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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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SUBCOMMITTEE ON MATERIALS, METALLURGY, AND

REACTOR FUELS

+ + + + +

OPEN SESSION

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NSSS LARGE COMPONENT FABRICATION

AND VENDOR INSPECTION

+ + + + +

WEDNESDAY

JANUARY 16, 2013

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear
Regulatory Commission, Two White Flint North, Room
T2B3, 11545 Rockville Pike, at 8:30 a.m., J. Sam
Armijo, Chairman, presiding.

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1 SUBCOMMITTEE MEMBERS:

2 J. SAM ARMIJO, Chairman

3 DANA A. POWERS, Member

4 MICHAEL T. RYAN, Member

5 WILLIAM J. SHACK, Member

6 GORDON R. SKILLMAN, Member

7

8 NRC STAFF PRESENT:

9 CHRISTOPHER BROWN, Designated Federal Official

10 SAMANTHA CRANE, NRO

11 YAMIR DIAZ-CASTILLO, NRO

12 LAURA DUDES, NRO

13 BOB HARDIES

14 JOHN HONCHARIK, NRO

15 KERRI KAVANAGH, NRO

16 JIM LUEHMAN

17 RICHARD McINTYRE, NRO

18 RICHARD RASMUSSEN, NRO

19 EDWARD ROACH, NRO

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P R O C E E D I N G S

8:30 a.m.

CHAIRMAN ARMIJO: The meeting will now come to order. This is a meeting of the Materials, Metallurgy and Reactor Fuels Subcommittee, and I am Sam Armijo, Chairman of this Subcommittee.

Members in attendance are Bill Shack, Dana Powers, Mike Ryan, Dick Skillman. Others may come in a little bit later. Christopher Brown of the ACRS staff is the designated federal official for this meeting.

Both the court reporters for this meeting and the meeting in the adjacent room on human reliability analysis, those reporters are stuck in traffic.

Ed Hackett has told us that we can proceed. The meeting is being recorded by our staff. And so, the reporter will take their notes from -

MEMBER SHACK: The red line strikes again.

CHAIRMAN ARMIJO: So, be careful what you say.

Okay, with that -

PARTICIPANT: What?

CHAIRMAN ARMIJO: All right.

PARTICIPANT: Since when does recording

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1 the meeting have any implications on what we say?

2 (Laughter.)

3 CHAIRMAN ARMIJO: Yeah, I know. It never
4 inhibited us before.

5 The purpose of the meeting is to receive
6 a briefing by the staff on their approach for
7 component fabrication and inspection of large steam
8 supply system components.

9 We'll hear presentations from
10 representatives of the Office of New Reactors and the
11 Subcommittee will gather the information, analyze
12 relevant issues and facts and formulate proposed
13 positions and actions as appropriate for deliberation
14 by the full committee.

15 This presentation is being provided at the
16 request of the ACRS staff. And we appreciate the
17 NRO's willingness to do that for us.

18 The rules for participation in today's
19 meeting were announced as part of the notice of the
20 meeting previously published in the Federal Register
21 December 17th, 2012.

22 The meeting will be open to public
23 attendance with the exception of a portion that may be
24 closed to protect information provided in confidence
25 by foreign source pursuant to 5 USC 552(b)(c)(4).

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1 We have received no written comments or
2 requests for time to make oral statements from members
3 of the public regarding today's meeting.

4 With that, I'd like to first thank the
5 staff for preparing for this briefing. We will also
6 have a bridge briefing for the full committee later.

7 With that, I'd like to turn it over to
8 Laura Dudes from Office of New Reactors. Laura.

9 MS. DUDES: Thanks. Good morning. I too
10 was stuck in a little traffic this morning. I made it
11 over the pike.

12 We're happy to be here. Some members who
13 will be presenting to you today remarked yesterday how
14 much they were looking forward to this, because we
15 don't often - the Vendor Inspection Program - the
16 Reactor Vendor Inspection Program has been around for
17 well over 25 years in the Agency with various levels
18 of resources and types of - or activities associated
19 with vendors and suppliers.

20 In 2007 with the new reactors coming
21 forward, NRO developed a more rigorous Vendor
22 Inspection Program, or numerous inspection programs,
23 to cover the global supply chain that would be
24 supplying our new reactors.

25 As we moved forward, we were noticing that

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1 some of our vendors that we inspect also supply
2 operating reactors.

3 So, working with our peers in the Office
4 of Nuclear Reactor Regulation, we developed a Center
5 of Expertise and consolidated all of the vendor
6 inspection activities for the Agency's Reactor Program
7 in NRO, but we do, do both operating reactor and
8 vendor - or new reactor vendors. And vendor
9 inspection - direct inspection is only part of our
10 oversight program.

11 As you know, there's thousands of
12 suppliers and vendors throughout the world. So, we
13 also leverage other activities which you'll hear about
14 today to make sure that we are achieving our goal of
15 making sure that the licensees are providing adequate
16 oversight.

17 We have several outreach activities and
18 inspection activities that we do to sample how that's
19 being done, but ultimately the responsibility of
20 vendor oversight in the US nuclear regulatory
21 framework is with the licensees.

22 So, we're very happy to be here. We look
23 forward to giving you the presentation and discussion.
24 And I did hear a sidebar earlier about some of the
25 issues in other countries. And any insights that can

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1 be brought to bear on our large forging-type
2 inspections would be useful.

3 So with that, I'll turn it over to Ed
4 Roach. Each of our presenters will introduce
5 themselves and give you a bit of background.

6 MEMBER SHACK: Just a quick question.

7 The engineering validation - engineering
8 design validation inspections, that's also done by you
9 or is that -

10 MS. DUDES: Yes. Yeah, yes, design
11 verification inspection with the design authority. In
12 this case, Westinghouse. We do those as well.

13 MEMBER SHACK: I was very impressed with
14 the one you did on the AP-1000 back in 2011.

15 MS. DUDES: Yes. Well, Jeff Jacobson who's
16 one of our fine vendor inspectors, led that. And, you
17 know, consistent - I guess I'll make the point, I know
18 you'll hear this again, because we've - I've been
19 before the various committees talking about inspection
20 activities and previously it was DAC, ITAAC-type
21 activities, but our vendor inspections, we go out and
22 we do a quality assurance programmatic review, but we
23 always have technical specialists with us so we can do
24 a physical verification of whether the systems,
25 structures and component or service that is being

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1 offered, we bring the right technical expertise so
2 that we also verify not only the program is solid, but
3 we have - we witness either construction or testing or
4 engineering activities.

5 MEMBER SHACK: Well, I mean, you raised a
6 number of substantial engineering -

7 MS. DUDES: Yes.

8 MEMBER SHACK: - questions, I think, in
9 that inspection.

10 MS. DUDES: We had several contractors,
11 experts, who came on that, and we do that with all of
12 our inspections to the extent of what the supplier is
13 providing.

14 A design authority is a much bigger
15 inspection. So, good. I'm glad that was a good
16 inspection you all received.

17 So with that, Ed.

18 MR. ROACH: All right. Thank you, Laura.

19 Chairman Armijo, members of the
20 Subcommittee, thank you for seeing us this morning.
21 I will go over the agenda just very quickly. I'll
22 present on just Vendor Inspection Program methodology
23 and our centers of expertise.

24 Following me will be one of our
25 inspectors, Rich McIntyre, who will talk about recent

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1 inspection findings and trends in our inspections.

2 Following that, one of our branch chiefs,
3 Rick Rasmussen, who is the chief of the electrical
4 branch, he will speak about our international
5 engagement and how we leverage the resources
6 internationally.

7 Then Ms. Kerri Kavanagh, who is a branch
8 chief over quality assurance and vendor branch, will
9 discuss the large forgings. We went to quite a few
10 inspections from the 2007 to 2011 time frame to
11 observe those with technical specialists also.

12 And then finally, we'll take a break, I
13 believe, at that point and we'll move into the closed
14 session.

15 And then Mr. John Honcharik of the Design
16 Engineering Branch will talk about a reactor vessel
17 nozzle issue. And he has information related that
18 makes it a closed session.

19 So, that's what we plan to do today. Any
20 questions before we move on?

21 (No questions.)

22 MR. ROACH: Okay, thank you. Good morning.
23 I'm Ed Roach. As I said, I'm the chief of the Vendor
24 Inspection Branch - Mechanical Vendor Inspection
25 Branch of the Office of New Reactors.

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1 My background is about 27 years of
2 industry experience, plus some Navy time. And I've
3 had experience in quality assurance, auditing, health
4 physics, waste shipping and transport, emergency
5 preparedness and health physics.

6 And I also have worked probably on the
7 order of about 15 to 20 outages in my career,
8 including the replacement of steam generators and
9 reactor vessel heads and reactor internals.

10 I came to the NRC in about 2006 as an
11 emergency preparedness specialist and became a
12 technical reviewer, and then moved to be the branch
13 chief of, first, the Health Physics Branch in New
14 Reactors, and now the Mechanical Vendor Inspection
15 Branch.

16 What I wanted to discuss today was the
17 recent approach to maximizing our effectiveness in
18 several areas, but primarily how we are approaching
19 vendor inspection for nuclear reactor vendors.

20 Just to focus on how important this goal
21 is to the Office of New Reactors, the number two goal
22 on our list of goals is implement the Agency's Reactor
23 Vendor Inspection Program, including inspection,
24 outreach and communication to stakeholders and self-
25 assessment in support of operating reactor safety and

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1 new reactor construction. So, that's the number two
2 goal within the office.

3 In today's briefing, I'll provide a
4 context for our Vendor Inspection Program and the
5 presentations that follow by discussing our
6 regulations, guidance and types of inspection, our
7 Vendor Inspection Program plan and our vendor
8 selection criteria.

9 Available for questions today are two
10 members from my branch - one member from my branch,
11 Mr. Yamir Diaz-Castillo, who is the primary author of
12 our Vendor Inspection Program plan. And also Mr.
13 Garrett Newman who's in the audience, who is the - a
14 key player in our selection criteria and how we
15 determine which inspections we go on with the vendors
16 we have in our database.

17 I will conclude today with a discussion of
18 the Centers of Expertise, which really talks about
19 how, as Laura spoke, brought NRR vendor inspection and
20 NRO vendor inspection together so we can leverage
21 those resources and maximize their effectiveness.

22 Okay. As Laura said, again, the Division
23 of Construction Inspection and Operational Programs is
24 responsible for construction inspection. And that's
25 the division we are in, in new reactors.

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1 For new reactors, the Construction
2 Inspection Program is implemented in these four main
3 areas, but the one we're going to focus on is vendor
4 inspection.

5 We work very closely with our division,
6 with the other technical branches in NRO, with NRR,
7 with NSIR and also with Region II. So, we're
8 constantly on the phone having good communications
9 with those folks.

10 So, let's talk about the Vendor Inspection
11 Program. As I'm sure you're aware, the NRC does not
12 license vendors.

13 However, the NRC does hold power plant
14 licensees responsible for effective implementation of
15 their quality assurance program, oversight of
16 contracted design and construction activities, and
17 vendor oversight. Therefore, ultimately the
18 responsibility for safety always lies with the
19 licensee.

20 And licensees accomplish this vendor
21 oversight by directly qualifying their suppliers
22 through audits and surveys. They might have an
23 approved vendors list or suppliers list. They use
24 qualification audits and certifications performed by
25 third parties such as NuPIC, which is the Nuclear

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1 Procurement Issues Committee, or ASME, the American
2 Society of Mechanical Engineers.

3 And so, those committees perform a sort of
4 third-party certification that many utilities or
5 licensees find acceptable.

6 First-tier suppliers are responsible for
7 passing the quality assurance of technical
8 requirements to lower level suppliers through purchase
9 orders and ensuring compliance through audits and
10 surveys.

11 Licensees impose the quality assurance
12 requirements of Appendix B from 10 CFR Part 50 to
13 their suppliers of basic components. And vendors of
14 basic components must meet the defect and
15 noncompliance reporting requirements of 10 CFR Part
16 21.

17 Consequently, the NRC inspects vendors to
18 verify that licensees are meeting their Appendix B
19 criteria oversight responsibilities and that the
20 vendor is meeting the contractually imposed quality
21 requirements.

22 Next slide. So, as Laura said, this
23 vendor inspection has been around about 30 years in
24 the NRC in one form or another. The program has had
25 varying levels of emphasis corresponding to resource

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1 levels and shipping priorities throughout those years.
2 Remained largely responsible for inspecting vendors
3 providing components to the operating fleet.

4 With the anticipation of new reactor
5 construction, the new Reactor Vendor Inspection
6 Program was established in 2007. And the program was
7 to make sure that we took the lessons learned from
8 NUREG-1055 and applied them to the new reactors being
9 built and make sure that the requirements of Appendix
10 B and 10 CFR Part 21 were implemented.

11 As you can see from our slide here, we
12 increased from 2011, 24 inspections in '11. 27
13 inspections in 2012. And our target is 30 inspections
14 in 2013.

15 CHAIRMAN ARMIJO: In a typical inspection
16 we're talking about one week at a vendor site, or two
17 weeks, the size of the crew?

18 MR. ROACH: Typically, we would have five
19 to six inspectors for one week at a vendor site.
20 We'll enter on a Monday morning around eight o'clock,
21 nine o'clock, and exit Friday morning sometimes.

22 CHAIRMAN ARMIJO: Okay.

23 MEMBER SKILLMAN: Could you describe
24 basically what your inspectors are inspecting in that
25 four-day period, please?

1 MR. ROACH: I'm trying to think how to
2 characterize it best. It's situational. It's going
3 to depend on what the vendor does, first of all.

4 And in the case of someone who
5 manufactures valves, say a squib valve, we will -
6 before we ever get there, we develop an inspection
7 plan. We arrange responsibilities for the team, what
8 they're going to inspect. And then we lay out that
9 ahead of time.

10 When we get there, we break in - we get an
11 indoctrination and we break into our pieces and go off
12 to do our things.

13 Some of it will include testing. We might
14 be in their shop watching them conduct tests,
15 hydrostatic tests, NDT or whatever test they're
16 performing. Shaker tests, for instance, for seismic
17 qualifications.

18 We would be looking at their
19 nonconformance corrective action programs. We'll see
20 if there's issues that should have been reported as
21 Part 21s and try to vet those. And then evaluate the
22 performance of the evaluations that the vendor did on
23 those type of topics.

24 And then through the week we roll up the
25 issues and debrief every afternoon with the vendor.

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1 And then kind of roll up and give a pre-decisional
2 exit of these are the issues we see.

3 And once the report is issued, they'll
4 either be characterized as nonconformances, a Notice
5 of Nonconformance or a Notice of Violation if it's a
6 violation of the regulatory requirements.

7 MEMBER SKILLMAN: Thank you.

8 CHAIRMAN ARMIJO: On a brand new design,
9 for-of-a-kind design of a major component, you know,
10 the Westinghouse reactor coolant pump comes to mind,
11 is there a special focus within the branch to select -
12 to identify those as, you know, we've never built
13 these before?

14 Like the squib valve you mentioned, these
15 giant -

16 MR. ROACH: As a matter of fact, that's
17 within Rick's branch, Jeff Jacobson who leads the -
18 led that EDB.

19 We have biweekly phone calls with
20 Westinghouse. And in those phone calls, we get the
21 latest information as to what testing is going, where
22 they are in fabrication of certain components. And we
23 use that to inform our inspections, when we're going
24 to go.

25 And clearly, the higher priority items are

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1 those first of a kind, those new technology, key
2 testing of a component.

3 Squib valves has a story to itself, but an
4 example of that would be - another one would be the
5 flow check valves that are in the piping, I think,
6 from the core makeup tank - or the accumulator down
7 into the RCS.

8 And so, those are a different - they're
9 used in some applications, but we haven't seen them -

10 CHAIRMAN ARMIJO: So, you do focus on the
11 new first-of-a-kind -

12 MR. ROACH: Yes.

13 CHAIRMAN ARMIJO: - new technology as
14 opposed to something that's fairly routine that you
15 still inspect, but then you're not as concerned about
16 it, I guess.

17 MR. ROACH: Yes. And in the course of our
18 routine review of our inspection schedule, we may pick
19 a vendor who supplies both operating fleet and new
20 reactor fleet with more or less a standard component,
21 because we've seen some issues in the industry with
22 it.

23 An inspection like that might be
24 considered like one of the differential pressure
25 manufacturers. We did a vendor inspection of their

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1 program and they will probably be providing those
2 transmitters to both new reactors. And they currently
3 provide them to the operating fleet.

4 MR. McINTYRE: Ed, can I add something?

5 MR. ROACH: Sure.

6 MR. McINTYRE: Yes, you have mentioned -

7 MR. ROACH: Identify yourself for the
8 bridge.

9 MR. McINTYRE: Oh, I'm Rich McIntyre. I'm
10 a senior reactor engineer and I work for Ed.

11 The flow nozzle check valve that Ed is
12 talking about, that issue was originally - there were
13 some concerns with it identified during the AP-1000
14 EDB inspection.

15 So, we took that information and we
16 performed a review of the design of EDB. And then we
17 looked at the whole qualification to ASME QME1 at Utah
18 State University. And then also looked at the
19 manufacturing portion of it at the supplier in
20 California.

21 So, yes, that was a valve that hadn't been
22 used before. So, we then went through the
23 qualification requirements from ASME QME1 and then the
24 ASME Section 3 fabrication requirements, and it was
25 all really an outflow of what was identified during

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1 that AP-1000 EDB.

2 So, that kind of process flows from one
3 portion into the other as we move forward.

4 CHAIRMAN ARMIJO: Okay, thank you.

5 MR. ROACH: I'll just add one other key
6 piece of information.

7 We work very closely with design
8 engineering, the engineers who did the technical
9 review or the reviews of the applications in the DCD
10 and to be informed about which components really we
11 should be concerned about and be out there to look at.

12 So, and they oftentimes accompany us on
13 inspections. So, we can take the benefit of their
14 licensing review and their design review.

15 MEMBER SKILLMAN: Let me ask this building
16 on the question that Mr. McIntyre just responded to:
17 Virtually every part of, if you will, the reactor
18 coolant system pressure boundary is governed by ASME
19 Section 3. ECCS is 3.2. The boundary is 3.1.

20 Each component that is 3.1 is governed by
21 its own design requirements, document or
22 specification. And each component has an allowable U,
23 number of cycles. And the total U is the aggregate of
24 all of the cycles that are anticipated for that
25 component for the service life of the component.

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1 Where in the inspection is the adequacy of
2 that specification challenged?

3 MR. ROACH: Kerri.

4 MS. KAVANAGH: Yeah, my name is Kerri
5 Kavanagh. I'm the branch chief of quality assurance.

6 Generally and depending on the inspection,
7 we may or may not actually challenge the design spec,
8 because that might have been done in the actual
9 licensing of the DCD review.

10 And if that's the case, we generally just
11 look at the implementation of that design spec in the
12 manufacturing process to make sure that the
13 specification was translated into manufacturing
14 drawings that could be manufactured into that
15 component.

16 So, the actual challenging of whether or
17 not it met code would have come from the design
18 aspect, unless it was an actual design inspection that
19 we were performing.

20 So, that would have been back into the
21 licensing process, not necessarily during inspection.

22 MR. McINTYRE: And we do look at some of
23 that information during the engineering design
24 verification inspection, the one that Laura was
25 talking about, the Jeff one. That's the - that would

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1 be probably the foremost inspection where we challenge
2 the design attributes of the AP-1000 and the
3 equipment.

4 So, that would typically be done during
5 the APDB portion of the design.

6 MEMBER SKILLMAN: Thank you. Thank you.

7 MR. ROACH: One other aspect I'll just add
8 is that we do go in many cases and verify that the
9 design spec referenced in the AP-1000, they
10 incorporate that correctly in the procurement
11 documentation so they aren't building something that
12 isn't per design. And we've had some challenges on
13 that also.

14 MEMBER SKILLMAN: Thank you.

15 MR. ROACH: Okay. As I alluded to earlier,
16 there are regulations that apply to vendors of basic
17 components. They're listed on this slide. Primarily,
18 Part 21, Part 50.5 and 0.7. And one of the aspects
19 we've picked up is the support of allegations and when
20 we follow things.

21 If a vendor doesn't meet the technical
22 requirements in the purchase order, the vendor will be
23 issued a nonconformance against the appropriate
24 criteria in Appendix B. And then we follow that to
25 closure as part of our resolution, basically. And

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1 that could include correspondence, reinspection or
2 something else.

3 At the top of this slide we talk about the
4 Vendor Inspection Plan. In 2010, the Division of
5 Construction Inspection and Operational Programs
6 implemented recommendations from an NRC Inspector
7 General audit to improve the Vendor Inspection
8 Program.

9 Among those improvements, the Vendor
10 Inspection Program Plan was authored to document that;
11 one, articulates a clear purpose for the Vendor
12 Inspection Program and; two, establishes metrics to
13 evaluate to the program's performance and success.

14 With its development and subsequent
15 revisions, the Vendor Inspection Program Plan has been
16 guiding the Vendor Inspection Program since.

17 So, while the Vendor Inspection Program
18 Plan describes how the program will be accomplished,
19 the actual inspection process is described in
20 Inspection Manual, Chapter 2507.

21 And under 2507 there's a number of
22 inspection procedures for reactive, routine ITAAC
23 inspections that guide how we perform inspections.
24 And those are all publicly available within our
25 website.

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1 MEMBER POWERS: The general issue of how
2 well a program functions in connection with the
3 Agency's mission is an area of great interest to me.

4 MR. ROACH: Okay.

5 MEMBER POWERS: Do we have something
6 quantitative, well, analogous to either a risk
7 achievement or a risk reduction worth metric that we
8 can apply to ascertain if this Vendor Inspection
9 Program as it's currently implemented has any
10 significant impact on safety?

11 MR. ROACH: Okay. So, I think what I
12 understand you're asking is do we perform a risk
13 quantification of the impact of -

14 MEMBER POWERS: Well, it doesn't have to be
15 risk so much as some point - what I'm looking for is
16 a quantitative metric that would say, okay, what
17 happens if I don't do this at all? Or what happens if
18 I do this perfectly?

19 In the end, does it change safety of the
20 plant by a lot, or just a little bit?

21 MS. DUDES: I'm going to just jump in here,
22 because I can see -

23 MR. ROACH: Okay. Thank you, Laura.

24 MS. DUDES: I mean, the short answer is no.
25 We don't have a quantitative assessment. We are

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1 thinking now that we've consolidated the Reactor
2 Vendor Oversight Program and we have our Vendor
3 Inspection Program Plan, we have - we've just done our
4 first annual assessment to look at some - the really
5 qualitative measures of effectiveness.

6 The vendor community is so vast and so
7 diverse and, you know, we can think about - and we are
8 thinking about how we assess our program and what's
9 effective and what's not. But at this point, we don't
10 have a quantitative view of our impact on safety.

11 I think we used both of our - both or all
12 of our tools before us, which is leveraging licensees
13 oversight, interactions with ASME, our work in
14 oversight activities with the Nuclear Procurement
15 Issues Group, NuPIC, and our inspections are really in
16 some ways, a drop in the bucket of vendor oversight.

17 There's, as I said, thousands of
18 suppliers. We don't even know who all the sub-
19 component suppliers would be. And so, to some extent,
20 you know, our inspections keep people on their toes
21 and we try and focus on first-of-a-kind and high-risk
22 components when we're out there, but we still have to
23 rely on licensees oversight and leverage. Lots of
24 different activities.

25 That's sort of how we approach vendor

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1 inspection. But as we go through and implement this
2 plan and as we've taken more responsibility with the
3 Center of Expertise, we are looking to see how we can
4 measure impact and - because that will dictate if the
5 program stays the same size, if the program grows, if
6 the program shrinks.

7 The Agency has been through this in the
8 past. We had a larger Vendor Inspection Program maybe
9 25 years ago. And then over time, licensees
10 performance was improving. We went into the Reactor
11 Oversight Program.

12 And so, the Vendor Inspection Program
13 started to tail off in terms of there was some
14 thinking that maybe the licensees really had a much
15 better handle on their receipt inspection, how they
16 were overseeing their suppliers.

17 The supplier community was smaller back
18 then. There was a lot less commercial-grade
19 dedication. So, then the Vendor Inspection Program
20 sort of tailed off and became more of a reactive
21 activity probably in the `90s, late `90s into 2000.

22 Now, we're seeing a much broader number of
23 vendors, licensees, that don't have Appendix B
24 programs. The licensees may have to do more
25 commercial-grade dedication.

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1 So, the world has changed such that we're
2 trying to reassess how we can assess the effectiveness
3 of the Oversight Program.

4 MEMBER POWERS: Yeah, I mean, that's what
5 I don't quite understand is, okay, I've got an
6 existing program. I can conceive of making changes
7 internally within that scope of work or I can see
8 broadening that scope of work.

9 I don't know how you decide that other
10 than I've got X number of dollars for budget, line
11 number of people, how much can I do to fully occupy
12 them plus ten percent to get a raise in my budget next
13 year?

14 I mean, that's the only metric I see is
15 available here and I'm not sure that's an entirely
16 satisfactory metric.

17 I don't have troubles with qualitative in
18 the sense that qualitative is the first step that you
19 have to take to go to quantitative. And sometimes you
20 just get stuck at qualitative, because you can't do
21 anymore, but we need to have some basis, a much more
22 objective basis to decide are we effective and is that
23 adequate?

24 And I don't know, but I do know one of the
25 questions that's going to be on the Board for you all

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1 the time is, okay, you've got a supplier in Europe,
2 he's been inspected by X number of European agencies,
3 why do you need to do it?

4 And he's complying with ISO-9000. Why
5 does he have to do Appendix B? And a quantitative
6 answer is much more satisfactory than a plausibility
7 argument, which is all that we can offer right now.

8 MS. DUDES: Right. I don't think we would
9 disagree with that. I think that actually
10 implementing it is where -

11 MEMBER POWERS: Yeah, I mean, I don't -

12 MS. DUDES: - we have the challenge.
13 Number of suppliers and the licensees and the
14 requirements -

15 MEMBER POWERS: I think that tends to
16 bollocks you that you say, okay, I got 80,000
17 potential suppliers here and how do I do something -
18 well, that's probably not the answer. Let me pick one
19 and figure out whether I do something with, or badly
20 with him, and then I will worry about the
21 extrapolation, because I don't even know how to do it
22 for one right now and any kind of objectives.

23 MS. DUDES: Well, I think it's a valid
24 point. And I think within our program plan we do have
25 some qualitative assessment-type tools available to

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1 us.

2 And as we implement, we will continue to
3 think about that and we'll be asked to show those
4 types of results in our program.

5 MEMBER POWERS: I mean, there are some
6 really bright guys that are wasting their time
7 worrying about HRA next door.

8 (Laughter.)

9 MEMBER POWERS: Have you asked them to
10 think about these kinds of issues, because these
11 really are HRA kinds of issues by and large.

12 And, you know, it seems to me that I would
13 invite somebody, you know, some bright guy, maybe
14 Nathan Siu, to come over and think about it for a
15 while and see is there any handle on this that could
16 be done.

17 And I'd put the monkey on his back rather
18 than your back on how to answer these terrible
19 questions that you're going to get faced with, you
20 know. When do I accept other people's inspections?
21 When do I do detail? When do I do not detail?

22 I mean, you guys are totally tied up.
23 You've got your own set of questions of how do I
24 sample from 80,000 different potential suppliers? And
25 that one strikes me as absolutely a formidably

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1 difficult question in and of itself.

2 This other one is how do I know I'm doing
3 the right thing in a persuasive sense, because, I
4 mean, your problem is that you inspect it, you retire,
5 your kids take the job, they get close to retirement
6 before a defect shows up.

7 (Laughter.)

8 MEMBER POWERS: And he says, well, damn,
9 Dad screwed this one up.

10 (Laughter.)

11 MEMBER POWERS: I mean, it's a long time
12 before you know what you screwed up, because, I mean,
13 the easy stuff gets caught. The stuff that's
14 consequential doesn't show up until somebody turns it
15 on. And we hope they never turn on the safety
16 systems.

17 MR. ROACH: Okay. Thank you, Laura, for
18 pitching in there. To that aside, we do solicit as
19 part of our Vendor Inspection Program, input from the
20 vendors, you know, feedback on the quality, the scope,
21 the issues identified.

22 MEMBER POWERS: Yeah, I think that's, I
23 mean, I think I am reminded of one of the complaints
24 that comes back about the current ROP is, routinely
25 nuclear safety officers say, well, you know, I'm not

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1 getting as much feedback from NRC's inspection
2 program. Everything ends up in the, you know -

3 MR. ROACH: Minor.

4 MEMBER POWERS: Minor and I'm not getting
5 the feedback I used to get from this. I would think
6 that vendors would have the same response. They'd
7 say, gee, you know, I'm getting tremendous feedback
8 here that I will never get any other way.

9 MR. ROACH: And that's been our experiences
10 because when we walk the floor, the shop floor with
11 them looking at their, say, control materials or their
12 welding, their NDE equipment, their fabrication, their
13 assembly of a valve, there's things we observe that
14 because they're so intuitively doing it that they
15 don't even recognize it.

16 MEMBER POWERS: Of course not.

17 MR. ROACH: So -

18 MEMBER POWERS: I mean, you know it
19 yourself.

20 MR. ROACH: Yeah.

21 MEMBER POWERS: You do things and you -

22 MR. ROACH: Yeah.

23 MEMBER POWERS: - never think about it,
24 because I've always did it that way.

25 MR. ROACH: And we also besides soliciting

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1 vendor feedback to the inspections that occur, we do
2 outreach with a - every other year we do a vendor
3 workshop where we go out and this past year it was in
4 Baltimore. We're not sure where it's going to be - it
5 might be in Washington this year, the next year we do
6 it, 2014.

7 And we give them the opportunity to come
8 and talk to us. We make presentations on the issues
9 we've found.

10 MEMBER POWERS: We ought to try to attend
11 one of those. I mean, I don't know about these, but
12 I know the ones that they've had like in the fire
13 protection area have been extremely edifying.

14 MR. ROACH: And then our final piece of
15 this is we do - we perform self-assessments of our
16 program within the last three months to try to; one,
17 address our Center of Expertise integration, our
18 implementation of the VIPP so that we can - lessons
19 learned from that, and then finally look at overall
20 what do we need to do to move our program forward.

21 We could anticipate that as vendor
22 inspection moves forward, in two to three years there
23 may be fewer vendors we need to go see. And so,
24 resource-wise it might ramp down with the current work
25 on the plate.

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1 That all remains to be seen. But as it is
2 now, our prioritization for vendor selection is based
3 on the ones we have in our database. We constantly
4 search out intelligence of other vendors that are out
5 there that we're finding out about whether they be in
6 the US or overseas.

7 And then we weigh them in our matrix to
8 see the significance of the parts they make. Do we
9 have issues with them operating experience-wise, Part
10 21s?

11 And then that gives them a sort of matrix
12 point total. And then we rate them. And then we
13 readjust our inspection schedule.

14 So, that's how we try to pick the most
15 bang for the buck as we move forward.

16 MEMBER RYAN: That sounds like a pretty
17 robust program. I'm curious about your - you do self-
18 inspections. Do you have other outside folks or folks
19 around the country participating in the assessment of
20 your program? How do you interact with the broader -

21 MR. ROACH: Actually, I'll let Rick
22 Rasmussen talk to that when he presents on -

23 MEMBER RYAN: Okay, fine.

24 MR. ROACH: I think that's a good time for
25 him to talk about how we learn from international and

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1 how they look at our program and ask questions.

2 MEMBER RYAN: Okay, great. Thanks.

3 MR. ROACH: We routinely have had folks
4 from the NNSA, the Chinese, participate in inspections
5 with us.

6 MEMBER RYAN: Okay, great. Oh, terrific.
7 Thanks. I'll look forward to that then.

8 MR. ROACH: So, as I said, our procedures
9 delineate how we perform our inspections and the
10 processes associated with that and it's described in
11 the enforcement manual that the NRC has implemented.

12 So, we try to have a - it's a level
13 playing field when it comes across inspections across
14 the Agency. So, it's not - something a little
15 different.

16 The majority of our inspections fall into
17 two categories; routine and reactive. Routine are the
18 ones described where we're going out and we do this
19 evaluation and then plan our inspection so we can get
20 out. And sometimes international travel requires us
21 to plan a little farther ahead, but we do that for
22 important components.

23 Mangiarotti makes core makeup tanks and
24 accumulators in Italy. And we've been to Doosan. And
25 we've been to several other places.

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1 Reactive, when we start seeing a trend in
2 the operating experience, information coming in or we
3 get calls from resident inspectors or the Region
4 saying, hey, this is an issue, you know, we're seeing
5 this problem, then we'll start doing some research and
6 intelligence gathering on that vendor and look at them
7 and when was the last time we went there, you know.
8 What products do they generate? Is this a potential
9 safety concern? Do we need to go and look at them and
10 their quality?

11 So, when we perform a reactive inspection,
12 it says right in the cover letter that this was a
13 reactive inspection. And I'd say two to four reactive
14 inspections per year conducted based on operating
15 experience.

16 MEMBER POWERS: Does a reactive inspection
17 represent a failure of the ordinary routine inspection
18 program?

19 MR. ROACH: Maybe, maybe not. And I say
20 that because it could be that we had been there three
21 years ago, they moved into making another type
22 component or there could have been, in many cases, the
23 corporation is bought out and change of management.

24 Allegations also would be a - if we're
25 tasked coming out of the Allegation Review Board to

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1 perform a vendor inspection, a reactive inspection of
2 a vendor because of allegations, that's another driver
3 for that.

4 So, it isn't necessarily a failure of the
5 routine inspections. It may be that there's other
6 variables.

7 CHAIRMAN ARMIJO: Ed, in your routine
8 inspections, things can look superficially very good
9 in a QA program, you know, but how deep do you go into
10 their internal findings of, you know, let's say the
11 vendor's own QA program saying, look, you have an
12 unusually large amount of findings of your own product
13 not meeting requirements, or you have an unusually
14 large rework program built in to do your manufacturing
15 process.

16 Some of it is obvious rework, some of it
17 is hidden rework. They integrate it into their
18 manufacturing process as a built-in rework process.

19 MR. ROACH: In-process.

20 CHAIRMAN ARMIJO: Poor is not a quality
21 way to do things. Do you go into that level of detail
22 to say, hey, look, the only reason these guys are
23 having apparently good quality assurance record is
24 because they're reworking everything under the sun and
25 they're just on the edge of something getting through

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1 that could cause grief later on.

2 MR. ROACH: I would suggest that were we to
3 see examples of that on the floor, that really almost
4 gets into their business plan or their business model,
5 right.

6 CHAIRMAN ARMIJO: You really have to get
7 your hands on that.

8 MR. ROACH: Yeah. If we were seeing that
9 on the floor, typically we would be looking for the
10 fact is if it doesn't conform to the specs before it
11 goes to the next step in the fabrication process, that
12 they appropriately identify it and reject it and send
13 it back for rework, you know.

14 Our ultimate goal is, you know, business-
15 wise that's not an efficient model, but our ultimate
16 goal is that the parts that they deliver to the
17 industry performs their intended function. And so,
18 that's what we would be looking for.

19 MR. RASMUSSEN: Ed, let me provide some
20 perspective on this.

21 MR. ROAD: Sure.

22 MR. RASMUSSEN: Rick Rasmussen, the chief
23 of the Electrical Vendor Inspection Branch. And one
24 way to look at this, most of the suppliers out there
25 supply parts that function, they'll pass the receipt

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1 inspections, the installation tests.

2 Where our findings really shine are the
3 ones that get beyond that and we're trying to measure
4 the difference between functionality and adequate
5 assurance that they'll work in the complete design
6 envelope.

7 And so, the detail of our inspections, the
8 rigor that we go through is looking at their product
9 lines, for example, of how it's been manufactured for
10 30 years now. What's changed? What's different? Are
11 the same people supplying the same part with the same
12 recipe?

13 And what we often find is that these
14 vendors in some instances have made substitutions to
15 seemingly innocuous parameters without adequately
16 justifying and going back and revising the
17 qualification tests that support that assumption.

18 And so, I think if we're having that kind
19 of findings, it tells you that we're getting down to
20 the nitty-gritty -

21 CHAIRMAN ARMIJO: How good is their change
22 control process.

23 MR. RASMUSSEN: That's right.

24 CHAIRMAN ARMIJO: Do they really qualify
25 the change, or do they just say, this couldn't make

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1 any difference and it costs less and let's do it.

2 MR. RASMUSSEN: That's right. And, you
3 know, they may say that, but we challenge it.

4 CHAIRMAN ARMIJO: Yeah, good.

5 MS. KAVANAGH: Can I offer one more
6 perspective? Your question was regarding the - and
7 this is Kerri Kavanagh, I'm sorry, the chief of
8 Quality Assurance Branch.

9 Your question was regarding whether or not
10 if we would comment or look into an excessively high
11 corrective action program.

12 It's a balance. We don't want to
13 discourage them from entering things into their
14 corrective action program.

15 However, if they have, you know, something
16 that we would consider was excessively high, I think
17 our sample size looking at those different corrective
18 actions would be a lot larger than typical.

19 CHAIRMAN ARMIJO: Okay, thank you. The
20 reason I ask those questions is because I used to buy
21 a lot of components from a lot of vendors and sub-
22 vendors.

23 And some of the things that we experienced
24 was excessive corrective action, excessive rework and
25 eventually good products came out of that, but

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1 sometimes you'd wind up with no product being
2 deliverable and you had to ship your product simply
3 because the fundamental process wasn't sound. And
4 people had made some changes, seemed to be innocuous
5 and it turned out to be a huge mess.

6 So, you know, those are numerous
7 challenges to quality. And the more challenge you
8 have, eventually something will get past even a good
9 inspection program. And then you have problems.

10 MR. McINTYRE: Another thing we'd be
11 looking at is, as Kerri said, if there are a number of
12 corrective actions, we'd be looking for repetitive-
13 type failures that, you know, you identify the
14 problem, a non-conformance, you put in your corrective
15 action program, and then you're seeing it six months
16 later or nine months later.

17 That means the corrective action process
18 isn't working and somewhere -

19 CHAIRMAN ARMIJO: Exactly.

20 MR. McINTYRE: - along the line you're
21 going to end up shipping a component with a defect if
22 you don't adequately correct the program - the
23 problem.

24 MR. BROWN: Can you state your name?

25 MR. McINTYRE: Okay. Rich McIntyre.

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1 CHAIRMAN ARMIJO: Yeah. Thanks, Rich.

2 MR. ROACH: Okay. This is just kind of a
3 snapshot from our Vendor Inspection Plan just to talk
4 about the key attributes that we look at.

5 Since we're not resourced to routinely
6 inspect all vendors that may provide basic components,
7 there are about 600 vendors currently listed in our
8 database, which approximately a hundred of them are
9 foreign vendors.

10 So, our bias right now is those vendors
11 supply basic components for the AP-1000s, and
12 specifically those are the first-of-a-kind or we go to
13 vendors who are doing the testing on those components
14 that are kind of first-of-a-kind.

15 So, that's why you heard us talk about the
16 squib valves, talk about RCP, talk about the
17 Intertech, the vendors making the flow check nozzles.

18 The Vendor Inspection Program Plan
19 establishes the criteria. And we just monthly, every
20 four weeks to six weeks we sit down with the senior
21 staff and we go through and populate our inspection
22 plan.

23 We look at new information we receive from
24 our briefings with Westinghouse and the licensees, and
25 then figure out what are the next ones. Are we still

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1 on track for the ones we have planned, or do we need
2 to bump something and bring something up because it's
3 more urgent or more important for us to inspect that?
4 So, we try to make it a living plan.

5 Okay. The Centers of Expertise, Laura
6 talked about that. Really, we're looking for a way to
7 - one of the challenges within the NRC sometimes,
8 there are offices that operate similar programs in
9 different manners.

10 And so, we looked at this as an
11 opportunity. And so, between NRR and NRO there were
12 four programs that were evaluated and considered for
13 the construction - Centers of Expertise. And they
14 were allegations, operating experience, electrical
15 engineering and vendor inspection.

16 And so, fundamentally that worked its way
17 through and we formed a Center of Expertise and vendor
18 inspection. And three fellows came over from NRR to
19 work in NRO and fairly experienced. Paul Prescott,
20 very good. He's working for Kerri. A lot of
21 experience. And Jonathan Ortega, he worked on the AIT
22 for San Onofre in order to support that. And also
23 Aaron Armstrong who's been on several - he's an
24 electrical engineer. He's been on several
25 inspections.

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1 So, we basically fully integrated those
2 and then we've incorporated within our scheduling
3 process the look at operating reactors, as well as new
4 reactors in our scheduling.

5 So, in many cases these vendors we pick
6 supply both the operating, current operating fleet,
7 and the fleet of new reactors that are planned.

8 So, all the folks reside in our office and
9 work for Laura at this point. And so, that gives us
10 ability to do effective training and also making sure
11 we meet our goals.

12 MEMBER SKILLMAN: Ed, let me ask this
13 question, please.

14 MR. ROACH: Sure.

15 MEMBER SKILLMAN: What amount of effort
16 proportionately was given to these four areas;
17 allegations, operating experience, electrical and
18 vendor?

19 You know, just in a round number, what
20 percentage is allegations? What's the traffic out of
21 the allegations area?

22 MR. ROACH: The result in inspections, you
23 would say?

24 MEMBER SKILLMAN: Yeah. 10 percent? 20
25 percent?

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1 MR. ROACH: I'd say less than 10 percent
2 right now. What do you think?

3 MS. KAVANAGH: I think it's higher.

4 MR. ROACH: You think it's higher?

5 MS. KAVANAGH: Yeah.

6 MR. ROACH: We've had a couple of vendors
7 specifically that have had more allegations than
8 others. So, we have made repetitive trips to those
9 vendors. So, but overall not every allegation
10 requires a vendor inspection.

11 In many cases, we may send a request for
12 further information or we may actually initiate
13 something for a safety conscious work environment
14 evaluation or something like that.

15 MEMBER SKILLMAN: That's where I was going
16 to go next. Of the percentage that are allegations,
17 can you give us an idea of how many might be - what
18 percentage might be a disgruntled employee just
19 throwing a hand grenade at management versus a highly
20 respected employee having a real concrete concern?

21 MR. ROACH: I'm going to turn to Kerri.
22 Kerri and I worked pretty closely on this one. I
23 would say 10 to 20 percent, you know, are a real -

24 MS. KAVANAGH: Yeah.

25 MR. ROACH: - conscientious employee

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1 raising issues that may have been squashed. I don't
2 know if that's the right term.

3 MEMBER SKILLMAN: It's fair enough.

4 MR. ROACH: It may not have been heard
5 within his organization -

6 MS. KAVANAGH: Right.

7 MR. ROACH: - compared to folks who might
8 have a beef or might have a disagreement with their
9 management.

10 MS. KAVANAGH: Right, right. This is Kerri
11 Kavanagh. NRO has been averaging about 20 allegations
12 per year the last two years.

13 It's January and we're already up to
14 three. So, we're starting the year off really well.
15 So, it's looking like it's going to be a very busy
16 year for us supporting allegations.

17 MR. ROACH: And the follow-on to that is if
18 we had a vendor who repetitively had issues,
19 allegations, we might ask them to do an assessment of
20 their safety culture. We may bring in specialists
21 from NRR to do a safety conscious work environment
22 assessment. Or in the case, we may issue a letter, a
23 chilled work environment letter to them. Put them on
24 notice.

25 MR. McINTYRE: This is Rich McIntyre.

1 Also, that's a great question. A lot of them are
2 disgruntled employees, but it's because usually their
3 technical concerns haven't been addressed to their
4 satisfaction.

5 So, kind of they go from having a
6 technical concern, it's not covered adequately, and
7 then they become a disgruntled type of employee.

8 MEMBER SKILLMAN: Let me ask one more.

9 On either OE or electrical engineering or
10 vendor inspections, can you give us an idea of what
11 the concerns may be that are related to poor incoming
12 materials?

13 So, here's a vendor that's producing
14 whatever the devices are that are widely used in the
15 nuclear business. Now, all of a sudden the issue
16 becomes these devices are not what they're supposed to
17 be.

18 The manufacturing is fine, but the
19 incoming material is tainted, not conforming, came
20 from a source that wasn't anticipated. It's like the
21 formaldehyde in the paneling that came from China, the
22 drywall.

23 A concern that I've had for many years is
24 as we've seen the industry change and the supply chain
25 change, we're seeing vendors that are producing raw

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1 materials or basic materials that aren't what they
2 were in the `60s and `70s.

3 MR. ROACH: I'm going to - I see Rick
4 Rasmussen stepping up to address this a little bit.
5 I think he can probably - he's got a little more
6 experience than I do in this.

7 MR. RASMUSSEN: We don't have a lot of
8 examples that are exactly that. We hold the
9 individual vendors - they're accountable for their
10 supply chain and doing the verification of their
11 source materials.

12 We have raised issues with vendors. We
13 had some that were procuring some electrical circuit
14 breakers from just an open source, almost an internet
15 site getting things that were substandard and then
16 trying to do dedication activities. And they just
17 didn't have adequate controls in place for using that
18 kind of a supply chain.

19 And so, you know, we pointed that out and
20 issued a Notice of Nonconformance to them and
21 hopefully it made some kind of example of that, but
22 it's a problem that it really is - it falls right back
23 on the suppliers themselves. They are under Appendix
24 B, are accountable for that.

25 MEMBER SKILLMAN: Thank you.

1 MR. ROACH: And again just to clarify,
2 there are Centers of Expertise for allegations, there
3 are Centers of Expertise for operating experience and
4 ConE. There's Centers of Expertise for electrical
5 engineering.

6 Basically, there was only a few members of
7 the electrical engineering staff left in NRO. They
8 were brought over to NRR, but they still work on NRO
9 projects. So, kind of there's the mentoring the
10 experiences to make sure - and vendor inspection we
11 did the opposite of that.

12 MEMBER SKILLMAN: Thank you.

13 MR. ROACH: Next slide. So, the one piece
14 I just wanted to drive home is that our vendor
15 inspection center of expertise, we're looking for
16 effective implementation of the vendor QA programs
17 that vendors take us seriously and hold their sub-tier
18 suppliers accountable to assure the quality of the
19 materials, equipment and services supplied in the
20 commercial nuclear industry.

21 I'll go back to Gordon's question there
22 and one of the things I've seen on the inspections
23 I've gone on is typically we will go and see what does
24 the vendor do to assure that the incoming raw material
25 for in the case it might be plate steel or it might be

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1 ingot, you know, when they do the verification of the
2 materials, do they do the quick and dirty
3 spectroscopic type and only look at a couple of
4 elements when they should make sure that the other
5 elements that could be contaminants are not there?
6 And so, we have had findings related to that before.

7 We support allegations, as we talked
8 about. And then we're also in working with Rich
9 Rasmussen and Kerri and the CFSI Initiative, looking
10 for those issues where counterfeit or sub-type parts
11 are identified in the course of one of our
12 inspections.

13 And so when we do that, we communicate
14 that and then try to get our hands around - arms
15 around that one.

16 So, basically that's my presentation. Any
17 other questions? And then we're going to turn it over
18 to a couple of the other folks from my staff. Rich
19 McIntyre and Samantha Crane and Kerri Kavanagh will be
20 talking. And Rick Rasmussen, who is the branch chief.

21 MEMBER POWERS: You've spoken several times
22 about doing an internal assessment in your program.

23 MR. ROACH: Yes.

24 MEMBER POWERS: I think you've said three
25 times in -

1 MR. ROACH: We've done three of them. Just
2 three different aspects of it.

3 MEMBER POWERS: Do you ever try to
4 benchmark yourself? And if you did try to benchmark
5 yourself, who is your peers in the field of vendor
6 inspection?

7 MR. ROACH: I would - I think Rick can
8 probably give us, you know, we would benchmark
9 ourselves to the international community. We do
10 attend ASME meetings. We do have staff who attends
11 the NuPIC.

12 MEMBER POWERS: I'm wondering why you would
13 avoid something like, say, the Navy program as a
14 benchmark.

15 MR. ROACH: I don't - I'm not sure we
16 avoided, Dr. Powers, but I don't think we included
17 that as a potential candidate at this point.

18 MR. RASMUSSEN: I think it's a very
19 different environment. And the things that we find
20 when we compare international standards is you not
21 only have to compare the quality assurance standards,
22 but you also have to compare the regulatory structure.

23 And so, it's hard to compare our program
24 to an environment where the vendors are licensed or
25 approved by the regulatory body. They've got far more

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1 direct impact on the vendors and more control.

2 In our case, we don't license the vendors
3 and we require the licensees themselves to provide
4 that oversight. And so, we don't - just like we in
5 our normal construction oversight program, we don't
6 have hold points. There are just some very
7 fundamental differences.

8 If you break through those layers and get
9 down to the attributes of inspection, I think we
10 become very comparable, if not, leaders. And I can
11 talk about that in just a little bit.

12 MR. McINTYRE: And to answer your question,
13 you know, comparing to the Navy, I've done - led
14 vendor inspections at facilities that are -

15 MEMBER POWERS: I'm really not asking about
16 the Navy. I'm asking about benchmarking.

17 MR. ROACH: Yeah.

18 MR. McINTYRE: Yeah, well, that's what I
19 was trying to - we don't have - we're not privileged
20 to any of that information.

21 Even when we go to a facility where
22 they're fabricating power plants in the Navy, that's
23 usually in a segregated area and all that information
24 is proprietary. So, we would never have viewing
25 rights to any of that information.

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1 MEMBER POWERS: Well, that's just a matter
2 of effort.

3 MR. ROACH: Understood.

4 MEMBER POWERS: I mean, we review the Navy
5 nuclear system. So, basically we can get it. It's
6 just a matter of effort.

7 MR. ROACH: We actually do have three of
8 our staff working on the -

9 MEMBER POWERS: Yeah.

10 MR. ROACH: Right now.

11 MEMBER POWERS: You can get it if you just
12 try hard enough, I mean.

13 CHAIRMAN ARMIJO: I think we're running a
14 little late and we're going to have to keep moving.

15 MR. ROACH: So, we'll thank you for your
16 time and - you got it? Okay, I'll step to the side.

17 (Discussion off the record.)

18 MR. McINTYRE: Well, I can see everybody
19 now. Good morning, everyone. My name is Rich
20 McIntyre and I'm a senior reactor engineer in the
21 Construction Mechanical Vendor Branch.

22 I've been with the NRC for over 28 years
23 and I've led vendor inspections and plant site
24 inspection activities for the Office of Inspection and
25 Enforcement, the Office of Nuclear Reactor Regulation

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1 and currently the Office of New Reactors.

2 My background is in civil structural and
3 I worked for ITT Grinell up in Providence, Rhode
4 Island for eight years before coming to the NRC.

5 I'm the - currently I'm the NRC
6 representative on several industry standard committees
7 such as the ASME NQA 1 Executive and Main Committee,
8 the ASME Section 3 Committee on Nuclear Certification,
9 which is basically the oversight of all the nuclear
10 suppliers, and I'm presently the chair of the Section
11 3 Subgroup on General Requirements.

12 Today, what I wanted to do is describe how
13 we identify our vendors for inspection, what's some of
14 the emphasis areas for our vendor inspections, and
15 then describe some of the key inspection results.

16 Some of the current NRC sources for vendor
17 information we use to identify vendors for inspection
18 include areas such as the reporting systems of 10 CFR
19 Part 21, the 50.72 notification requirements for
20 operating reactor process, and the licensee event
21 reporting system.

22 As Ed talked about, we have a lot of
23 involvement/interaction with industry and standard
24 committees such as NuPIC, which is the Nuclear
25 Procurement Issues Committee, that's the licensees

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1 oversight of suppliers, the NIAC, which is the Nuclear
2 Industry's Assessments Committee, which is the vendors
3 getting together and auditing each other, and also the
4 ASME Section 3 nuclear certificate holder survey
5 process.

6 We also utilize formal and informal
7 communication with licensees, applicants and
8 engineering procurement and construction contractors
9 as part of the Part 52 licensing process.

10 And as we just discussed, allegations
11 often require vendor inspections to get into the
12 details of the allegation.

13 Some of our vendor initiatives that we
14 have under development is a regulatory issue summary
15 requesting voluntary identification of safety-related
16 suppliers, our NRC public website to allow voluntary
17 entry of vendor information, and that's awaiting OMB
18 clearance, and then we have our NRC internal database
19 to facilitate communications with suppliers. And as
20 Ed alluded to, we use that as part of our vendor
21 selection process.

22 And all of this information we have
23 available on a new reactor quality assurance link
24 which is on the NRC website. So, anything that we
25 talk about today is pretty much available on our

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1 quality assurance link.

2 MEMBER SHACK: Get the Part 21 thing
3 translated into Italian.

4 MR. McINTYRE: And the Part 22.

5 Vendor inspections being performed are a
6 combination of both domestic and international
7 inspections for both new and operating reactors.

8 Most of the international inspections
9 include observers from foreign regulatory agencies as
10 part of the multinational design evaluation program
11 that we just talked about a little bit.

12 Observers have participated from Canada,
13 France, Finland, Sweden, Japan, Korea and China. And
14 that currently makes up almost half of the MDEP
15 countries.

16 We expect further participation from other
17 MDEP countries such as Russia, South Africa and the
18 United Kingdom sometime during the next couple of
19 years.

20 And as Ed -

21 CHAIRMAN ARMIJO: I want to make sure I
22 understood that. These are people that actually
23 participated in NRC inspections?

24 MR. McINTYRE: They are. They participated
25 as observers. So, they're from the foreign regulators

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1 in these countries and have observed.

2 And Rick will go into a little bit where
3 we've actually have inspection interaction. So, I
4 don't want to steal his thunder, but we do, do
5 inspection together.

6 But those are - so, we've had observers
7 from all those countries, and these are both in the
8 United States and in our foreign -

9 CHAIRMAN ARMIJO: But they can - they do
10 interact with the inspectors.

11 MR. McINTYRE: Oh, without a doubt.

12 CHAIRMAN ARMIJO: They're not just sitting
13 there at -

14 MR. McINTYRE: No, when we - I've had them
15 on inspections I've led. And when we do, we encourage
16 participation.

17 I did an inspection at Westinghouse Fuels
18 in Sweden and we had both Finland and Sweden there.
19 And we had two very knowledgeable individuals and they
20 provided very good insight that, to be honest with
21 you, we didn't have on the inspection team that helped
22 facilitate the quality of the inspection.

23 MS. KAVANAGH: Right. And both in Korea
24 and Japan, the inspections that I have led, this is
25 Kerri Kavanagh, just the ability to talk to the vendor

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1 and help, you know, we do have translators, but their
2 ability to explain the technical aspects of what we're
3 trying to get across has been extremely helpful.

4 MR. McINTYRE: Yeah, "observe" is just a
5 word. They fully participate on our daily debriefs
6 that Ed talked about. We, you know, they fully
7 participate in that.

8 CHAIRMAN ARMIJO: But as far as preparation
9 of your inspection report, things like that, that's
10 purely NRC staff.

11 MR. McINTYRE: Exactly.

12 CHAIRMAN ARMIJO: Okay.

13 MR. McINTYRE: Yes. Our inspections
14 include emphasis on the inspection of in-process
15 design, fabrication testing and inspection of
16 component and product lines of interest. Ed touched
17 on that.

18 We now use more of a vertical slice
19 approach as opposed to a broad programmatic review.
20 We'll start with a component, and then we'll work back
21 into the Appendix B criteria as necessary as opposed
22 to saying, you're looking at corrective action, you're
23 looking at nonconformance, you're looking at training.
24 We work that backwards into the actual component.

25 We have an increased use of technical

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1 specialists in the areas of mechanical, materials,
2 structural, electrical and digital I&C.

3 We have an emphasis on qualification and
4 type testing and design work associated with targeted
5 ITAAC. Ed discussed that earlier.

6 And we've reviewed general ITAAC such as
7 the component was designed and fabricated in
8 accordance with the ASME Section 3 code. That would
9 be for, say, a reactor vessel head forging.

10 And then we have more specificity such as
11 pertinent ASME Section 3 tests identified in the code
12 such as a hydrostatic test for the component. So, we
13 do broad, and then we do very specific ITAAC.

14 This slide identifies the Appendix B
15 criteria from all of the inspections completed in
16 fiscal year 2012. As you can see, we had a total of
17 60 Notices of Violation and Notice of Nonconformances
18 that were cited against licensees, applicants and
19 vendors.

20 A large percentage of the vendors, about
21 75 percent, have been related to AP-1000 design
22 fabrication and testing.

23 An NOV is cited for failure to meet 10 CFR
24 Part 21 requirements. And an NON, Notice of
25 Nonconformance is cited against Appendix B

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1 requirements for the 18 criteria and failure to
2 implement those.

3 The most significant findings we have seen
4 in the last year are failure to implement the
5 following Appendix B criteria. These findings are
6 consistent with the scope of our NRC inspections over
7 the past year that focus more on design control and
8 mechanical and electrical equipment qualification
9 testing.

10 As you can see on the chart, the highest
11 percentage of findings were against Criterion 3, which
12 was design control including dedication of commercial-
13 grade items, which Laura alluded to earlier.

14 Number 2 were Criterion 16, which is
15 corrective actions. We talked a little bit about
16 that.

17 Three was test control as we were doing a
18 lot of testing activities. Yes, we had a number of
19 test findings.

20 And then the fourth was control of
21 purchase material, equipment and services that is
22 oversight licensee and other suppliers' oversight of
23 each other.

24 MEMBER SKILLMAN: Before you change, back
25 to 18, please.

1 MR. McINTYRE: Yes.

2 MEMBER SKILLMAN: I contend that the
3 finding, the 32 percent in Criterion 3 may be
4 understating the significance of what that means. Let
5 me explain.

6 MR. McINTYRE: Okay.

7 MEMBER SKILLMAN: Your Commercial-Grade
8 Dedication Team at the site or in the utility has the
9 ability to fundamentally change the personality of the
10 plant by dedicating what they believe is the right
11 part into the control system, into the ECCS command
12 and control system, ESFAS, whatever you call it, or
13 into the heat balance control system, whatever that
14 might be. By sleight of hand, intentional or by
15 accident, those who are doing commercial-grad
16 dedication can change the risk profile of that plant
17 very significantly.

18 So, my question is in this pie chart with
19 what appear to be approximately 20 of the violations
20 being design control related, and of those a large
21 percentage commercial-grade dedication, what attention
22 is given to the significance of those findings?

23 I can give you an example. You change a
24 relay, phosphor bronze springs, one set of springs
25 that you can replace are six mils thick, and another

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1 are eight mils thick. And the difference in the
2 thickness is the wicking characteristic on the actual
3 contacts.

4 One set will perform during seismic. The
5 other will fail during seismic. But unless the
6 critical attributes of the commercial-grade dedicator
7 is understood, that feature won't be appreciated.

8 MR. MCINTYRE: Yeah. And one of the things
9 we always do look at is starting with the safety
10 function and then identifying those critical
11 characteristics to verify that it will perform its
12 intended safety function.

13 The question, do we look at the
14 significance? Yes, we do. And it's an area of
15 emphasis for us.

16 And Ed and Laura talked about our
17 workshops. We've over the last two workshops, we have
18 spent a lot of time with presentations on - with
19 utilities and vendors trying to get a better awareness
20 and understanding of the commercial-grade dedication
21 process and what it can do.

22 You mentioned, you know, materials. One
23 of the things we see is, you know, an ASME Section 3
24 component is being supplied. Well, if it's a pressure
25 boundary item within that N stamp certificate, it has

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1 to be provided as ASME Section 3 material.

2 So, we haven't seen a lot of problem with
3 that, because they're required to meet the code. But
4 what about those piece parts within the component that
5 aren't pressure boundary, but they're safety related?

6 Now, those, we're starting to see those
7 items being dedicated where 20 years ago everybody
8 would have bought that as code material. They
9 wouldn't have even thought about dedicating that.
10 Now, it's more economical. So, that's an area that
11 we're really, you know, we're looking into in the
12 dedication within the piece parts. And just like you
13 were saying with your relays.

14 MEMBER SKILLMAN: Okay. So, let me finish
15 what I'm trying to communicate.

16 How is the significance of that population
17 communicated? So, here are 20 out of 60 findings that
18 are in design control. Some number of those are
19 commercial-grade dedication. Failures or oversights
20 or whatever that might be.

21 Of those, some could be really significant
22 in terms of changing the plant's personality. So,
23 where those are significant, how is that significance
24 identified?

25 It goes back to Dr. Powers' question on

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1 risk reduction work or risk achievement work for these
2 processes. How do you know you're making a
3 difference?

4 I would suggest that if in that area,
5 Criterion 3 of Appendix B to 10 CFR 50, if you say,
6 here, of the 60, here are 20, and 23 were really
7 significant because they affected the ESAS or, you
8 know, whatever the system is, because they were of
9 such significance.

10 That would be a burning - that would be a
11 lighthouse for the industry to double their efforts to
12 ensure that they really understand what they're doing
13 in this area. And that's a large percentage.

14 MR. McINTYRE: Yes.

15 MEMBER SKILLMAN: 33 percent, a third of
16 them. A third of them are design control. That's
17 significant.

18 MR. McINTYRE: And we do within our
19 website, we list all of our findings by criteria. So,
20 they're available for people to review, but I don't -
21 you guys can help me out. I don't think we have a
22 process in place right now.

23 CHAIRMAN ARMIJO: It's sort of like an
24 emerging generic issue. It's like dedication is
25 really going the wrong way.

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1 MR. McINTYRE: Rick is going to add
2 something.

3 MR. RASMUSSEN: Yeah, I think, you know,
4 this is an area, design control and the commercial-
5 grade dedication aspects, we see that as a big issue.

6 I think if you've seen the press, the
7 issues that the Koreans have experienced recently with
8 commercial-grade dedication issues. TBA has announced
9 some pretty significant problems.

10 And so, we have had the opportunity to
11 supply some inspectors to the operating oversight
12 program to do some inspections, and we're evaluating
13 an initiative to tackle that a little more direct and
14 come up with some pilot inspections where we can go in
15 and look at what the licensees are doing on the site.
16 And then pull the string from the licensee to the
17 vendor and look a little harder down that chain.

18 So, you know, we definitely recognize it
19 and we're trying to address that in those ways.

20 MEMBER SKILLMAN: I guess my point would be
21 that the bulk of the plants in the United States are
22 aging.

23 CHAIRMAN ARMIJO: Without a doubt.

24 MEMBER SKILLMAN: The aging plants have
25 greater and greater difficulty getting spares. They

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1 are often put to the test by having to commercially-
2 grade dedicate parts that otherwise would never have
3 been used.

4 And unless the people that are doing the
5 dedication really understand the function and
6 performance requirements and the critical features of
7 the replacements, then the people that are doing the
8 small modifications can incorporate into the plan
9 nonconformances that can have huge risk later on. And
10 it's a latent defect. It's just embedded.

11 MR. MCINTYRE: I don't think you'll get any
12 disagreement from any of us here.

13 MEMBER SKILLMAN: So, unless that's
14 highlighted, unless there's really a conscientiousness
15 about that, then I would suggest that's a growing risk
16 area that we're probably not attending to as
17 thoroughly as we need to be.

18 MR. LUEHMAN: This is Jim Luehman. I'm the
19 deputy director of the Division of Construction
20 Programs.

21 To answer that question directly, there's
22 a couple things. One is I think as Rick alluded to,
23 one of the things that we are doing as part of our
24 reevaluation of our process and, in fact, we're about
25 to work with the Regions, specifically the operating

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1 plants, back in the `90s, and Rich McIntyre was
2 involved in this, we made a big effort to work with
3 the commercial industry as commercial-grade dedication
4 started to become a fairly routine way that they
5 conducted business.

6 We at the time, were after many workshops
7 and a lot of inspections, I think, fairly satisfied
8 that the operating fleet understood the requirements,
9 but now time has moved on.

10 And so, one of the things - and obviously
11 not only has time moved on, but the people that are
12 doing this are a different generation of people and
13 the complexities of the dedications that are being
14 done are greater.

15 So, one of the things that we are doing,
16 and Rick alluded to it is, we are going to be working
17 with the Regions to do some - reach out and do some
18 commercial-grade dedication inspections to do some -
19 do some sampling in the operating fleet to see to what
20 extent their programs are as robust as they once were
21 in commercial-grade dedication.

22 Are they, you know, at the same level back
23 in the `90s when we engaged them? So, that's one
24 thing that we're doing.

25 The other thing with respect to

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1 individually significant events or findings that
2 occur, we do have generic communications. And from
3 time to time, generic communications with regard to
4 part failures that may be related to dedication or
5 other misapplications, we do use that process whether
6 it's the information notice, the regulatory
7 information summary. And obviously we have - also
8 have the ability to issue bulletins if the occasion
9 arises.

10 So, that avenue is used, is available.
11 Those avenues are available and can be used. So,
12 that's the second thing I would say.

13 And then the last thing we alluded to
14 earlier and Rich mentioned it just recently, we do
15 spend a significant - we have spent a significant
16 portion of our vendor workshops where we have both the
17 industry and the vendors there with numerous sessions
18 related to commercial-grade dedication, the processes
19 for doing that and getting down into some specifics
20 whether it be electrical components or mechanical
21 components.

22 So, I think as Rich said, you'll get no
23 disagreement from us that commercial-grade dedication
24 is a potential - is a large area of potential
25 introduction of problems. And we continue to work

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1 with the industry and we continue to question
2 ourselves as to whether we're doing enough now in that
3 area.

4 MR. McINTYRE: And we did issue an
5 information notice, I believe it was in 2011,
6 highlighting some recent dedication findings.

7 So, that's going along with what Jim was
8 saying on the generic communication. So, we have done
9 that within the last two or three years.

10 MEMBER SKILLMAN: Thank you.

11 CHAIRMAN ARMIJO: Okay. We're going to
12 have to keep moving here.

13 MR. McINTYRE: Okay. Next slide.

14 I was just going to - this slide just goes
15 over some of the typical inspection findings. I think
16 we've discussed the majority of them. We talked about
17 Part 21. Failure to provide oversight of contractors,
18 basically subcontractor control. Failure to develop
19 and implement procedures for all safety-related
20 activities.

21 And we've talked a lot about dedication.
22 It's a process, an Appendix B process that requires a
23 combination of Criterion 3 and Criterion 7. And we've
24 had a number of findings in that area.

25 Failure to meet design requirements such

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1 as design specifications and design drawings where
2 you're not actually following and incorporating the
3 design requirements.

4 Test control. We have identified findings
5 such as making a change to the component that's
6 undergoing testing without the supporting technical
7 justification. And in many of the test inspections,
8 we've had measuring test equipment that was used
9 outside of the calibrated range without any
10 justification.

11 And in closing, I wanted to identify some
12 of the areas of concern that we will concentrate
13 during our vendor inspections in 2013 so you have a
14 great lead in going to where I was going.

15 We will continue to inspect weakness areas
16 such as inadequate design control and commercial-grade
17 dedication, including the dedication of commercial
18 software programs.

19 We're starting to see more and more of
20 that. Again, something we didn't see even 15 years
21 ago. You didn't see people dedicating commercial
22 software programs.

23 Now, that's on our table. We're spending
24 a lot of time with industry trying to come up with
25 generic documentation in both the NQA 1 standards and

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1 with EPRI coming up with a guidance document for
2 software dedication, as well as a revision to the old
3 EPRI 5652 for dedication of components, which we hope
4 to see probably later this year or early in '14.

5 And commercial-grade dedication is now a
6 widely used process in the nuclear industry. However,
7 suppliers exhibit - not all suppliers exhibit a basic
8 understanding of or are implementing sound dedication
9 practices, including sub-supplier qualification,
10 inadequate technical evaluations for identifying
11 safety functions and critical characteristics, exactly
12 what you're getting into, you were talking about,
13 Gordon.

14 We have identified dedication as an area
15 for inspection emphasis of both new reactor components
16 and testing, and for operating reactor replacement
17 parts. As you were alluding to, we're seeing more and
18 more of the replacement parts now aren't being
19 developed under the full Appendix B. There's some
20 part of them are going through the commercial-grade
21 item dedication process.

22 So, that is going to be one of our -
23 probably our main emphasis for 2013. So, hopefully we
24 can continue to educate the utilities and make that
25 process a stronger process as we get new engineers

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1 doing dedication as Jim Luehman alluded to.

2 CHAIRMAN ARMIJO: Do you think the
3 licensees are sensitive to these, this emerging issue
4 on commercial-grade dedication that - and they're
5 saying, you're right, things are changing on us and we
6 thought the process was good, the system was good, but
7 it's evolving into something that is not as good as we
8 thought?

9 MR. MCINTYRE: I do.

10 CHAIRMAN ARMIJO: Okay.

11 MR. MCINTYRE: And the reason - the basis
12 I have is that we participate in the NuPIC meetings
13 and they're constantly asking our staff to come in and
14 help them, tell us - educate us on what we need to do
15 on dedication.

16 They realize that the work staff has
17 changed. The people that were doing dedication in the
18 `80s are probably pretty much all but retired. Not
19 many people like myself who were doing dedication in
20 the `80s are still here in 2013. And that's a
21 problem.

22 So, yeah, they do recognize that. And
23 Greg Galletti will probably be at the NuPIC meeting in
24 a couple of weeks and I guarantee you he'll be talking
25 about - and one of his issues is dedication of

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1 software. So, the answer is yes.

2 CHAIRMAN ARMIJO: Thank you.

3 MR. McINTYRE: That concludes my
4 presentation. And if there aren't any further
5 questions, Rick Rasmussen will now discuss our
6 international engagement.

7 MR. LUEHMAN: This is Jim Luehman. While
8 Rick is coming up, one other thing I would mention in
9 the commercial-grade dedication area, one of the
10 efforts we have presently ongoing is we have a draft
11 regulatory basis out for comment on potential change
12 to Part 21.

13 And in that draft regulatory basis, one of
14 the proposals to the staff that is put out for comment
15 is actually some clarifications to Part 21 to make,
16 you know, the industry's understanding and everybody's
17 understanding of the requirements for commercial-grade
18 dedication and how reporting under Part 21 and
19 commercial-grade dedication, you know, how we envision
20 it should flow better, you know, to rewrite that
21 better in Part 21.

22 So, again, along the lines of that we
23 recognize that commercial-grade dedication is a big
24 area of emphasis and concern, we are trying to in
25 addition clarify Part 21 in that area.

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1 Now, again, we're only at the draft reg
2 basis. We have not proposed a draft regulation change
3 yet, but we are - that is an area of emphasis.

4 MR. RASMUSSEN: All right. Well, thank
5 you, Jim.

6 My name is Richard Rasmussen. I'm the
7 chief of the Electrical Vendor Inspection Branch in
8 the Office of New Reactors. And I'm also privileged
9 to be the NRC's representative for the Multinational
10 Design Evaluation Panel Vendor Inspection Working
11 Group. A super good title.

12 A little about me. I've been with the NRC
13 now -

14 MEMBER POWERS: You're the only person that
15 could get the whole title out.

16 MR. RASMUSSEN: That's right. Well, they
17 accuse us of talking in acronyms.

18 So, I've been with the NRC now for about
19 20 years. The majority of that has been in the areas
20 of inspection and oversight in one way or another. I
21 was a resident inspector, senior resident inspector,
22 a risk analyst and now leading the vendor inspection
23 programs.

24 So, the MDEP Vendor Inspection Working
25 Group has 12 member countries. Pretty good

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1 participation among those countries. We meet twice a
2 year to work on the program, and then other
3 engagements that I'll talk about.

4 Next slide. I'm going to tell you about
5 our objectives of the group, the inspection activities
6 that we conduct, and then some future goals called
7 multinational inspections.

8 So, the overall objective simply stated
9 would be to facilitate the understanding and sharing
10 of results. And to accomplish this, we've spent a
11 considerable amount of time talking, understanding
12 each other's quality assurance requirements, and then
13 the country requirements, the different laws, how
14 they're affected, the inspection practices employed by
15 each of the countries. And that gets down to things
16 even as far as cultural differences and how we
17 interact as people.

18 From the 50,000-foot view, I think it's
19 safe to say that we all have the same objectives out
20 of our quality assurance programs. We all want the
21 same things. How we go about it is certainly
22 different.

23 MEMBER POWERS: It is that cultural aspect
24 that is the one that continues to bother me. Bothers
25 me more in the area of HRA, classic HRA, than this

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1 area, but it is one that I think is just a formidable
2 barrier toward your first objective here sharing the
3 vendor inspection results as the two different
4 cultures view the world in two different ways.

5 MR. RASMUSSEN: That's very true. We've,
6 you know, got everyone to come to English because they
7 realized we wouldn't change.

8 (Laughter.)

9 MR. RASMUSSEN: And so, maybe I can work on
10 that, but for now I'm trying to understand it.

11 The facilitation of the joint and
12 multinational inspections, and I'll talk more about
13 what those are on the next slide, but we've developed
14 a protocol document for how we interact, which has
15 been very helpful in gaining participation in this
16 program, getting people to interact at the inspection
17 level.

18 We have inspection sharing. We have for
19 the folks that don't have their inspection documents
20 publicly available, we have an MDEP library that we
21 have access to as member countries. We can go on and
22 get information.

23 Now, with established contacts, you know,
24 I have email addresses, it's very easy for me to get
25 individual inspection information. So, that's

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1 certainly been helpful.

2 And then the harmonization of qualify
3 assurance, that's tied to one of our long-term goals
4 and I'll talk about that a little later.

5 So, our working group activities, we have
6 witnessed inspections that Rich talked about, we have
7 joint inspections and we're working on multinational
8 inspections.

9 So, the witnessed inspections, this is
10 where we started. One country just sending inspectors
11 and supervisors, a mix of both initially. Now, it's
12 more inspectors that are joining.

13 They attend the inspection. They have
14 full access to whatever the NRC has access to. Their
15 purpose, and it's described in the protocol, is not
16 necessarily to interact with the vendor. We don't
17 want them, you know, we're trying not to get in each
18 other's way, but we've always had very good working
19 relationships during these inspections.

20 They ask questions, contribute in that
21 observation mode and we learn a lot from them and the
22 feedback that they provide at the MDEP meetings.

23 The joint inspections was a bit of a
24 breakthrough. And that's using inspectors from other
25 countries on an NRC inspection team just like we would

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1 use a contract inspector.

2 And so, we've had several of these.
3 They're listed on the next slide. I'll get to them in
4 a minute and I'll talk about them, but this is where
5 we really see the benefits of this MDEP program.

6 And then the multinational inspections,
7 that's a further effort at bringing more players into
8 an inspection and being able to have meaningful
9 results that all the countries can understand and
10 utilize to the extent that they need to utilize those.

11 Next slide. Our joint inspections, the
12 first one was led by KINS at Doosan and the NRC
13 participated. Kerri and Rich were the inspectors on
14 that.

15 NRC led one last year at Target Rock. We
16 had, again, KINS, and there's a reason for our
17 relationship with the Koreans. They're one of the
18 easiest international regulators for us to interface
19 with. They basically adopted Appendix B.

20 And so, it's been convenient and we share
21 vendors of interest, but that's not the only reason
22 that they're participating.

23 And we believe that other countries could
24 equally participate. We're trying to make that
25 happen.

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1 And there have been some joint inspections
2 that were not NRC involved that were conducted in
3 Europe with the French and the Finnish, for example.

4 Another one that we're planning to lead in
5 2013 is Qual Tech, and that's commercial-grade
6 dedication shop. And so, we're looking forward to
7 that, again, with the Koreans.

8 Let's see. Before I leave that slide,
9 some of the benefits that we've already seen, it
10 minimizes the resources that each country provides for
11 a one-week inspection. And so, we have found that the
12 input that we get from sending two inspectors to
13 Doosan for a week, it goes a long way to satisfying
14 our need to go there in the immediate future.

15 And we always reserve the right to go back
16 if we see indications of problems, things that we
17 didn't get adequate information on that we want to
18 explore more.

19 But having participated in the development
20 of the inspection plan and then participating on the
21 inspection, we get a lot of bang for our buck out of
22 those. We get the expertise of the foreign
23 inspectors, a very highly-trained population out there
24 and it's nice to be able to harness those.

25 We get the language benefits. Even though

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1 we have interpreters, there's nothing like having
2 engineer-to-engineer dialog. And that can get lost
3 with interpreters sometimes.

4 And, then, it's a benefit to the vendors.
5 They have perceived less oversight because of less
6 weeks that they have to dedicate to entertaining
7 inspection teams. And so, that's a plus for the
8 program as well.

9 Next slide, please. The multinational
10 inspections where we're trying to go, and this goes
11 back to our - to my original statements about
12 understanding people's regulations and laws, finding
13 that right level of detail that we have the common
14 goals and not overly burdened by the implementation
15 details.

16 And along those lines, we're having
17 discussions with the standards development
18 organizations, the folks from - well, we represent
19 Appendix B. We have ISO in the room, the ASME NQA
20 folks, folks representing GSR. And we've also done
21 outreach with some of those other organizations, DOE
22 and Department of Defense, talking about what they're
23 doing particularly with a focus on electronics and the
24 counterfeit, fraudulent kind of aspects for that.

25 Trying to develop a set of inspection

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1 standards, see where maybe we could whittle away some
2 of these differences in these various standards.

3 And so, this is early in the process.
4 Will we ever make them all the same? I'll vote no,
5 but every bit we can do helps. And just understanding
6 the differences helps immensely.

7 And so, that's the end of my statements.
8 Samantha Crane is going to talk to you next about some
9 very specific interactions with the Chinese and time
10 she spent there. And so -

11 CHAIRMAN ARMIJO: I have a question on
12 that. I'll just wait for Samantha to get up there.

13 MR. RASMUSSEN: Okay.

14 CHAIRMAN ARMIJO: What have we learned from
15 the Chinese, working with the Chinese particularly
16 with respect to AP-1000 since they're far ahead in
17 construction compared to us.

18 MR. RASMUSSEN: That's right.

19 CHAIRMAN ARMIJO: Have we avoided some
20 problems that they spotted before it hit us?

21 MR. RASMUSSEN: I think the answer to that
22 is yes.

23 CHAIRMAN ARMIJO: Good. Well, there's a
24 proposal that we should take a break. Let's try and
25 get back - I agree. Let's have a break. Let's try

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1 and get back in 15 minutes. That will be by this
2 clock, 10:25, okay? And then we'll start with you,
3 Samantha.

4 MS. CRANE: Sure.

5 CHAIRMAN ARMIJO: Thank you.

6 (Whereupon, the proceedings went off the
7 record at 10:03 a.m. for a brief recess and went back
8 on the record at 10:18 a.m.)

9 CHAIRMAN ARMIJO: Okay, Samantha. You've
10 got the floor. It's 20 after. Let's get started.

11 MS. CRANE: Zao shang hao, or "good
12 morning" in Chinese. So, I'm Samantha Crane. I've
13 been with the NRC about ten years now. So, I've been
14 a vendor inspector and an inspection team leader for
15 the past five years in the Office of New Reactors.

16 I also participate in the ASME Working
17 Group on quality assurance certification stamping and
18 the Standards Committee on qualification for
19 authorized inspection.

20 Before joining NRO, I worked in our Office
21 of Nuclear Regulatory Research and I managed the
22 Agency's programs on environmentally-assisted
23 cracking. So, I did that from 2005 to 2008.

24 MEMBER POWERS: They are hopeless, right?

25 MS. CRANE: What?

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1 MEMBER POWERS: Environmentally-assisted
2 cracking, I mean, it's just hopeless, right?

3 MS. CRANE: You'll have to ask Dr. Shack.

4 MEMBER POWERS: I mean, that's one of the
5 reasons I just concluded.

6 (Laughter.)

7 MS. CRANE: I also have a Bachelors and a
8 Maters in material science and engineering.

9 As Rick mentioned in his previous
10 presentation, one of the goals of the MDEP Working
11 Group for vendor inspection is to understand the
12 regulations and inspection practices of the member
13 countries and to share information.

14 As part of our international outreach, I
15 spent three months last year working with the Chinese
16 Northern Regional Office of Nuclear and Radiation
17 Safety Inspection. So, they're the part of the
18 Chinese government that provides oversight for vendors
19 in their country.

20 The objectives of my rotation were to gain
21 an understanding of the Chinese regulatory structure,
22 observe the vendor inspection process that includes
23 the planning, implementation, documentation of
24 inspections, and to identify commonalities and lessons
25 learned.

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1 So, Ed went into some detail of what we do
2 for vendor inspection in the US. So, this is a little
3 compare and contrast.

4 There are few key differences between how
5 the US and China provide vendor oversight. So, namely,
6 the Chinese license their domestic vendors and require
7 their foreign vendors to register with the regulator.

8 The licenses and registrations outline the
9 types of safety classes, products and services that
10 the vendor may provide, and identify the key processes
11 that - and services that may not be subcontracted.

12 Also, the Chinese don't have a nationally-
13 endorsed construction code. So, in the US through
14 50.55(a) required ASME boiler and pressure vessel code
15 and certain IEEE standards, China doesn't have a
16 similar requirement. So, the designer may use
17 whatever design and construction code that they're
18 most familiar with.

19 So, for example, the EPR and the operating
20 fleet in China right now were designed by AREVA. And
21 so, all of those plants were designed through the
22 French RCCM code.

23 The AP-1000 was designed by Westinghouse
24 to the ASME code. So, the Chinese are trying to get
25 their hands around the different design and

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1 construction codes right now.

2 One thing that is also different is that
3 the Chinese don't allow third-party oversight for
4 their domestic vendors. So, while the AP-1000 is
5 designed and will be manufactured and constructed to
6 the ASME code, it's the technical requirements that
7 the vendors have to meet and that the utilities have
8 to meet.

9 And the functions - the administrative
10 functions that would be performed by the ASME-
11 authorized nuclear inspectors, that's actually
12 performed by the regulator.

13 So, the regulator will perform the witness
14 point, the hold points, review the reports and provide
15 those checkpoint inspections.

16 So, these are primarily performed by
17 resident inspectors that the regulator maintains at
18 the major manufacturing facilities.

19 And then the last difference is that the
20 Chinese -

21 MEMBER SHACK: Now, do they have enough
22 people to do this, or are they stretched thin because
23 of these requirements?

24 MS. CRANE: So, they have - I think it's
25 somewhere around 104 domestic vendors that are

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1 licensed. And not all of these are providing
2 equipment or services under the ASME code.

3 The majority of the manufacturers that are
4 providing ASME material, ASME products, there are
5 resident inspectors, there are eight resident
6 inspectors. The Northern Regional Office they have
7 somewhere around - I think it's a hundred staff. And
8 those hundred staff are divided into a mechanical
9 vendor group, an electrical vendor group, as well as
10 a quality assurance and NDE group. So, they're
11 structured similarly to the way we are as well.

12 So, they are able to do that. So, between
13 the resident inspectors and any additional regional
14 support, they have that.

15 The other thing, too, is that the vendors
16 that are providing products under ASME although those
17 materials or those components aren't stamped, all
18 those companies have had surveys by ASME and do have
19 the appropriate N stamps, NPT, you know, NA, all of
20 that.

21 So, they've gone through that process.
22 They're just not required under the contracts to have
23 the authorized nuclear inspector and the stamping,
24 because it's not allowed for domestic components.

25 So, does that answer your question?

1 MEMBER SHACK: Yes.

2 MS. CRANE: Okay.

3 MEMBER SKILLMAN: Samantha.

4 MS. CRANE: Yes.

5 MEMBER SKILLMAN: Just a curiosity
6 question.

7 In the areas where China does not allow
8 key processes to be subcontracted, no national
9 construction code, no third-party accreditation, are
10 these technical or political issues that drive these
11 requirements?

12 MS. CRANE: So, based on - so, my
13 understanding of this, this is not necessarily the
14 Chinese position, but my understanding is that they do
15 this in order to have better control of their supply
16 chain. And they don't really have confidence in a
17 third-party organization doing that work.

18 They want to do it themselves so that they
19 have verification that that is being done. And it's
20 based on, you know, just the way things work in their
21 country.

22 MEMBER SKILLMAN: Thank you. Okay.
23 Thanks.

24 MS. CRANE: So, the last difference is that
25 the regulator, the Chinese require central

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1 certification of welders and NDE personnel. So, in
2 the US, that's an employer-based qualification
3 program. And in China, that is a central
4 certification.

5 Next slide. There are three main types of
6 inspections that the Chinese regulator performs.
7 These are comprehensive inspections, special
8 inspections and checkpoint inspections. And there's
9 a US analogous inspection for all of these.

10 The inspections primarily consist of
11 onsite inspections, documentation reviews, record
12 verification or interviews.

13 The first type of inspection, the
14 comprehensive inspection, includes quality assurance
15 inspections and technical inspections. So, the
16 quality assurance inspections mainly focus on whether
17 the quality assurance program has been implemented
18 effectively.

19 And then the technical inspections include
20 a spot check on whether the process of designing,
21 manufacturing, installing or performing nondestructive
22 examination for civil nuclear safety equipment meets
23 the requirements.

24 So combined, these inspections are very
25 similar to what we do during our routine vendor

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1 inspections.

2 The next type of inspections are special
3 inspections, and those are performed when quality
4 issues are identified or likely to emerge.

5 The special inspections mainly involve
6 inspecting the implementation of technical
7 requirements or the quality assurance program, as well
8 as the implementation of corrective actions issued by
9 the regulator. So, that's very similar to what we do
10 during our reactive inspections.

11 And the last type is the checkpoint
12 inspection which I alluded to earlier. So, these
13 inspections are carried out on site at specific
14 checkpoints. And these include hold point, witness
15 point and report point inspections. And they're
16 similar to the witness and hold point inspections that
17 are performed by the ASME-authorized nuclear
18 inspectors.

19 Next slide. So, while I was there, I had
20 the chance to observe the planning and implementation
21 of a comprehensive inspection at China First Heavy
22 Industries. They manufacture the AP-1000 reactor
23 pressure vessel.

24 So, there are several locations. The
25 location that I went to in Dalian, they do the post-

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1 forging machining and manufacturing.

2 So, the comprehensive inspection was very
3 similar in format to our routine inspection. So,
4 there was an entrance meeting, inspection activities.
5 So, they did shop observations, document review and
6 then there's an exit meeting.

7 CFHI is one of the sites where they do
8 have resident inspectors. So, those resident
9 inspectors have a daily presence. They perform walk-
10 downs, they do checkpoint inspections. So, they're
11 observing shop activities on a daily basis.

12 So, because of that, the comprehensive
13 inspection focused more on our view of documentations
14 supporting completed work for that reactor pressure
15 vessel.

16 At the completion of the inspection, the
17 vendor is given an inspection record that documents
18 the preliminary findings. This is very similar to
19 what we do verbally during our exit meetings.

20 And the type of inspection findings that
21 they had were also similar in type to what we would
22 identify during our inspections. And then afterwards,
23 there was a report issued.

24 CHAIRMAN ARMIJO: Samantha.

25 MS. CRANE: Yes.

1 CHAIRMAN ARMIJO: That picture there with
2 the reactor coolant pump casing -

3 MS. CRANE: Yes.

4 CHAIRMAN ARMIJO: - that's manufactured in
5 China.

6 MS. CRANE: Yes.

7 CHAIRMAN ARMIJO: But the pump is a
8 Curtiss-Wright pump, is it?

9 MS. CRANE: This pump is actually for the
10 CPR-1000.

11 CHAIRMAN ARMIJO: Oh, it's a different -
12 it's not -

13 MS. CRANE: It's not an AP-1000.

14 CHAIRMAN ARMIJO: It's not an AP-1000.

15 MS. CRANE: Yes.

16 CHAIRMAN ARMIJO: Okay.

17 MS. CRANE: But there will be - so, right
18 now the lead pump or the lead pumps for Sanmen Unit 1
19 are done by Curtiss-Wright. And within their contract
20 they do what's called technology transfer.

21 So, they pretty much teach the Chinese how
22 to make that themselves. And that's part of their
23 contract.

24 So, there will be pumps manufactured in
25 China for subsequent plants.

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1 CHAIRMAN ARMIJO: So, the first-of-a-kind
2 will be manufactured in the United States, and then
3 the Chinese will -

4 MS. CRANE: Learn how to do it and make it
5 themselves.

6 CHAIRMAN ARMIJO: Okay, got it.

7 MS. CRANE: So, that's in a lot of the main
8 equipment contracts.

9 So, I also had a chance to observe three
10 checkpoint inspections. These are at Shanghai Heavy
11 Machinery Plant Company, Shanghai Electric Nuclear
12 Power Equipment Company and Shandong Nuclear Power
13 Equipment Manufacturer.

14 So, during these inspections I accompanied
15 the resident inspector on their daily walk-downs. I
16 witnessed an unpacking inspection. So, this is kind
17 of unique for the Chinese also.

18 Although they have a very strong presence
19 for their domestic suppliers, they don't perform as
20 many inspections for their foreign vendors.

21 So, when - there's a requirement that when
22 anything comes in from a foreign vendor, they have to
23 do an unpacking inspection. So, the vendor is there,
24 the licensee is there, as well as the regulator. They
25 observe the unpacking. They look at the

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1 documentation, do any additional tests and inspections
2 to verify that it meets the requirements.

3 So, I got to witness that for a steam
4 generator tubing for the CPR-1000 steam generator at
5 SENPEC. They also had tubes in from Valinox that were
6 going to be for the EPR. While I was there, I also
7 got to see some work done on the Chinese EPR.

8 I also when I was at Shanghai Heavy
9 Machinery Plant Company, I accompanied the resident
10 inspector. And he and I both independently identified
11 material traceability issue on the same component.

12 So, I was walking with someone from the
13 vendor, and he was walking with someone else from the
14 vendor. We were having conversations and came around
15 the other side of the part and said, did you see that?
16 He said, yes, I'm just talking to him about that. So,
17 we're identifying the same sort of issue. So, I got
18 to see that.

19 And then while at Shandong Nuclear Power
20 Equipment Manufacturer who does modulator
21 fabrications, I got a plant tour and I talked with the
22 quality assurance manager who had discussed some
23 issues that they were having with the equipment
24 module.

25 So, you know, just like anyplace else,

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1 sometimes you have some delays on some of the major
2 equipment. So, they were creating the equipment
3 modules and then they were having to wait for the main
4 components.

5 And then to get them to fit in, they'd
6 have to disassemble them and reassemble them and get
7 permission from the original equipment manufacturer to
8 do that.

9 So, that's something that, you know, we're
10 going to keep in mind and look out for, for the US
11 manufacturers as well.

12 MEMBER SHACK: Who did you say was making
13 the tubing for the AP-1000 steam generators?

14 MS. CRANE: I didn't.

15 MEMBER SHACK: You didn't.

16 MS. CRANE: No. So, for the CPR-1000 - I'm
17 trying to remember where that came from. I do
18 remember that day there was material from Valinox.
19 There was material from Sandvik. And I can't remember
20 the other one off the top of my head.

21 MS. KAVANAGH: The last supplier - this is
22 Kerri Kavanagh. The last supplier was Sumitomo,
23 Japan.

24 MS. CRANE: Yes.

25 MS. KAVANAGH: And we'll discuss that in my

1 presentation.

2 MS. CRANE: So, it might have been Sumitomo
3 for the AP-1000, but I think it was either Valinox or
4 Sandvik that we were looking at.

5 MEMBER SHACK: But the Shanghai people made
6 the steam generator. I mean, that's a -

7 MS. CRANE: For the subsequent ones, yeah,
8 they made that. So, and they have -

9 MEMBER SHACK: Which subsequent ones? They
10 got one from somewhere else or -

11 MS. CRANE: Yes. So, for the EPR the lead
12 plant was done by AREVA. And so, those steam
13 generators came from France.

14 Their subsequent ones, they were done at
15 Shanghai Electric Nuclear Power Equipment Company and
16 they had AREVA representatives there who were
17 overseeing that work.

18 So, I was there. They were doing the
19 tube-to-tube sheet welds and all of that work.

20 MEMBER SHACK: But the AP-1000 ones would
21 be the big steam generators again, I mean -

22 MS. CRANE: Yes. So, again, you know, the
23 lead unit, a lot of that work is done by a foreign
24 manufacturer foreign to China. And then subsequent
25 ones are done domestically.

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1 Next slide. So, towards the end of my
2 visit I had a site visit to Haiyang Nuclear Power
3 Plant.

4 So, Haiyang is one of the two AP-1000
5 sites currently under construction in China. The
6 other one being Sanmen.

7 So, licensee had made significant progress
8 on the construction of the two units. And Unit 1 is
9 scheduled to come online at the end of 2014.

10 So, while I was there, I viewed the
11 assembly area for structural and equipment modules, as
12 well as the containment vessel.

13 At the time of my visit in December of
14 '11, many of the conventional island structural units
15 were in place for both units, as well as significant
16 progress had been made on the nuclear island. And
17 many of the - and much of the containment vessels in
18 place for both units.

19 All of the main components for Unit 1,
20 including reactor pressure vessel, reactor coolant
21 pump, steam generators, pressurizer and reactor
22 coolant piping were expected to be onsite by March of
23 2012. And actually by now, many of those components
24 have come onsite and been installed.

25 On the day that I visited, it was actually

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1 very interesting. They had the reactor pressure
2 vessel closure head was coming in on a barge from
3 Doosan and Republic of Korea. So, I got to observe
4 that as well.

5 So, there are some lessons learned from
6 the construction of the first four AP-1000 units in
7 China at both Sanmen and Haiyang.

8 The Chinese planned for a six-month
9 construction gap between the units. So, Sanmen Unit
10 1 would be first. Six months later is Sanmen 2. Six
11 months later Haiyang 1. And then six months later
12 Haiyang 2.

13 So, this is kind of similar to what we've
14 got going on with the Vogtle and Summer units and
15 similar to what we had here kind of caught up and
16 compressed of it on that.

17 So, the reason why they built in this
18 construction gap was partly to a lessons learned from
19 the construction of Sanmen Unit 1 to be incorporated
20 into the subsequent units.

21 And in some cases this has worked, for
22 example, with some of the modular lifts - or module
23 lifts. They were noticing they were having some
24 deformation in it. So, they started using temporary
25 bracing for that. And then that's been incorporated

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1 into the other units, and it's also been incorporated
2 for the units here as well.

3 So, when we go, for example, to Shaw
4 Modular Solutions who is the module fabricator for the
5 AP-1000 in the US, they're also incorporating some of
6 those lessons learned for those modules.

7 But in other cases, this hasn't worked as
8 well and that's partly due to the long lead time for
9 many of these heavy section components.

10 Sanmen Unit 1, as I've mentioned, relies
11 heavily on foreign manufacturers. And the remaining
12 plants rely more heavily on domestic manufacturers.

13 But because of the long lead time, there's
14 not - sometimes you start on a process and in a
15 foreign vendor, and then a couple months later you
16 start here in China, but there's not always time to
17 incorporate those lessons learned.

18 And you might learn something for the
19 first time with the foreign vendor, you do it again
20 for the first time with new people and new
21 manufacturing facilities. So, they have to
22 incorporate that as well.

23 So, we're going to be looking out for that
24 for the US AP-1000 manufacturers as well. So, that
25 concludes my presentation.

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1 Any questions?

2 CHAIRMAN ARMIJO: Yeah, Samantha. I have
3 a general question.

4 MS. CRANE: Sure.

5 CHAIRMAN ARMIJO: Have you found anything
6 from your activities in China that would give us -
7 help us avoid problems with the AP-1000 construction
8 in the United States?

9 MS. CRANE: So, there are a lot of -
10 there's a lot of communication for - okay. Let me
11 start again.

12 CHAIRMAN ARMIJO: Certainly Westinghouse
13 knows.

14 MS. CRANE: Yes. So, the joint project
15 management organization for the AP-1000s in China is
16 Westinghouse, Shaw and then the Japanese - or, sorry,
17 not the Japanese. The Chinese utilities. So, they
18 work together.

19 And because you also have the same - you
20 also have Westinghouse and Shaw working here, they
21 obviously were translating a lot of those things over.

22 So, we're learning lessons that way,
23 through MDEP you learn lessons through our
24 interactions with the Chinese regulator, as well as
25 the fact that we have in some cases the same

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1 manufacturers doing work for the Chinese AP-1000s as
2 the US AP-1000s.

3 So, as they identify issues or they
4 identify new lessons learned on what they're making
5 for the Chinese AP-1000 which is first, those
6 sometimes get incorporated back for the U.S.

7 CHAIRMAN ARMIJO: But so far you haven't
8 really come across something that, oops, the Chinese
9 found this big problem and fortunately we haven't
10 started building that here for the US plants and we
11 can avoid that problem. Nothing like that?

12 MS. CRANE: Nothing really like huge,
13 showstopping sort of things.

14 CHAIRMAN ARMIJO: Okay.

15 MS. CRANE: There have been small things,
16 you know. For example, with stud welding for the
17 modules, the Chinese were doing it freehanded and they
18 were having some issues with the stud weldings.

19 So, now for the US they require that when
20 they do stud welding, there's a device to maintain
21 perpendicularity. They've made some design changes as
22 far as stud spacing and things like that.

23 There are some constructability issues
24 that they've resolved and will be incorporated for the
25 US plants.

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1 MEMBER SHACK: Well, I think of stud
2 welding in terms of that shield building, but I guess
3 a lot of the modules depend on stud welding too then?

4 MS. CRANE: Yeah, so a lot of the wall and
5 floor modules for the auxiliary building as well as
6 parts of the - like the steam generator - I'm sorry,
7 Kerri said that? Steam generator like the cubicles
8 and parts of the containment, parts of the in-
9 containment refueling water storage tank that those
10 are done through modular construction.

11 So, there are steel plates that are
12 actually - the forms for the concrete, that will
13 remain in place when they reissue the studs on those
14 for development of the concrete interaction.

15 CHAIRMAN ARMIJO: Okay. Thank you.

16 MS. CRANE: Thank you.

17 (Pause in the proceedings.)

18 MS. KAVANAGH: Good morning.

19 GROUP RESPONSE: Good morning.

20 MS. KAVANAGH: I'm told I'm on a limited
21 schedule. So, I'm going to go - I'll show you lots of
22 pictures really quickly.

23 I am Kerri Kavanagh. I'm the chief of the
24 Quality Assurance Branch of NRO. I've been with the
25 NRC a very long time and that's what I'm going to

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1 leave it at.

2 (Laughter.)

3 MS. KAVANAGH: But I've been with reactor
4 systems, plant systems, tech specs and vendor
5 inspections -

6 MEMBER POWERS: I'm willing to bet I've
7 been with the Agency longer than you have.

8 (Laughter.)

9 MS. KAVANAGH: It's close.

10 (Laughter.)

11 MS. KAVANAGH: All I'm going to say is that
12 Ed and I were working on core cracking internal issues
13 back in the `90s.

14 MEMBER POWERS: Oh, `90s. That's baby
15 stuff.

16 MS. KAVANAGH: So, I'll just leave it at
17 that.

18 I also serve on one of the - as one of the
19 Agency's representatives to several ASME Section 3
20 committees for conformity assessment and NQA
21 subcommittees.

22 Prior to my current position, I was a
23 senior team leader for many of the vendor inspections
24 that I'll be describing today.

25 The purpose of my presentation is to

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1 highlight the NRO/DCIP vendor inspection activities of
2 a variety of large component manufacturers both
3 foreign and domestic.

4 NRO/DCIP has been conducting technically-
5 focused and programmatic vendor inspections since the
6 Office of New Reactors was stood up in 2007.

7 The vendor inspection teams consist of
8 both vendor inspectors and technical specialists from
9 NRO and Region 2.

10 During the inspections, the inspectors
11 conduct observations of manufacturing process
12 including special processes such as non-destructive
13 examinations, welding, and in some cases forgings.
14 The inspectors also conduct a thorough records review
15 of the components being inspected.

16 Babcock & Wilcox. The vendor inspected
17 branches have performed two inspections of Babcock &
18 Wilcox facilities. In 2007, NRR staff performed an
19 inspection of the Palisades replacement reactor vessel
20 head at the B&W Canada or Ontario, Canada. In 2008,
21 NRO staff conducted an inspection of the replacement
22 reactor vessel heads for Diablo Canyon with the B&W
23 facility in Mount Vernon, Indiana.

24 NRO/DCIP has conducted two inspections at
25 Mitsubishi Heavy Industries in Kobe, Japan. In 2008,

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1 a vendor inspection evaluated MHI's manufacturing
2 process for reactor vessels, steam generators and
3 other reactor internals.

4 The picture on the left is a replacement
5 steam generator for a US operating plant. The picture
6 on the right, NRO vendor inspectors are evaluating the
7 NDE indications of a steam generator nozzle.

8 In 2012, a reactor vendor inspection was
9 conducted at MHI to evaluate the SONGS tube wear
10 issues.

11 Next slide. Vendor inspection branches
12 have performed two inspections of Doosan Heavy
13 Industries in Changwon, South Korea.

14 Prior to 2009, Doosan manufactured reactor
15 pressure vessels, steam generators and reactor
16 internals for operating reactors in AP-1000s, reactors
17 using forgings from Japan Steelworks.

18 In 2009, Doosan began pouring their own
19 forgings. During the 2009 inspection, the inspection
20 team witnessed the pouring of the AP-1000 reactor
21 vessel upper shell for the VC Summer site.

22 In the picture on the left, the NRC
23 inspectors are evaluating the reactor had J groove
24 weld inspections.

25 The pictures on the right, the NRC

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1 inspection team is joined by representatives of
2 Doosan, KINS, Westinghouse, Souther Nuclear and SCANA
3 in front of a steam generator destined for the Vogtle
4 site.

5 NRO/DCIP conducted an inspection of Japan
6 Steel Work in Muroran, Japan on the island of
7 Hokkaido. JSW has a 14,000-ton press in operation and
8 can produce a single ingot of 600 tons.

9 JSW manufactures large steel forgings and
10 castings for reactor pressure vessels, heads and steam
11 generators for all reactor designs for new and
12 operating reactors.

13 During the inspection, the team observed
14 nondestructive examinations of the South Texas Project
15 Units 3 and 4, an ABWR design, reactor pressure vessel
16 bottom head dome and bottom head ring.

17 In the pictures, the inspectors are
18 reviewing NDE indications with the JSW-authorized
19 nuclear inspector on the steam generator bottom
20 forgings.

21 The NRC inspection report for JSW
22 inspections is available in ADAMS on our NRC quality
23 assurance public website along with all of our NRO
24 vendor inspection reports and quality assurance
25 inspection reports.

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1 NRO/DCIP conducted an inspection of
2 Creusot Forge in Le Creusot, France. Creusot Forge
3 manufactures reactor pressure vessel and steam
4 generator forgings for EPRs. Creusot Forge also
5 manufactures the reactor coolant piping for the EPRs
6 in Finland and France.

7 During the Creusot Forge inspection, the
8 inspectors verified manufacturing activities such as
9 nondestructive examination and machining operations
10 for a US EPR reactor pressure vessel lower head, steam
11 generator lower shell, reactor pressure vessel upper
12 head and a steam generator upper shell.

13 MEMBER POWERS: Do you guys inspect the
14 cast?

15 MS. KAVANAGH: The casting?

16 MEMBER POWERS: Yeah.

17 MS. KAVANAGH: We have not done any
18 inspections of castings, per se, except for maybe at
19 JSW, but I wasn't on that inspection.

20 Did you guys look at castings at JSW? No.
21 So, we have not looked at any of the castings so far.

22 MEMBER POWERS: But the weld, they're
23 attributing the problems that dwell to the casting?

24 MS. KAVANAGH: I just really can't speak to
25 that.

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1 CHAIRMAN ARMIJO: Yeah, it's surprising
2 that it would still persist from a casting all the way
3 through the forging, all the way to the final
4 component, you know. I got to read more about that.

5 MS. KAVANAGH: Yeah, I don't have the
6 appropriate background to answer your question.

7 MEMBER POWERS: Well, I mean, it's a
8 question of how far you go on this thing. And now, we
9 have at least one indication that you have to look at
10 the cast.

11 And certainly AREVA and EdF have a huge
12 amount of quality requirements on the cast that we
13 don't look at, and I'm wondering why.

14 MS. KAVANAGH: Well, all I was trying to
15 imply is that we have not looked at them in the past.
16 As part of our inspector planning program, we also
17 look at operating experience, both foreign and
18 domestic.

19 So, once those results are appropriately
20 captured in our program, we will be looking at whether
21 or not we need to evaluate different manufacturers of
22 the different castings.

23 MEMBER POWERS: In the course of sorting
24 out, well, AREVA brought forth a steam generator that
25 had the exact same problem and they had rejected it

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1 based on their criteria, and of course provided it for
2 the Belgians to do things with. So, now you see that
3 clearly they have a program that catches things and
4 they're looking at cast, and you're not.

5 So, I'm just wondering why.

6 MR. ROACH: At this point, Dr. Powers, this
7 is Ed Roach, we have been working closely with both
8 design engineering of NRO and NRR, Dr. Hardies, to
9 take the lessons learned from dual and use that as
10 part of our operating experience.

11 We haven't looked at castings, to my
12 knowledge, in recent large component inspections.

13 MEMBER POWERS: I wanted to ask you,
14 because I have not seen a vacuum cast in 35 years.

15 MR. ROACH: Yeah.

16 MEMBER POWERS: And so, I don't know what
17 they're doing differently now. And so, I was going to
18 ask you guys.

19 CHAIRMAN ARMIJO: Well, I'd be very
20 surprised if something that big was a vacuum casting.

21 MEMBER POWERS: It is.

22 CHAIRMAN ARMIJO: It is.

23 MEMBER POWERS: Yes.

24 CHAIRMAN ARMIJO: Those big ingots.

25 MEMBER POWERS: Yes.

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1 CHAIRMAN ARMIJO: Amazing.

2 MR. HARDIES: This is Bob Hardies from NRR.

3 Just in case you're going down the dual
4 path, the way these things are fabricated, there's a
5 vacuum cast - a double vacuum cast, and then there's
6 an ingot and it's bloomed. It's cut. The ends are
7 cut off, and then at some point it's pierced.

8 I don't know whether this particular one
9 is a ring forging - I mean a ring pour or a solid
10 pour, but at that point there's no flakes. The flakes
11 come after the forging.

12 So, they heat it up to a forging
13 temperature. They do forging. And then they maintain
14 it at temperature until they complete the -

15 MEMBER POWERS: Yeah, when I say the cast,
16 I mean that whole process.

17 MR. HARDIES: You cannot inspect it until
18 the - before the point that you've cooled it down from
19 quench and temper, because it's hot. It's red hot.

20 So, these -

21 MEMBER POWERS: What you can inspect is do
22 they do the anneal.

23 MR. HARDIES: Pardon?

24 MEMBER POWERS: Do they do the anneal? And
25 at the weld, they don't have records on anneal. That,

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1 you can inspect.

2 MR. HARDIES: Sure. Right, the process for
3 creating it. There are inspections subsequent to the
4 casting of the ingot, but it's far down the road after
5 the thing is cooled down.

6 MS. KAVANAGH: Thank you.

7 MS. CRANE: I was just going to make a
8 comment. This is Samantha Crane.

9 As part of our inspection of special
10 processes, we do look at heat treatment and heat
11 treatment records and controls for heat treatment.
12 So, the anneal would be covered in that.

13 So, we do look at those types of
14 processes, their controls and records. So, it's not
15 that we don't look at it at all. It's just during the
16 specific - during the casting it is observed.

17 CHAIRMAN ARMIJO: Okay. Let's keep going,
18 Kerri.

19 MS. KAVANAGH: Okay. So, as we mentioned,
20 there are three manufacturers of steam generator
21 tubing in the world.

22 NRO/DCIP has performed inspection at
23 Sumitomo Metal Industries in Yokohama, Japan.
24 Sumitomo manufactures the steam generator tubing for
25 AP-1000 in the US operating fleet.

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1 Sandvik Material Technology in Sanviken,
2 Sweden is also a manufacturer of steam generator
3 tubing for EPR in US operating reactors. NRO/DCIP
4 conducted an inspection of Sandvik in 2010 focusing on
5 the manufacturing process and related records.

6 In the picture, the NRC inspection team is
7 in front of the steam generator bundle that is being
8 prepared for shipping.

9 NRO/DCIP has conducted two inspections at
10 two locations in - of Mangiarotti S.p.A. in Italy.
11 2010, the vendor inspection evaluated Mangiarotti's
12 manufacturing process for AP-1000 pressurizers and
13 passive residual heat removal exchangers.

14 In 2012, a vendor inspection evaluated the
15 manufacturing process for AP-1000 core makeup tanks
16 and accumulators.

17 IHI Corporation. In 2010, NRO/DCIP
18 conducted a vendor inspection at IHI Corporation in
19 Yokohama, Japan. The inspection team evaluated the
20 manufacturing process for the South Texas ABWR reactor
21 pressure vessel, and the AP-1000 containment vessel
22 which is currently being assembled at Vogtle.

23 In the picture on the left is the STP
24 reactor pressure vessel head. In the picture on the
25 right, an NRC inspector standing next to a personnel

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1 hatch.

2 These pictures show the rolling of the AP-
3 1000 containment vessel. The inspection report for
4 the IHI inspection is available in ADAMS and on our
5 NRC QA website.

6 NRO/DCIP performed a vendor inspection at
7 Westinghouse Newington in Newington, New Hampshire.
8 Westinghouse Newington manufactures AP-1000 control
9 rod drive mechanisms and reactor pressure vessels
10 internals.

11 In this picture, members of an MDEP vendor
12 inspection team is standing in front of an AP-1000
13 core shroud on the left, and the APR-1400 core shroud
14 on the right, which is the Korean design. Kind of
15 gives you an idea of the differences in sizes.

16 Last, but not least, NRO/DCIP conducted
17 vendor inspection at SPX Copes-Vulcan in Erie,
18 Pennsylvania. SPX is responsible for the design and
19 manufacture of the AP-1000 squib valves as shown in
20 the picture.

21 This concludes my portion of the
22 presentation. I'd like to entertain any further
23 questions you may have on the Vendor Inspection
24 Program.

25 CHAIRMAN ARMIJO: Did you observe any

1 testing of these squib valves?

2 MS. KAVANAGH I personally have not.

3 CHAIRMAN ARMIJO: Has the staff?

4 MS. KAVANAGH: Yes, there has been multiple
5 inspections of the different tests. The
6 qualification, the seismic test. The QME test, has
7 that been performed yet?

8 PARTICIPANT: Correct. So far it's been
9 tested in components and we're engaging at the
10 different facilities to see the different tests and
11 operations.

12 A lot of focus on the actuators and the
13 qualification that's being put into those very
14 important components. And we'll continue to inspect
15 those. We're not done with that.

16 MS. DUDES: All right.

17 (Discussion off the record.)

18 MS. DUDES: I think this is one of the
19 successes of our program. Again, it's a qualitative
20 assessment. But in these early vendor inspections on
21 issues associated with the squib valves, our
22 inspectors are finding quality issues and testing
23 issues.

24 But when they come back and we put it all
25 together and we are early on in the process, because

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1 this is not going to be installed in our AP-1000s for
2 quite some time, but we're saying, wait a minute,
3 there's no design integration here.

4 And so, we have engaged our licensees,
5 Southern Nuclear and SCANA and we've called them in.
6 We were actually supposed to be having a meeting with
7 the licensees today and tomorrow to really talk about
8 this is a new and unique design. The risk associated
9 with these valves and their operation in the AP-1000
10 plant is significant in terms of them needing to
11 operate when called upon, and not operating when
12 they're not called upon.

13 And so, you know, from vendors looking at
14 how the charge and actuation is developed and
15 designed, to looking at the operation of the piston
16 and shearing this relatively large plate, I mean, our
17 experience with squib valves, I was a BWR inspector,
18 I could stand next to it and it's like a cap gun going
19 off. And it's got a small two-inch line on it.

20 So, this is very significant to the staff.
21 So, these early inspections, I think, is going to add
22 a lot of value moving forward.

23 And now early on in the construction
24 process, we call the licensees in and say, explain how
25 you understand the integrated design of this new and

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1 unique component.

2 So, I think we need to highlight this is
3 something that we use the Vendor Inspection Program
4 not only for individual vendors and having findings,
5 but integrating what we're finding and making sure
6 we're getting that information back to the licensee
7 and holding them accountable for assuring the quality
8 and safety - safe design and construction of these
9 components.

10 CHAIRMAN ARMIJO: Okay. Thank you, Laura.

11 Okay. Are there any other questions on
12 Kerri's presentation? Anything else?

13 (No questions.)

14 CHAIRMAN ARMIJO: With that, let's - we are
15 going to go into a closed session now to talk about a
16 reactor vessel nozzle issue.

17 (Whereupon, at 10:56 o'clock a.m. the
18 proceedings went of the record for a closed session.)

19

20

21

22

23

24

25



Large Component Fabrication and Vendor Inspection

Laura Dudes

Office of New Reactors

Briefing for ACRS

January 16, 2013

Large Component Fabrication and Vendor Inspection

- Vendor Inspection Program
 - Vendor Inspection Program Plan
 - Vendor Selection Methodology
 - Centers of Expertise
 - Recent Inspection Findings / Trends
 - International Engagement / MDEP
 - Chinese Oversight of Nuclear Vendors
 - Large Component Inspection
 - Reactor Vessel Nozzle Issue (*closed*)
- Mr. Edward Roach
- Mr. Richard McIntyre
- Mr. Richard Rasmussen
- Ms. Samantha Crane
- Ms. Kerri Kavanagh
- Mr. John Honcharik



Vendor Inspection Program

Edward Roach

Construction Mechanical Vendor Branch

Office of New Reactors

Division of Construction Inspection and Operational Programs

301-415-1973

Briefing for ACRS

January 16, 2013

Overview

- New Reactors and the Construction Inspection Program
- Oversight of Vendors
 - Key Regulations and Guidance
 - Types of Inspections
 - Vendor Inspection Program Plan
 - Vendor Selection Criteria
- Centers of Expertise



Construction Inspection Program

Vendor
Inspections

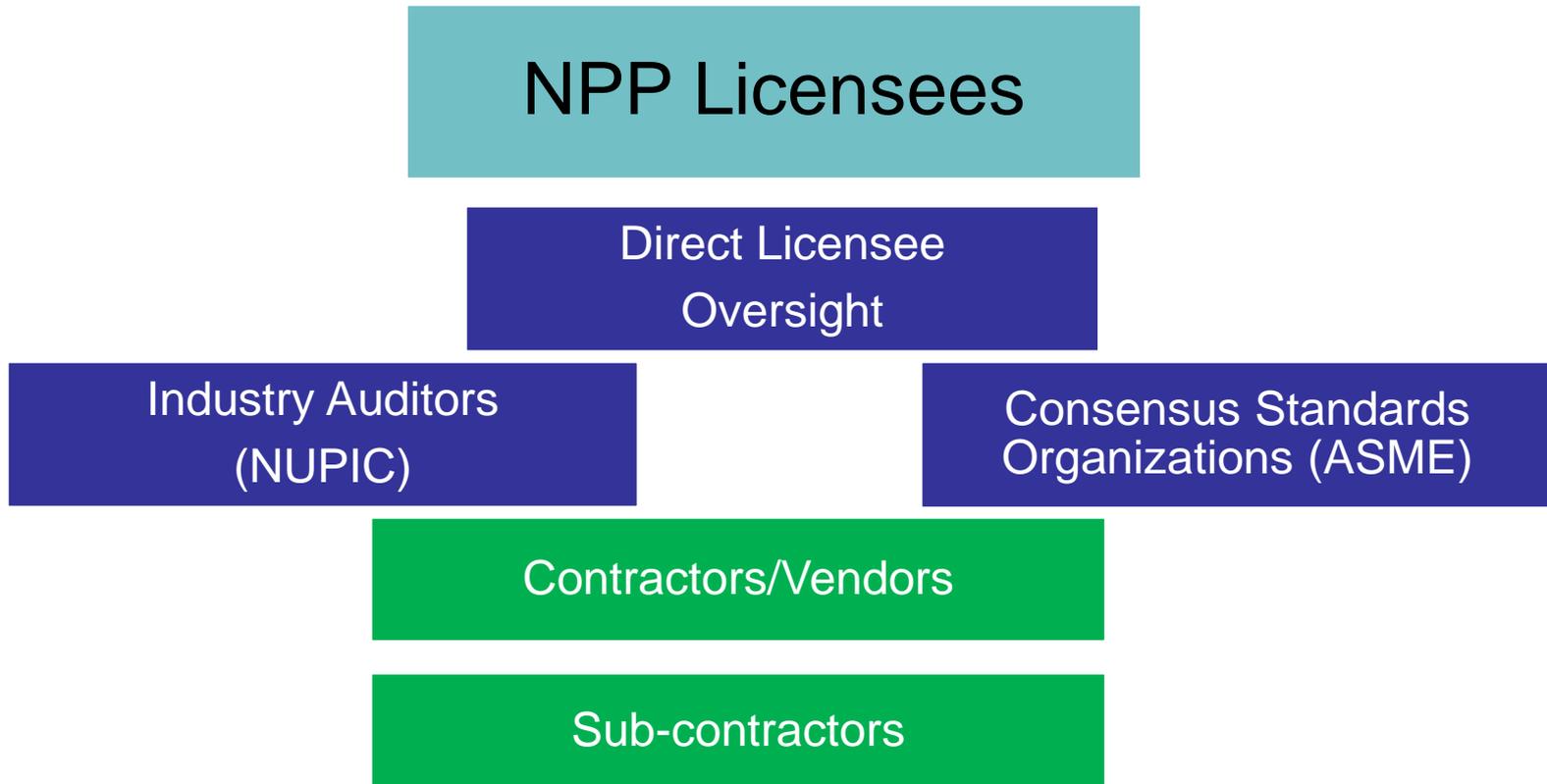
QA
Implementation
Inspections

Operational
Program
Inspections

Inspections,
Tests, Analyses, and
Acceptance Criteria



Oversight of Vendors



- The ultimate responsibility lies with the licensees
- NRC verifies licensees meet their responsibilities

Vendor Inspections

- Vendor inspection program for new reactors was established in 2007
- To verify effective implementation of
 - Appendix B to 10 CFR Part 50 (Quality Assurance requirements)
 - 10 CFR Part 21 (Reporting of Defects and Noncompliance)
- NRO conducted 24 inspections 2011
- NRO conducted 27 inspections in 2012
- NRO plans to conduct 30 inspections in 2013

Vendor Regulations

- **Directly – NRC issues Violations**
 - 10 CFR Part 21, “Reporting of Defects and Noncompliance”
 - 10 CFR 50.5, “Deliberate Misconduct”
 - 10 CFR 50.7, “Employee Protection”
- **By Contract – NRC issues Nonconformances**
 - Appendix B to 10 CFR Part 50, “Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants”

Vendor Inspection Guidance

- Vendor Inspection Program Plan (VIPP)
- Inspection Manual Chapter (IMC) 2507, “Vendor Inspections”
 - Establishes the inspection program for vendors providing safety-related materials, equipment, and services in support of new reactor construction
 - Provides requirements and guidance to NRC inspectors for conducting inspections at vendor facilities.
 - Implemented through six inspection procedures

Routine and Reactive Inspections

- **Routine** - Verify that vendors supplying basic components have implemented an effective QA program that complies with the requirements of Appendix B to 10 CFR Part 50.
- **Reactive** - In response to reported problems involving vendor-supplied products or services.

Vendor Selection

- Safety significance of components and services
- Scope of components and services
- Construction Inspection Program insights related to ITAAC
- First-of-a-kind component fabrication
- Vendor experience with component fabrication
- Operating and construction experience
- Insights from international vendor oversight activities
- Insights from third party audit organizations
- Resources available based on licensing workload

Centers of Expertise (COE)

- COE established within NRO and NRR in the areas of:
 - Allegations
 - Operating Experience/Construction Experience (OpE/ConE)
 - Electrical engineering
 - Vendor inspection

Centers of Expertise

The Vendor Inspection COE conducts inspections:

- To verify the effective implementation of vendor QA programs
- To assure the quality of materials, equipment, and services supplied to the commercial nuclear industry (both Part 50 & 52)
- To support the Allegations COE
- To lead efforts to address and deter the potential use of CFSI in safety-related applications



Recent Inspection Findings and Trends

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301-415-3215

Briefing for ACRS

January 16, 2013

- Vendor Identification
- NRC Vendor Inspections
- Inspection Results

Outline



Vendor Identification

Current Sources of Vendor Information

- Reporting systems: 10 CFR Part 21, 50.72, 50.73
- Industry and standards organizations
- Communication with licensees, applicants, and engineering, procurement, and construction (EPC) contractors
- Allegations

Initiatives

- RIS requesting voluntary identification
- NRC public web site
- NRC internal database



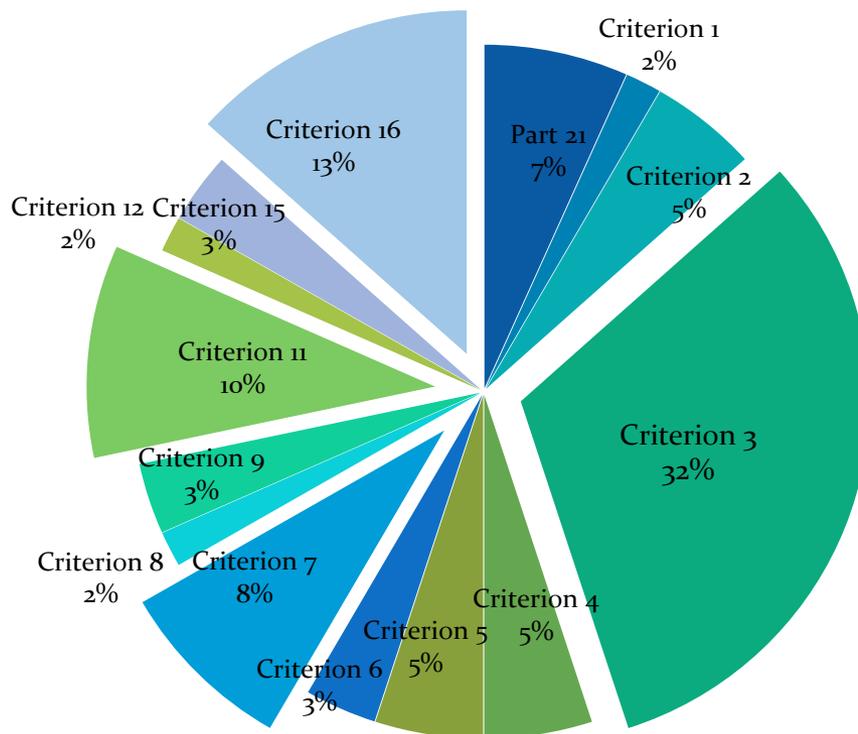
Recent NRC Vendor Inspections

- Emphasis on inspection of in-process design, fabrication, testing and inspection of specific SSCs and product lines of interest
- “Vertical-Slice” approach as opposed to a broad programmatic review
- Increased use of technical specialists in areas of mechanical, materials, structural, electrical, digital I&C
- Emphasis on qualification and type testing and design work associated with Targeted ITAAC SSCs
- Increase inspection activity to a projected 30 inspections in 2013

Recent Inspection Results

- III - Design Control
- VII - Control of Purchased Material, Equipment and Services
- XI - Test Control
- XVI - Corrective Actions

FY12 NOVs and NONs
60 total findings



Typical Inspection Findings

- Compliance with 10 CFR Part 21 - Identification and Reporting of Defects and Noncompliance
- Failure to provide appropriate oversight of subcontractors
 - Subcontractors must implement 10 CFR Part 50, Appendix B Quality Assurance requirements
- Procedural adherence and documentation
- Commercial grade items not adequately dedicated
- Failure to meet design requirements
- Test Control - Configuration changes made without a technical assessment
- M&TE used outside of calibrated range

Typical Inspection Findings (cont'd)

- Summary
 - Inadequate design control and CG dedication
 - Inadequate dedication of commercial software
 - Inadequate technical evaluations of conditions adverse to quality
 - Inadequate justification for substitution of materials of construction
- Challenges and Trends
 - Commercial Grade Dedication
 - Licensee and Supplier Oversight





International Engagement MDEP Vendor Inspection Cooperation Working Group

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Briefing for ACRS
January 16, 2013

International Efforts Overview

- MDEP VICWG Objectives
- VICWG Inspection Activities
- Multinational Inspections



MDEP VICWG Objectives

- To facilitate the understanding and sharing of vendor inspection results
- To facilitate Joint and Multinational Inspections
- Harmonization of Quality Assurance requirements

VICWG Activities

- 2011
 - 7 witnessed inspections and 1 joint inspection were conducted
 - Observing countries gained additional information and added confidence in the inspection results
 - MDEP regulators are sharing inspection practices

- 2012
 - 7 witnessed inspections and 1 joint inspection completed
 - Multinational Inspections
 - Definition currently under development
 - Intent is to develop a multinational inspection team working to common requirements

Joint Inspection Experience

- 2011: KINS Lead – Doosan Heavy Industries
- 2012: NRC Lead – Target Rock
- March 2013: NRC is planning to lead Qual Tech



Multinational Inspections

- Assessment of Member Country Regulations
- Discussions with Standards Development Organizations (SDO's)
- Goal is harmonization of standards



Chinese Oversight of Nuclear Vendors

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January 16, 2013

Regulatory Differences

UNITED STATES

- Licensees qualify vendors
- Vendors qualify sub-suppliers
- Allows safety-related activities to be subcontracted
- Requires the use of the ASME BPV Code
- Allows third party accreditation
- Employer qualifies welders
- Employer qualifies NDE personnel

P.R. CHINA

- Regulator licenses domestic vendors
- Regulator registers foreign vendors
- Does not allow key processes to be subcontracted
- No national construction code
- Does not allow third party accreditation
- Regulator qualifies welders
- Regulator qualifies NDE personnel

Types of Inspections

- **Comprehensive Inspections**
 - QA and Technical Inspections
 - Like NRC Routine Vendor Inspections
- **Special Inspections**
 - Similar to NRC Reactive Vendor Inspections
- **Checkpoint Inspections**
 - Include hold point, witness point, and report point inspections
 - Similar to the witness and hold point inspections performed by the ASME ANI



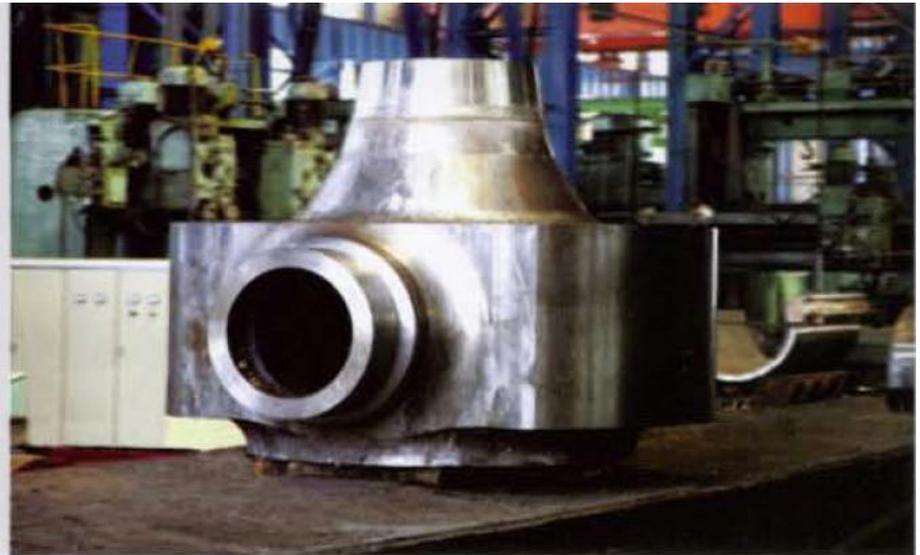
World's largest open die hydraulic press at the Shanghai Heavy Machinery Plant

Comprehensive Inspections

China First Heavy Industries



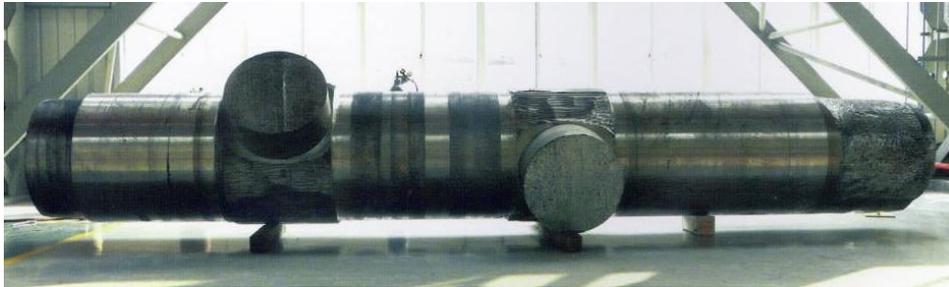
Nozzle Shell Forging for CPR 1000



Reactor Coolant Pump Casing

Checkpoint Inspections

Shanghai Heavy Machinery Plant Company



AP1000 RCS Piping

Photo courtesy of Shanghai Heavy Machinery Plant Company

Shanghai Electric Nuclear Power Equipment Company



AP1000 Steam Generator

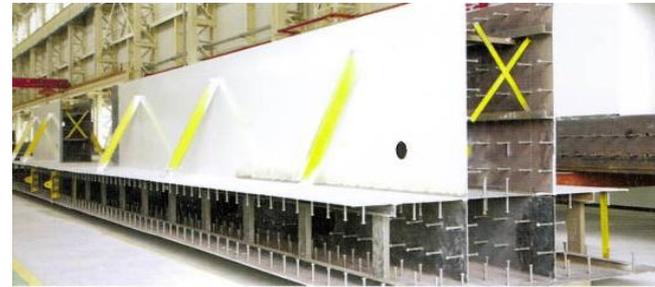
Photo courtesy of Shanghai Electric Nuclear Power Equipment Company

Shandong Nuclear Power Equipment Manufacturer



AP1000 Containment Vessel Plate

Photo courtesy of Shandong Nuclear Power Equipment Manufacturer



AP1000 Structural Module

Site Visit to Haiyang Nuclear Power Plant



CA03 Lift for Unit 1



Reactor Pressure Vessel Lift for Unit 1



Containment of Unit 1



CA01 Module Lift for Unit 2



Large Component Inspection

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Briefing for ACRS
January 16, 2013

Large Component Inspection

- Vendor inspection renewed focus on large components with creation of the Office of New Reactors (2007)
- Direct technical vendor oversight
- Approximately 14 NSSS/heavy component inspections performed since 2007
- Global supply chain presents challenge of inspecting international vendors

Babcock and Wilcox (foreign and domestic)

- *Components inspected:* Replacement reactor vessel heads (Palisades and Diablo Canyon)
- NRC Inspection Report Nos. 99900067/2007-201 (performed by NRR) ADAMS Accession No. ML072850014
- NRC Inspection Report Nos. 99900042/2008-201
- ADAMS Accession No. ML082680271

Mitsubishi Heavy Industries



- *Components inspected:* Reactor Vessels, Steam Generators, and Reactor Internals
- NRC Inspection Report No. 99901030/2008-201
- ADAMS Accession No. ML081890043

Doosan Heavy Industries



- *Components inspected:* Reactor pressure vessels, steam generators, and reactor internals for operating and AP1000 plants
- NRC Inspection Report No. 99901373/2008-201 ADAMS Accession No. ML081930582
- NRC Inspection Report No. 99901373/2009-201 ADAMS Accession No. ML091380474

Japan Steel Works, LTD



- *Components inspected:* Large steel forgings and castings that are used for reactor pressure vessels, heads, and steam generators

Japan Steel Works, LTD



- NRC Inspection Report No. 99901364/2009-201
- ADAMS Accession No. ML092290864

Areva – Creusot Forge



- *Components inspected:* Reactor pressure vessel and EPR steam generator forgings
- NRC Inspection Report No. 99901381/2009-201
- ADAMS Accession No. ML092370387

Sumitomo Metal Industries

- *Components inspected:* AP1000 and operating reactor steam generator tubes
- NRC Inspection Report No. 99901384/2009-201
- ADAMS Accession No. ML093070450

Sandvik Material Technology



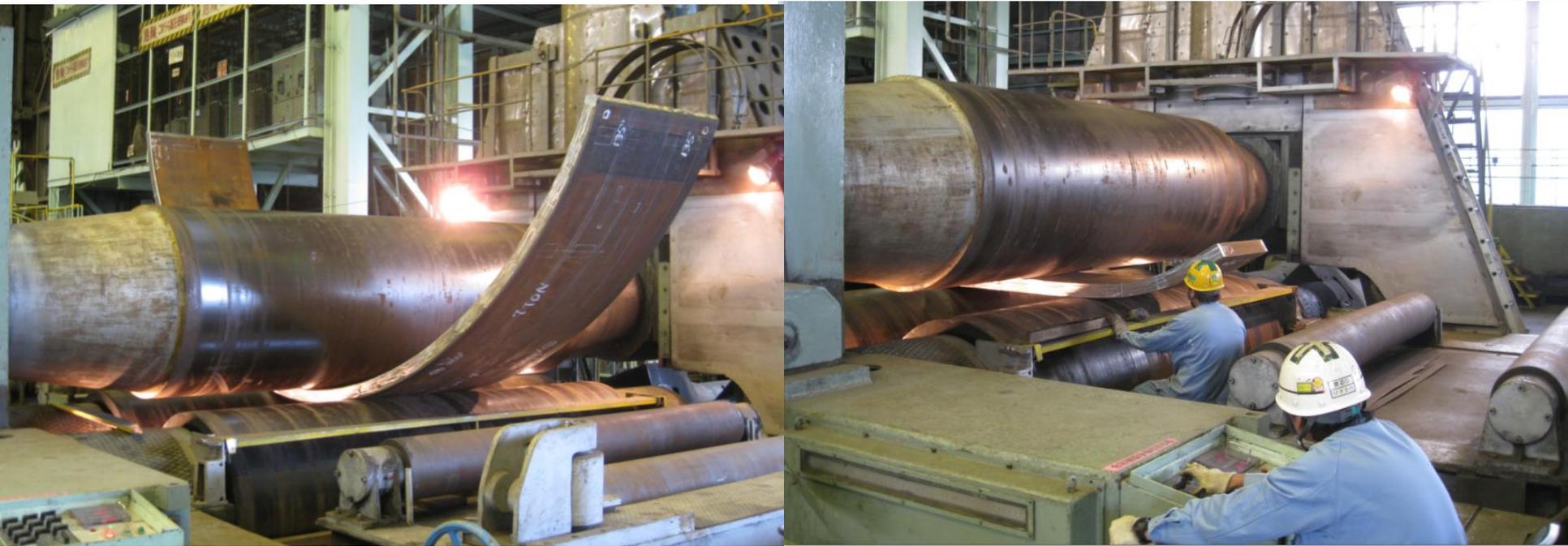
- *Components inspected:* EPR steam generator tubes
- NRC Inspection Report No. 99901326/2010-201
- ADAMS Accession No. ML101940246



- *Components inspected:* AP1000 pressurizers and passive residual heat removal exchangers
- NRC Inspection Report Nos. 99901393/2010-201 and 99901416/2012-201
- ADAMS Accession Nos. ML102600433 and ML 12320A661



- *Components inspected:* AP1000 containment vessel and ABWR reactor pressure vessel
- NRC Inspection Report No. 99901395/2010-201
- ADAMS Accession No. ML102870167



- *Components inspected: AP1000 containment vessel and ABWR reactor pressure vessel*

Westinghouse Electric Company (Newington, NH)



- *Components inspected:* AP1000 control rod drive mechanisms and reactor vessel internals
- NRC Inspection Report No. 99901392/2011-201
- ADAMS Accession No. ML112144266

SPX Copes-Vulcan



- *Components inspected:*
AP1000 squib valves
- NRC Inspection Report No. 99900080/2012-201
- ADAMS Accession No. ML12158A154



Large Component Fabrication and Vendor Inspection

Laura Dudes
Office of New Reactors

Briefing for ACRS
January 16, 2013