welds was about 10 percent of the wall thickness. For the repair welds it was about 20 percent, a little bit more than 20 percent of the wall thickness. The truncation limits on the plates were only 5 percent. And you went back and looked at that, and that was my recollection, that the truncation limit was quite a bit smaller and the reason for that

if you go back and look at NUREG, the 6817, the basis is that the plate flaws were only supposed to be flaws from the processing of the plates and forgings. It didn't have anything to do with the welds because you could in fact have a small plate flaw close to the weld and the welding process itself could have caused it to grow. But that should have been categorized as a weld flaw. So our concern is that the -- and again, the truncation limits that I said, those were typically based on about twice the size that had actually been observed in those detailed evaluations of the PVRUF and the Shoreham vessels.

The weld ISI volume that we're looking at now, the one-half T on either side of the weld, that's pretty much the heat-affected zone where you might expect that the flaws, any plate flaws may have been extended by the welding process. And also, it also in this NUREG report, the flaws of any size that were really flaws of concern for fraction mechanics appeared at the weld base metal interface. So what we're saying is that we should only be using basically, for the ISI volume that we're looking at right now we should only be using the weld limits. We should not be using the plate limits. Now, that doesn't mean that the plates get a free ride because

really the way that works, and Mark can verify this, but one of the things that's built into the FAVOR code is if you had this weld in the region, you use the embrittlement properties from either the weld or the base metal, whichever is the worst, whichever is the more embrittled has the higher arc TNDT. So the plates don't get a free ride, it's just that what we are inspecting really should be inspected to I believe, or the people at Westinghouse believe to the weld limits and not to the plate limits. So. If we ever do start to use, inspect away from the welds, that we would use the plate limits but that's not what we're doing right now. Any questions on that?

MR. KIRK: So, just to clarify, in what you're doing you're calling everything in the inspection volume, if it's in the inspection volume it's classified as a weld flaw.

MR. BISHOP: That's not what we did, okay, but --

MR. KIRK: That's your proposal forward.

MR. BISHOP: Looking back at what we've seen and so forth like that, that's what we would recommend for going forward, yes.

MR. KIRK: Okay. But yes, there's obviously a lot of -- can be a lot of ambiguity in

demarcating within the inspection volume what's weld and what's plate, and without -- I mean, you've got the lines where the weld nominally is, but of course there can be repairs and welds don't go in straight lines. So absent more definitive information and I don't think anybody's into etching the outside of a vessel for all sorts of reasons. The distinct, carving up that inspection volume between welds and plates is probably completely arbitrary. The only thing that we --

MR. BISHOP: We tried to focus, Mark, on the, like the inner 1-inch where we're really concerned about that. Because again, once you get away from that the weld, the demarcation line between the two is all over the place.

MR. KIRK: Yes, the only thing that we had talked about which we never really tried relative to available data, but I'm just, I'm not sure there are enough flaws to make this work would be to just simply take the results of an inspection and plot the flaws in three space if you will. And you would think if the flaws were predominantly caused by lack of side wall fusion that they'd all be lined up in a nice row, wherever that row is, and then if there's something out in the plate or in the bulk of the weld it would

be off that line. But given that thank goodness the numbers of flaws in like the reports that Nathan sent are few and far between, I don't think there's be, in any vessel inspection I don't think there'd be enough flaws, which again is a good thing, to process the data in that way.

MR. BISHOP: I tend to agree with that.

MR. STEVENS: Question.

MR. BISHOP: I'm sorry. Sure.

MR. STEVENS: I have a question on, and this maybe makes a huge assumption but I'll ask the question anyway. If there are known weld repairs in the vessel would those be -- is the examination volume expanded to get full coverage of those?

MR. TOMES: There used to be a provision in Section 11 that said when you rewrote your ISI plan that you would include any weld repairs that were made in the vessel in the scope for the next inspection. So, it's a difficult thing to do though because not everyone has access to all the fabrication records.

MR. ANDERSON: One thing along those lines to consider is the base material volume that the code requires, a half T, is believed would encompass most weld repairs that would have occurred during that. Now, having said that there's new code cases out

there, 633 is one of them that takes that down to a half inch on either side. But that code case actually says half inch of the widest portion of the weld which should encompass any repairs that are there. So it's incumbent on a user of the code case that they know where their weld repairs are.

MR. BISHOP: Yes, I was aware of that, that Ed Siegel's group had come up with that. I know that that's been around for quite awhile and they're still working on a technical basis. And if I looked at the PTS rule I'm not so sure that it would support that. The technical basis for the PTS rule.

MR. ANDERSON: Did your question on the weld repair, are you happy with that discussion? Okay. I had a couple of simpler questions I think. One was on the axial versus circumferential direction. Obviously we're talking about axial with respect to the overall cylinder of the vessel, right?

MR. BISHOP: Well I'm going to talk about that on the next slide. But yes, axial is --

MR. ANDERSON: Remember, you're talking to NDE guys here.

MR. STEVENS: Vertical to the vessel.

MR. BISHOP: It's vertical to the vessel.

MR. ANDERSON: Tell us exactly what you

mean.

MR. BISHOP: And the circ flaws are in the circ welds which are horizontal.

MR. ANDERSON: Okay. The one thing I'd say about that is when we get down to the size that we're talking about it's unclear whether the NDE can tell which direction they're in, especially if they have volumetric characteristics and not just planar characteristics associated with them. So I'm not sure you can tell the difference between one's axial and one's circumferential when you get small enough, you know.

MR. BISHOP: Well, one of the things that the FAVOR code assumes, and it was based on fabrication experience was that you have circ flaws in the circ welds and you have axial flaws in the axial welds. And I think, I mean that was based on actual fabrication experience and what the inspection results basically show.

MR. ANDERSON: Oh. So you're basically following the bead of the weld. I don't disagree with that but from a UT point of view I don't know that we can tell you that one's axial and one's circ when they get to small.

MR. BISHOP: Well, basically what we're

saying is if it's in an axial weld you would assume it's axial.

MR. ANDERSON: Okay.

MR. SELBY: I think if the flaw is very small and it's through-wall extent but it has, you know, if it's an inch long or something you can tell from the ultrasound which direction it's long in. If the flaw was, if you envision an embedded planar disk-like flaw 2mm across, yes, you might have a hard time. You'd probably see it from every direction. You'd have a hard time telling what --

MR. ANDERSON: Some of the flaws that we -- you're right. Of course. A lot of the flaws don't have that much length to them relative to what we dug out of the PVRUF and Shoreham. And they have a lot of volumetric features, almost, not purely volumetric, but they have a lot. I don't know that you can tell the difference.

MR. SELBY: If you saw them on a single scan stroke in both directions.

MR. ANDERSON: Maybe. I don't know.

MR. SELBY: You probably would not know which direction it was going.

MR. ANDERSON: The other question, when you say no one should use the plate would you hazard

to say what far removed means from the weld?

MR. BISHOP: Again, the flaw size that was used as the technical basis was the flaw size that came from the processing of the plates and forgings, not the welding process. So my recollection is that the half T in Section 11 was picked specifically on that basis to say that's -- and that was picked a long time ago. But at that time their judgment was that was the extent. If it fell within the half T that was considered to be into the heat-affected zone.

MR. ANDERSON: Okay, so you're saying then -- and I'm just asking, I don't have any clue. But you're saying about half T are greater, is the only flaws you should consider for the plate bins. A half T away from weld centerline or? I mean.

MR. BISHOP: If it's outside the ISI volume it would be a plate flaw. But we're -- I mean the thing is, I know when you do scans okay you obviously don't just scan just the ISI volume, you do some over-scanning to make sure you're getting the ISI volume correctly. But my approach is that ISI volume should be treated as axial weld flaws.

MR. ANDERSON: Yes, I don't have a problem with that. I'm just wondering when you say far removed, I was trying to get a definition on what you

meant by that.

MR. BISHOP: Well, the assumption was there was no effect of welding. Now, again, that's how far away is that. But what I'm saying is that was the basis of Section 11 requirements when they were first imposed.

MR. STEVENS: What you might be saying is -- well, I'll answer your question, you can tell me if this is maybe wrong. Anything beyond half T would be far removed.

MR. ANDERSON: That's what I'm hearing.

MR. BISHOP: Yes, as far as we know right now.

MR. ANDERSON: I mean, the heat-affected zone obviously doesn't extend as far as that. But that would be a conservative way of saying. The only thing is I think, I doubt we're going to find any flaws that are a half T away from the weld when we do our exams. Carl?

MR. LATIOLAIS: This is Carl Latiolais. I agree with Mike but one thing I've been thinking about with this flaw density, you know, in populating the bins and things. You know, these big plates tend to have a lot of plate segregates, bands of plate segregates. Many times those segregates move into the

examination volume close to the weld and they're at different levels within the plate itself. Has that been considered with this code? And if we would identify plate segregates usually it's a note on the examination report. We have a band of plate segregates, you know, so many inches wide at so many inches in depth at this location. They're not, you know, you don't inventory each little segregate, you basically treat it as a band. Has that been considered?

MR. BISHOP: Well, the consideration was that the plate flaws came from the plate and forging fabrication process. They did not come from the welding process. Now, where you draw the distinction from one to the other I think what I'm saying is historically it's been the ISI inspection volume was that definition. Now, if -- and that was, I think that was sort of the basis. Because the plate, when you, when the FAVOR code simulates a plate it assumes half the flaws are axial, half the flaws are circumferential. There's no orientation with regard to the weld or anything like that. But again, our concern, our primary area of concern is the lack of fusion welds between the two. Those are the real flaw-like indications that we think are the fracture

mechanics problems.

MR. STEVENS: So I was going to have you just move ahead here so we can get all the -- but one thing I wanted to ask is so from your perspective what you're saying here. And I can't ever remember the order of the tables. Table 2 is the weld table.

MR. BISHOP: Table 3 is the plates.

MR. STEVENS: Yes. So on a typical Section 11 exam you would say there's no use for Table 3 of the rule.

MR. BISHOP: That's correct. Okay, now the application of the weld flaw limits. Again, when we looked at the weld flaw densities for 70,000 Palisades simulations and the Palisades vessel is the basis for the flaws that were used in the VFLAW program and the limits that were used in the alternate PTS rule. You can go into this VFLAW output and look at the maximum and mean values for the thousand flaws that were generated. And there are some backup slides that show that. But what we were able to show, and this is sort of a good check on the FAVOR code is that if you took the output average weld flaw distributions from FAVOR, it's within about a half a percent of the mean distribution from the VFLAW program. So on average, okay, it's doing what you expect it to do.

However, the size range for the maximum flaws, and when I say maximum flaw, it's really 1 in a 1,000. So it's like a 90, it's really more like a 99.9 percentile because you know all, there are 999 out of 1,000 distributions would have values less than or equal to this one maximum value. Now, why would we want to use a maximum flaw distribution as opposed to a mean value? And I'm doing this to be consistent with what was sort of done with the surveillance capsule data where you're trying to show that your surveillance data capsule is consistent with the trend curve. Again, what the -- originally the first test actually used like a 3 sigma limit in one of the early versions of the alternate PTS rule. That was changed in a later version to when they added two additional tests on the surveillance capsule data. They went to 99 percentile. So using sort of like an upper bound. And we could use 99, VFLAW could be modified to give you a 99 instead of a 95 or something like that if you wanted to go back and do that. But again, it showed about a factor 2.8 flaws higher than the mean over the range that the flaw limits apply. Now, for the ones where you have no limit it was actually a little bit less than that where we have the no limit and for the flaws above the 4.75, the ratios were actually a

little bit higher than the 2.08.

And again, if you look at the ratio of weld flaws that are axial to the total it comes out about 45 percent. So you take 2.08 and 45 percent and you say 93 percent of the average density for all weld flaws would apply to the maximum density for axial weld flaws only. And I think 93 percent in PFM space is good enough. So that's why I'm proposing I think even though it was not generated that way, I think we can address the legitimate concern of the axial flaws that caused the failure by just applying the limits we have now to the axial flaws. And when I mean axial flaws I mean the flaws in the axial welds. Any question about that?

MR. STEVENS: So, okay the mind's not working fast enough now. So what does that mean for a forged ring plant?

MR. BISHOP: For a what?

MR. STEVENS: A forged ring plant that has no axial welds.

MR. BISHOP: What I'm saying, what the FAVOR code says is you may initiate some flaws and that may be a concern from -- you have to go and repair those if you initiate them. But they don't run through the wall to cause failure.

MR. STEVENS: So are you advocating at a plant that only examines their circ welds, what would they do in terms of applying the rule?

MR. BISHOP: They wouldn't do anything.

MR. STEVENS: They would have no check.

MR. BISHOP: On flaws, yes. It doesn't matter. If the concern is the failure frequency of the vessel it doesn't matter.

MR. KIRK: And Bruce, I mean I would agree. That's what the results show is that circumferential flaws are highly unlikely to go through. That's why the circumferential, that's why the limit on circ weld embrittlement is so relaxed in the rule even though it's set at a 10^{-8} value. So if you believe in PFM there would be no reason to object to this proposal. Speak to your minister.

MR. ANDERSON: If you don't believe the PFM then throw the alternate PTS rule.

MR. KIRK: I mean, for example that type of logic is already embedded in the rule in that you're obligated to, if you find -- and I'm not going to get the words right and I'm probably going to mess up the words "flaw" and "indication" but if you find something that's close to the surface you're supposed to go back and find out if it's surface-connected.

But that restriction is only applied to things that you think might be surface-connected that are axial. If they're circumferential we don't care. Same logic.

MR. STEVENS: Steve has a --

MR. DINSMORE: Yes, hi, this is Steve Dinsmore from the PRA branch. I almost hate to ask this question but why are you doing these calculations? You're going to propose a change to the rule? Is that what we're talking about?

MR. BISHOP: Well, no, we're not saying to change the rule. What we're saying is you can use the limits that are in the rule but you just apply them to the axial welds.

MR. DINSMORE: But I thought that rule had a table with flaw sizes.

MR. BISHOP: Right, for welds, okay. But what I'm saying is what that table was based on was the average instead of the maximum and it was based on both circumferential axial welds.

MR. DINSMORE: So you're proposing to change how the rule is applied?

MR. STEVENS: Yes, I was going to say I think, well you correct me if I'm wrong, but you're proposing a way you're going to use the existing rule.

MR. BISHOP: Right.

MR. STEVENS: And --

MR. BISHOP: Rather -- I don't want to change the existing rule, I just want to clarify how you use it.

MR. STEVENS: And by not using for example Table 3 --

MR. HARDIES: You're going to come in and you're going to say we didn't measure the plates or the forgings so we're not going to do the comparison for Table 3.

MR. TOMES: Is there a requirement to examine the forgings outside the one-half T to implement the alternate PTS rule?

MR. HARDIES: You answer my question before he gets to ask his. You're proposing to come in and say you're just not going to do Table 3. You're not going to do that step of the rule.

MR. BISHOP: That's plate flaws.

MR. HARDIES: Right.

MR. BISHOP: Now we're talking about weld flaws.

MR. HARDIES: I want to know about plate flaws. What are you going to do about plate flaws?

MR. STEVENS: Well, at least I'm not the only one that's confused.

MR. BISHOP: What I'm saying is, okay, we're not inspecting plate flaws. Right? The effects of plates are considered. The flaws that are concerned are the flaws that are in the interface between the weld and the base metal. And the way the plate is treated is that you calculate the big flaws in the weld region. You do not simulate big flaws in the plates, you simulate small flaws. And but when you do that weld flaw you do the big weld flaws, you look at the embrittlement properties of the weld and you look at the embrittlement properties of the adjacent base metal and you take whichever is worse. Part of the input to the FAVOR code is well, for this weld, what are the base metals next to it so it can check that. And that's the way the calculations are done. And the metric in the alternate PTS rule that handles that is the definition of RT max for the axial welds. That's how you do that. You take the weld and the adjacent base metal and take whichever embrittlement characteristics are the worst at the weld fluence.

MR. KIRK: Did that answer your question, Bob?

MR. HARDIES: No.

MR. KIRK: Okay. Can I try?

MR. HARDIES: It sounds like there was a contribution of the plates to -- for failure.

MR. BISHOP: All right. Okay. All right, for -- all right. No, wait a minute. The question about the contribution of plates to failure, or Palisades which is the basis. In the handout, okay, I have a table about the contribution of the welds. There is another table in the FAVOR output for the contribution for the plates. It's zero. They're all zeroes. It didn't contribute at all. Now, that's for Palisades which is a weld-limited plate. If you go to Beaver Valley which is a plate-limited plant, plates contributed about one-third, all right? But again we're throwing away 50 percent of the weld contributions to large flaws so it's about on the same order of magnitude. It's -- go ahead.

MR. KIRK: Okay, well now -- I'm going to clarify something, I'm going to attempt to clarify something Bruce just said and then I'm going to take a cut at your question. Your statement that we're, the last thing you said, we're ignoring the 50 percent through-wall cracking frequency contribution of large flaws in the table. I understand how you get there because if you go to the, I think I understand how you get there because if you go to the basis document

which has the ML number that you cited in your slides and you go to Table 2 of that which only Bruce and I have so the rest of you will have to be mystified. That table, if you sum up the percent through-wall cracking frequency contribution of all flaws that are bigger than appear in Table 2 of 10 CFR 50.61a, if you sum all those numbers up you get 50 percent. And I think that's where you got that. Is that correct?

MR. BISHOP: Well, if you go to backup slide, the very last slide, slide 27. All right, this is the output from FAVOR, okay?

MR. HARDIES: I can't read that.

MR. BISHOP: All right. Well, what it says is that for the flaw depths of 0.088 it's 1.68. That's the contribution of those small flaws. Now, if you take the contributions and you sum it up to the 0.438 which is about the 0.4375 limit you can see you've got about 20, 30, 40, 50 percent. The rest of the slides bigger than that produce the other 50 percent.

MR. KIRK: Okay. Yes, okay. So you actually agreed with me, although that might not have been obvious to anybody without the secret decoder ring and the secret handshake.

MR. BISHOP: Scan up a little bit, Gary,

can you just a little bit. Or I mean down, I'm sorry.

MR. KIRK: The point I wanted to make is if you fall outside of the 50.61a flaw tables, if you have one flaw that's bigger than the upper bin you have to do something to check that, right? That's what we said.

MR. BISHOP: In the procedure I'm going to propose in the next slide I'll show you how I'm going to do that.

MR. KIRK: Okay, well you might not get there. But, the only point was if you have a flaw that's bigger that if that flaw that our PFM calculations showed, if you had a flaw like that and it happened to wind up in a high embrittlement region it would be significant. And so the rule requires you to check that, you're going to propose a procedure to check that. So we're -- my point was we're really not ignoring 50 percent of the through-wall cracking frequency, we're simply checking it in a different way than agreement with Table 2.

MR. BISHOP: And again --

MR. KIRK: And so are you.

MR. BISHOP: Right. Yes.

MR. KIRK: Okay.

MR. BISHOP: And Gary, if you go back up.

Don't go back to my original slide, but just go back up two slides. Okay, the previous slide to this one talks about the proximity rule. No, you're far.

MR. STEVENS: Hang on. Oh, that worked.

MR. BISHOP: Keep going. Keep going. Oh, you're going the wrong way. All right, right here. There. All right, this is the procedure that I'm proposing and since the -- all right. Now again, starting over on the left-hand side, all right here are the bin sizes from this point, from 0.076 to 0.125. All right. The max number you're allowed to have in a thousand, and again, because the contribution is given as 1 percent and it's given by these bin sizes you sort of have to un-accumulate them. And it says the max number for a thousand inches for that 166 or so in the PTS rule would actually be 75.9 in this bin. You correct that for the actual weld length. Okay, in this case we assumed 106 inches which was what was really in Palisades. Okay, so that makes it 76.3. And you have 77 axial flaws, but you look at the contribution, it's 20.9 percent so you would increase it by 18 percent. Now, if you go down and look for all the flaws above the 0.438, all right, there you're allowed to have zero. So if you have any you count the full percentage of

the increase. Like, in one case I have two, its percent contribution was 1.6 so it would be 3.2. Okay, that one right above -- go down a little bit, Gary. Right, down further. One more. Right there, that one right there. You had two flaws where you're not allowed to have any. The contribution of through-wall cracking frequency is 1.6 so the increase, percent increase would be 3.2, double that. You don't have any. Now, on the other ones where you do have some, okay, you're allowed to have what's in the limits so it's only the numbers that are above the limit that you increase the percent increase in contribution. And again, if you go over then to the right side, for this example it came up like 26.4, 4 percent increase, so your ISI flaw increase factor is 1.2644 and you multiply that by the -- to get the through-wall cracking frequency using the equations to NUREG 1874 which is the basis for the PTS rule. And for the individual plant embrittlement metrics, you know, the RT max axial weld, and you apply that and you come up with the difference, the increase in the through-wall cracking frequency for all those different flaws.

MR. KIRK: Maybe you said it but the numbers in your column, percent of TWCF, where do they

come from?

MR. BISHOP: Okay. That came from slide 27, the last slide. The output from the FAVOR code.

MR. KIRK: Okay, so that's a weight. I don't care about the numbers.

MR. BISHOP: That's weighted for all the --

MR. KIRK: That's a weighting factor based on --

MR. BISHOP: All the PTS transients.

MR. KIRK: Okay. Okay. So it's saying, okay. So if you find a flaw in a particular bin, go back to.

MR. BISHOP: Now see that first one, okay. For a flaw size, that first line is for flaws that are 0.088. That's that 1.68 contribution.

MR. KIRK: Okay.

MR. BISHOP: That's the contribution of the small flaws we talked about earlier. The contribution for flaws that are 0.175. So this would be, that's the 20.9 percent.

MR. KIRK: Okay, so let me try to say it back to you without the numbers and see if I understand. You're simply, you're taking your ISI results, you're finding out the flaw sizes and you're

weighting their percent contribution to TWCF based on the output of a FAVOR run for Palisades at 200 EFPY.

MR. BISHOP: This was actually done at 60.

MR. KIRK: Okay. Whatever.

MR. BISHOP: The memo was 200, this was 60.

MR. KIRK: Okay.

MR. BISHOP: 60 EFPY.

MR. STEVENS: So I'm going to call the question because you guys have completely lost me and the expert over here seems to understand. So I want to pull this back to get him going along and get the information out so we can understand the ramifications of this on NDE. So.

MR. KIRK: Well, in that case I'd like to circle back to try and answer Bob's question.

MR. STEVENS: That was going to be my next comment is did we answer Bob's question which is so you're ignoring plate flaws.

MR. KIRK: My, I'm going to put some words in Bruce's mouth and see if he chokes on them. I think what Westinghouse is saying is that the inspections that are required as part of Appendix VIII blah blah blah are only adequate to detect weld flaws. And so we're going to call everything in that

inspection volume a weld flaw and compare it to the weld table. Is that correct? And going on further from that, now this is going to be my statement that I'm going to put in my mouth. If we want to require people to provide data to compare with the plate table or conversely forgings we need to have them provide us with an inspection that's focused on that region of the vessel, not something that's confused by having a weld in the middle of it. That's my statement. I don't expect anybody to agree with that one.

MR. BISHOP: I agree with that because --

MR. KIRK: Oh wow, okay.

MR. BISHOP: That's, yes.

MR. STEVENS: So Bob's question would be answered with yes. He asked so you're going to ignore the plate and forging defects and the answer would be yes.

MR. BISHOP: Because that's not what we're looking at.

MR. STEVENS: Yes, unless you do something else. And I understand that the reason everything -- we're looking at welds so we're going to call everything a weld flaw, oversimplified but that's what I heard.

MR. KIRK: Yes.

MR. STEVENS: And therefore we do no examinations to get plate or forging flaws. Therefore there could be no comparison. Therefore we are neglecting that comparison.

MR. BISHOP: We are neglecting the plate and forging fabrication flaws. From the fabrication process. We're not ignoring the flaws that are close to the weld that could get extended by the welding process.

MR. KIRK: And again, speaking strictly for me with the usual disclaimer that the views expressed herein are those of the individual staff member and do not represent an official position of the NRC, the only case I can see a technical reason to require a licensee to provide additional data to compare with Table 3 concerning plate flaws would be in a situation where you had a vessel that was known to be plate-limited, meaning, by which I mean specifically its plate has the highest embrittlement. In that case as Bruce said for the Beaver Valley vessel the PTS result, the PFM results for PTS showed that the plate flaws, meaning the flaws that are in the plate that are remote from any welds and are not, have not arisen as a consequence of the welding process contributed about one-third of the overall

through-wall cracking frequency. If an applications were coming forward for that type of plant I could certainly in my mind build a technical case for saying show us something to demonstrate that that's been covered. If you have a vessel like Palisades that's well understood to be weld-limited I would have real trouble cooking up a technical reason to make somebody go do that. I realize everything I've just said is outside of the bounds and probably the intent of the rule so that's just a thought.

MR. STEVENS: So Bob, I'll ask you, did you get your question answered?

MR. HARDIES: Yes. You're going to ignore E, let's see, E12 of the regulations. You're just going to exempt yourself from it. So you'll have to come in with some sort of exemption I guess. I don't know how you're going to handle it. But I understand the proposal is not to follow the rule and we'll have to run our minds through your proposal you know in some.

MR. BISHOP: And the basis for that is what we're inspecting now when we do the vessel --

MR. HARDIES: I understand the basis.

MR. BISHOP: Okay.

MR. HARDIES: I do.

MR. BISHOP: Okay. All right.

MR. HARDIES: But we have words we have to live by.

MR. STEVENS: Okay, so let's move on.

MR. HARDIES: Unless we change them but it takes four years to change them. And before the four years -- it takes two years, but that always stretches to four. And you're only allowed to start under certain circumstances.

MR. BISHOP: Well again, this is our proposal, Bob. This is something --

MR. HARDIES: Yes, and we need to understand it.

MR. BISHOP: -- to think about, okay. I mean, we're not saying this is absolutely the way it has to be, this is based on some of our experience, what we think it might -- what it should be. All right. Okay. Let's go back, you can go back to the other slides now. This just sort of explains in words what that spreadsheet was talking about. This will be slide 11, yes. And again, the contributions of the flaw sizes to failure. And again, in this case we were only doing the flaw evaluation for the welds come from the FAVPOST output. It assumes the probability and frequency of failure is directly proportional to

the number of axial welds in the reactor pressure vessel belt line. And I don't think that anybody would disagree that that's unreasonable. The contributions of through-wall cracking frequency by size is increased by the ratio of the ISI flaws found in a given bin to the corresponding max limits from Table 2 for that bin.

MR. STEVENS: For the purposes of how you come up with your number of flaws and all that, what's your definition of belt line? Somebody's laughing so they must have liked my question.

MR. BISHOP: Okay. I know this is a subject near and dear to your heart. My definition of belt line here is adjacent to the reactor core. I know that that's not the same as the definition in the --

MR. STEVENS: So I'm thinking let's take a hypothetical. So I've got a 12-foot high core and right at the mid of the core is a circ weld and you've got axial welds going up above that and down below that. So would you grab all of those axial welds in their entire length or would you be just gathering a portion of the length of those axial welds?

MR. BISHOP: Just a portion of the axial welds adjacent to the reactor core.

MR. STEVENS: And would you define the extremity of those lengths to be, what, the top of active fuel and bottom of active fuel or something like that?

MR. BISHOP: Right, right.

MR. STEVENS: So you'd basically examine 12 linear -- 12 vertical feet of weld, well, they don't line up but in the situation I said, 6 feet up, 6 feet down.

MR. BISHOP: Now in fact, okay, the FAVOR code typically simulated about a foot above and a foot below that. Just to make sure that they were catching anything that might be of concern.

MR. STEVENS: Okay.

MR. BISHOP: All right. And again, this shows how you can use the through-wall cracking frequency. And actually these are the 95th percentile because that's what was used in NUREG 1874. And you just multiply it by this ISI flaw, what I call the ISI flaw factor. A couple, on the other side there's a couple different points. The worksheet procedure conservatively treats the following: difference in FAVOR flaw size for bin widths in those in the alternate PTS rule. I got that misspelled, okay, that should be SR instead of RS. But maximum limits. And

what I mean by that is what I did, is if you had, if you go back to that slide that had the worksheet, the numbers in bold, all those, in that bin, in the alternate rule, Table 2 of the alternate rule, all those flaws fell fully within one of the FAVOR bins, all right? The ones that were non-bolded that could be in either of two bins. Like for the first one part of it could have been in the 1.68 contribution, part of it could have been in the 20.9. So we use the maximum of the two. And when we did that we took no credit for the flaws that didn't -- credit for the flaws that were below the limits. In reality if you were going to do this you could take credit for that but we didn't. We didn't take any credit. We just said if they were below the limit, okay. We took no benefit of that. But if you exceeded the limits the ISI flaw factor increased. All right. But we did include the contribution of any flaws that exceeded the size limit of 4.475 as I pointed out.

Now, again, this is where the disconnect comes is that the technical basis in this NUREG 6817 is multiple flaws are combined into one flaw per the ASME code proximity rules that were in effect at the time. And that's different to the changes that were made to the code in 2004. So that is a disconnect.

MR. STEVENS: Is anybody -- well, okay. I'm going to hold off because I know that in Jack's part of the presentation that's brought up and I'll ask the question then.

MR. BISHOP: And then I did want to point out that we used as the output and this will vary about -- the contribution to failure will vary by how much fluence you have on the welds. And it will also, this only applies really to the alternate PTS rule and the ISI interval extension which are both based on PTS because that's where the contributions come from. The contributions could be different for the risk-informed Appendix G work. And that would be a similar procedure but the numbers would be different. Again, Table 2 in the NRC technical basis had the contributions, 200 EFPY conditions. I think the ones at 60 EFPY would be more realistic which is what we used, but there should also be FAVOR 6.0 runs at 60 EFPY that the NUREG 1874 results are on to do that. So that's really all I wanted to say.

MR. KIRK: Just as a point, if you use the importance weighting from a 60 EFPY run you're going to make smaller flaws more important. No, no, no, no, no, no. You're going to make bigger flaws more important because it's less embrittlement. So you

need a bigger flaw to make it break.

MR. BISHOP: But I think in terms of what we're looking at for even to 80 or 60 EFPY is more realistic than 200 EFPY.

MR. KIRK: I'm not disputing that.

MR. BISHOP: But again, I mean this is our suggestion.

MR. KIRK: Yes.

MR. STEVENS: And it's fair to say that your approach here is what's going in that MRP White Paper? Okay. So I'm anxious to move on here to the second half of this that I think Steve's going to cover.

MR. SABO: Okay, these slides were prepared by Jack Lareau. I'm going to try to talk through them. I spoke with him briefly on them and I'm going to take this down an order of magnitude for the NDE guys. Okay.

The main topics that I'm going to cover here are the use of the proximity rules for the combination and clustering of flaws. Scanning deck size, specifically going to address the Westinghouse procedures and any other vendors can put their input there. Default depth sizing versus demonstrated flaw depth sizing. Surface examination requirements and

the actual areas we're inspecting which was, we did deal with that somewhat in Bruce's presentation.

First to talk about the proximity rules. We did use the proximity rules for the calculations for the 20-year extension and they were done with '98 code. So if we're going to use them we should probably continue to use -- and I'll just summarize this briefly -- we should continue to use the '98 code whether or not the code of record for a specific plant is 2004 or greater. The reason being in the '98 code the proximity rules combine flaws if the through-wall depth was two times --

MR. STEVENS: The space.

MR. SABO: The space was two times the through-wall depth.

MR. STEVENS: Right.

MR. SABO: Starting in 2004 it's now one-half through-wall depth. So essentially one long indication but using 2004 code could be multiple shorter indications with the '98 code so you've pretty much changed it. You've become less conservative. You could take four short flaws and make them one long flaw.

MR. STEVENS: Have any exams been done yet using the new proximity criteria?

MR. SABO: You mean the later?

MR. STEVENS: Yes.

MR. SABO: 2004 code. I don't think so.

MR. STEVENS: I was going to say that it seems to me that to use the older proximity criteria is consistent with the technical evaluation and basis that all this work was done with. So I guess I would be agreeing with your first statement.

MR. SABO: So what that's going to do, it's going to require people to set the calculations when they have flaws if they're working to 2004 and later code.

MR. STEVENS: Yes, and so it also doesn't appear to affect any past exams, it's only an issue moving forward as folks adopt later versions of the code.

MR. SABO: Right, and if someone's going to do a re-analysis of previous data the same thing, they have to use. And I don't know if that's specific in the rule.

MR. BISHOP: Jack, I just wanted to point out that in slide 26 I took the wording right out of the technical basis document for the VFLAW program about the proximity. And it says you shouldn't. It would be a disconnect.

MR. SABO: Okay, so I just wanted to bring that up that that's something that really needs to be -- I don't quite understand Jack's logic in the way he described it from length-based to depth-based.

MR. STEVENS: Yes, I didn't follow that either.

MR. SABO: There's probably some reasoning why he calls the first one length-based. I'm not quite sure. But essentially that's the change, the spacing between them.

MR. STEVENS: Yes, and I think we probably agree with, I don't know about the long word, but basically with shorter proximity criteria you potentially end up with more flaws.

MR. SABO: Shorter proximity you would end up with fewer flaws.

MR. STEVENS: You're right, yes.

MR. SABO: You combine them.

MR. STEVENS: I'm probably saying the same thing in the opposite direction. It's going to change a number of flaws.

MR. SABO: Exactly, exactly. Not the way it was calculated. Okay, the next slide we're talking about scan index. Now, this 12mm is specific to the Westinghouse procedure. Other vendors may have

different index size. Essentially we take a scan line, move a half inch and take another scan line. So what's the impact of that? Our flaw length is a half inch, that's the shortest length that we can report. Actually the procedure says half-inch plus 0.1, that's our procedural length. If there's a shorter flaw we're calling it 0.6 inches. That's just the way our procedure worked, it was set up to pass the PDI exams and the Appendix VIII requirements.

MR. STEVENS: So, okay. So I have a question on that but I'd also like to hear from GE and IHI and AREVA what they might use for a scan index. Is that typical or are those values significantly different?

MR. HACKER: This is Mike Hacker with AREVA. We use the half-inch for detection and two-tenths for sizing.

MR. STEVENS: GE? IHI? Okay, so GE said their answer was the same as what AREVA, Mr. Hacker said on the phone. And IHI is saying that he's not sure what their scan index is. Size and detect are the same. Whatever that index is you do both at the same.

MR. SABO: Our intent is when we have to apply PTS we're going to be scanning at a finer index.

We realize that for shorter flaws we're going to have to describe them. We're going to have to reduce that index size. We've already discussed that with probably the first utility to be using this is Palisades. We've already been in discussion about that. So we realize that we want to be able to do that. And also you want to be able to maybe break up the flaws if you can. That's what you're looking to do.

MR. STEVENS: So do you have any idea as to what that new scan index might be?

MR. SABO: Off the top of my head I would say reducing it by half. Probably going to a 6mm.

MR. STEVENS: And my understanding is you're basically going to end up taking more time on the exam and collect a heck of a lot more data.

MR. SABO: Yes.

MR. ANDERSON: Hey Steve, just a general question. You talked about the scan index affecting link sizing more than anything else, right? What do you think it does for detection relative to half-inch versus 6mm versus tenth of an inch or whatever? I mean, you'll have to think about that in terms of the beam that you're projecting and whatnot, right?

MR. SABO: You're talking about our

element size is 1-inch, half inch transmit, half inch receive.

MR. ANDERSON: And you're not focusing?

MR. SABO: It's focused on about 20mm in depth. From the entry surface.

MR. ANDERSON: So the focal spot is at 20mm? So anywhere between the clad to base metal interface to 1 inch is variable.

MR. SABO: Well, actually that's 20mm from the entry surface.

MR. ANDERSON: Oh, okay.

MR. SABO: So now you have to subtract the cladding thickness and then.

MR. ANDERSON: Yes. So I just wondered if you thought about detection capability relative to increment, scan increment sizes and stuff. And whether you factored into that --

MR. SABO: To improve detection --

MR. ANDERSON: Or just to make sure that you're not changing, if you're using focused transducers you know you have to be careful with that.

MR. SABO: I haven't thought about that any further.

MR. ANDERSON: Okay.

MR. SABO: But that's something to think

about, yes.

MR. ANDERSON: Maybe some modeling? It wouldn't be that difficult.

MR. SABO: No. Okay, the next slide is just going to talk about sizing. As we spoke of before, the Appendix VIII near-surface sizing exams rely on tip-to-fraction for depth sizing and we talked about why we use a default through-wall size with the Westinghouse procedures. We feel that we can accurately measure tips down to about one-eighth of an inch. Anything less than that is hit or miss so you may get -- hit or miss with respect to getting actually tip-defracted signals. If we don't get them we're giving a default size of one-eighth. If we can measure smaller we will measure smaller.

MR. STEVENS: I have a question, Mark, on the rule. Which bin is the less than or equal to or whatever size applied to? So 0.125 falls into which bin?

MR. KIRK: If you go back to the display of the table it's in the header. I think it's greater than or equal to the minimum size. There. Greater than or equal to TWE min and less than TWE max.

MR. STEVENS: So in your case --

MR. KIRK: We could change that.

MR. STEVENS: -- flaws --

MR. KIRK: It's a printing error.

MR. STEVENS: -- down around 0.075 you'd be putting in from bin 2 to 3?

MR. SABO: Probably. I like Bruce's table a little better that had that number of 0.126. I don't know if you noticed that.

(Laughter)

MR. SABO: Because actually if you look at it there is an overlap in that table, 0.075 on the first one and 0.075 on the second.

MS. NOVE: Steve.

MR. SABO: You should get a better definition. Yes.

MS. NOVE: What's your accuracy? Are you 3-digit accuracy on these measurements?

MR. SABO: We report them that way because that's the way it reads in Appendix VIII for sizes.

MR. SELBY: You report nearest millionth, nearest thousandth?

MR. SABO: Yes. I always claim if we put another decimal there we could be more accurate. You know, that's the way it's written as and that's why we use that. I guess we could have used 0.12 or 0.13 but. No, the accuracy requirement for Appendix VIII,

Supplement 4 is 0.15. Whatever you want to read into that, that's what the accuracy --

MR. ANDERSON: Wait a minute. You mean the acceptable criteria for phasing sizing is RMS error is 0.15. That's nothing to do with actual sizing error.

MR. SABO: No, that's just something to think about.

MR. ANDERSON: I knew you would think about that.

MR. STEVENS: So I need to make sure I understand that bullet because I'm not sure I do. So you detect a flaw and you call it at 0.2 inches in depth. So what does the last bullet imply about that sizing?

MR. ANDERSON: Nothing. It's 0.2 inches in depth.

MR. STEVENS: Okay.

MR. ANDERSON: When they qualify the procedure for acceptable sizing capability the acceptance criteria said they had to meet an RMS error of 0.15 for all the flaws they sized. Under-sized, over-sized, small flaws, large flaws, all added up together. So once they met it we take the exact number that they describe in the field. We don't

apply any error to it at all.

MR. STEVENS: That's nothing more than an accuracy requirement of the qualifications.

MR. ANDERSON: That's right, that's all it is.

MR. SABO: We just wanted to bring that up because someone could read that out of the code and figure hey, you're claiming 0.075 or 0.125.

MR. ANDERSON: No, that's an acceptance criteria for passing qualification.

MR. SABO: Right.

MR. ANDERSON: Yes.

MR. SABO: The next topic is the surface examinations. The way the PTS rule reads is you could use visual or surface examinations to verify that you're not breaching the cladding. At Yankee Rowe the way I understand it, I'm not really familiar with that, you actually could see the rust coming through the clad. But if you don't see the rust coming through the cladding before you scan you could wipe the rust off and so you really can't depend on the visual seeing rust to do it. You could do a visual, an enhanced visual, but what's better than enhanced visual? Probably eddy current. So we're proposing that we're going to use eddy current to verify that

any of these flaws come through the cladding. And we're going to use that in any areas where we have any flaws within that first 10 percent or 1 inch.

MR. HARDIES: I did talk to Matt earlier today and I can tell you that what you just said would make him very happy.

MR. ANDERSON: So you went to Japan?

MR. HARDIES: No, he talked to me right before he walked into Japan.

MR. SELBY: What would make him happy, the part about using eddy current or the part about making the observation for anything that's within the 10 percent?

MR. HARDIES: No, the part about eddy current.

MR. SELBY: Eddy current.

MR. KIRK: Bruce are you familiar at all with Yankee Rowe?

MR. BISHOP: Just that its cladding was a tack cladding. That was one of the things.

MR. ANDERSON: Yes, but the thought that Steve was trying to project there is that the base metal oxide came through, would be expected to come through a through-clad crack and show up as against a background of the cladding as a reddish discoloration

or whatever. Maybe. It's possible I suppose.

MR. SABO: Okay, so anyhow, we intend to use the eddy current and realize that we're going to have to either use an array or reduce the index size. I think that's -- we haven't decided exactly which way we're going to do that but it's probably going to be the same type of eddy current that has been used in DM welds from the ID. Basically the same thing, you're going on stainless steel cladding.

MR. CSONTOS: I think that in the Bs, I know it's not going to be used for PTS or alternate PTS, but in case for Appendix G types of inspections or whatever, I don't think you're going to have rust, right? You're not going to be able to see rust even because of the oxygen levels. So eddy current would still be better.

MR. SABO: Surely. Surely.

MR. CSONTOS: So we also concur with Matt and with Bob.

MR. SELBY: I think the provision in 50.61a that talks about using visual or surface methods isn't -- until I saw this slide it never occurred to me that visual might mean looking for rust. I think it meant enhanced visual, looking for cracks. Looking for crack openings.

MR. WIRTZ: I think when you get to Bs you're going to need to consider the possibility that they might want to propose doing enhanced visual exam. I mean, the Ps are doing the exam from the ID. All the tooling is already designed.

MR. ANDERSON: OD.

MR. WIRTZ: Pardon me?

MR. ANDERSON: Well, the UTs --

MR. WIRTZ: The Ps are doing it from the ID so they already have the capability and tooling there in a BWR access for the tooling and it just might be a different animal. So I don't think it should be assumed that everybody was going to go straight to eddy current.

MR. STEVENS: Good point. Thanks, Chuck. I have a question and it may seem kind of unrelated but I'm going to ask it anyway on cladding. With respect to whether plants have one or two layers of cladding, and I guess I'll look at kind of Robin for this or EPRI. But so I know there's been some, for example, the EPRI Embrittlement Management Handbook that talks about fabrication techniques and how the various practices that vendors use to fabricate vessels. And it gives a range of practices that may have been applied, and there were some recommendations

in there that you know, bottom line, for any given plant can vary and recommended that plants go pull fabrication records. With respect to cladding layers I saw that recommendation in there. I have never found anything anywhere you know where that information was collected and compiled by the industry. But is there any information that you're aware of that tells us how many layers of cladding were deposited in the various plants is the first part of the question. The second part of the question is as a part of an Appendix VIII exam is there any information that would come out of that that might help answer that question.

MR. TOMES: I know for the Palisades Plant they sent a letter to the NRC where they documented the thickness of the cladding. And that doesn't really tell you the number of layers but they took and measured the thickness of the base metal and then they did, measured the thickness of the cladding and that's how they used the -- determined what values should be used for the PTS work. So that was a statistical analysis based upon hundreds, or many measurements of the cladding thickness.

MR. STEVENS: Yes, and I've in fact seen cladding thicknesses I think in all the plants, at

least from a design drawing. Carl?

MR. SELBY: To answer another part of your question, there isn't anything in an Appendix VIII vessel exam data set that would tell you how many layers of clad there are. It's not there.

MR. LATIOLAIS: And I've -- in working on some other projects, some vendors have tried to come up with techniques from the inside to measure the clad and not had much success. From that surface. You have better success going from the OD trying to measure it than you would trying to measure it from the clad surface.

MR. SELBY: But there's the thickness of the clad --

MR. DYLE: In regard to your first question, there's information about how they're made. You can go to the plant and determine from their fabrication records how the cladding was applied, but I'm not aware of any compilation of which plants had cladding applied which way. At least I don't remember anything like that.

MR. SABO: Gary.

MR. HARDIES: There was a CE Owners Group, reactor vessel integrity group that developed -- Steve Byrne collected all the records, fabrication for

welding that was applied to the reactor vessel including the cladding. And that just identifies the procedures, weld layers, everything. And it lists the procedure and the procedure will tell you whether it's a single layer or a double layer. And a lot of the CE vessels are in that compendium. And we have it, NRC has it.

MR. DYLE: Yes, you have that data. I mean, that would be a way to compile it. What I remember looking at at our plant was only for our plant so I didn't see a roll-up for -- I never thought about going back and looking at the procedures and try to figure out which plant used which procedure and then determine it that way. But yes, all the CE stuff was provided in response to Generic Letter 9201.

MR. STEVENS: Right. So I was, from what I could see is consistent with what you guys just said and I was just wondering were some specific recommendations to the folks to collect stuff. And I just wondered if I might have missed some compilation downstream for the fleet.

MR. BISHOP: I just wanted to say that for the PTS three representative plants, for the Beaver Valley and Palisades they were able to find, okay, that there were small-pass cladding so there were no

surface-breaking flaws. For Oconee they couldn't find that information so they assumed that they did have single-pass cladding and so they could have surface-breaking flaws.

MR. THERIAULT: Yes, kind of more around what Bruce was just saying, from what I've seen the documentation does seem to be limited but like for some specific plants I can think off the top of my head like Catawba Unit 1 and McGuire Unit 2 we have equipment specifications that document how many layers of cladding were used.

MR. STEVENS: Sorry, to document? What was the last part?

MR. THERIAULT: That document how many layers, if it was multi-layer or single-layer passes. I mean, I don't think it's consistent, at least most of the time that information isn't available though.

MR. STEVENS: Okay.

MR. SABO: If I could ask a question either of Greg or Carl. The cladding on the PDI vessel blocks, I know it's very thick. Do we know anything else about it?

MR. LATIOLAIS: The vessel blocks themselves were canceled reactor -- the thickest layer I think is, thickest area is about 0.375. But you

mentioned earlier that the clad was removed and put back on. It was only removed in certain areas. So it's typical of a PWR bin vessel of that age. So it's, most drawings I see, I see one-eighth of an inch nominal but a lot of times they're much thicker than that.

MR. SABO: Right. And that is, what I was, getting to my point that's a very, it's a thick cladding, it's one of the thickest claddings I've seen. And everyone's techniques for the Supplement 4 were proven out on blocks with thick cladding, so.

MR. STEVENS: Okay.

MR. SABO: Pretty much to my last slide here talking about the inspection area. Bruce stated previously about the plate flaw limits are more restrictive than the weld flaw limits. But if the plate limits need to be used, they are more restrictive, and you have the number of flaws becomes your limiting factor I don't think there's anything that precludes you from saying let's scan more base material to get more square inches so we can dilute the number of flaws.

MR. STEVENS: This one I can speak to because I did talk to Mr. Mitchell about this on Monday.

MR. SELBY: It came up at the last meeting.

MR. STEVENS: He particularly enjoyed the use of the word "dilute."

(Laughter)

MR. STEVENS: And he said if that's your real objective in life you're probably misapplying direction of the rule. But more specifically he said if, and I guess we're in a little bit of a -- because you had said you're not doing plate exams so I'm not sure when you'd come up with this, but given that that's what's happening what he said was if you are going after examinations of highly embrittled areas because that's the real focus of this rule and that he wouldn't have a problem with that. If you were at the extremities of the belt line zone, whatever that might be, and you were just adding some extra volume to truly dilute your flaw density he said he would have a hard time seeing a technical justification for such practice.

MR. BISHOP: Based on the comments that Bob made, and I appreciate those comments, Bob, your feedback. Probably I think what we're going to say is don't do the plate flaw limits but specifically I think what we're recommending is you shouldn't be

using the plate flaw limits to the weld inspection volumes that we're using now. If you want to do plate inspections do plate inspections, but for what we're doing now, for the ISI volume use the weld flaw limits because I think that's more representative. But don't apply, try to apply the plate flaw limits within the ISI volume we're currently using. I think that would be a better representation I think of your understanding of what we would recommend.

MR. HARDIES: Fortunately I've been reading the rule. I'm trying to figure out what you were suggesting and how it fit into the rule. The rule says you've got to look at plate and give us plate densities and weld and give us weld densities. You have to do it within the Section 11 volume, the figure. So it gives us both something to work on.

MR. ANDERSON: Yes. Whether that's possible or not is the question.

MR. TOMES: Well, I have a follow-up question on this. Let's suppose that we had a vessel that was forging. And we got --

MR. ANDERSON: Is it north of here?

(Laughter)

MR. KIRK: Is it in a place famous for cheese?

MR. TOMES: This is a hypothetical question I'm asking relative to the way the rule is written. And it doesn't have a weld, doesn't have an axial weld and doesn't have a circ weld within the belt line region because it has a long forging. And since there -- and I don't have to do any exams for Section 11, but let's say I'm limited by my forging material. I'm approaching my 300 degrees because I've operated for a hundred years. Does the rule require us to inspect the forging? And I think it does because we're going to apply 10 CFR 50.61a to use a higher PTS screening criteria to the forging. So I don't understand this concept about applying Section 11 weld volume only unless we're saying the Section 11 weld volume is adequate for the rule.

MR. ANDERSON: Well, let me throw something in to make that even more murky than that. Is there is a code category as we all are aware of that if you have plate repairs you will examine them. They have nothing to do with the weld volume. You have to go examine those repair areas. Now, granted, that's weld material in the repairs so you can make an argument that you should still use the weld binning process.

But that's why somebody said if you didn't

have -- if you had -- if you were a pressurized water reactor with all ring forgings and you don't have any L seams that you didn't really have to do, well, yes, maybe, but if you've got a repair weld out there in the middle of one of those forgings somewhere, oh yes, you do. Because which direction is the repair weld in? How do you know the flaws are axial or circumferential?

MR. BISHOP: You don't. You assume they're half and half.

MR. ANDERSON: But you've got to go examine it. So you should be able to -- I mean you have to deal with that somewhere. You can't ignore them relative to this PTS rule.

MR. BISHOP: I don't think we're allowed to use the alternate PTS rule to the plant you're talking about. Because the PTS transients are significantly different.

MR. KIRK: What?

MR. HARDIES: Are you talking about a new plant? Yes, it's not applicable to new plants.

MR. TOMES: I'm really talking about the case where I'm not limited by my weld, I'm limited by my forging.

MR. HARDIES: We don't have any of those

hypothetical plants you described.

MR. TOMES: Well --

MR. HARDIES: There aren't any that this rule applies to.

MR. TOMES: In portions of our plant --

MR. HARDIES: The part above the weld?

MR. TOMES: The RTPTS values on the plate are approaching and are larger than portions of the weld. So we will become ring forging limited.

MR. KIRK: And I think what Bruce is referring to is the alternative PTS rule would be applicable to that plant because it's already in service where it specifically says, and I don't know if it's in the statement of considerations or wherever, that the alternate PTS rule doesn't apply unless the licensee brings the case forward is to new plants. And the reason that's said is because we haven't analyzed the types of -- we haven't analyzed new plant overcooling transients if they even exist. We simply don't know.

MR. TOMES: So the thing I'm asking for clarification, the way the PTS rule is written now the only examination volume that's required is the examinations that are current -- the volumes that are currently specified in Section 11?

MR. HARDIES: We wrote this test with the objective in mind of not making a plant do something different than they had done before. So we didn't specify a new exam of some new volume. So that's the answer, it specifies the ISI volume that was required when we wrote the rule.

MR. TOMES: Now, we did have this conversation about adding plate volume to -- if you don't have enough plate data or if you miss it and you want to inspect more. We did have that conversation. That doesn't line up with the words in the rule. The words in the rule say do the normal examination volume. So you've got to work your way through that.

MR. BISHOP: Again, we sort of did what we thought was the objective. And again, the point is the proposed treatment of the alternate PTS rule ISI flaw limits is consistent with and supported by how the risk-informed technical basis was developed typically, the NUREG 1874 work in terms of the application of flaw limits, plate flaws, application of weld flaws and the evaluation procedure of the weld flaws and limits exceeded. So that's -- I mean, we've already talked about that. And I think in the methods we're proposing you would not have to do any new plant-specific FAVOR runs. That's the bottom line.

MR. STEVENS: Okay. I want to, I had called earlier and I just want to make sure. So I didn't hear that there were any members of the public that had anything to say. Is that still true? Also online or on the phone? Okay. I think there's one other topic we'll talk about at the end but I just wanted to take this opportunity now to spend maybe 30 minutes and recap. We have actions, if there are any actions summarize those and to get any residual questions now based on everything we've discussed. Greg had a question earlier.

MR. SELBY: It was a question or an observation from a licensee to me over lunch about it would be great if he could come away from here with a real good understanding of how to write is bid spec for his relevant inspection job. What should we do?

MR. STEVENS: And that's a pretty good end-all summary question of why we. Well, we had this meeting for a variety of reasons but with particular focus on NDE I think that's the end-all question that I've been hearing. So now that everybody has a complete and thorough, rigorous understanding of the rule could they go off and write a bid spec for their vendors to do an exam? And I think the other question we asked earlier too is still a good one and do those

vendors that are present, if they got such a bid spec are they comfortable that their current procedures would provide the appropriate information to apply the rule.

MR. LATIOLAIS: I've got a question. Before lunch I think a lightbulb came off to me. What I thought I heard you saying, what was agreed upon. Based on my understanding of the rule and what was discussed this morning requirements are that you take Appendix VIII qualified procedure people and equipment, you perform the examinations, you perform -- once you've performed the examinations, you've recorded all of the data, you used the screening criteria contained in the Appendix VIII qualified procedure. You detect all the flaws, you put the flaws in a bin. You have all the flaws here. Then you apply your proximity rules per the code to all of these flaws. You compare them to the 3500 tables for acceptance. If they all meet it, that's fine. If you have some that exceed you have to do 3600 calculations. But for the purpose of binning you take not just these flaws that had to go -- that you had to do 3600 on, you take the entire bin of flaws that you identified during the exam after screening and that's what you populate the bins with. The only other

question after that is --

MR. ANDERSON: But you apply your proximity rules before you do that.

MR. LATIOLAIS: You apply your proximity rules before you do your 3500 calculation. You also grab them together to do your binning.

MR. ANDERSON: No, you apply your proximity rules before you do the PTS binning.

MR. LATIOLAIS: Yes. You do it for both. You only do it once, you're not going to do it twice. You do it one time, you use those values, you put them in the bins. With the exception of is the increment fine enough, is it -- do you want to find more or anything else, that was my understanding. You go forth and do it that way. Now, there was other discussion that if you exceed this limit which appears to be fairly large based on all the presentations and that seems to be a very good way to handle a vessel that ends up exceeding, potentially exceeding this rule, you may want to consider other techniques that maybe are not qualified but technically justifiable to more accurately bin the flaws if you feel that they're over-populated.

If you have a good technical basis you go use higher frequencies or whatever you may need to do

to be more accurate. But that would be a relief to you gentlemen and you'd have to explain it and justify it. In addition to that, if you found a flaw that was either connected by proximity or potentially connected to the surface you'd have to do an additional exam to confirm that it's connected or not connected to the inside surface. From an NDE perspective is that what I heard? Is that a good summary of what your expectations are from all these discussions?

MR. HARDIES: I thought that was crystal clear. I don't know if anyone else has a different opinion.

MR. SELBY: Yes, I thought that was good.

MR. HARDIES: I thought you nailed it.

MR. STEVENS: I liked it and this is another reason why we have transcripts so that I don't have to have you repeat that seven times.

MR. LATIOLAIS: You can remove the Cajun accent if you want, also.

MR. SELBY: Okay. Timestamp 3:20 p.m., look for those words.

MR. DYLE: Gary, if I could, just to clarify one thing Carl said. What you bin is those things that by Section 11 are determined to be flaws. That's what we're talking about is flaws, not

indications. So that would be the thing to do. And a flaw can be acceptable, it can be less than the 3500 acceptance standards, but it -- you're using flaws because that's what the rule requires.

MR. ANDERSON: Robin, I don't know that I would say by Section 11. I would say by whatever your procedure protocol that has passed Appendix VIII says are flaws.

MR. DYLE: The rule says flaws. Section 11. You're using Section 11 procedures and personnel and that's what --

MR. LATIOLAIS: I'm back. Carl Latiolais. It's flaws. When I said you record all the data, the analyst performs his evaluation per the criteria in the qualified procedure. What he does then is he sorts out indications from flaws, geometry from flaws, and he puts all these flaws in this imaginary bin here. He has them all there. Then he goes and he analyzes those flaws to determine whether they're acceptable or rejectable. He does proximity calculations, he takes it to 3500, see if it exceeds or not, but what goes in the bins, after he does that what goes in the bins is not just this number here that exceeded 3500, it's all of the flaws in this bigger bin over here gets used to populate the bins

for this rule. But it is flaws. Thank you. I'm leaving again.

(Laughter)

MR. HARDIES: Section 11 flaws, but it's the procedure where that happens.

MR. ANDERSON: It's the qualified procedure that does it.

MR. STEVENS: Thanks for that because we did get wrapped up in that terminology earlier and we spent a fair amount of time iterating on it until we concluded that. So thanks for that clarification.

MR. ANDERSON: That brings up a question. Based on that clarification, Bruce and Steve, the work you did and you sent to -- that's in the ML number that you talked about for that tabulation of those 20 plants or whatever. Thirteen. Does that match what we've just described, what Carl just very succinctly described? Or is that only the flaws that were reported based on Section 11 reportability?

MR. STEVENS: No, remember that -- yes. Remember, all of them in that last column I showed were Section 11 evaluated to acceptance criteria. And every single one of them in that report was allowable meaning it met acceptance criteria. And none of those flaws had an IWB-3600 flaw evaluation. So I would say

yes, that data they provided is consistent with the definition Carl just gave which I'm thankful I don't have to have him repeat and write down.

MR. SABO: The only thing that wasn't done, there was no surface and/or visual exam done.

MR. STEVENS: That's right, they're not -- there's no evaluation in that report against the flaw tables of the rule. And there's also no information in there that there was supplementary surface exams to verify the, you know, non-connectability of the flaws to the inside surface.

MR. DYLE: And if I could, just a clarification, and I think Mark said this earlier but to get it documented. The surface-connected flaws that you're concerned about are only those that are axially oriented. Circumferentially oriented flaws you don't have to worry about the surface connection according to the words of the rule.

MR. STEVENS: Yes. That, just to clarify that Mark's head nod would not be on the transcript.

(Laughter)

MR. KIRK: Nor would the brain rattle.

MR. STEVENS: You know, at lunch we talked about it would be useful to bring up the rule and then I got it and we never showed it. Maybe we're beyond

this now. Does anybody want to see the words of the rule? The actual words in the rule for NDE. That was brought up at lunch as why don't we bring this up and show what it says, but maybe we're beyond that now. Well, I can blow it up so you can read it. It only occupies if you want to see it. Unless I hear a strong suggestion to do so I will not display it. I don't want to prolong the. Any other -- let's just say any questions? Any remaining residual questions? Did we answer Greg's question? Carl answered.

MR. SELBY: You'd have to ask the licensee how they felt about whether they come away confident they know what to do.

MR. STEVENS: Would the person that asked you the question at lunch be able to go write his bid spec?

MR. SELBY: I haven't talked to him since lunch.

MR. STEVENS: Okay. So. He's not in the room? He/she is not in the room? All right, anybody in the room that might write a bid spec have the information they need to do so?

MR. TOMES: I'm not sure I have all the information but we'll be writing a bid spec.

MR. CSONTOS: What are you missing? Or

what do you consider that you're missing?

MR. TOMES: One of the things that I'm still concerned about relative to our population of plants is really how we're going to handle a situation where if we examine the vessel and we determine that we have more flaws than is described in bin number 2 and bin number 3. So right now I'm kind of torn with the idea of requiring the vendor to qualify a transducer with a smaller frequency such that we can go back in the areas where we think we have that population of additional flaws to examine them with another transducer.

Then I'm thinking well then maybe someone's going to require us to have calibration blocks and go through PDI and the NRC may not accept it. But I feel as a licensee if we're in that situation where we have more flaws than is described, than the tables we have to be able to have a process to move forward. So we're probably going to be toying with that idea, alternate examination scans and then also Bruce's idea of ways of incrementally assigning the risk to the larger population of flaws. And maybe it's an exemption to the rule where we ask for another FAVOR code with a new FAVOR run with the actual flaw population.

MR. HARDIES: So I'm not sure that would be an exemption to the rule. You fail this table, it tells you to do a risk evaluation. It's not an exemption.

MR. STEVENS: So then I'll say that in the regulatory guide that we'll be preparing it's our intention to give guidance on how to do that. And it's our aspiration to provide you with some possibilities short of a full-blown probabilistic fraction mechanics analysis.

MR. HARDIES: We would expect that the first thing you would do is go find those flaws and find out what the fluence is on them.

MR. CSONTOS: What's your timetable for getting that out? So that we know that if we're -- for our timetable on this reg guide.

MR. TOMES: Well, the Kewaunee exam will probably occur in 2015 but I think the Palisades exam which you know Dominion doesn't own but it's my understanding that might be spring 2013 and I don't know when the Beaver Valley one will occur. But I'm just speculating as to who will be the early applications.

MR. CSONTOS: So when do you need your information from us? This reg guide for public --

we're trying to get this reg guide for public comment out by early in 2012. Is that going to be too late?

MR. TOMES: We would probably need to put a contract in place a year in advance. So for Kewaunee it would be 2014, for Palisades it's probably going to be spring -- okay, so you're talking fall.

MR. CSONTOS: 2012. So you'll get at least the draft I think for public comment sometime in the spring of 2012. So that should be sufficient time, correct?

MR. SELBY: Draft of the reg guide?

MR. CSONTOS: Yes. Yes.

MR. BRILEY: If we get the draft and we start preparing and going into this I mean we're going to be on a timetable that's pretty expedited. And things change before we implement based off the draft. What will happen? I mean, again, we're going to be kind of doing stuff at risk.

MR. CSONTOS: Would you -- how about having something like this again, a public meeting while we're in the midst of writing it so maybe we can present.

MR. STEVENS: Well I was going to say that Al, to that you know, we've committed to holding these periodic public forums, meetings, to facilitate that.

And really it goes both ways, to try and minimize your uncertainty as well as to provide us input on timing and things like that.

MR. CSONTOS: We're seeking that public dialogue. So whether we -- we're going to start, this is one of the activities that we're looking for. Thank you, Bruce, for what you've written and presented. And we're looking for something like this. We'll present it maybe, I don't know, when would be the next one? A couple of months from now maybe? About three months?

MR. STEVENS: Well, you're segue-waying into the next one, but.

MR. CSONTOS: Okay.

MR. STEVENS: You know, right now my proposal is going to be the next meeting be at ASME code meetings in St. Louis in the second week in November. And I have tentatively a room assignment already locked with ASME for Tuesday evening for three hours and I would public notice that. I wanted to solicit input here and also keep in mind that we've been averaging about every month and a half to two months for these meetings. It won't be the last meeting and I know at some level that's still in outage season and all that. So we don't necessarily

have to -- each meeting may have different topics. Like this one focused on NDE. The last one really kind of didn't. So if we don't get to NDE in November we could have the next meeting cover it which might be January or something like that.

MR. DYLE: I've got one additional question about your process going forward. Bruce presented a lot of interesting information and different ways to look at the rule and all, but we don't yet have the rule change so how do you envision using that information in a generic sense, or is the expectation that Bruce and the folks at Westinghouse need to bring that forward as a proposed alternative means. Or what's the right way to approach that?

MR. STEVENS: I think even --

MR. CSONTOS: That would be more for NRR to. Bob? I think it's a question for you guys to answer, not us.

MR. DYLE: The question was a process question. Going forward with the proposals that Bruce put on the table about how to treat the flaws and given that that's different than what's in the existing row what is the way we proceed and go forward with that and try to find ways to use that or benefit from it. I don't think it's something you can just

put in the reg guide that says here's an alternative, but could it be a, you know, I'm curious about how the process is so we get that fleshed out.

MR. HARDIES: That's a good question. I don't know myself. Bruce made like two presentations. One was how to do the risk assessment if you flunk the table and one was how to -- well, I'm going to talk about that one first. That one's a nice input and I would think you would write that up and send it in to us and we evaluate it, maybe meet with you some more and maybe include it in the reg guide if it's an approach, a viable approach. The other one, I'm still having a hard time grasping that one. The way I read the rule it says you do these exams, you fill in the table and if you flunk the table you can go do this risk stuff and it seems what you did is you did the risk stuff and said I don't need to do this table stuff first. And that's very different. I'm having a hard time wrapping my mind around how we proceed on that. I mean, it's a potential, it could work but I just don't know how yet.

MR. DYLE: I'm not trying to speak for Bruce or Westinghouse or anybody but it would seem that if there's some way to evaluate what they've proposed and find it acceptable it could go into the

reg guide as a means of how to perform that through-wall cracking.

MR. CSONTOS: Matt at the last meeting basically said bring it in, you know, bring your suggestions in. We will take that under advisement while we're writing up the reg guide. That's the first step, okay? After that, if you disagree in the public comment period it's a great time for you to comment again, okay? What we've come up with. But then after that whatever happens with the reg guide, then there's something else that I'm sure that, you know, NRR and Matt and Bob can discuss. But I think in the next maybe five, six months, that's the kind of procedure we would like to follow.

MR. DYLE: One of the reasons I asked was while Westinghouse was represented if somebody else was thinking about what their options are this gets that on the table for them to --

MR. CSONTOS: This -- right. Bringing it -- that's why we wanted to have these public meetings. That's why we're transcribing it, getting the public meeting, getting the presentations put into a summary for us to, you know, hopefully to review for the reg guide.

MR. STEVENS: Now, the other thing we

talked about at the last meeting all about this, regarding this was timing. And you had asked us at that meeting is for us to consider things seriously for the reg guide when would we need to see them. And our response to time was we would need to see them by the end of this month. So time's running short to get suggestions in to us to build into the reg guide.

MR. SELBY: I have a couple of questions, Gary. One is for staff or Robin or anyone who knows, that's the tables and this process are being applied for three things apparently, PTS applications and Appendix G and also going to 20-year code interval. My understanding was that for the purposes of PTS the population was small. What's the population if you take all three of these applications together? Population of plants. Is it still just a few plants, or is it a lot of licensees?

MR. STEVENS: No, our --

MR. SELBY: It's a lot. And then what kind of term? Near term?

MR. STEVENS: The risk -- well.

MR. BISHOP: Well, like I said, we've already done 20 ISI interval extensions. The risk-informed Appendix G is being delayed. I think if we had, there are people that want to use it now, but --

and particularly the BWRs for their -- some relief that they're going to be getting. But I mean it's still in the regulatory arena right now.

MR. KIRK: And as Bob pointed out, I mean certainly the suggestion has been made that the same inspection flaw assessment rules that we've been talking about here might be applied to risk-informed Appendix G but just to reiterate Bob's earlier statement. I mean, we're still discussing that. I think we should focus on the "might." If it was it would obviously apply to pretty much everyone in the fullness of time but it's still very much a "might."

MR. HARDIES: Yes, it might be a completely different flaw set that we're interested in for Appendix G.

MR. SELBY: Okay, thanks. The second question was one of the things that you, RES, needs to go and figure out, or one of the things I saw consternation about in you, Gary, was coming to grips with the observed variation in distributions from vessel to vessel. Why, what are the reasons. Is the true distribution that variant, or are there other factors engaged? And in the meeting here we wrestled a little bit with how you could access the kind of data that might shed some light on it while still

protecting the identities of the licensees who contributed data. And I guess what I have is not really a question but an offer. If there's any way that we, EPRI, can help you, help provide you data to inform your deliberations let me know.

MR. HARDIES: Yes, I mean, I don't know. Is this a Hardin question, a Tim Hardin question? I mean, I was going to -- I mean, Bruce. Well, that's a different subject. But yes, we need some help with aligning manufacturing information out there with the inspection data that Westinghouse has given us. If it helps explain the large difference in number of flaws. That would be very helpful to us. And I will start with asking I think Westinghouse and EPRI if there's any information that could be supplied to help with that.

MR. DYLE: I would just suggest if you request it specifically in an email then send it to Tim and copy me and Bob Carter and Greg.

MR. STEVENS: Okay.

MR. DYLE: We could get together and figure out what we could do.

MR. CSONTOS: This is in a short-circuit time path here.

MR. DYLE: I understand.

MR. CSONTOS: This is something very.

MR. DYLE: Tim will be at the meeting next week.

MR. CSONTOS: Yes, we'll have to bring it up there. Okay.

MR. STEVENS: So in fact, in the way of actions I kind of had two here. That was one which was to close the loop on fabrication. And then another one was the question that Chuck Wirtz asked regarding the BWR circ welds and whether there was going to be any kind of a need to go back and revisit those. And I think we just need to get back to you on that one.

MR. HARDIES: Greg, I had a question for you relative to your offer on a different kind of thing. Since you guys are really the keepers of the PDI specimens and you suggested that there might be some techniques that could be applied if the bins were exceeded frequency-wise, angles, whatever someone might want to apply. And probably a lot of licensees would be looking for you guys to lead that effort. Would it be worthwhile for you to try to look at some techniques that might be appropriate to apply there?

MR. SELBY: That's why I asked my first question about the population of interested plants.

Because that, yes, the background of the question was if I'm going to go out and get funding to develop such a technique it's easier if there's a lot of interested plants. So yes, I was thinking the same thing.

MR. HARDIES: Okay. So are you going to seek funding for that then?

MR. SELBY: Yes, I'll try to figure out a way to do that.

MR. HARDIES: Okay. That's all I wanted to know. Thanks.

MR. CSONTOS: I had one question about the BWRs. And Chuck, you had mentioned about that you're going to do VT, right? Automated VT. You know, if we need to go EVT.

MR. WIRTZ: I was saying the surface exam you can't --

MR. CSONTOS: Do the eddy current.

MR. WIRTZ: Surface requirements of the PTS rule --

MR. CSONTOS: Oh, can you go to the mic?

MR. WIRTZ: -- be made with regard to --

MR. CSONTOS: Can you go to the mic? Sorry.

MR. WIRTZ: I was just alluding to the fact that the surface requirement if you have what's a

surface-breaking flaw or a flaw by proximity has to be assumed to be a surface-breaking flaw. The verification of that I don't think you can assume that that requirement will be met for the rule, whether it's the PTS rule or a rule that's developed for implementation of the risk-informed Appendix G. I'm not considering that maybe EVT-1, some enhanced visual, some type of visual exam would be a tool for that. And some of that may come out of what we find in the round robin results that we're working on right now.

MR. CSONTOS: Right, that's the work with Cumblidge? Okay.

MR. STEVENS: And my understanding of that is you're just, you know, you're making that comment with respect to what was in Westinghouse's presentation about eddy current being the exam, or the technique of choice because you're just not set up to do that readily.

MR. SELBY: Yes, there's a lot of these, a lot of locations in the belt line area of a BWR on the inside surface are just really, really difficult to access with a robotic scanner.

MR. STEVENS: And that was actually one question I wanted to ask, follow up on Westinghouse.

So I understand when you told me in my example you went six feet up and six feet down and that's what your definition of belt line was. So, are those welds examined? Is that your limit of what you analyzed or is that the limit of what the inspection did? So in other words, were those welds completely the full length of them interrogated and then you just paid attention to 12 feet? Is that correct? Or was the examination only done plus or minus 6 feet and therefore that's all you had to evaluate?

MR. SABO: A full examination was done.

MR. BISHOP: Of the full welds. But again, our interpretation of the PTS rule was that you would only apply that to the belt line, the region of the welds that were in the belt line.

MR. STEVENS: Correct.

MR. BISHOP: Because if you look at Palisades, okay, 1000 versus 1006, I think that's how they came up with 1006 was using just the belt line.

MR. STEVENS: Right.

MR. BISHOP: Now, in the FAVOR code they did simulate. In Palisades' case they did simulate another foot on each end of that beyond that definition. In some of the plants they had to assume less because they started running into some nozzles

and stuff like that that the code wasn't able to accommodate. So.

MR. STEVENS: Okay. Anything else? Duncan.

MR. MACLEAN: I just double-checked with the powers that be and our increment is 0.9 of an inch.

MR. STEVENS: Sorry?

MR. MACLEAN: Our increment on the vessel exams is 0.9 of an inch for sizing on detection.

MR. STEVENS: I still didn't get the number.

MR. MACLEAN: 0.9. Better late than never.

MR. STEVENS: Okay. That's bigger than Westinghouse. Okay, thank you. Steve.

MR. DINSMORE: Yes, this is Steve Dinsmore from PRA branch in NRR again. Just real quick. Of course, the reg guide is not going to trump the rule and if you want to change the way you're going to address the rule you don't -- you can try to change the reg guide. The other thing would be the rule was written to avoid doing this risk analysis. So if you're going to just try to jump one of the tables, go directly to the risk analysis you should consider how

difficult it might be to get the risk analysis through and kind of weigh your options. Because again, we were trying to avoid those risk analyses.

MR. STEVENS: Okay. Anything else? Does anybody have any -- if you have any input, you know, please send it to me or talk to me regarding the next meeting which, you know, barring any significant input otherwise I was going to put Tuesday, the second week of November, 4:00 to 7:00 p.m. And I don't have any specific topics for that meeting other than RPV integrity right now. Three hours. So that's my plan for the next meeting. It's during code. In St. Louis.

MR. ANDERSON: Oh, you're going to do it in St. Louis.

MR. STEVENS: Yes.

MR. ANDERSON: Okay.

MR. STEVENS: In St. Louis. And I would notice that in the next few weeks. Yes, sir.

PARTICIPANT: Just quickly, how long will it take to get the meeting minutes out from today's meeting?

MR. STEVENS: I'm going to say two weeks. I believe the request for transcripts is one week and I will do a brief summary, compile everything, so two

weeks. It was my intention, yes. And everything will be in ADAMS too but I, at least from the population of folks I was sending the appointment to my goal would -- well actually, in this particular case anybody who signed the attendance sheet is going to get the meeting minutes. And it'll all be filed publicly. Anyone else? Yes. Last call for public comments. Anybody on the phone? All right, well thank you again everybody for coming. Meeting adjourned.

(Whereupon, the foregoing matter went off the record at 3:48 p.m.)