Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
APR1400 Subcommittee
Open Session

Docket Number: N/A

Location: Rockville, Maryland

Date: April 20, 2017

Work Order No.: NRC-3023 Pages 1-136

NEAL R. GROSS AND CO., INC.
Court Reporters and Transcribers
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

DISCLAIMER

UNITED STATES NUCLEAR REGULATORY COMMISSION'S ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, as reported herein, is a record of the discussions recorded at the meeting.

This transcript has not been reviewed, corrected, and edited, and it may contain inaccuracies.

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

+ + + + +

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

APR1400 SUBCOMMITTEE

+ + + + +

OPEN SESSION

+ + + + +

THURSDAY

APRIL 20, 2017

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 8:30 a.m., Ronald G. Ballinger, Chairman, presiding.

COMMITTEE MEMBERS:

RONALD G. BALLINGER, Chairman

DENNIS C. BLEY, Member

MICHAEL L. CORRADINI, Member

WALTER L. KIRCHNER, Member

JOSE MARCH-LEUBA, Member

DANA A. POWERS, Member

JOY REMPE, Member

GORDON R. SKILLMAN, Member

JOHN W. STETKAR, Member

MATTHEW W. SUNSERI, Member

DESIGNATED FEDERAL OFFICIAL:

CHRISTOPHER BROWN

JOHN LAI

CHRISTIANA LUI

ALSO PRESENT:

TONY AHN, KHNP

ROSS ANDERSON, ENERCON

DENNIS ANDRUKAT, NRO

AARON ARMSTRONG, NRO

CLINTON ASHLEY, NRO

ODUNAYO AYEGBUSI, NRO

JOHN BUDZYNSKI, NRO

NAN CHIEN, NRO

JEFF CIOCCO, NRO

ANTONIO DIAS, NRO

THINH Q. DINH, NRO

RAYMOND DREMEL, ENERCON

ASHLEY FERGUSON, NRO

STEVE D. FLOYD, Jensen Hughes

ANNE-MARIE GRADY, NRO

NICHOLAS HANSING, NRO

GARY W. HAYNER, Jensen Hughes

SUN HEO, KHNP

RAUL HERNANDEZ, OSRA

SEOKHWAN HUR, KEPCO E&C

KYUHO HWANG, SGH

TAEHEE HWANG, KEPCO E&C

YOUNG H. IN, ENERCON

ATA ISTAR, NRO

RANDY JAMES, Anatech

REBECCA KARAS, NRO

NADIM KHAN, NRR

BYUNG JO KIM, KEPCO E&C

JAE GAB KIM, KEPCO E&C

MINSEOK KIM, KEPCO E&C

YIU LAW, NRO

JEFF LEARY, ENERCON

DONGWON LEE, KEPCO E&C

CHANG-YANG LI, NRO

ROBERT LICHTENSTEIN, ENERCON

JAESOO LIM, KHNP

MARK LINTZ, NRO

TIMOTHY LUPOLD, NRO

MICHAEL MCCOPPIN, NRO

JILL MONAHAN, Westinghouse

HO RIM MOON, KHNP

LYNN MROWCA, NRO

TONY NAKANISHI, NRO

ALISSA NEUHAUSEN, NRO

RYAN NOLAN, NRO

DAEGEUN OH, KEPCO E&C

JIYONG OH, KHNP

NGOLA OTTO, NRO

CHAN Y. PAIK, FAI

CHAN EOK PARK, KEPCO E&C

CHANG SUN PARK, KEPCO E&C

SUNWOO PARK, NRO

HANH PHAN, NRO

STEVE PHILLIPPI, ENERCON

MARIE POHIDA, NRO

PAUL PRESCOTT, NRO

SHEILA RAY, NRR

ROBERT ROCHE-RIVERA, NRO

JAMES ROSS, AECOM

GREGORY ROZGA, ENERCON

IN CHUL RYU, KEPCO E&C

SUJIT SAMADDAR, NRO

THOMAS SCARBROUGH, NRO

JASON SCHAPEROW, NRO

RAY SCHNEIDER, Westinghouse

ROB SISK, Westinghouse

SWAGATA SOM, NRR

COURTNEY ST. PETERS, NRO

JAMES STECKEL, NRO

ANGELO STUBBS, NRO

VAUGHN THOMAS, NRO

ANDREA VEIL, Executive Director, ACRS

ROBERT VETTORI, NRO

HANRY WAGAGE, NRO

GEORGE WANG, NRO

JAKE ZIMMERMAN, NRO

*Present via telephone

P R O C E E D I N G S

8:30 a.m.

CHAIRMAN BALLINGER: Okay. We're back in session. A couple of things. For those people who were not here yesterday, we're going to do Chapter 17 this morning, or first, and then, when we finish that, we'll take a break and then, the remainder of the day will be on closed session. So, that's what we'll do. And so, before we get started, Member Rempe would like to make a request or make a -- or say something.

MEMBER REMPE: A comment, yes.

CHAIRMAN BALLINGER: A comment or say something.

MEMBER REMPE: I'd like to follow up on Section 19.2 yesterday. In the draft SE that we got from the Staff, there's a Reference 54 called, independent MELCOR confirmatory analysis of selected scenarios for APR1400 PWR, and it has, this report is under development.

And so, that's why yesterday I asked, where are these things documented? And I learned yesterday from Jason that, oh, we put that in, it's got an ML number, and I did get a copy last night and I looked through it, with the few hours I had last

night.

And it appears, if I'm characterizing it, and maybe I'm mischaracterizing it, but the confirmatory MELCOR calculations used different assumptions for the KP containment volumes. They actually had differences in the concrete composition and then, they even had differences in the assumptions with respect to the SIT performance.

And so, they asked, then, for one of the cases, from what I could tell, for KHNP to do some sensitivities with MAAP and the conclusion was, well, the results now come a bit closer to what we predicted with MELCOR. And I am real puzzled of how we get confidence from those kind of confirmatory calculations in the MAAP results.

And so, I'd like some additional information on what gives the Staff confidence with those MELCOR calculations that the MAAP results are correct. And I don't care when that's done, you can work with Christopher and Ron and that on it, but I just didn't see enough information in what I saw in that document and it -- yesterday, there were no plots or anything and it kind of seemed like a number-free presentation and I'd like a little more information.

Okay?

CHAIRMAN BALLINGER: And for the record, we should send the report to the entire Subcommittee.

MEMBER REMPE: Christopher can take care of that stuff, with all the procedures that are -- I'd surely mess it up.

(Laughter.)

CHAIRMAN BALLINGER: Okay. You can proceed.

MR. SISK: With no undue delay, I'll turn it over immediately to Mr. Jaesoo Lim to lead us through the 17.1. Mr. Lim, please?

MR. LIM: Good morning ladies and gentlemen. I hope today is another good day to all of us. My name is Jaesoo Lim in KHNP. I'm in charge of KHNP QA Program of this project. And this morning, I want to give you a short presentation about the QA Program.

The QA Program is described in Chapter 17 of the Design Control Document and it is especially related to Section 17.1, 2, 3, and 5. Other sections, 17.4 and 6, will be touched later with other gentlemen, because they are not parts of the QA Program. Next.

My presentation is composed of four main parts. Firstly, I want to start from introduction. In this part, I will give you the main features of the QA Program. Secondly, I will give you the present evaluation status about the QA Program. NRC Staff reviewed the QA Program and issued SER, it says that the QA Program is acceptable.

Thirdly, I will touch the inspection status done NRC Staff. This inspection is mandatory task to check the implementation status of the QA Program after docketing DCD. Lastly, I will summarize my presentation. Next.

This is the overview of the Section 17.1, 2, 3, and 5. These sections require establishing correct QA Program and it being implemented properly in the phase of design, construction, and operation. Presently, because this project is in the phase of design, KHNP should follow the Section 17.2.5 and KHNP has been doing according to it.

KHNP prepared submitted QA Program to NRC as the form of Topical Report. This complies with all the relevant requirements. Next.

Now, let me give you the document system of the QA Program. The top and the mandatory document

for the QA Program is QAPD. It stands for Quality Assurance Program Description. This is described in the Topical Report.

The fifth revision is the latest version and it is approved by the CEO of KHNP, because the nuclear safety is the non-reversible policy and the CEO is showing his full support for its implementation.

Under the QAPD, several other lower level documents are developed and implemented now. They are QA Manual and Procedures. They are more detailed and specific to deploy the QAPD in the project real activities. All of these documents are also based on the same requirements, as you see in the slide. Next.

The QAPD was submitted to NRC on May 2, 2016 and it was approved on October 6 of the same year. Next. The QA Program is composed to comply with the 18 criteria of 10 CFR 50 Appendix B.

From the first requirement, organization, to the QA audits, they are all fulfilled in the QA Program, except 8, 9, 13, and 14, because these four requirements are not the scope of the design phase and they are related to the construction or the

operation phases. Next.

Another basic 10 CFR is Part 21. This is also --

MEMBER SKILLMAN: Excuse me.

MR. LIM: -- fully followed in the --

MEMBER SKILLMAN: Please back up one slide, please. What is the Pj Pro, the fourth column to the right? Pj Pro, what is that?

MR. LIM: Project Procedure.

MEMBER SKILLMAN: So, the Project Procedure?

MR. LIM: Yes.

MEMBER SKILLMAN: Thank you. Okay.

MR. LIM: The QA Program adopts a graded QA -- no, no. Okay, yes. Another basic of 10 CFR is Part 21. This is also fully followed in the project with two main procedures, DC-QA-15-01 and 04. The main idea with 10 CFR 21 is to prevent the non-conformancies in the proactive and corrective manners.

To do this, first thing in 10 CFR 21, finding and screening the non-conformancies, notifying to NRC, taking proactive and corrective actions, and keeping the records are all included in

the procedures. The procedures included in the mandatory training courses for all personnel who are involved in the project. Next.

The QA Program adopts a graded QA, according to the Nuclear Safety Categories. Three level of quality classes are assigned, such as Q, A, and S. They are to guarantee the classification requirements, such as Reg Guide 1.26, Quality Group, and ASME Boiler and Pressure Vessel Code class. Next.

This is the organization chart of the project. It is composed with two levels, such as headquarters level and project level. The Vice President of KHNP Central Research Institute is practically in charge of this project and if there is a need for support from the company level, the CEO, the Executive Vice President, and the Vice President of Quality Assurance are to be involved automatically. This is why the QAPD is approved by the CEO and the QA Manual is approved by the Vice President of CRI.

Within the project organization, three design suppliers are involved through their contracts. They are all qualified vendors. Their

design scopes are from system design to component design. Next.

As an applicant, KHNP has the final and the full responsibility to Design Control, even though KHNP delegates the design activities to the design suppliers. To oversee the delegated design activities, KHNP doing five kinds of activities.

First, KHNP evaluates and selects the qualified design suppliers and assesses the concepts with them only. In the contracts, KHNP requires the design suppliers to have their own QA Program and approved by KHNP before commencing their activities. Even further, these KHNP QA requirements should be passed down to sub-contractors.

Second, KHNP receives, reviews, and approves the design products from the design suppliers, and finally, submits to NRC. Third, KHNP controls the RAIs and all their related changes in the design processes.

Fourth, KHNP presides committees related to design change, interface, and the project management meetings. Fifth, KHNP does QA audits internally and externally to check the implementation status and to improve the QA Program as part of

Corrective Action Programs. Next.

The basic policies of the QA Program are described in the top management policy to enforce the nuclear safety culture. To do this, the top management gives all employees the proper training and qualification. Also, top management especially gives the QA Team the organization freedom and independence from the cost and the schedule, holding work stop authority and direct reporting to the top management. Next.

Let me tell you about the evaluation status of the QA Program. The evaluation is done by NRC Staff. At this moment, there is no further RAI and there were three RAIs and they were all cleared and accepted and KHNP revised the DCD based on the RAIs. Next.

Now, I want to tell you about previous results and the next plan for the QA inspection done by NRC Staff. After the docketing DCD, NRC did inspection last year, 2016. At that time, the QA Program and the software control were mainly focused. There was no finding, but four recommendations. I mean, four observations. And the recommendations were all resolved right after the inspection through

KHNP Corrective Action Programs.

For this year, 2017, during May 22 to 26, NRC will take another inspection. At this time, NRC will check the QA Program again, focusing on design change control, and KHNP will do best again. Next. This is the final page of my presentation, the summary.

First, I can tell you that KHNP QA Program is complying with all the relevant requirements. Second, KHNP QA Program can be expanded to COL phase and will comply continuously with all the requirements after the successful DC approval. Thank you for listening to my presentation.

MEMBER SUNSERI: Thank you. I just have one kind of question. It's a good explanation of the overall program. On Page 9, you describe a process of oversight of design suppliers and a very comprehensive oversight process. Can you give us an example of something that that process has discovered or uncovered as a result of its oversight review of the design suppliers? Just an example?

MR. LIM: I can tell you that two examples. First, for the procedures, at the first time, we didn't have a 10 CFR 21 procedures, but after the QA

audit, we ask that the suppliers to have their own 10 CFR 21 procedure.

And for the design part, some -- I cannot remember exact title of the document, but some case, we checked the design product if it is followed, the design procedures, to imply the requirements in the Reg Guides or other requirements in their design product.

MEMBER SUNSERI: Okay. So, that was, if I understand right, that second example sounds like a good one to me. I mean, you say you reviewed a product, you found something, and you gave the vendor some feedback that --

MR. LIM: Yes.

MEMBER SUNSERI: -- and then, through the Corrective Action Program, something was done to correct the situation.

MR. LIM: Yes.

MEMBER SUNSERI: Okay. Thank you. That's good.

MEMBER SKILLMAN: May I ask this question, please? Is this the same basic program that was used at Shin Kori 3 and 4?

MR. LIM: Yes. But some parts are

different, because government regulations are different. Shin Kori 3 and 4 is based on the Korean regulation.

MEMBER SKILLMAN: Okay.

MR. LIM: But regulations are almost the same. Yes. But 10 CFR 21 is typically different. When we started this project, there is no procedure or requirement 10 CFR 21, but I had to prepare this kind of procedure for this own project. Now, my company has its own Korean version of 10 CFR 21, following this project. Yes.

MEMBER SKILLMAN: Okay. Let me ask one more question, please. What lessons did you learn at Shin Kori 3 and 4 that you have imported into the APR1400 QA Program?

MR. LIM: For the APR1400 QA Program, there is no difference, because Korean QA Program is based on totally American QA Program. So, KHNP has applied American style QA Program since the nuclear business, yes, of the -- first nuclear business. So, there's no difference.

MEMBER SKILLMAN: Okay, thank you. One final question.

MR. LIM: Yes.

MEMBER SKILLMAN: You have had an NRC inspection of your QA Program and you will have an inspection next month --

MR. LIM: Yes.

MEMBER SKILLMAN: -- of your RAP Program. What are the NRC inspectors inspecting?

MR. LIM: This year -- last year, NRC Staff checked KHNP QA Program only.

MEMBER SKILLMAN: Checked what?

MR. LIM: Checked KHNP QA Program --

MEMBER SKILLMAN: Okay.

MR. LIM: -- last year.

MEMBER SKILLMAN: Okay.

MR. LIM: But in this year --

MEMBER SKILLMAN: So, it is a programmatic review --

MR. LIM: Yes.

MEMBER SKILLMAN: -- of your written program?

MR. LIM: Yes.

MEMBER SKILLMAN: And that is what they audited or that is what they inspected?

MR. ARMSTRONG: Excuse me. I was actually on the inspection, my name is Aaron Armstrong.

MEMBER SKILLMAN: Identify yourself, please. Go ahead.

MR. ARMSTRONG: Aaron Armstrong from NRO.

MEMBER SKILLMAN: Yes, sir, go ahead.

MR. ARMSTRONG: During the -- there's been two previous inspection at KHNP. One in Korea, which was an oversight of suppliers inspection. There was one that was done for commercial grade dedication of software and the QA requirements that are associated with that software, so that would be Corrective Action Part 21 Non-Conformance Reporting.

We, as an agency, haven't done an inspection, and that's part of my presentation. We will be doing an inspection, it's a QA implementation inspection, it's actually called a post-docketing inspection.

And all 18 criteria, during that inspection, will be evaluated and implementation of the procedures. So, I just wanted to clarify that that's where we're headed and clarify what we've already looked at as the agency. Does that --

MEMBER SKILLMAN: Aaron, thank you. Yes, sir, that's good.

MR. ARMSTRONG: Yes.

CHAIRMAN BALLINGER: You'll forgive my ignorance though --

MEMBER SKILLMAN: Thank you.

CHAIRMAN BALLINGER: -- does that inspection include the suppliers?

MR. ARMSTRONG: Yes, we'll do supplier oversight.

CHAIRMAN BALLINGER: So, you'll go to DOOSAN and --

MR. ARMSTRONG: I believe that Mr. Lim was going to have DOOSAN and KEPCO there and we're going to be looking at all the items available. So, we're doing an oversight of their suppliers, which is part of their engagement criteria, Part 21 and the audits, all the good things of Appendix B.

CHAIRMAN BALLINGER: Especially Part 21.

MR. ARMSTRONG: Yes.

CHAIRMAN BALLINGER: Yes.

MR. ANDERSON: Can everybody hear me clearly in the back room? Okay, I see heads nod.

CHAIRMAN BALLINGER: Start with your name.

MR. ANDERSON: My name is Ross Anderson, I work for Enercon for Mr. In, and I'm going to talk about the Reliability Assurance Program, or the RAP

for short, and the Maintenance Rule Program, which follows that in the actual operation stage of the APR1400. Next slide, please.

I will touch base on three areas. One are the requirements of the RAP itself. The second, the feedback that we've received from the Staff on the RAP Program as it is currently constituted. And third, our response, which is in progress at this very time. Next slide, please.

First of all, the RAP requirements are spelled out in Standard Review Plan 17.4, revised not long ago as Rev. 1. It requires that design, construction, and operation of the plan should be consistent -- should reflect the risk significance of components identified by the risk insights, key assumptions of all the PRA risk analyses and non-PRA other analyses and evaluations.

All available risk information has to be factored in, digested in order to identify what components and functions are risk significant. This then turns around and it will be used in plant design, in the QA process, and in testing, reflecting the risk significance of the plant as it's designed.

Later, the RAP will ultimately end during

plant operation and be replaced by Maintenance Rule, again by QA, and by Testing, but in good part, the RAP will feed into the Maintenance Rule Program and, therefore, RAP and Maintenance Rule should be aligned as much as possible to effect a bump-less transfer. Next slide, please, sir.

In November of 2015, the Staff issued RAO 316-8305, two questions, and you've got the full text on the slide in front of you. Very briefly, the key point is down near the bottom, where it says, please provide details of a RAP Program.

Right now, what we have, through the SRP -- I'm sorry, through the DC response, is a very high level description of the RAP. And we are in the process of developing more rigorous, more thoroughly detailed implementation procedures to address this particular response.

Question 17.04-2 is less broad in scope. It requires additional detail for the COL action items for the RAP. But the big one between these two is the first one. Next slide, please, sir.

The original RAI was issued in November of 2015. The Staff asked additional questions in a telecon in September of last year and, ultimately,

they wound up requesting a face-to-face meeting, which was held a month ago, in order to clarify their concerns and requirements for meeting and closing out this RAI.

We did hold that meeting, it was a very good face-to-face exchange. We came away with a much better understanding of what the Staff expects to see to have a good RAP in place. Next slide, please, sir.

Here's our response. We have taken what we originally had drafted for the DC 17 -- well, we re-reviewed the Standard Review Plan 17.4. It has been revised, some changes, but that wasn't really the main issue that the NRC had with our program.

Nevertheless, we reviewed SRP 17.4 Rev. 1 and took a look at it. We have completely revised our response to 17.4. Literal blank page, the Word document was emptied, rebuilt from scratch, and it is under review at this time.

Finally, the revision was initially drafted a few weeks ago, but it's still under internal review. And we're also in the process of drafting the implementation procedures, the details where it actually is executed.

And in the process, proposing programmatic changes, which will be reflected in large part in the implementation procedures. And these are designed to address the concerns that the Staff identified in last month's face-to-face meeting. Next slide, please.

Short list, not inclusive, but a short list of the primary procedures we need to revise. 03-09, 10, 11, are the RAP procedures. So, they're the heart and soul of the program. Very dramatic revisions, you wouldn't want to see the change tracker on these particular documents right now.

03-24, Risk Management Procedure. This is the one that directs and controls PRA review of actual design changes. A change occurs, a PRA engineer is tasked, look it over. Does it impact the model? Does it need additional information to determine if it does and, if so, what does he do with that if there's an impact or a potential impact?

Finally, 03-01, Design Change Control. This has to go back, if a component is identified as risk significant or high safety significant, this information has to be funneled back into the design process to make sure that it reflects the fact that

Component X is risk significant.

CHAIRMAN BALLINGER: And I have --

MEMBER SKILLMAN: Oh -- go ahead.

CHAIRMAN BALLINGER: Go ahead.

MEMBER SKILLMAN: Two questions.

MR. ANDERSON: Yes, sir?

MEMBER SKILLMAN: First question, why was it required to basically rebuild from the ground up these three procedures?

MR. ANDERSON: They did not have sufficient detail to properly address the NRC concerns for an adequate nuts-and-bolts implementation.

MEMBER SKILLMAN: They do now?

MR. ANDERSON: They are much closer. We're still in the process of drafting them, but we're feeding in a lot of additional detail. I can give you a bit of background.

I sat on the expert panels for a couple of Westinghouse plants in the U.S., four units total, for the better part of a decade, so I know where the RAP is going, what it takes, what kind of level of detail is needed, expert panel selection, utilization of end results, we're factoring that information in

this way. Mr. In asked me to participate in this process --

MEMBER SKILLMAN: Okay.

MR. ANDERSON: -- to bring that expertise and add in the necessary nuts-and-bolts detail.

MEMBER SKILLMAN: Second question.

MR. ANDERSON: Yes, sir?

MEMBER SKILLMAN: Presuming that the outcome of this effort is excellent, what does that then do for the Maintenance Rule implementation? You communicated earlier that these are woven together so that there is a transition --

MR. ANDERSON: Well --

MEMBER SKILLMAN: -- and to me, the diamond is the Maintenance Rule Program, making sure that when this unit is built, if ever, that Maintenance Rule Program incorporates the risk insights and lessons learned so that Maintenance Rule Program defends the material condition of that plant. So, describe how that is going to occur.

MR. ANDERSON: We are tailoring the RAP so that it is, as much as possible, a bump-less transition from one to the other. The regulatory requirements aren't quite identical, so we're keeping

that in mind.

Again, knowing where we have to go with Maintenance Rule, where the requirements for RAP are not rigorously clear, we can tailor it and make sure it matches up pretty well with that and our objective is to make sure that the RAP, as once properly constituted, is what the Maintenance Rule needs, so that when plant operations are ready to start, during the construction phase when they're staging things for final transition, that there is a minimum of any kind of complication, that it lines up pretty well in stages for that. I realize that probably --

MEMBER SKILLMAN: That's sufficient.

MR. ANDERSON: -- I don't want to give a --

MEMBER SKILLMAN: Thank you.

MR. ANDERSON: -- vague answer, but --

MEMBER SKILLMAN: No, that satisfies the intent of my question.

MR. ANDERSON: Okay.

MEMBER SKILLMAN: Thank you.

MR. ANDERSON: By -- and it doesn't say so, other than the fact that the SRP does identify RAP as a precursor for Maintenance Rule, among other

things, but Maintenance Rule is the big dog there.

MEMBER KIRCHNER: Ross, would you give a --

MR. ANDERSON: Yes, sir?

MEMBER KIRCHNER: -- tangible example? Now, we heard yesterday, and I believe you were here, Chapter 19. So, we were told that some significant design changes were made vis-a-vis the existing Korean plants to improve the overall safety and risk envelope.

Could you -- you are writing procedures now, the design is almost complete, so it's almost as if these procedures are being implemented after the design has been completed. So, how useful are these going to be going forward? Is it more just QA boilerplate, pardon my saying that, or is this really something that will tangibly impact the design process going forward?

MR. ANDERSON: One, the -- and, again, we're in the process of developing programmatic changes. Dynamically, the RAP needs to be in place from the beginning, as soon as there are risk results available, and factor that back into design.

The design then needs to review and make

sure that what's identified as risk significant matches up with the way they are treated in design. At this point, additional changes need to go back to design.

Design would need to review and say, this is what's risk significant, have we treated these components that way? Are there any omissions that need to be revisited? Does anything need to be done differently? And we're -- again, these are programmatic changes under review at this time, but this is the type of discussion we're already having.

CHAIRMAN BALLINGER: So, will these changes be done in time to feed back into what would amount to be Revision 2 of Chapter 19 or the DCD?

MR. ANDERSON: When you say --

CHAIRMAN BALLINGER: Maybe I'm saying it wrong, there's an updated version of Chapter 19?

MR. ANDERSON: Yes.

CHAIRMAN BALLINGER: We've seen Revision 0 and there's Revision 1 and then there's update, is this all going to be done in time to be fed back into that?

MR. ANDERSON: I'm not sure how this would --

CHAIRMAN BALLINGER: I'm not sure either, but --

MR. ANDERSON: -- necessarily factor into 19 --

CHAIRMAN BALLINGER: -- maybe some other member can clarify what I'm trying to say.

MEMBER KIRCHNER: Yes, I -- sort them in risk significant and then, how do you iterate? The implication is you've got, at least the bottom three procedures would suggest that you determined something was significant, you've got a management procedure in place to deal with that, and then you go through a formal design control.

But it just appears to me that this is rather late in the game, the design is very mature. But going forward, how would you use this in practice?

MR. ANDERSON: Very well.

(Laughter.)

MR. ANDERSON: We do anticipate that most, if not all, of what we identify as risk significant by the expert panel will have been treated as risk significant. But we're anticipating the possibility that not everything will have, therefore, the design process would need to revisit that and determine what

changes, if any, need to be made. And that's obviously very indeterminate, so I really can't give you any good details there.

MEMBER SUNSERI: So, I think there's just maybe a little disconnect in understanding here. This is primarily a program to maintain the reliability of equipment during the operational phase and you're setting up the program right now using feedback from the design as it's being done to make some adjustments to it.

But when we talk about Maintenance Rule and Reliability and that list of stuff, we're talking about the future, not the present, right? I mean, the present influences the future --

MR. ANDERSON: Well, no, it's supposed to be factoring back in --

MEMBER SUNSERI: Yes.

MR. ANDERSON: -- right now --

MEMBER SUNSERI: Right.

MR. ANDERSON: -- into the design process. Later, Maintenance Rule means maintenance is effective, that's the objective of that. That's a paraphrase, but that's what they're looking for. Right now, and I'll paraphrase again, what they're

looking for is that design should be effective and that design should reflect the risk significance of components in the plant, components and functions.

MEMBER STETKAR: For members who haven't been around struggling with this for the last ten years, and you guys have or you're aware of it, there used to be the concept of a D-RAP, which is mostly what we're talking about --

MR. ANDERSON: That's what this is.

MEMBER STETKAR: -- in these sessions. There was a so-called O-RAP, which was an Operational Reliability. And then there was a Maintenance Rule. And those were sort of three progressive stages, finally getting you to transition into a Reliability Assurance Program pretty much under the Maintenance Rule during operation.

So, that's why you kind of get this notion of, where are we in time and what are we talking about? For this purpose, we're talking about what used to be called the D-RAP, which is now called --

MR. ANDERSON: That's correct.

MEMBER STETKAR: -- just the RAP --

MR. ANDERSON: That's correct.

MEMBER STETKAR: -- because they've sort

of gotten rid of this notion of D and O separately.

MEMBER MARCH-LEUBA: So, for those members that are catching the train at 50 miles an hour, this is the QA Program for the DCD or is it the QA Program for the construction or is it a QA Program for operations?

MR. ANDERSON: It's not a QA Program. It provides information to QA, they will prioritize based upon risk significance, but it's not the QA Program.

MEMBER MARCH-LEUBA: Okay. They, being who? The people that are --

MR. ANDERSON: All the --

MEMBER MARCH-LEUBA: -- designing the DCD?

MR. ANDERSON: I'm sorry?

MEMBER MARCH-LEUBA: There is a process of creating DCD and making it approved.

MR. ANDERSON: Yes.

MEMBER MARCH-LEUBA: Once that is put on the shelf, somebody will buy it and build a plant. And then, somebody will buy that plant and operate it.

MR. ANDERSON: Yes.

MEMBER MARCH-LEUBA: So, is this the QA

process for which of those three stages, which stage?

MR. ANDERSON: Again, it's not a QA process, but it provides input to the QA process. This is for the design process.

MEMBER MARCH-LEUBA: Only for the DCD?

MR. ANDERSON: Only for design, yes. But we know that the RAP will need to be revisited and updated during construction. There will be changes and new information --

MEMBER MARCH-LEUBA: And construction --

MR. ANDERSON: -- that will need to be --

MEMBER MARCH-LEUBA: -- it might be done by a Spanish company --

MR. ANDERSON: Yes.

MEMBER MARCH-LEUBA: -- and they might have a different one or they will get yours?

MR. ANDERSON: No, they would start with ours. It wouldn't make any sense to do anything else. They start with ours, then they evaluate to make sure that any changes that they implement during construction are used to update the RAP list and then factor back to Design, QA, and Testing.

MEMBER MARCH-LEUBA: Okay, thank you.

MR. ANDERSON: I hope that answers

everyone's questions.

CHAIRMAN BALLINGER: For now.

(Laughter.)

MR. ANDERSON: Okay. We will try to answer any other questions that you have as they come up. Okay. Let's move on, next slide, please. Very briefly, the criteria for selection is -- fall into two categories, quantitative and qualitative.

Quantitative, we're going to go back and take a look at the NUMARC 93-01 requirements for the Maintenance Rule, endorsed for Maintenance Rule guidelines and, therefore, adopted for the RAP as well.

Individual systems, structures, and components, risk achievement worth greater than two, Fussell-Vesely half a percent. We would take a look at the 90 percent criterion as well.

And we will do this and, right now, at this point, for model development, we have full power and shutdown models for internal vents, flooding and fire, Level 1, Level 2. Take a look at all of them, dump the importance files to spreadsheets, combine them, merge them, identify everything, and you'll see how we table this in a moment here.

For risk significant trains, and this is something that is not addressed in 93-01, but we understand the intent of the law, of the regulation, and, therefore, we want to take a look at things at the function level as well. Basically, the same criteria, we identify those with common-cause failure events in the PRA model. That's the quantitative part of the process.

CHAIRMAN BALLINGER: Ross, did --

MR. ANDERSON: Oh, yes, sir?

MEMBER STETKAR: I've been amazingly quiet so far.

(Laughter.)

MEMBER STETKAR: There was, and you may be revising this, regarding that last bullet, there's a statement in the DCD that caught my attention. It said, risk significant SSCs identified by a RAW, risk achievement worth, greater than two for a single-failure basic event sufficiently cover the risk significant SSCs identified by a RAW greater than 20 for common-cause basic events. That gave me pause, because it seemed to be telling me that you were not going to look at those common-cause importance metrics. This bullet says that you are.

MR. ANDERSON: Well, the Maintenance Rule effectively requires that we're --

MEMBER STETKAR: But --

MR. ANDERSON: -- taking a look at function --

MEMBER STETKAR: But let's not mess up the Maintenance Rule with what you're doing today.

MR. ANDERSON: No, I understand, but we're staging for the Maintenance Rule --

MEMBER STETKAR: I understand that.

MR. ANDERSON: -- going forward.

MEMBER STETKAR: So, are -- the question is, will you be applying -- typically people apply a different numerical metric for those common-cause risk achievement worth or Fussell-Vesely importances, they don't use the two and the 0.005. Will you be doing that?

So, for example, will you search the results of the PRA and identify common-cause, I'll call them basic events just to get down to the details, that have a metric above your screening criteria and include those? Because if you don't, you're going to miss things.

MR. IN: Oh, my --

MEMBER STETKAR: You're not going to catch stuff on only the single --

MR. IN: My name is Young In. For the individual basic events --

MEMBER STETKAR: That's straight --

MR. IN: -- we will apply these criteria right here.

MEMBER STETKAR: Yes.

MR. IN: But for the common-cause and basic events, we apply the RAW greater than 20.

MEMBER STETKAR: Greater than 20?

MR. IN: Yes.

MEMBER STETKAR: And you're going to do that?

MR. IN: Yes.

MEMBER STETKAR: Okay, thanks. That's all I was trying to -- because that statement led me to believe that you were somehow not going to do that and just infer that you could capture everything with the individual basic events. Okay. Thanks, I just wanted to make sure.

MR. ANDERSON: Okay, good. Again, these are the quantitative criteria right out of 93-01. We had to supplement that with qualitative evaluations.

Here's how the process typically works. You begin with the PRA results, table them based on hard numbers.

The PRA engineer compiles them, translates them into English that the rest of the committee can understand. Then, they go to the expert panel and their job encompasses several requirements. One, confirm the PRA results. Do these make sense or not?

And I've seen cases where they come back and the expert panel will have reasonable questions and the PRA has to go back and revisit, sometimes update the model. So, the expert panel, qualitatively, will confirm what they typically see from the PRA model and then, they will supplement that with qualitative input.

They're taking a look at anything that's modeled, but didn't show up as risk significant by the numbers. They take a look at components that are not modeled, but in their judgment, may be risk significant.

The tools for qualitative evaluation, professional judgment, operating experience, LERs. There's actually a bit of a list available in the SRP

of what would make for a typical appropriate qualitative assessment. Then, that combined information, quantitative and qualitative, allows you to establish the list of risk significant components and functions. Next slide, please, sir.

The expert panel, established by the three procedures that we looked at briefly, 09, 10, and 11. Their job is to identify risk significant equipment. What comes out of the PRA is not risk significant, it's simply recommended by the PRA model. They will confirm, they will supplement.

And once that's done, then they will identify dominate failure modes, talk about that in a moment, and table it in a plain English table that we call the RAP list. And that's Table 17.4-1 in the DC. Updates can be done anytime.

They need to be done following a PRA model revision, but if anything else occurs between that can warrant a review of the RAP list, new information comes up, we made a design change, PRA is not going to be able to model it until later this year, but we need to make sure that gets rolled in and implemented now, we can call an expert panel meeting now and revisit that.

This can be based upon design changes, new information, omissions or errors in the PRA model that are identified that can be adverse and can result in something being more risk significant than we expected.

These are examples of the kinds of things that can warrant an interim RAP list revision. The results then, when the RAP list is set, gets funneled out to Design Engineering, QA for prioritization, Testing. Next slide, please.

The RAP list, as it is currently constituted, was based upon the original SAREX results and supplemented with qualitative judgment from the expert panel. We have since done the conversion of SAREX to CAFTA and expanded some of the areas that are analyzed, so the list has been expanded by PRA, but has not yet gone to the expert panel. Following the model revisions that are now underway, it will be revisited again. Next slide, please, sir.

Here's an example from what was the original RAP list, updated with the PRA input following the CAFTA conversion. And this is just an excerpt, there are well over 200 lines in this, but you see the example here. These are a few for aux

feed, we've got some MDP Discharge Check Valves.

Risk significance basis, how did they get in? That is, where did the RAW and the Fussell-Vesely flag these? Full power internal events, fire, and flood, low power flood, Level 2 full power internal events. They all showed up as risk significant by those PRA criteria, that's why they're on that list.

What type of failure? In this case, a failure to open. Motor-Driven Pump Discharge Check Valves, intuitive, should make sense, that's the type of thing that the expert panel looks over. Does it make sense to them?

CHAIRMAN BALLINGER: Ross?

MEMBER KIRCHNER: Ross, just out of curiosity --

MR. ANDERSON: Yes, sir?

MEMBER KIRCHNER: -- how did this list change substantively from SAREX to CAFTA? Or did it not change at all?

MR. ANDERSON: No, it did change. The --

MEMBER KIRCHNER: That's what you implied, yes.

MR. ANDERSON: Very well. There were a

lot of changes. I know that, numerically, the model results didn't change very much at all. I did some reviews on some of the conversions and they matched up exceedingly well, just simply taking SAREX model and dropping into CAFTA. That was good, but we expanded it, and Young In may be able to help out, I'm not sure what additional --

MEMBER KIRCHNER: Did it change because of the scenarios that you evaluated or the code conversion? That's really my question.

MR. ANDERSON: Very well. I can address the code conversion. We expanded it, we picked up things that were not analyzed as part of the original SAREX model. I don't have the information to answer all of your question.

MR. IN: Let me correct that. The -- this is Young In. The list, the RAP list didn't change, but the -- what we omitted in the original list was that the failure went down on failure model. So, that got a -- that was request from the NRC Staff.

CHAIRMAN BALLINGER: Ross?

MR. ANDERSON: Thank you, sir. Yes, sir?

MEMBER STETKAR: I hate to dwell on body counts. The last little bullet says, the full table

has greater than 210 rows. The table in Rev. 0 of the DCD has 385 rows, which is truthfully greater than 210.

MR. ANDERSON: You get two rows, in the old one, two rows for every train. I'm not going to waste time with two rows, when I can put it in one and say, Alpha and Bravo Check Valves, CV1003 --

MEMBER STETKAR: Oh, I see.

MR. ANDERSON: -- Alpha and Bravo.

MEMBER STETKAR: Okay. I got you.

MR. ANDERSON: So, I did --

MEMBER STETKAR: So, you've collapsed --

MR. ANDERSON: I did a lot of --

MEMBER STETKAR: -- it by symmetry?

MR. ANDERSON: -- consolidating for simplicity.

MEMBER STETKAR: Okay. Okay, thanks.

MR. ANDERSON: Next slide, please.

MEMBER SKILLMAN: Ross, does that consolidation mask what could be other decisions? For instance, the Discharge Check Valve Alpha/Bravo, in one case, Alpha's failure may be part of a string of the Alpha string that does one thing, whereas the Bravo failure or not failure was part of perhaps a

different scenario. By doing the consolidation, is there masking occurring?

MR. ANDERSON: No.

MR. IN: Can I respond to that? It's actually the other way around.

MEMBER SKILLMAN: Oh, okay.

MR. IN: You have it backward, because at the -- if you just specify, let's say, Alpha train, you may be masking the Bravo train. You may be missing.

MEMBER SKILLMAN: Okay.

MEMBER STETKAR: I was going to wait on this until the next slide, but I'm going to, since we've kind of gotten to this point. When I -- I did not study every line item in the 385, but I took a look at them. And I noticed some anomalies.

For example, there are valves not specified for safety injection, I'll call it a train for purposes of this discussion, 2-Charlie, where the valves are specified for 2-Alpha, Bravo, and Delta. Some other things are in there for 2-Charlie, so that told me that it's probably some anomaly of the way that the model was being solved.

I can give you a specific valve number if

you want to go look for it, Young. It's -- there were a few of these, I just -- I'll give you one of them. The check valve, these are discharge check valves, since you're dwelling on discharge check valves here, but they show up as Check Valves 404 for A, 405 for B, and 446 for D, dog, but the list, the long list doesn't include 434 for Charlie.

And there are a few other valves that are similar like that. So, I kind of look for these symmetries in things when I check stuff, that was an asymmetry. You want to talk about specific items on -- let's get to the next slide and I've got a couple others that I want to ask you about, after you talk about --

MR. ANDERSON: Okay.

MEMBER STETKAR: -- this part of the process.

MR. ANDERSON: Okay, very well.

MEMBER STETKAR: That was the symmetry one, there may be others, that was just the first one that struck me.

MR. ANDERSON: No, that's fine. That is --

MEMBER STETKAR: But, I mean, your

consolidation, in principle, ought to pick that up --

MR. ANDERSON: Yes.

MEMBER STETKAR: -- if you're not looking only at the minutia.

MR. ANDERSON: Important statistics have always been a good way to QA a model.

MEMBER STETKAR: Yes. That -- yes.

MR. ANDERSON: Okay. The table you have in front of you now is just a tabled summary of what I said earlier. What PRA results did we look at, did we look over in this latest revision, in order to propose risk significant classification on the RAP list for components.

Level 1, Level 2, Full Power and Shutdown, Internal Event, Flood, Fire, those are the quantitative, those are the PRA results. Seismic, that's something of a hybrid process, but anything that we can, from the basis of judgment, identify as risk significant for seismic risk mitigation would show up here.

And then, expert panel, qualitative determination is very broad and multifaceted. But those are all the factors that we call into play in

evaluating whether a component or function should be risk significant.

MEMBER STETKAR: Okay, now I get to ask the other two. Again, I'm working from the long list in the DCD. So, on that long list, I noticed that it includes the standby auxiliary transformers, which you would expect. It includes one, and only one, of the non-safety related 13.8 KV busses.

It includes both of the permanent non-safety 4.16 KV busses, 1M and 1N. And it includes the circuit breakers that normally supply the safety related 4.16 KV busses from their respective unit auxiliary transformers.

So, it's -- the only reason I wanted to establish that is, it's got some chunks of the non-safety related AC power supplies in there. What it doesn't have is, it doesn't have the unit auxiliary transformers or the main transformer itself. And that, to me, was a curiosity. I don't know why.

I don't know how those are modeled in the PRA, and even if they are not modeled in the PRA, I don't know why the expert panel didn't say that they might be important. Because the expert -- several of the items on this list are from the expert panel.

So, that was a curiosity. I'm just -- since it does have chunks of the non-safety related electric power system -- I don't need an explanation, I'm just pointing that out.

MR. ANDERSON: Okay.

MEMBER STETKAR: The other thing, again, on this long list, is that the list contains the Containment Building, and it's just a line item, it says, Containment Building was added by the expert panel. It doesn't include any other buildings.

It doesn't include the Auxiliary Building, doesn't include the, my favorite buildings, the Essential Service Water Component Cooler Water Heat Exchanger Buildings. If you want to get into tunnels, the tunnels. It doesn't include the Emergency Diesel Generator Building.

So, I was curious why the expert panel determined that the Containment Building and only the Containment Building satisfied their criteria for inclusion on the list. And, again, that's just an observation and kind of a curiosity. I'm not going to say anything more about the list.

MR. IN: This is Young In. We'll have to go back and check on those stats and the UATs. The

one thing on the non-safety busses, I remember now the reason for that one being there. That's tied to the startup feed water pump. The power supply chain, yes, that feeds the startup feed water pump, and that's why we took the startup feed water --

MEMBER STETKAR: That's why that one particular 13.8 KV, okay, I didn't track it all the way down, I just --

MR. IN: I just --

MEMBER STETKAR: -- noted the anomaly.

MR. IN: I just happened to remember that.

MEMBER STETKAR: I understand why the two, I'll try to not use acronyms, the two permanent non-safety busses, because they feed things like chilled water and stuff that actually does show up in the model at a pretty low level. So, that explains why only that one 13.8 KV train shows up.

MR. IN: Right.

MEMBER STETKAR: Still doesn't address the --

MR. IN: But we will --

MEMBER STETKAR: -- UATs and the --

MR. IN: -- take a look at that.

MEMBER STETKAR: -- main transformer.

MR. IN: Yes, we'll have to --

MEMBER STETKAR: Okay, thanks.

MR. IN: -- take a look at that.

MR. ANDERSON: So, want to move on?

CHAIRMAN BALLINGER: Sure.

MR. ANDERSON: Okay, next slide, please, sir. What do we do with this information once it's collected? The first item that it needs to go into is Design Control. If something is risk significant, it goes back into the design process to make sure that they understand everything in that component that's risk significant needs to be treated as risk significant.

And that shows up -- the implementation procedure is two-fold, 03-24 and 03-01. Risk Management, that's the PRA review, that's how it's identified. That is how design changes are identified and will get back to the expert panel. Then, subsequently, the information, the RAP list is funneled back to Design Engineering via 03-01. Next slide, please.

What are we doing? Action items. We're revising the implementing procedures and they're in the midst of very comprehensive drafts at this point

to implement a much greater level of detail on control of the program, make sure it's active, dynamic, and functioning properly.

We're taking a look at certain things, including model change process, audits, and, as I mentioned earlier, a complete rewrite, literal blank page rewrite of DC Section 17.4. Next slide, please, sir.

Based upon the feedback from the Staff, the 17.4 revision complete. Implementing procedures, very substantial, quite a number of procedures, and we're developing programmatic changes that will be reflected, in large part, in the implementing procedures. Next slide, please.

I'll move on to Maintenance Rule now. Are there any more questions on the RAP?

MEMBER KIRCHNER: Just to explore it further, so, if you do this, you identify, as John just did, you go into the detailed plant design and you find this Component X is risk significant and such, do you then go back -- and it was previously unidentified, so you go back through a design control process, does that cause you to change the quality level that is assigned to that component? Or what's

the process of incorporating a design change that might result in the classification of the equipment moving up the quality chain?

MR. ANDERSON: I'll try to address that with a hypothetical --

MEMBER KIRCHNER: Yes, but this --

MR. ANDERSON: -- design change.

MEMBER KIRCHNER: -- a hypothetical question.

MR. ANDERSON: A design change gets implemented --

MEMBER KIRCHNER: Yes.

MR. ANDERSON: -- proposed, approved this afternoon and it's flagged in the design change process by the PRA engineer, who looks at it and says, yes, this could be risk significant. Comes back to the expert panel.

Takes a while to update a PRA model, sometimes you can take a look at something and know that when it gets rolled on in, that the numbers will be significant, but if not, the appropriate action is to make a qualitative judgment, say, it could be, therefore, let's conservatively treat it as potentially.

So, it goes to the expert panel, they make the call. The list gets updated, comes back out. Goes back to Design Engineering and says, pending more rigorous PRA quantification, X needs to be treated as risk significant. Goes to Design. Goes to QA for prioritization --

MEMBER KIRCHNER: Right.

MR. ANDERSON: -- oversight, things like that. Goes to Testing.

MEMBER KIRCHNER: Okay.

MR. ANDERSON: So, it's -- we anticipate that this will be a risk significant component, make sure it's reflected with the appropriate testing requirements.

MEMBER KIRCHNER: Okay.

MR. ANDERSON: Does that --

MEMBER KIRCHNER: Yes, that's a good answer.

MR. ANDERSON: Okay.

MEMBER KIRCHNER: So, now, let me ask a specific question. What, if any, changes have been made as a result of this process to the Design Certification?

You did some conceptual changes early on

for the design, like avoiding common-cause failure in changing out turbine-driven pumps versus diesel generators and such, but those are pretty high level -- I wouldn't say they're obvious, with or without the PRA, but they're good engineering judgment, notwithstanding the PRA. Have you done any specific design changes as a result of this RAP process?

MR. ANDERSON: Young, do we have someone who can speak to that matter?

MR. IN: I could -- this is Young In. I could speak to that. We haven't really done any changes, you know, coming from the RAP list. Is that the RAP list is still formulating, we went through the several expert panel meetings and then we went through the RAP list.

That RAP list itself is evolving right now. Because the PRA itself is in under one year, several updates. So, we haven't gone through the -- actually, we haven't even gone through the actual whole process of changing the classification or anything like that.

MEMBER KIRCHNER: Thank you.

MR. ANDERSON: Any other question on RAP? Okay. I want to talk very briefly about Maintenance

Rule. This is going to be an operations program, so we're really just staging for it with the RAP, but we'll talk about it a little bit nonetheless. Next slide, please.

Briefly, what I'll do is talk about the requirements of the Maintenance Rule Program and the KHNP plan for preparing for Maintenance Rule. Next slide, please. Requirements are spelled out in Standard Review Plan 17.6 Rev. 2.

There is also important detail in CFR 50.65, Alpha-1, Alpha-2, and Alpha-3. I deliberately omitted Alpha-4, it's a different animal there. Basically, the requirement of the Maintenance Rule Program is that the plants must ensure that maintenance is effective.

Meaning, we identify components and functions that are risk significant, establish high performance criteria in terms of reliability and availability, monitor them to make sure they meet those and if they don't, we kick in with corrective actions that are going to restore performance to a high level and monitor them and verify that they're restored to that point.

At that time, we can ramp down our

monitoring. But they get a lot of scrutiny when something's in Alpha-1, meaning it didn't meet its criteria, and corrective actions are either being developed or are in place and being monitored. Next slide, please, sir.

Strategy, we're going to utilize the RAP to stage for the Maintenance Rule. Again, we want to make sure that we have, as much as possible, a bump-less transfer from RAP and RAP is what's going to be in place design and construction to Maintenance Rule and operation.

In prepping for this, we've been reviewing NUMARC 93-01. That sets the requirements for Maintenance Rule, therefore, it tells us, what do we need to be looking over with the RAP development to make sure that we align as much as possible?

Scope is a little bit different. RAP is just what's risk significant or high safety significant. Maintenance Rule is almost everything, but Maintenance Rule has risk significant and low risk components. So, the Maintenance Rule scope will be bigger than the RAP scope, and that's just one of those minor things, minor program differences.

In the process of evaluating what should

go in, the RAP expert panel is going to take a look at 17.6, it's going to take a look at 93-01, and we are taking a look at those already. Next slide, please.

Very briefly, we are working to develop a Reliability Assurance Program that will stage us, that will set us up properly for the Maintenance Rule, when that is ready to roll into effect during operation. Deliberately setting up details, especially we're keeping an eye on areas where the regulations aren't particularly -- don't have a lot of detail, we're making sure that we line up well.

Specific details for the Maintenance Rule itself will be laid out by the COL applicant. That's going to wrap it up. Let me ask, any questions on Maintenance Rule? Okay. Thank you very much.

CHAIRMAN BALLINGER: Okay. Are we ready for the Staff?

MR. CIOCCO: Good morning. My name is Jeff Ciocco. I've only got ten more days to remember this.

(Laughter.)

MR. CIOCCO: It's been a while. Thank you, my apologies. Thank you. We're going to

present the Staff's Chapter 17, Quality Assurance and Reliability Assurance.

The reviewers today, we have -- Aaron Armstrong is going to do the Quality Assurance and Odunayo Ayegbusi is going to do the Reliability Assurance Program and the Maintenance Rule. I'm the Lead Project Manager and Tarun Roy is our Chapter Project Manager, who couldn't be with us today.

MR. ARMSTRONG: Good morning. My name is Aaron Armstrong. I'm a Vendor Inspector, Quality Assurance Vendor Inspector in Branch 1 of the Division of Construction, Inspection, and Operations Program, or DCIP, in the Office of NRO, our Office of New Reactors.

I'm going to give you a little background of the Quality Assurance Vendor Inspection group, there's three of them. They're all located at NRO in the Center of Expertise, or CO. QVIB leads and performance routine and reactive vendor inspections and it also conducts QA implementation inspections, which we discussed earlier, for new reactors.

QVIB also does QA licensing for Part 52 and Part 50 applicants, and also the initial test programs review for new plants. We -- QVIB also

supports Region II Office for construction inspection and oversight of construction inspection activities.

So, I was responsible for the 17.0, Quality Assurance and Reliability Assurance. It was basically on overview statement of what the application would include. Chapter 17.1, I was responsible for, it's the Quality Assurance during the Design Certification Phase. That was going to be performed, or we call it incorporated by reference, into Chapter 17.5.

Chapter 17.2 was the Quality Assurance during the Operating Phase. KHNP submittal passed down the requirements to the COL applicant to establish a QA Program for that phase. I also was responsible for 17.3, Quality Assurance Program Description, performed in accordance with Section 17.5. Another incorporation by reference to 17.5.

So, for these sections, most of it was housed in 17.5. And, of course, I was responsible for Sections 17.5, which is the QA Program Description for Design Certification.

I would like to point out that the NRO Division of Safety Systems and Risk Assessment, or DSRA, was responsible for Section 17.4 and 17.6.

Section 17.4 would be the Reliability Assurance Program, which we discussed earlier, and 17.5 is the Maintenance Rule. So --

CHAIRMAN BALLINGER: You mean 6?

MR. ARMSTRONG: 6, sorry, sorry, 6.

CHAIRMAN BALLINGER: Okay.

MR. ARMSTRONG: KHNP Topical Report was submitted outside the DC application submittal. By outside, I mean it was actually submitted in advance of the DC application as a Topical Report, which the Staff reviewed it in accordance with 50.2, the Quality Assurance Requirements for Written Communication.

So, they preemptively structured or implemented a QA Program. And so, what did this do? It enabled them and ensured that the preliminary work for the DC application was going to be performed in accordance with 10 CFR 50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Processing Plants.

The Staff used guidance NUREG-0800, 17.5, Quality Assurance Program Description for Design Certs, Early Site Permits, and New License Applications, as a guidance for the review. KHNP's application was submitted in accordance and formatted

to the NEI 06-14, Final Safety Evaluation for Technical Reports, NEI 16-05, Quality Assurance Program Description. This was previously approved in an SE by the Staff as a formatting option for QAPDs.

The Applicant did commit to Reg Guide 1.28 Rev. 4, which the Staff has endorsed as -- endorses ASME NQA 1, 2008 and 2009 addenda, as an option for meeting the applicable requirements for 10 CFR 50 Appendix B.

During the review, the Staff identified three RAIs. The three RAIs were actually turned into confirmatory items. The RAIs identified that COLA -- information item tracking numbers were not included in those sections for 17.1, 2, and 3.

So, KHNP had taken those on as a confirmatory item. And on a quick review that I have done, not officially, I did notice that these numbers were included in the most recent revision. I'd like to also point out that the Staff has an open item for a post-docketing QA Program inspection of KHNP. This was discussed earlier as well.

The intent of this inspection is actually to verify the implementation of the QA Program and

all aspects of it. As stated earlier, I identified that some of the items -- the most recent QA inspection wasn't a full-blown QA inspection, it only had certain aspects of QA, but it was really focusing on the commercial grade dedication of analysis software.

So, this post-docketing QA implementation inspection will be performed on May 22, as Mr. Lim has identified. The Staff is going to use IP 35017, Quality Assurance Implementation Inspection, as one of the procedures for this inspection. Of course, we will be covered in Part 21, which has its own inspection procedure as well. So, that's all I have. I can entertain questions and attempt to answer your questions.

MEMBER SKILLMAN: I do --

MEMBER SUNSERI: I -- go ahead.

MEMBER SKILLMAN: Go ahead, Matt. Go ahead.

MEMBER SUNSERI: So, my question is regarding this post-docketing inspection, which I'm just curious about the timing of it. I mean, when was the application docketed? A couple of years ago, right?

MR. CIOCCO: Yes. The application was resubmitted in 2014. We docketed it March of 2015.

MEMBER SUNSERI: So, it would just seem to me that the Staff, I guess, takes some risk in assuming that the Quality Assurance Program was implemented appropriately, as you've invested thousands of hours of review time on all of the information that has been submitted to date without verifying that the QA Program is being implemented appropriately.

Now, you did part of it for the commercial grade codes, but I would have thought timing for this inspection would be earlier than later, so that you would have some assurance that the products that you're reviewing are going to be okay. Can you comment on the timing of this inspection?

MR. ARMSTRONG: As for the decision making of the timing, I can't, but it's -- timing is important, because if you do it too early, you don't have enough objective evidence to support that their QA Program works.

If you do it too late, you also might run a risk, but Design Control always says that they're responsible for the design and they have to provide

reasons why that design is acceptable. And we do look at that. So, the timing doesn't matter.

Appendix B, it started even before they were docketed. We expect them to follow design control, corrective action, and these aspects. They have to keep evaluations for Design Control of why things are acceptable.

MEMBER SUNSERI: Yes. So, I understand that. I guess, maybe, let me just digest that for a second. But when they submit their design certification for review, it's fairly complete at that point, isn't it? Or you wouldn't be reviewing it.

MR. ARMSTRONG: The program and then the implementation are two things. The program doesn't -- it's the guidance, the QAPD is the guidance, or the Topical Report is the guidance that they should follow. The real implementation is in the procedures, which might not be invoked until later.

So, as for why we select when we do the QA post-docketing, I can't answer that. We communicate with KHNP and find out where they are, like their most recent submittal, we required that and they submitted it to us. So, I can't say why we

do it when, that's -- I have no answer for that.

MEMBER SUNSERI: Oh, okay, thank you for your response.

MEMBER SKILLMAN: Aaron, I had a question. Both you and the gentleman before you who spoke for KHNP reinforced the introduction of a Part 21 program. Why so much emphasis on that? It's almost as if that's an, ah ha, we better do this. Where did it come from?

MR. ARMSTRONG: Well, I think -- there is some issues with foreign regulating bodies, which we have MDEP that kind of handles that. But there's always the legal requirements for the U.S. operating fleet and the vendors here and then, other countries.

So, I think that there's a sensitivity to Part 21 because of the reporting requirements that are involved. There's hard, fast rules. If you're aware, some of the things in Appendix B are very difficult to implement and we -- as the agencies try to change that and may in the future.

So, I think, with Part 21, I think it's important and there's a sensitivity also that with the U.S. fleet, and probably with the Korean fleet as well, and when they go to implement it here, the nexus

to -- the legal nexus that the agency has for inspection activities in QA come from Part 21.

Appendix B is not directly applied on vendors, it's contractually required by licensees. So, they probably were looking at that as, how could we do this better, or, how can we evaluate and have them do that? Because the way we contractually do the requirements is very round about in the U.S.

So, it's -- 21 is a difficult regulation to implement for people. So, there was the translation and wording and language and the intent of it. So, I think that that's why 21 is a very important thing and that's why they focused on it.

MEMBER SKILLMAN: Is the approach that KHNP will use for Part 21 consistent with how you as an inspector or how the NRC intends for that Part 21 to be implemented?

MR. ARMSTRONG: When we went and looked at it, it wasn't fully developed and it wasn't -- if there were any -- I don't think there was any 21 evaluations that have been done. So, there was not any objective evidence in our last inspection that we could review for that, but we did touch some QA things, but a majority of it was the commercial grade

dedication of the design and analysis software that they were using for the plant design.

I dabbled in the QA stuff while I was there, which I wasn't really supposed to, but I did, because I'm an inspector. But these things will be evaluated on the upcoming inspection.

MEMBER SKILLMAN: I ask the question because my experience is that the Part 21 gives you something, gives us something that the rest of the Appendix B doesn't. And that is, a root cause and an extended condition.

And those two coming out of Part 21 normally get the fog cleared. And so, it is essential that those two pieces come through with what the Korean program will be, extended condition and root cause.

MR. ARMSTRONG: Right. The root cause is also associated with corrective action. That has SCAC that is identified there. So, yes, I agree with you. The reporting requirements, the expectations for the Staff would be the reporting requirements would be very similar to what we do here.

``A deviation is found, an evaluation is done on it, and then it's determined to be a defect and then it's

reportable. And that's going to be the threshold that we use when we go and evaluate it for the plant in May.

MEMBER SKILLMAN: Okay. Thank you.

MR. ARMSTRONG: Any other questions?

MR. CIOCCO: Okay, we'll move on then to the Reliability Assurance Program. Odunayo?

MR. AYEGBUSI: All right. Good morning. My name is Odunayo Ayegbusi, I'm a Risk and Reliability Analyst in the Office of New Reactors. I will be covering the Reliability Assurance Program and the Maintenance Rule Program, basically, what I reviewed and what I found.

So, starting with the Reliability Assurance Program, my review was performed in accordance with SRP 17.4 Rev. 1. And I'd like to state that that was available more than six months prior to when the DCD was submitted.

Part of that review included reviewing the D-RAP ITAAC and the D-RAP list and comparing parts of the D-RAP list to the information or the PRA results that were reported in Chapter 19.

There were some instances in the DCD, in Chapter 17.4 of the DCD that would indicate that the

Applicant used a previous revision of SRP 17.4 to develop the guidance with the Reliability Assurance Program. So, I guess, bearing that in mind, we did find some -- we did find that the RAP Program was insufficient in a few areas.

One is program description and implementation. We found that they needed to establish an implementable program that, once we approve it, they will be maintained during -- as they continue with design, construction, and then turn over for operation.

And that -- the key thing there is the RAP list, right, that as the design -- if there are any design changes, that's fed back into this program and the list is kept current.

Then, the other thing was, part of establishing an implementable program is also establishing an approach for selecting the SSCs that go into this RAP list. And, as Mr. Stetkar said earlier, one of our concerns with this was, those are risk achievement worth value for single-component failures of two.

And then, there was a statement that said, basically, that encompasses the common-cause

failures of components, and we had an issue with that. So, that was part of the things that made the description insufficient.

MEMBER STETKAR: Is -- let me -- I was going to let you finish --

MR. AYEGBUSI: Okay.

MEMBER STETKAR: -- but you gave me an opening. In the SER right now, it says you didn't perform a detailed review of the RAP list because of this concern about perhaps a disconnect between Rev. 0 and Rev. 1 of the SRP.

The implication there is that, if they follow Rev. 1 of the SRP, the RAP list might change. Is the Staff's biggest concern that common-cause failure issue or are there other things in Rev. 1 versus Rev. 0 that might affect the population of the RAP list?

MR. AYEGBUSI: So, this is --

MEMBER STETKAR: If you understand what I'm asking.

MR. AYEGBUSI: I completely --

MEMBER STETKAR: In other words, what are the functional effects of the difference between Rev. 1 and Rev. 0? Not programmatic, but functional

effects?

MR. AYEGBUSI: Oh, so not -- you want to know --

MEMBER STETKAR: Yes, programmatic stuff, I understand.

MR. AYEGBUSI: Okay.

MEMBER STETKAR: I just -- if I follow Rev. 1 versus Rev. 0, how might that change the population of the RAP list?

MR. AYEGBUSI: So, in the grand scheme of things, probably not significantly.

MEMBER STETKAR: Okay.

MR. AYEGBUSI: I don't --

MEMBER STETKAR: Okay.

MR. AYEGBUSI: Is that enough or --

MEMBER STETKAR: No, that's enough. I wasn't -- you mentioned the thing that I brought up about the common-cause failure risk achievement worth and that, in principle, could change things, but I was just curious whether there was anything. Because I'm familiar with Rev. 1, I didn't go back and do a comparison between Rev. 0 and Rev. 1 of the SRP. But if --

MR. AYEGBUSI: There --

MEMBER STETKAR: -- you're saying you wouldn't expect much of a difference, that's okay.

MR. AYEGBUSI: Well, so, as far as what goes into the lists, right, we don't expect to see a significant difference. However, I think something that -- one of the changes that was made has to do with the dominant failure modes, right?

MEMBER STETKAR: Yes.

MR. AYEGBUSI: And so, that's something that Rev. 1 has the Applicant provide an approach for determining that and putting that in the list.

MEMBER STETKAR: Does that -- I have to say that the ACRS is on record of questioning the usefulness of that. We wrote a letter on it in July of 2014 and again in August of 2014 questioning whether or not focusing on dominant -- I hate that word -- focusing on specific failure modes is really useful activity.

Because it implies that, for example, I'm going to apply at my plant a different testing, maintenance, inspection for, like, fail to open of a valve versus fail to close of the same valve, or fail to start of a pump versus fail to run of the same pump.

That it makes more sense to just apply all of those testing, maintenance, inspection oversight at the component level, regardless of its particular failure modes that you might be able to identify doing some sort of numerical search on cutsets or basic events or whatever.

So, I hope that -- I know in the example that we saw on the screen this morning, they did have the column with, I guess it was called dominant failure modes, but I hope we're not getting into a situation, and that was the essence of our letters, where we are so finely tuning this that someone says, I'm going to apply certain testing and maintenance and inspection and quality for fail to open of a motor-operated valve versus fail to close of a motor-operated valve, because that's the only thing that triggered some numerical criterion.

So, I had to say that, but I was more interested on whether there was anything, quite honestly, between Rev. 0 and Rev. 1 of the SRP that, at the component level, would affect population of the RAP list. And I hope this focus on dominant failure modes would not affect the component population.

MR. AYEGBUSI: Yes, like I said, there is, as far as the list goes, there is -- we don't expect a significant delta.

MEMBER STETKAR: Okay. Then, that's --

MR. AYEGBUSI: I think --

MEMBER STETKAR: -- reassuring.

MR. AYEGBUSI: -- Mr. Hanh wants to mention something.

MR. PHAN: Good morning. My name is Hanh Phan. The lead reviewer --

CHAIRMAN BALLINGER: Closer to the mic, that mic needs you real close.

MR. PHAN: The lead reviewers for PRA, severe accidents, and drafts. In the past, we raised the issue of the asymmetric of the PRA to the Applicant. In one of the meetings, the Applicant confirmed to the Staff that you have a comprehensive list at the end.

They will manually, at the backup trains or the other trains components into the list. So, we expect that the Revision 1 would have many more components or events included in the list.

The other issue, like transformer fires, the Staff expected that transformers fires included

in the fire PRA. However, because transformer fires is modeled as one of the ignition source of the switch yard, which means making the cutsets as just initiating events, not as the basic events, that's why transformers may not make the RAP list. The Staff expected that the expert panels will catch those and add them to the final list.

MR. AYEGBUSI: Okay. So, moving on. So, the third bullet there has to do with the expert panel member requirements. The Applicant's program description for the expert panel or the tasking for the expert panel that we reviewed did not meet the minimum requirements as discussed in the SRP and the Applicant didn't provide a rationale for deviating from the guidance.

I guess I should probably pause there and kind of provide some, maybe a little bit of background. So, there isn't a regulation for RAP, right, we're working off a Commission Directive. And so, the SRP has been developed as guidance that we follow and part of the expectation is, if you -- you can choose to use that guidance or you can come up with your own guidance

In this case, the Applicant, as part of

their application, said that they were following the SRP guidance, which is why we reviewed in accordance with that guidance and, I guess, in more specific detail. So, moving on.

In the Applicant's response to the RAIs that we issued, as you heard earlier, they have been revising the RAP Program and we plan on reviewing the next draft that's submitted.

In addition, one other point I wanted to add is, because of the PRA model conversion and questions about the expert panel that I mentioned earlier, we weren't able to perform a detailed review of the RAP list and so, we plan on doing that once we have -- once the program part of the RAP has been established that we can now follow the implementation of it.

We plan on doing a detailed inspection of the RAP list and likely an audit of expert panel meeting minutes and supporting documents. I don't -- are there any questions for the Reliability Assurance Program? All right.

Moving on to Maintenance Rule. This, I reviewed using the guidance in SRP 17.6. And the guidance explicitly states that the Maintenance Rule

is an operational program to be addressed by the COL applicant.

Hence, the DC is not required to develop a Maintenance Rule Program, however, KHNP included a COL action item to ensure that the COL applicant develops a Maintenance Rule Program for their application.

We found this acceptable, because this ensures that a COL applicant would have to meet this requirement when they come in with an application. And that's all I have on this slide. Are there any questions?

MR. CIOCCO: That concludes our presentation on 17.

CHAIRMAN BALLINGER: Okay, thank you. We're about to transition from the open session to the closed session. So, we'll take a break, but before that, while we're trying to get the phone line open, are there questions from the -- I'm getting there. Yes, okay. Walt, go ahead.

MEMBER KIRCHNER: Well, Mr. Chairman, if you'll forgive a digression, I'm sitting and listening to this morning's presentations, we're dealing with a fairly mature design that's

evolutionary, but I guess my concern might be, looking forward, the first concern I would have that would be relevant to APR1400 would be for the COLA applicant, that transition.

So, how does all this transition? We've had experience here in the U.S. with certified designs and difficult transitions in the field, I won't go further than that. But are there any things that the Staff has learned from this or would be looking at lessons learned going forward towards a COLA application, in this particular area? It's a rhetorical question.

MR. ARMSTRONG: I -- this is Aaron Armstrong. I'll speak for the QA sections. The COLA applicant is responsible for coming in with a QAPD and it is reviewed in accordance with it.

The transition period I think you're referring to for the QAPD, there are criteria of Appendix B that are relevant to both the DC applicant, early site permit, and also -- so, organization for a QA Program is expected. Implementation of the program is expected. Design Control for the designs of these are expected to be verified by both parties.

So, for the QA, there's not really that

transitional point, Appendix B still applies to both entities. Some areas of it are not applicable to, let's say, a DC, but the requirements for Design Control and evaluation of design is still applicable to the COL.

MEMBER KIRCHNER: I admit, it's all there on paper, but in the transition from a certified design to actually building something in the field is quite an undertaking.

MR. ARMSTRONG: Yes.

MEMBER KIRCHNER: Okay.

MR. ARMSTRONG: We -- with our group, we work with Region II and we do supplement the construction inspection oversight activities for their QA. So, we, as an agency, are learning and applying things that we learn. As for the industry, I'm assuming that the industry is also learning and understand the requirements. But we do have oversight of both vendors and the licensees.

MEMBER KIRCHNER: As we have gone through this review, there are an enormous number of items that are handed over, as it were, to the COLA applicant and the tracking of that and the implementation --

MR. ARMSTRONG: It --

MEMBER KIRCHNER: -- they --

MR. ARMSTRONG: It seems overwhelming, but it's still -- they are responsible for a QA Program.

MEMBER KIRCHNER: So, then, if I may, Mr. Chairman, and you are NRO, we are looking at new designs. Here, we're looking, like the presentation this morning, if you followed my questioning, it looks like we're putting this RAP Program in after the fact, because the design is so mature, it's evolutionary, and such.

But, looking forward, we're going to have designs that don't have this maturity. Are we going to have this RAP Program and design control process in place so that we actually make good use of the PRA, as an example, in informing the design?

Or are we going to see that the procedures for this are being written after the design is completed? Or almost complete? Or 95 percent complete? Whatever you would ascribe the maturity of the APR1400.

MR. AYEGBUSI: Should I take a stab at answering that?

MEMBER KIRCHNER: Please.

MR. AYEGBUSI: So, listening to the conversation earlier on, prior to my presentation, there's a lot of -- I've had to do a lot of explanation of what the Staff views the role the RAP plays in what you just mentioned.

And the way we see it is that, first and foremost, it's a program, right? So, once you come in, we review the program, if we find it acceptable, it's a program you have to continue. So, post, say, a DC certification, right, we expect that the program would be implemented going forward.

And the idea or the concept is, it's going to be implemented prior to the COL applicant coming in and during construction. And so, I'll give you an example. There's -- we have the RAP list, right, the reason for the RAP list is to identify SSCs that are not just safety related, right, but are also risk significant.

And if you look at the SRP, the way it's written is, for safety related SSCs, we have Appendix B, we have requirements already established. So, in Design Control, in procurements, in installation, for the non-safety risk significant SSCs, what do you then do?

So, the idea of the RAP is to say, as opposed to waiting until the plant is being built or has been built to identify what's risk significant and probably not safety related and figuring out what to do, in this case, you have an idea of what those SSCs are.

You control how any design changes you do to those SSCs. And as you go through construction, you procure, you install with a higher level, not on the level of Appendix B, but with a higher level of QA requirements, with augmented QA requirements on those SSCs. So, that's how we see the RAP going forward.

And then, the tie into Maintenance Rule really is, all the items on the RAP lists are put into the Maintenance Rule Program, because we've pre-identified those items. So, does that give an idea of how the RAP fits into, I guess, the transition periods?

MEMBER KIRCHNER: Thank you.

MEMBER STETKAR: There has been, I don't want to talk too much out of the context of this particular meeting, there's been a lot of discussions over this issue.

Let me say that, if you look back at some of the ACRS Subcommittee meetings on previous certified designs, we had raised several questions about consistency between criteria for populating the RAP list and how do you transition to the Maintenance Rule Program

Because, for example, and I don't want to point at a particular design, because it's irrelevant, but other designs had different criteria for populating the RAP list and we said, well, if you have the RAP list according to these criteria, according to the Maintenance Rule, you would have a different list, and how are you going to make that transition?

In this particular design, they've made that transition seamlessly. They use the same criteria. So that this one, this is the -- the regulators, the industry is learning that they need to pay attention to those, like I said before, D-RAP, O-RAP, Maintenance Rule, but now RAP to Maintenance Rule and think forward.

This one actually is, at least in terms of that interface, seamless, because they've already established the fact that anything on the RAP list is

of high safety significance for the Maintenance Rule. So, in principle, one shouldn't have different lists of things there.

That wasn't the case in the past. Going forward, I would assume that people think about this more clearly, because there's evidence that they are. On both the Staff and the industry.

CHAIRMAN BALLINGER: We probably should just continue this and go around the table for member comments.

MEMBER BLEY: Do you want the public first?

CHAIRMAN BALLINGER: That's what I was going to do, but then you reminded me that I should do this.

MEMBER BLEY: Oh, let's just do that first.

CHAIRMAN BALLINGER: Okay. Are there any members of the public in the audience behind me that would like to make a comment? Hearing none, are there any members of the public on the line that would like to make a comment?

OPERATOR: Bridge open.

CHAIRMAN BALLINGER: Bridge open, aye.

Hearing none, can we go around the table? Joy?

MEMBER REMPE: Okay. So, just so it's clear in my mind, this is our going around the table for discussions from yesterday --

CHAIRMAN BALLINGER: Everything.

MEMBER REMPE: -- as well as today, right? Okay. Because I don't really have anything to talk about with respect to today. But yesterday, I just wanted to reiterate what I mentioned earlier about the use of the 1570 conditional probability numbers.

I am very interested in understanding, again, the Staff's confidence with their MELCOR calculations that the behavior depicted for the plant with the MAAP calculations are appropriate. And so, I'm looking forward to hearing more about that.

And then, I still am -- I keep thinking about this thing about in-vessel retention and the fact that they didn't rely on it, so they didn't assume it in the calculations presented to us. They didn't take credit for it. And so, at some point, somebody is going to have to come up with appropriate guidance on what's going to be done with this, which won't be reviewed by the Staff.

And I think, and, again, maybe my memory

is incorrect, but with the AP600 and the AP1000, they did -- that was the planned approach and then, at the end, they said, well, there's uncertainty, and it was kind of a last minute, we aren't -- because they started off with, we can rely on this and it's good stuff, and then, they kind of said, well, if we don't have it, we still have a lower containment failure probability than existing plants and life goes on.

But I just am curious on how that's going to be -- because it won't be -- the design is going to be certified and then, the Staff won't be reviewing it. And I just am still -- in my mind, it's not clear how that disconnect gets addressed. Thanks.

I did want to mention, too, I thought KHNP had a really great review of severe accident history in that accident analysis report. I appreciated that they had done a lot of background research on the various issues and I enjoyed reading it. That's it.

CHAIRMAN BALLINGER: Walt?

MEMBER KIRCHNER: Just a brief comment on yesterday afternoon's discussions. This is related to the steam explosion issues and loading on containment. And I believe there is -- consistent

with what the Staff is requesting, that more justification is forthcoming on using the analysis tools and assumptions that they put into the ex-vessel energetics events.

I note that the COL applicant will be required to develop and submit an accident management plan, including the evaluation of taking credit for the ex-vessel cooling for accident management. I just point out, there's a lot of uncertainty in that calculational area and it made bear further attention. I believe the Staff is indeed aware of this and interacting with the Applicant. Thank you.

MEMBER MARCH-LEUBA: I have no comments.

CHAIRMAN BALLINGER: John?

MEMBER STETKAR: I have nothing more, other than to reiterate something that I said yesterday and I neglected to say yesterday. And that is, again, I really appreciate the effort that KHNP and their contractors put into developing a design certification PRA that's better than, as I said yesterday, any of the ones that I've reviewed so far.

And for the Staff, I was also impressed with the Staff's review of the PRA. I think they dug into areas in more detail than I've seen in the past,

especially in their audits. And that's it.

CHAIRMAN BALLINGER: Dennis?

MEMBER BLEY: Yes, just a couple things. And I got to thinking yesterday, after some of John's questions to both the Applicant and to the Staff, we forget about old work sometimes. We could learn the same lessons from studying a lot of completed PRAs.

But way back in the, I think it was early 1980s, there was a program here called, I think it was IREP, that tried to put together building blocks of systems so we could do simpler PRA analysis. It said, well, it ought to save us a lot of time.

And for some systems, like high pressure injection, maybe aux feed, emergency feed, you could do it pretty well. But for other systems, like all of the cooling water systems and all of the electric power systems, you couldn't even come close, they were all completely unique.

And when we start using generic data to cover these wildly unique designs, we need to rethink that process and at least be critical of it, so that we look more carefully later.

The other related thing was the AEoD studies on equipment reliability. We ought to

revisit these old studies, because they learned a lot of things that are still valid to us today about where generic data might be reasonable and where it's not.

On the other hand, I would really like to compliment both the Staff for all their work this week, and the Applicants and their consultants and contractors were as professional, thorough, and thoughtful as any I have ever met and their responses to questions is really appreciated.

CHAIRMAN BALLINGER: Matt?

MEMBER SUNSERI: So, I would echo the compliments. The presentations just seem to be getting stronger and stronger as we go through this review process. I want to go back to my one comment about the inspection, timing of the inspection.

And I realize that there is probably more procedures to be developed and more quality programs to be developed going forward, and I might be totally off base on this comment, but it seems to me there are some procedures that have been developed already that affect quality related work. And you can't inspect in quality, you build it in as you go.

And for the application that has been submitted, there must have been some quality work

done and I would think that the Staff would want to verify that the Applicant is implementing their Quality Assurance Program rigorously before investing the thousands and thousands of review hours that you're going to do.

And maybe it's just a spot check or maybe a part of a sequence of an inspection leading up to this post, whatever it was called, post-docketing review, but just something to consider, because we've seen too many examples of where, when we look back on why there was a breakdown in the implementation of a plant or a construction project or whatever, we're often pointing at weaknesses in Quality Assurance.

So, I'll just leave it at that. Thank you, enjoyed all the presentations.

CHAIRMAN BALLINGER: Dr. Powers?

MEMBER POWERS: Well, I think I have the overwhelming feeling that particularly the accident analysis portion of the report is submitted too soon to us here. That we need to wait a while and let things age in the cast a bit.

I don't think there -- I mean, I think they've certainly hit all the buttons in this, but I think the head failure modeling isn't a lot at the

current state of understanding. I think the quenching and whatnot is very speculative. My perceptions.

CHAIRMAN BALLINGER: Dick?

MEMBER SKILLMAN: No further comments. Thank you.

CHAIRMAN BALLINGER: I'd like to reiterate, before we take a break -- oh, it's a miracle.

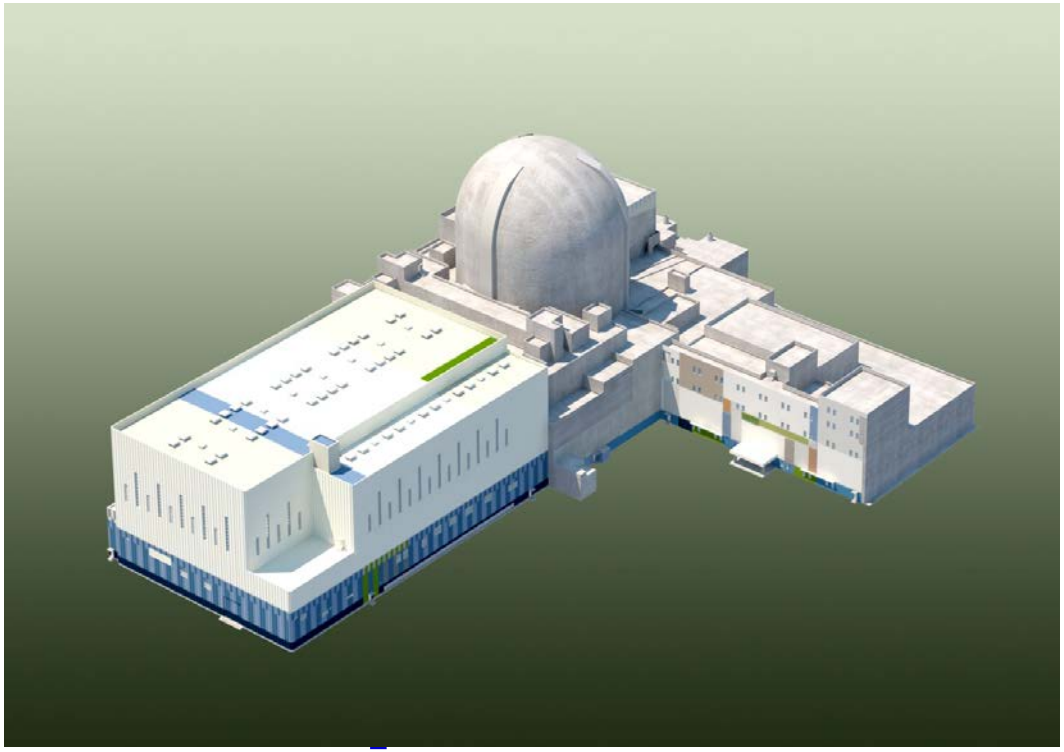
(Laughter.)

CHAIRMAN BALLINGER: Comments? Okay. What was I going to say? Okay. I'd like to reiterate my colleagues' comments on the quality of the presentations and the work that's been done. So, it's much appreciated.

So, we will take a 15 minute break, come back here at 20 minutes until the hour, and we will -- that would be 20 minutes. Faculty members, plus or minus a few, what's -- 20 minutes until, still. And then, between now and then, we would ask the -- we'll take a 20 minute break.

(Whereupon, the above-entitled matter went off the record at 10:21 a.m.)

APR1400 DCA
Chapter 17.1, 2, 3, 5: Quality Assurance Program



KEPCO/KHNP

April 19-20, 2017

Contents

- **Introduction: KHNP QA Program**
  - Overview of Chapter 17.1, 2, 3, 5
  - Document System of QA Program
  - Conformity of QA Program to 10CFRs and RGs
  - Organization within KHNP
  - Organization with Design Suppliers
  - Basic Policies of QA
- **Evaluation Status (by NRC Staff)**
  - RAI and Response, Issue of SER
- **QA Inspection Status (by NRC Staff)**
  - Previous Result, Next Plan
- **Summary**
- **Acronyms**

Introduction: KHNP QA Program(1/8)

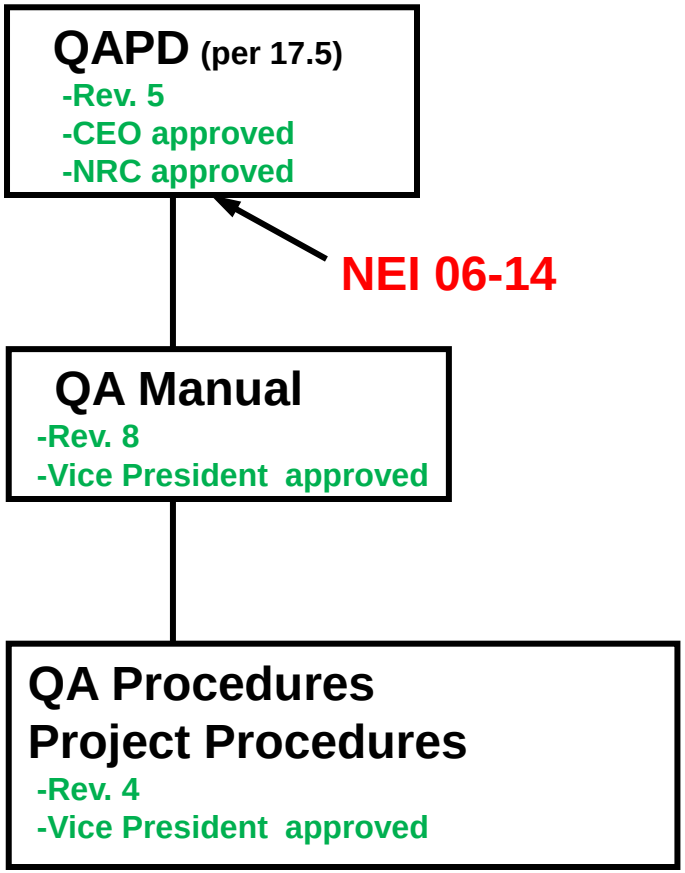
➢ Overview of Chapter 17.1, 2, 3, 5

- QA Program has been established and implemented to comply with the relevant 10CFRs, RGs, ASME NQA-1-2008, 1a-2009.
- QA Program was submitted to NRC as a Topical Report and was accepted.

Section No.	Description	Remarks
17.1	Quality Assurance during the Design and Construction Phases	-described in 17.5 -COL item
17.2	Quality Assurance during the Operations Phase	-COL item
17.3	Quality Assurance Program Description	-described in 17.5 -COL item
17.5	Quality Assurance Program Description – Design Certification	-submitted as Topical Report -APR1400-K-TR-11005-NP, Rev. 5

Introduction: KHNP QA Program(1/8)

➢ **Document System of QA Program**



Main Ref. Requirements
-10CFR 21 -10CFR 50.55a -10CFR 50 Appendix A -10CFR 50 Appendix B -10CFR 52 -RG 1.8 (Training) -RG 1.26 (Quality Group) -RG 1.28 (QA for DC) -RG 1.29 (Seismic Class) -RG 1.155 (SBO) -RG 1.189 (Fire Protection) -GL 85-06 (ATWS) -ASME NQA-1-2008, 1a-2009 -NIRMA TGs

*QAPD: Quality Assurance Program Description
*QAM: Quality Assurance Manual

Introduction: KHNP QA Program(2/8)

- **Document System of QA Program**

Submittal of QAPD to NRC: dated May 2, 2016
-APR1400-K-Q-TR-11005-NP, Revision 5

Approval of QAPD from NRC: dated on October 6, 2016
-ADAMS No. ML16265A505

Introduction: KHNP QA Program(3/8)

- Conformity of QA Program to 10CFR 50 Appendix B and RG 1.28

10CFR 50 App. B	QAPD	QAM	QA Pro	Pj Pro
1. Organization	Yes	Yes	Yes	N/A
2. QA Program	Yes	Yes	Yes	Yes
3. Design Control	Yes	Yes	N/A	Yes
4. Procu. Doc. Cont.	Yes	Yes	Yes	Yes
5. Inst. Proc. Drws	Yes	Yes	Yes	N/A
6. Document Cont.	Yes	Yes	N/A	Yes
7. Cont. of Purcahsed M/E/Servi.	Yes	Yes	Yes	N/A
8. Ident. & Cont. of M/P/Comp.	Not Applicable for DC. To be ready for Cont. & Operation.			
9. Cont. of Special Proce.				
10. Inspection	Supplier	Supplier	N/A	N/A
11. Test Control	Supplier	Supplier	N/A	N/A
12. Cont. of Measu. and Test Eqi.	Supplier	Supplier	N/A	N/A
13. Handling, Storage, Shipping	Not Applicable for DC. To be ready for Cont. & Operation.			
14. Inspection, Test, Operating Status				
15. Non-conforming M/P/Comp.	Yes	Yes	Yes	N/A
16. Corrective Actions	Yes	Yes	Yes	Yes
17. QA Records	Yes	Yes	Yes	Yes
18. QA Audits	Yes	Yes	Yes	Yes

Introduction: KHNP QA Program(4/8)

➢ Conformity of QA Program to 10CFR 21

10CFR 21	QAPD QAM	Procedure
Reporting of Defects & Non-compliance - Inserting 10CFR 21 into Procu. Docu. - Posting of 10CFR to everyone - Finding - Determination/Documentation - Notification to NRC - Corrective Action/Work Stop - Keeping Records - Inspection of NRC	Yes	DC-QA-15-04 "Reporting of defects and non-compliance according to 10CFR 21“ DC-QA-15-01 "Cont. of Non-conformance"
* GL 89-02, EPRI NP-6629, TR-1019163: Counterfeit/Fraudulent/Substandard		

Introduction: KHNP QA Program(5/8)

➢ Conformity of QA Program to RG s with Graded QA Concept

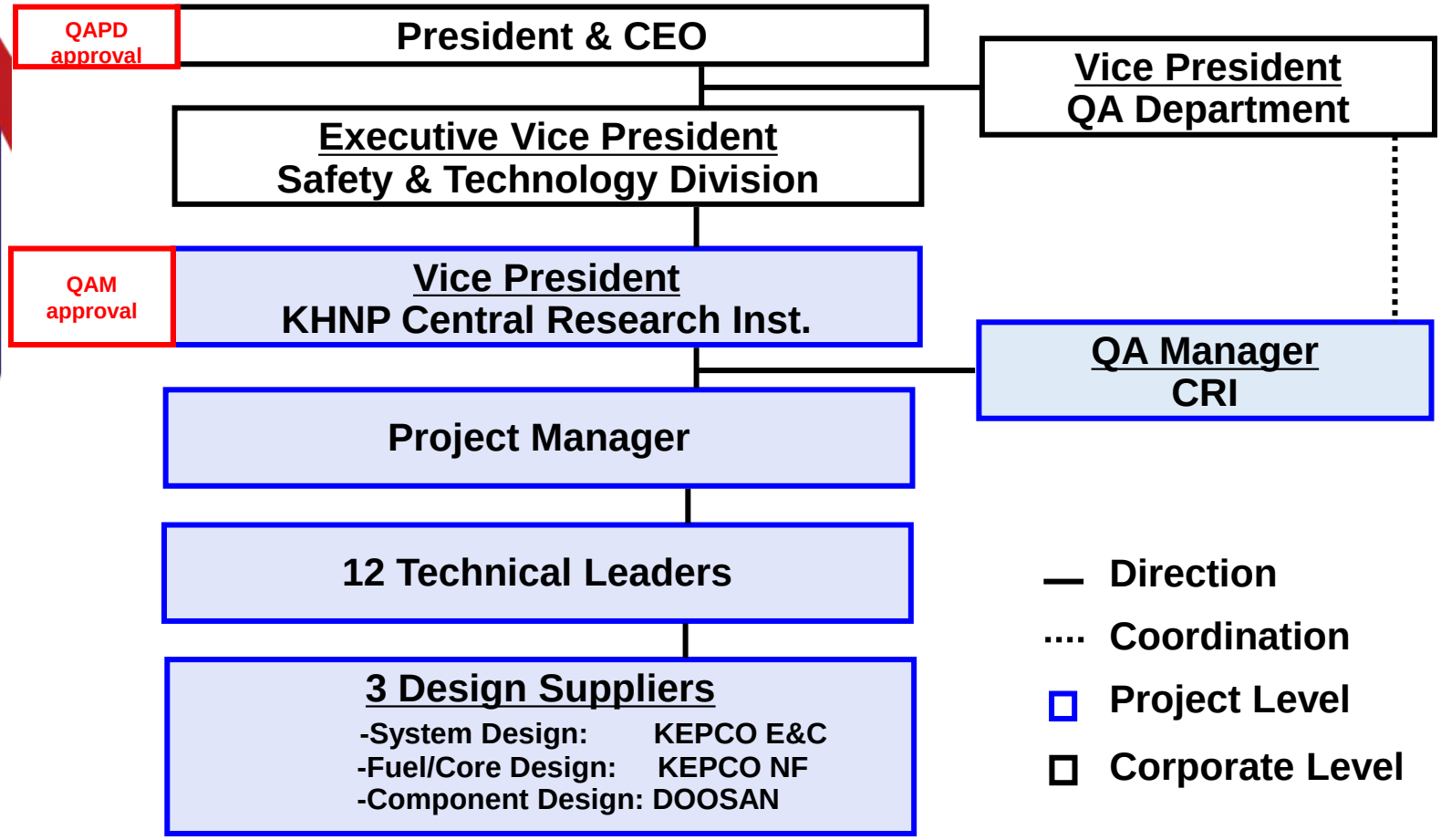
Classification	Requirement	Application				
Quality Group	Reg. Guide 1.26	A	B	C	D	
Safety Class	ANSI/ANS 51.1	1	2	3	NNS	
Code Class	ASME B & PV Section Ⅲ	NCA, NB	NCA, NC	NCA, ND	Other Sections or Other Stds.	
Seismic Category	Reg. Guide 1.29, 1.143, 1.151	Ⅰ	Ⅰ	Ⅰ	Ⅱ	Ⅲ
Electric Power System	Reg. Guide 1.32 IEEE 279, 308, 603	1E	1E	1E	Non-1E	
Quality Class	KHNP QAP	Q			A	S

-Q: Nuclear Safety Related: causing radiation troubles to employees and public
-A: Nuclear Safety Argument: affecting the function of Q
-S: Non-Nuclear and Commercial Grade: not affecting the function of Q and A

-Q/A/S: shall be allocated and described in FSAR and relevant documents

Introduction: KHNP QA Program(6/8)

➢ Organization within KHNP



Introduction: KHNP QA Program(7/8)

➢ Organization with Design Suppliers

KHNP
Applicant

Has Final Responsibility to Design Control
- -Interface/Change/Verification/Submitting DCD to NRC
- -Qualification (QA Program, Personnel, Procedures, Tools, Facilities etc.)
- -Approving QA Program of Suppliers
- -Checking the Implementation status of QA Program (internal, external)
- -Corrective Action Program

KEPCO E&C
-System Design

KEPCO NF
-Fuel Engineering
-Core Design

DOOSAN
-Component Design

Have Contracts as Qualified Suppliers with KHNP to supply Design Activities and Products

- -Establishing and Implementing their own QA Program
- -Receiving Periodical Audit & Check from KHNP
- -Complying with the same requirements as KHNP does
- -Passing down the requirements to Sub-suppliers
- -Corrective Action Program

Oversight of KHNP to Design Suppliers
1. Evaluating & Selecting & Qualifying Design Suppliers before Contracting
2. Reviewing and Approving Design Products prepared by Design Suppliers
3. Controlling RAI Responses and related Document Changes
4. Presiding Committee for Design Change & Design Interface
5. Annual QA Audit

Introduction: KHNP QA Program(8/8)

➢ **Basic Policies of QA**

- Top Management Policy to enforce Safety Culture
- Training and Qualification
  -Designer, Reviewer, Approver, Inspector, Auditor, Test personnel
  -Procedures, Drawings, Test Facilities, Tools
- Organizational Freedom and Independence from Cost & Schedule
- Holding Work Stop Authority
- Direct reporting to Top Management and Feedback about QA Program Implementation Status

Evaluation Status (by NRC Staff)

❖ Summary of RAI and Response: based on SER

17.x	RAI	Response	Result
17.1 (DC phase)	**64-8042:** Addition of a COL Information Item Number for tracking purposes for COL items in 17.1	DCD Revision of 17.1 to add COL Number (responded with ML15217A634)	Accepted
17.2 (Operation phase)	**65-8043:** Addition of a COL Information Item Number for tracking purposes for COL items in 17.2	DCD Revision of 17.2 to add COL Number (responded with ML15217A637)	Accepted
17.3 (Construction phase)	**66-8044:** Addition of a COL Information Item Number for tracking purposes for COL items in 17.3	DCD Revision of 17.3 to add COL Number (responded with ML15217A641)	Accepted
17.5 (QAPD-DC phase)	**No RAI**	Topical Report for QAPD Revision 5 was submitted to NRC on May 2, 2016.	Accepted

QA Inspection Status (by NRC Staff)

✓ Previous Result & Next Plan

Date	Main Scope	Result	Response & Result
Feb.29-Mar. 4, 2016	QA Program & Software Control	-No finding -4 Recommendations	They were cleared out through CAP system.
May 22-26, 2017	QA Program & Design Change Control		

4 Recommendations

1. Improvement for QA audit method (using technical specialist and checklist, bench-marking on American practices)
2. Adding “ASME NQA-1-2008” to DC-DG-04-01 (Procurement Document Control)
3. Doing Design Review on WEC design products
4. Documentation of evaluation result for a specific S/W, RELAP5/MOD3.3

Summary

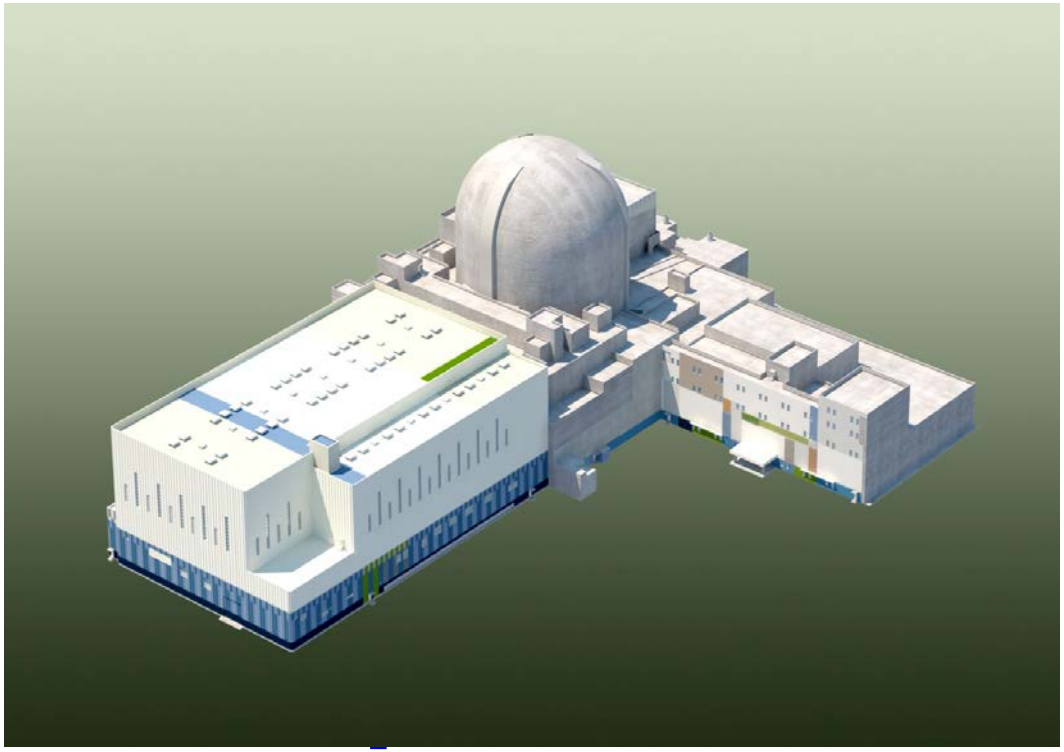
- KHNP QA Program conforms all the relevant requirements of 10CFRs, RGs, ASME NQA-1-2008 and 1a-2009.

- KHNP QA Program can be expanded to COL phase and will comply continuously with all the requirements after the successful DC approval.

Acronyms

ATWS	Anticipated Transients Without Scram
CAP	Corrective Action Program
CFR	Code of Federal Regulations
COL	Combined License
DC	Design Certification
DCD	Design Control Document
NIRMA	Nuclear Information and Records Management Association
QAM	Quality Assurance Manual
QAPD	Quality Assurance Program Description
RAI	Request for Additional Information
RG	Regulatory Guide
SBO	Station Black Out
TG	Technical Guideline

APR1400 DCA
Chapter 17.4: Reliability Assurance Program



KEPCO/KHNP

April 19-20, 2017

Overview

- RAP Requirements
- NRC Concerns
- Response
  - Program Overview
  - What has been done
  - What needs to be done (KHNP Action Items)

RAP Requirements

- Delineated in SRP 17.4, Rev. 1
- Design, construction and operation is consistent with risk insights and key assumptions of all risk analyses and evaluations
  - Programmatic controls ensure that the RAP list is appropriately developed and communicated to affected organizations
  - QA programs oversee activities affecting RAP SSC quality
- RAP is implemented during operations phase via Maintenance Rule program, QA for safety and nonsafety-related SSCs, and inservice inspection & testing, surveillance testing and maintenance programs
  - Design RAP should therefore align for a seamless transition to these programs

RAI 316-8305

Question No. 17.04-1

SRP Chapter 17.4, Revision 1, Section II, "Acceptance Criteria" states, "… an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide acceptable methods of compliance with the NRC regulations." The staff reviewed APR1400 DCD Section 17.4, "Reliability Assurance Program," and found that the DCD Table 1.9-2 referenced SRP Chapter 17.4, Revision 1, but the information seems to follow the guidance provided in SRP Chapter 17.4, Revision 0. For example, APR1400 DCD Section 17.4 discusses a) essential elements of RAP instead of programmatic controls and processes for RAP in the operations phase, and b) development/integration of operational RAP (O-RAP), which is not included in the SRP guidance. Therefore, in order for the staff to reach an assurance finding on the conformance to SRP Chapter 17.4 regarding program adequacy, please provide details of a RAP program that follows the guidance in SRP Chapter 17.4, Revision 1 or an alternative to the SRP acceptance criteria, and revise the APR1400 DCD Section 17.4 accordingly.

Question No. 17.04-2

SRP Chapter 17.4, Revision 1, Section II, "Acceptance Criteria" states in part, "… The DC application should include the following COL action items …." The staff reviewed APR1400 DCD Section 17.4, "Reliability Assurance Program," and found that the section did not include all the COL action items listed in the SRP 17.4 acceptance criteria. Therefore, in order for the staff to reach an assurance finding on the conformance to SRP Chapter 17.4 regarding COL action items, please provide COL action items that follow the guidance in SRP Chapter 17.4, Revision 1 or an alternative to the SRP acceptance criteria, and revise the APR1400 DCD Section 17.4 accordingly.

NRC Feedback

- Original RAI 316-8305 issued 11/17/2015
- NRC staff asked several additional questions in 9/27/2016 call
- NRC staff requested face-to-face meeting (3/17/2017) to clarify concerns
  - Need to ensure that RAP list is properly developed, maintained and issued to correct organizations

KHNP Response

- Re-review of SRP 17.4.
  - Program description enhanced
  - COL action items delineated
- Complete re-write of DC Chapter 17.4. Upon completion, revision will be incorporated into the next revision of the Design Control Document.
- Drafting substantial revisions of implementing procedures to better align with requirements of SRP.
- Actions underway to address design phase programmatic issues identified during 3/17/2017 meeting with NRC staff.

Implementing Procedures (partial list)

- DC-DG-03-09, “Implementation of the Reliability Assurance Program (RAP)”
- DC-DG-03-10, “Expert Panel Roles and Responsibilities”
- DC-DG-03-11, “Risk Significance Determination of RAP SSCs”
- DC-DG-03-24, “Risk Management Procedure,” (directs PRA review of design changes)
- DC-DG-03-01, “Design Change Control” (revision underway to direct RAP consideration during design)

Selection – Quantitative (PRA)

- Systems, Structures & Components
  - RAW > 2
  - FV > 0.005
  - Consider 90% criterion
  - Based upon review of FP & LPSD IE, FLOODING, FIRE
  - Levels 1 and 2
- Risk Significant redundant SSCs
  - Identified by CCF importance

Selection - Qualitative

- Seismic margins, ATWS, SBO, severe accident evaluations
- Industry-wide operating experience
- Professional judgment
- Considers SSCs not included in the PRA model

Expert Panel

- Established by DC-DG-03-09, 03-10 & 03-11
- Identifies risk significant equipment
- Begins with PRA input following model revisions, supplemented with qualitative evaluations
- Identifies dominant failure modes for RS SSCs
- Result constitute the “RAP list” (Table 17.4-1)
- Can perform updates upon member request, if PRA input is delayed
- Results are provided to Design Engineering, QA, Testing (ITAAC)

RAP List

- Originally based upon SAREX results, supplemented with additional components/systems designated qualitatively risk significant by the Expert Panel
- List has been revised to reflect SAREX/CAFTA conversion, and expanded to include PRA/LRF results for FP & LPSD fire & FP flood
- Expert Panel review of revised PRA input is pending
- Will be revised again following scheduled model update

Excerpt from RAP SSC List

TABLE 17.4-1 – RELIABILITY ASSURANCE PROGRAM SYSTEMS, STRUCTURES & COMPONENTS				
System (1)	**SSC ID(s)**	**SSC Description**	**Risk Significance Basis** (2), (3)	**Dominant Failure Mode(s)** (4), (5)
AF	CV1003A/B	Motor-Driven Pump Discharge Check Valves	Level 1: FP IE, FIRE, FLOOD LPSD FLOOD Level 2: FP IE	Fail to open
AF	CV1004A/B	Turbine-Driven Pump Discharge Check Valves	Levels 1 & 2: FP IE	Fail to open
AF	CV1007A/B	Motor-Driven Pump Discharge Check Valves	Level 1: FP IE, FIRE, FLOOD LPSD FLOOD Level 2: FP IE	Fail to open
AF	CV1008A/B	Turbine-Driven Pump Discharge Check Valves	Levels 1 & 2: FP IE	Fail to open

- Sample results following the SAREX/CAFTA conversion.
- Full table has >210 rows at this time.

Bases for Inclusion in RAP SSC List

Basis	Description
Level 1	CDF results
Level 2	LRF results
FP	Full Power PRA
LPSD	Low Power & Shutdown PRA
IE	Internal Events PRA
Flood	Internal Flooding PRA
Fire	Internal Fires PRA
Seismic	Seismic evaluation
Expert Panel	Qualitative determination

Design Control

- DC-DG-03-24, “Risk Management Procedure” already directs PRA review of design changes for input to Expert Panel
- DC-DG-03-01, “Design Change Control” is under revision to require inclusion of RAP status in the design process

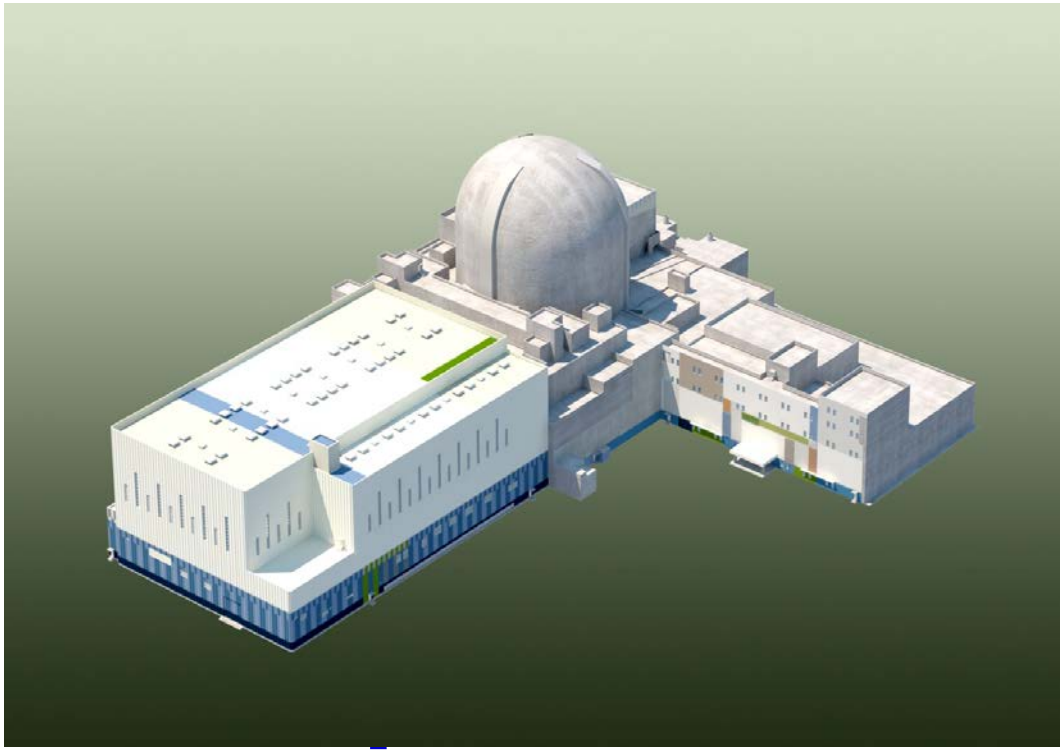
KHNP Action Items

- Revise RAP implementing procedures to ensure that:
  - All required disciplines are represented
  - All qualitative sources are considered in evaluation
  - EP meets as needed to capture new design changes and any emergent issues
  - RAP list is issued to, and used by, impacted organizations, which proceed to use them (Design Engineering and QA)
- Establish formal PRA model change request process
- Ensure annual audits are performed
- Complete re-write of DC Section 17.4

Summary

- Per NRC feedback:
  - DC Chapter 17.4 has been entirely re-written
  - Implementing procedure revisions are underway
  - Programmatic changes are underway

APR1400 DCA
Chapter 17.6: Maintenance Rule Program



KEPCO/KHNP

April 19-20, 2017

Overview

- Maintenance Rule program requirements
- KHNP plan

Maintenance Rule Requirements

- Delineated in SRP 17.6, Rev. 2 (see also 10 CFR 50.65)
- Ensure maintenance is “effective”
  - Identify risk significant SSCs and functions
  - Establish performance criteria
  - Implement corrective actions when required to restore performance

KHNP Strategy

- **Utilize the Reliability Assurance Program (RAP) as the precursor program**
  - **Identifies risk significant SSCs and functions during the design stage**
  - **Update list once site-specific model is available**
  - **RAP is explicitly cited as the Maintenance Rule predecessor in SRP 17.4**
- **Utilize the Reliability Assurance Program (RAP) as the precursor program**
  - **NUMARC 93-01 was reviewed when developing the RAP**
  - **All RAP SSCs will be classified as having "high safety significance" by the Maintenance Rule program**
  - **The RAP expert panel considers the 93-01 and SRP 17.6 scoping criteria when evaluating components not modeled by PRA**

Summary

- KHNP is working to develop a RAP that will provide effective input into the Maintenance Rule
- RAP details will be tailored to align with Maintenance Rule requirements
- Detailed procedures and implementation will be the responsibility of the COL applicant

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Presentation to the ACRS Subcommittee

APR1400 Design Certification Application Review

Safety Evaluation with Open Items

Chapter 17: QUALITY ASSURANCE AND RELIABILITY ASSURANCE

April 19-20 , 2017

Chapter 17: QUALITY ASSURANCE AND RELIABILITY ASSURANCE

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Technical Staff Presenters and Staff Review Team

- **Aaron Armstrong (DCIP/QVIB)**
  - **Sections 17.0, 17.1, 17.2, 17.3 and 17.5**
- **Odunayo Ayegbusi (DSRA/SPRA)**
  - **Sections 17.0, 17.4 and 17.6**
- **Project Managers**
  - **Jeff Ciocco – Lead Project Manager (DNRL/LB2)**
  - **Tarun Roy– Chapter Project Manager (DNRL/LB2)**

Chapter 17: QUALITY ASSURANCE AND RELIABILITY ASSURANCE

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- 17.0 Quality Assurance and Reliability Assurance
- 17.1 Quality Assurance during the Design Certification Phase
- 17.2 Quality Assurance during the Operations Phase
- 17.3 Quality Assurance Program Description
- 17.4 Reliability Assurance Program
- 17.5 Quality Assurance Program Description – Design Certification
- 17.6 Maintenance Rule

Quality Assurance

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- The quality assurance (QA) program is described in Sections 17.1, 17.2, 17.3, and 17.5
- All regulatory requirements of Appendix B to 10 CFR Part 50 have been satisfied
- The QA Program Description (QAPD) Topical Report is approved and will provide the QA requirements for Sections 17.1, 17.2, 17.3, and 17.5
- The only remaining issue is conducting the QA implementation inspection (post-docketing QA program inspection).

Reliability Assurance Program

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Reviewed the D-RAP ITAAC and compared D-RAP List with PRA results
- We find the RAP program is insufficient in:
  - Program description and implementation
  - Structures, Systems, and Components selection
  - Expert panel member requirements
- D-RAP list review is ongoing and pending resolution
- We will complete the review once the RAP program is in accordance with SRP 17.4

Maintenance Rule

- A COL action item was included to have COL applicants develop a maintenance rule program
- The DC applicant is not required to develop a maintenance rule program for its application
- The staff concluded that the APR1400 DCD Maintenance Rule section and COL action item are acceptable