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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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595TH MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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THURSDAY

JUNE 7, 2012

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ROCKVILLE, MARYLAND

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The Advisory Committee met at the Nuclear
Regulatory Commission, Two White Flint North, Room T-
2B1, 11545 Rockville Pike, at 12:45 p.m., J. Sam
Armijo, Chairman, presiding.

COMMITTEE MEMBERS:

- J. SAM ARMIJO, Chairman
- JOHN W. STETKAR, Vice Chairman
- HAROLD B. RAY, Member-at-Large
- SANJOY BANERJEE, Member
- DENNIS C. BLEY, Member
- CHARLES H. BROWN, JR. Member
- JOY REMPE, Member
- MICHAEL T. RYAN, Member

1 STEPHEN P. SCHULTZ, Member
2 WILLIAM J. SHACK, Member
3 JOHN D. SIEBER, Member
4 GORDON R. SKILLMAN, Member

5

6 NRC STAFF PRESENT:

7 PETER WEN, Designated Federal Official

8 EDWIN M. HACKETT, Executive Director

9 DAVID GARMON, NRR

10 JOHN KIRKLAND, Region IV

11 JOHN LUBINSKI

12 ED MILLER, NRR

13 JESSE ROBLES, NRR

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P R O C E E D I N G S

(12:44:30 p.m.)

CHAIRMAN ARMIJO: Okay, good afternoon. We're ready to start, and our first briefing will be on Significant Reactor Operating Experience, and Jack Sieber will lead the discussion. Jack.

MEMBER SIEBER: Okay, thank you, Mr. Chairman. First off, I'd like to say that every year we give an operating experience report to the ACRS. I usually deliver that, and it's based on the annual report to Congress which just came out publicly on the 4th. So, we can expect that presentation before the Committee in September.

On the other hand, there are three events that have occurred that are worthy of our attention right now, and we are lucky and privileged to have people who are directly involved with those events from the NRC standpoint. And, therefore, the event was the flooding at Fort Calhoun, which I notice in the report they blamed it all on the rain and snow in Montana where my house is, but I don't remember it raining that hard, and the Robinson fire which looked like an escalating event to me. A lot of things went wrong. And lastly, the Brunswick reactor pressure vessel head where the bolts weren't tensioned

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1 properly, and leakage was noted during startup. And as
2 I remember my plant days, tightening the bolts on the
3 reactor vessel head was a arduous and exacting
4 experience which we paid a lot of attention to.

5 So, what I'd like to do, I've read through
6 the materials that the Staff has prepared, and I find
7 them excellent, and the explanations are excellent, so
8 I direct your attention to those. And representing the
9 staff is Harold Chernoff, who is the Branch Chief of
10 the Operating Experience Branch. And, Harold, I'll
11 turn it over to you to guide us through this
12 presentation.

13 MR. CHERNOFF: Thank you, Jack. I'll keep
14 my remarks very brief, but to introduce those at the
15 front table here, from Jack's immediate left, Dave
16 Garmon from the Operating Experience Branch. Dave will
17 be speaking about the Brentwood head tensioning in the
18 middle, and a special thanks to John Kirkland coming
19 in. He's a Senior Resident from Fort Calhoun and was
20 nice enough to come up and brief our Executive Team
21 this morning on some information and be with us here
22 today. And to his left is Jesse Robles, also from the
23 Operating Experience Branch staff, and he'll be
24 speaking about the Robinson reactor trip fire and
25 safety injection events. With that, I'll turn it over

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1 to Dave.

2 MR. GARMON: Good afternoon, everyone.
3 Thank you, Harold, for the introduction. As Harold
4 said, I'll be briefing an event that occurred at
5 Brunswick Unit 2 where the licensee failed to properly
6 tension the reactor vessel head following a
7 maintenance outage.

8 The Brunswick Steam and Electric Plant is
9 located in southeastern North Carolina, about 40 miles
10 from the City of Wilmington. Unit 2 is a boiling water
11 reactor, a General Electric BWR4-type, has a Mark I
12 containment, and is licensed just above 2,900
13 megawatts thermal. It commenced operations in 1975,
14 and both units at the Brunswick site received license
15 renewals in 2006.

16 Just as an overview of the event that I'm
17 going to discuss, on November 16th, 2011 during
18 startup activities and recovering from a maintenance
19 outage, the licensee responded to excessive
20 unidentified leakage by declaring an emergency, and
21 inserting a reactor scram.

22 After the scram, the licensee
23 investigation revealed that the reactor vessel head
24 had not been properly affixed to the vessel because
25 the head studs were not tensioned. The NRC responded

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1 to the event with a special inspection.

2 To provide a little background, I want to
3 start on November 4th when the licensee shut down to
4 address indications of a leaking reactor fuel bundle.
5 Right around the 6th they completed their cool down
6 activities, and commenced a reactor disassembly. The
7 maintenance outage lasted about six days, and on the
8 12th they set the head back onto the vessel. On the
9 13th they commenced the head tensioning. Later that
10 day they finished tensioning the head, the studs and
11 they declared the unit to be in Mode 4.

12 On the 15th, the licensee actually
13 commenced their startup activities, and that's when
14 they noted the first signs of increasing unidentified
15 leakage late that day. On the morning of the 16th the
16 unidentified leakage became excessive to the extent
17 that they had to declare an unusual event, and they
18 inserted a reactor scram. Following the scram they
19 cooled down the plant.

20 CHAIRMAN ARMIJO: Dave, what was that leak
21 rate that triggered the unusual event report?

22 MR. GARMON: Oh, the tech spec limit is
23 five gallons per minute. That's unidentified leakage,
24 and the UE or the Unusual Event is 10 gallons per
25 minute.

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1 CHAIRMAN ARMIJO: Okay.

2 MR. GARMON: So, they had entered the tech
3 spec LCO before that, and then they declared the
4 unusual event soon thereafter.

5 After the scram, they cooled down and
6 depressurized, and entered the containment to look for
7 the leak. At first they couldn't find the leak and
8 they had to raise vessel level to assist the
9 technicians in finding the leak, and they finally
10 identified leakage coming from the reactor vessel
11 flange area.

12 Further evaluation revealed that several
13 of the head nuts were not tensioned to the extent that
14 the ones that they could access at the time they could
15 rotate by hand. Later on as they removed the head
16 insulation they found that all of the head nuts were
17 able to be rotated by hand or with hand tools only.

18 MEMBER SKILLMAN: How many studs are there,
19 please?

20 MR. GARMON: There are 64.

21 MEMBER SKILLMAN: Sixty-four.

22 MR. GARMON: Sixty-four.

23 MEMBER SKILLMAN: Thank you.

24 DR. NOURBAKHSH: How many were found loose?

25 MR. GARMON: Say that again.

1 DR. NOURBAKHS: How many were found loose?

2 I missed --

3 MEMBER SIEBER: All of them.

4 DR. NOURBAKHS: All of them?

5 MR. GARMON: Initially -- well, at the end

6 it was all of them.

7 MEMBER SIEBER: When I first read about
8 this I got the feeling that some were tensioned and
9 others were not, but the fact is none of them were
10 fully tensioned?

11 MR. GARMON: That's correct. That's
12 correct. And the delay in them being able to identify
13 all of them was the fact that the insulation on top of
14 the reactor vessel head was obstructing full
15 inspection of all of the studs.

16 Let's see. Additionally, the study
17 elongation measurements indicated that there was no
18 tensioning applied to the reactor vessel head.

19 We kind of touched on this a little bit
20 already, but the reactor vessel head is tensioned onto
21 the reactor vessel using 64 fasteners. The fasteners
22 are preloaded using a hydraulic tensioning process.
23 And hydraulic tensioning is essentially -- essentially
24 uses a hydraulic jack to elongate the studs which
25 allows a few more turns on the nut and allows the

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1 preload to be transferred to the head.

2 Before they tension the stud, the stud
3 length is measured and that initial measurement is
4 used as a comparison for the as-left tension
5 measurement of the stud. Operators then thread a nut
6 onto the stud until it makes contact with the washer,
7 and they attach the head tensioning device onto the
8 stud, and they pour hydraulic pressure into this port
9 right here which pulls up on the stud, elongates it,
10 allows a few more turns to be applied to the nut, and
11 once the nut reaches the end of its travel which is it
12 comes in contact with the washer and it's flush with
13 the reactor vessel head, at that point you could
14 relieve hydraulic pressure, and that transfers the
15 preloading from the hydraulic tensioner onto the
16 actual nut.

17 MEMBER SIEBER: Do they check the
18 elongation after they've --

19 MR. GARMON: They do, and I'll get into
20 what mistakes they made while they were doing that
21 here in a few slides. If done correctly, this
22 evolution should leave the studs with an elongation of
23 41 to 49 mils.

24 CHAIRMAN ARMIJO: Is that done one at a
25 time or are they grouped --

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1 MR. GARMON: Actually, the next slide will
2 show you how they actually do it.

3 CHAIRMAN ARMIJO: Okay.

4 MR. GARMON: This slide shows a couple of
5 more -- a little bit more of the tooling that's used
6 and a cross section of the flange area. On the left
7 you'll see a carousel with a strongback, and that's
8 used to tension multiple fasteners at one time. At
9 Brunswick they do four fasteners at a time, and that
10 just insures that the reactor head is -- when it's
11 tensioned is maintained level onto the vessel, so it
12 allows an even application of the preloading.

13 On the right you'll see that this is a
14 cross section of the vessel flange area. To the top
15 there's -- the vessel head is annotated, on the bottom
16 the reactor vessel is actually annotated, and then
17 there's a cross section of the actual fastener. At the
18 bottom of the stud there's actually a bushing that
19 threads onto the vessel and that's where part of the
20 -- that makes up part of the fastener. Then you have
21 the stud, a spherical washer, and a castle nut, and
22 then, obviously, the stud.

23 MEMBER SKILLMAN: On the left image you
24 show two rows of bolt heads. What are the outer and
25 inner rows, please?

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1 MR. GARMON: The outer rows are the actual
2 flange, and I believe the inner row is where the
3 insulation attaches to the top of the reactor vessel
4 dome.

5 MEMBER SKILLMAN: Does it also attach with
6 64 nuts?

7 MR. GARMON: I don't think so.

8 CHAIRMAN ARMIJO: That's an awful lot of
9 nuts.

10 MEMBER SKILLMAN: That's an awful lot of
11 holes, too.

12 MR. GARMON: I'm not sure what they are.

13 MEMBER SKILLMAN: It seems that the image
14 on the right is more accurate and that there are 64
15 holes, castellated nuts and spherical washers like
16 what is indicated on the right.

17 MR. GARMON: That's correct.

18 MEMBER SKILLMAN: Is that correct?

19 MR. GARMON: That's correct.

20 MEMBER SKILLMAN: Thank you.

21 MR. GARMON: The immediate cause of the
22 event is that the -- obviously, the operator did not
23 tension the head properly onto the vessel. This
24 happened because they misinterpreted readings on the
25 hydraulic tensioner display.

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1 The hydraulic tensioner display is not
2 unlike the one that's shown on the screen right now.
3 It offers a feature where the left-most digit does not
4 illuminate until a pressure of 9,999 pounds is
5 exceeded. At that point, the left-most digit
6 illuminates and that allows indication of pressure to
7 five digits. The operators -- the equipment operators
8 that were using this particular setup were unaware of
9 that feature, so they assumed that since there was
10 only four digits displaying at the time, that they had
11 to multiply that value by 10 to obtain the actual
12 pressure that was being applied by the hydraulic unit.
13 So, this caused them to instead of applying the
14 required 13,000 pounds of hydraulic pressure to
15 elongate the studs, they only applied to 1,300 pounds
16 which in insufficient to obtain any stud elongation.
17 And they performed this same -- I guess the same
18 mistake occurred for all 64 fasteners.

19 CHAIRMAN ARMIJO: Reaching those
20 indications must have been very short time compared to
21 what it would take to get up ten times higher stress.

22 MR. GARMON: It was, and that was one of
23 the things they looked at in the root cause analysis.
24 They also -- the pitch of the studs and the expected
25 elongation leaves a certain amount of expected turns

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1 left on the nut after you actually apply the preload
2 using the tensioner, and it ended up being about two
3 and a quarter turns. They didn't obtain any of that
4 when they actually tensioned it, and that was another
5 finding in the root cause evaluation.

6 MEMBER BANERJEE: So, this factor of 10,
7 was that just misreading the dials, or was it --

8 MR. GARMON: Yes, misinterpreting the dials
9 because they actually -- what they ended up reading
10 was the left-most digit was blank, then they were at
11 a one three and a zero zero, so that actually
12 represented 1,300 pounds but they interpreted since
13 the left-most digit had no indication at all, they
14 didn't realize that that display had that feature
15 where that digit would go blank until it reached the
16 9,999, or exceeded that level.

17 DR. NOURBAKSHSH: So, they just made it up
18 that they had to multiply by 10?

19 MR. GARMON: Basically, yes.

20 DR. NOURBAKSHSH: Because I'm sure it wasn't
21 written down in the procedure.

22 MR. GARMON: No, it was not written in the
23 procedures.

24 MEMBER BLEY: The report said, and this
25 happens in other places, at least what I read said one

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1 guy suggested it and the other said yes, that's right.

2 MR. GARMON: That's actually what happened
3 for the stud elongation measures, a similar mistake
4 that they made, but this actually I presume that the
5 same -- a similar thing happened here.

6 CHAIRMAN ARMIJO: They'd never used this
7 equipment before?

8 MR. GARMON: The operators that were using
9 this set up, no, they had not used this particular
10 equipment. They were experienced refueling
11 technicians, but they had not used this before.

12 CHAIRMAN ARMIJO: They hadn't been trained
13 on this particular --

14 MR. GARMON: They had not, no. And that was
15 another finding from the root cause analysis.

16 MEMBER BANERJEE: That was a new piece of
17 -- at least the display was new?

18 MR. GARMON: The next display that I'm
19 going to be talking about is. This one I can't
20 remember. I can find that out for you though, sir.

21 MR. CHERNOFF: Dave, if I could add.

22 MR. GARMON: Yes.

23 MR. CHERNOFF: They use crews of people
24 from the different Progress Energy plants, and in this
25 instance they had one member of the work crew had used

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1 this new tooling at one of their other facilities, but
2 if I recall correctly he was not on the initial group
3 of people that was working the job. He came in on one
4 of the shift turnovers.

5 The other point to one of the questions,
6 the procedures actually had five places to fill in the
7 data. And they actually modified the procedure to only
8 use four, so they had a lot of thumbnails that
9 something was amiss as they started into this
10 activity.

11 MEMBER SIEBER: The stud elongation is the
12 final check.

13 MR. GARMON: It is. It is, and
14 unfortunately they managed to make a mistake there,
15 too.

16 MEMBER SIEBER: And if you don't get that
17 and something is wrong and you stop, figure out what's
18 wrong.

19 MEMBER SCHULTZ: Harold, this was some kind
20 of field change of the procedure?

21 MR. CHERNOFF: Essentially, from the
22 documentation I read they pen and ink changed and
23 initialed, and got the QC people to actually come over
24 and witness the data sheet annotation.

25 MEMBER SCHULTZ: Thank you.

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1 MEMBER SIEBER: Okay.

2 DR. NOURBAKSH: The stud elongation
3 expected is not in the procedure either? It's just
4 supposed to be known?

5 MR. GARMON: No, I'll cover that --

6 DR. NOURBAKSH: You're going to get into
7 that?

8 MR. GARMON: Yes. As John mentioned, the
9 stud elongation, the as-left elongation is the
10 indicator where -- the final indicator that you've
11 tensioned the head properly. As I mentioned, the studs
12 should present an elongation of 41 to 49 mils or 45
13 plus or minus 4 mils. When the equipment operators
14 measured the as-left stud elongation they're receiving
15 actual readouts of less than -- of 4 mils or less,
16 which is indicative of the head not being tensioned.
17 However, they rationalized those unexpected readings
18 as a feature of the stud elongation measurement system
19 where that readout would subtract the targeted 45 mil
20 value.

21 Now, the data sheet that they filled out
22 had them fill out the actual stud elongation, and
23 rather than -- which would be 45 plus or minus 4. But
24 rather than do that, they just filled out variances
25 from that 45 plus or minus 4, so all of the recorded

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1 values were 4 mils or less. And since those values
2 satisfied the variances they convinced themselves that
3 that was the correct indication. So, they did have
4 indication that the head was not tensioned properly,
5 and as Harold kind of alluded to earlier, they
6 performed another field change to the procedure where
7 they actually developed an Excel spreadsheet which
8 kind of rationalized their explanation.

9 MEMBER SIEBER: Was there indication that
10 the studs were tensioned, even though incorrectly,
11 they were tensioned uniformly? For example, if you had
12 -- if you put the studs in and only tightened four
13 bolts, the amount of strain on those four bolts can --
14 - when you went to pressure that would be
15 astronomical.

16 MR. GARMON: Absolutely. And they didn't
17 mention initially that they had that, but later on
18 when the licensee went and they conducted their
19 investigation and their assessment of the reactor
20 vessel, that was one of the observations that they
21 made, that there was a uniform gap around in between
22 the reactor vessel flange and the vessel -- the
23 reactor head flange and the vessel flange, and that
24 the head did not show any indications of warping.

25 MEMBER SIEBER: Okay. That to me is an

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1 important factor if you intend to reuse the bolts
2 again.

3 MR. GARMON: Absolutely.

4 MEMBER SIEBER: Or the head.

5 MR. GARMON: Absolutely.

6 MEMBER SIEBER: Because the head will
7 distort, also.

8 MR. GARMON: Absolutely.

9 MEMBER SKILLMAN: With these procedure
10 changes that the operating crews were making, who was
11 complicit with them in agreeing to the changes?

12 MR. GARMON: Sir, it ended up being the
13 whole refueling crew. There was about 12 personnel.

14 DR. NOURBAKHSH: Including supervisors?

15 MR. GARMON: Including supervisors, yes,
16 and quality control personnel, as well.

17 MEMBER BLEY: I'd ask a different question.

18 MEMBER SKILLMAN: Let me finish, please. It
19 sounds as if the component engineer for the
20 manufacturer was not involved in any of those
21 discussions. Is that accurate?

22 MR. GARMON: Not to my knowledge. As Harold
23 said, the refueling crew that was working was composed
24 of licensee personnel, licensee refueling technicians.
25 There was also kind of a corporate conglomerate of

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1 Babcock & Wilcox personnel, and Bartlett Holding
2 personnel that formed this refueling team. And there
3 was also three or four AREVA personnel that served as
4 supervisory roles or in what they call technical
5 directors. So, I guess AREVA would be the one that's
6 representing the A&E, I guess.

7 MEMBER SKILLMAN: Thank you, Dave.

8 MR. GARMON: Okay.

9 MEMBER BLEY: Since we're using words like
10 complicit --

11 MR. GARMON: I didn't -- did I use --

12 MEMBER SKILLMAN: I did.

13 MEMBER BLEY: Some of my colleagues. Two
14 things I want to ask about. One is in an inspection,
15 what kind of inspection did we have?

16 MR. GARMON: We responded with a special
17 inspection.

18 MEMBER BLEY: Okay. Did you have the human
19 factors guy on that inspection team?

20 MR. GARMON: I can find that out, sir. I
21 don't know.

22 MEMBER BLEY: I'd like to know that. That's
23 number one. I'm going to use complicit just to join
24 the crowd, but only once. The machine itself was
25 complicit in this event. If a real look at this

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1 process had been done a priori and how that instrument
2 worked, it would not have been difficult to predict
3 that somebody somewhere, sometime would make this
4 error. You can always say well, we've had better
5 training, but eventually it would happen. And I hope
6 somebody looked at that and is blaming the system as
7 well as the people.

8 CHAIRMAN ARMIJO: Yes, it should be easy to
9 read, and this looks -- it's cryptic, isn't it?

10 MEMBER BLEY: It's -- you train people on
11 it and all that, but when you have something that --
12 you're essentially setting the guy up.

13 CHAIRMAN ARMIJO: Yes.

14 MEMBER BLEY: And you try to avoid that as
15 often as you can. Is the special inspection report
16 out? I don't think I've seen it.

17 MR. GARMON: The special inspection report
18 was out. The inspection was completed on November
19 30th, and they exited with one unresolved item.

20 MEMBER BLEY: Okay.

21 MR. GARMON: And then we completed a
22 follow-up inspection this past April, and I'll talk a
23 little bit about that in my NRC action slide if you'll
24 allow me, sir.

25 MEMBER BLEY: Okay. I'd like to get a copy.

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1 Is it on the CD? Okay, so we had it. So, maybe I
2 looked at it. It's been a while since we got that
3 information. Okay.

4 MR. GARMON: Okay.

5 MEMBER SCHULTZ: But this is a separate
6 instrument, and it appears to me that there's at least
7 three procedural violations associated with just this
8 one measurement. That someone had an opportunity to
9 know that they weren't doing this properly.

10 MR. GARMON: Yes.

11 MR. CHERNOFF: And if I could add, and,
12 Dave, correct me if I'm wrong here, but on the SEMS
13 instrumentation they actually enter in the desired
14 into the little computer for the SEMS instrumentation
15 and if used properly when it achieves the desired
16 result it actually has an arrow indicating that it's
17 good. And that entering in the if you would 45 mils
18 value is in the root cause analysis part of how the
19 group's thing got going with that, that added value
20 actually substracts. The SEMS instrumentation itself
21 had to have been properly trained, seems pretty sound
22 in giving very clear feedback on when the appropriate
23 values are achieved by the upward arrow, maybe not so
24 much with the hydraulic pressure indication system
25 itself.

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1 MR. GARMON: Thank you, Harold.

2 MEMBER STETKAR: This also is the first use
3 of the SEMS --

4 MR. CHERNOFF: Again, this only had been
5 used at other --

6 MR. GARMON: This one, the SEMS was used
7 for the first time during a previous outage on Unit 1,
8 and that was in the spring of 2011, sir. So, fairly
9 new instrumentation.

10 CHAIRMAN ARMIJO: And the first use
11 likelihood the crew got a lot of training for the
12 first use, and then somebody just assumed that any
13 other crew would just know what to do?

14 MR. GARMON: That's probably a fair
15 statement, sir.

16 CHAIRMAN ARMIJO: Okay.

17 MR. CHERNOFF: And as -- you know, the
18 other aspect is they got into a major restructuring of
19 how they were doing refuelings and staffing the
20 refueling crews in between that spring outage and this
21 one. So, there were a lot of dynamics that played into
22 this complicated event.

23 MR. GARMON: Aside from the immediate
24 corrective actions which involve the procedural
25 corrections and equipment evaluations that we kind of

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1 alluded to earlier making sure that the vessel was
2 sound, and that the reactor coolant pressure boundary
3 was able to be re-established with the as-found
4 condition, the licensee completed a fairly extensive
5 root cause analysis, and they determined that the root
6 cause's failure to provide proper training and
7 procedural guidance to personnel involved in that
8 refueling activity.

9 There were several contributing factors.

10 MEMBER RAY: Hold on a second. I always get
11 upset with these things, I guess. That isn't the root
12 cause. That's what -- that's not a root cause in my
13 opinion.

14 MR. GARMON: Okay.

15 MEMBER RAY: Just giving you an opinion.
16 It's a consequence of something, but you're now going
17 to go back up to contributing causes rather than
18 comment further in terms of a root cause. Like, for
19 example, inadequate supervisor, not enough time
20 allowed for the job or things like that. But just the
21 fact that they didn't get training -- well, why didn't
22 they get training? That's the question.

23 MR. GARMON: Harold kind of led to the --
24 or discussed this a little bit. They -- I would say
25 from reading the material that it was a schedule-

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1 driven issue, because they put together this team to
2 conduct this mid-cycle outage.

3 MEMBER RAY: Yes, it wasn't planned, it
4 came up --

5 MR. GARMON: Exactly.

6 MEMBER RAY: -- ad hoc. They were in a big
7 hurry I would imagine, and they pulled together a
8 bunch of people. Yes, they didn't get trained, but
9 they didn't get training because they didn't stop and
10 give them the training. And why did they do that is
11 the issue I'm trying to raise here. It's too easy to
12 say well, somebody didn't do it right because he
13 didn't get the training. But the real question is why
14 -- how is the decision reached to not provide the
15 training?

16 MEMBER RYAN: I really think Harold's
17 concern -- I think that's a very, very important
18 observation he's making. In my opinion, having done a
19 lot of root cause analysis, it's got nothing to do
20 with the fact that they didn't get trained. It's got
21 to do with the fact the system, whatever that is, of
22 people, and time, and procedures, and requirements
23 didn't get implemented.

24 MEMBER RAY: Yes, that's the root cause.

25 MEMBER RYAN: That's the root cause.

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1 MEMBER BLEY: And the doggoned procedures
2 for root cause which were developed by the industry,
3 they never want to go that far.

4 MR. GARMON: Well, I guess they kind of
5 did, but not calling it the root cause in the safety
6 culture assessment which I'll talk about --

7 MEMBER BLEY: All right. I mean, if you
8 come to it by another way, that's all right. But still
9 and all, it just really bugs me. It always has. They
10 stop at the -- the root cause for my not getting home
11 on time was that the plane was late. Well, that's --
12 why is the plane late is the question.

13 MEMBER RYAN: The bigger question it raises
14 for me, however, is the root cause analysis program
15 sound when you tell a story like that? I mean, that's
16 what I would be pulling the string on if I was in that
17 organization. Is that root cause analysis sound when
18 it comes up with that answer?

19 MEMBER SIEBER: To go along with your
20 observation, if you don't find the root cause, you
21 don't fix the problem.

22 MEMBER RAY: No, that's right. But like I
23 said --

24 MEMBER SIEBER: Five supervisors on, if
25 they don't know what they're doing, they might as well

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1 go play cards someplace.

2 MEMBER RAY: I was involved in the
3 development of the root cause guidelines, and let me
4 tell you, they deliberately don't go to the management
5 issues. They deliberately don't do that.

6 MEMBER BANERJEE: It also seems to me that
7 the dial on -- at least one of the instruments was a
8 bit confusing.

9 MR. GARMON: And they call that an
10 immediate cause, not necessarily a root cause.

11 MEMBER SIEBER: And you overcome that by
12 training.

13 MEMBER BANERJEE: Contributing cause.

14 MR. CHERNOFF: They're actually -- although
15 we are citing what the licensee said was the root
16 cause, they actually have about four pages of causal
17 factor and analysis in this writeup, and there's a --
18 it's down here at the bottom of our page, the safety
19 culture assessment. There's a very heavy emphasis in
20 the licensee's writeup about organizational factors
21 that led to this, heavily influencing things like lack
22 of -- I would use the phrase command and control, who
23 was in charge, who was responsible for accomplishing
24 things like training and dictating that those time --

25 (Simultaneous speech.)

1 MEMBER RAY: That's fine. I think that's
2 what we're looking for. But it just irritates they
3 call something a root cause that isn't even close to
4 the root cause.

5 MEMBER RYAN: And I guess I would -- if
6 there is a package that explains all that, it might
7 help if we could just look at it.

8 MR. CHERNOFF: Sure.

9 MEMBER RYAN: Thank you.

10 MEMBER SKILLMAN: I'd like to offer an
11 additional point of view on this. It's always -- let
12 me back up. It seems that when we have issues like
13 this no matter whether at this station or another
14 station, we almost always end up with a root cause
15 that appears approximately the way this root cause is
16 worded. But what comes to my mind is if one had looked
17 at the Corrective Action Program two months before
18 this event, would one have concluded that the
19 Correction Action Program for this unit and this
20 station is strong enough to prevent something like
21 this from occurring? And one of the quickest ways to
22 know how strong the Corrective Action Program is, is
23 how effective the root causes are, how deeply they go,
24 how quick the unit is to go to an apparent cause, and
25 just take the item to fix and not dig any more deeply.

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1 So I wonder to the NRC Staff, to what extent did you
2 take a look at their Criterion 16, 10 CFR 50, Appendix
3 B and say you know what, they were set up for this
4 because their system doesn't even really ask those
5 tough questions. There may be many examples where
6 there were near misses. This one just happened to get
7 them. And the reason is because the root causes just
8 weren't performed with a sufficiently thick magnifying
9 glass to really go down and find out what the problem
10 is.

11 MEMBER SCHULTZ: And that's a real concern
12 here because if this is termed the root cause, then
13 the corrective actions that result from it to apply to
14 the organization or to other issues are not going to,
15 in fact, catch them. They'll be programs associated
16 with assuring training is done, on other features of
17 maintenance on the site, but as Jack indicated, and
18 Harold, as well, had you gone one or two more steps
19 deeper and found the root cause, you likely would have
20 affected the culture of the site to a higher degree.

21 MR. GARMON: I can't speak too much to the
22 -- how far we looked into the Corrective Action
23 program during the inspection. I can get back to you
24 on that one, sir, but I will say that during the
25 follow-up inspection one of the reasons that we exited

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1 the SIT with an unresolved item is so that we can
2 evaluate the root cause analysis. And whether you
3 agree or don't agree with the final bolded statement
4 that they say the region when they're evaluating the
5 root cause analysis, they evaluate the document in its
6 entirety, and its ability to -- or its effectiveness
7 at addressing the weaknesses that are identified by
8 the event. Part of the weaknesses, or a larger part of
9 it was in safety culture, and the safety culture of
10 that root cause analysis, so I can't speak to that.
11 Don't feel comfortable speaking for the region, but I
12 will say that that probably fed into their -- the
13 findings that they pulled out of this event. And it
14 also -- that section speaks to a lot of the concerns
15 that you gentlemen are raising as far as the culture,
16 the management, the supervision, the fact that the
17 operators felt that it was proper to adjust procedures
18 in the field rather than use the appropriate
19 organizational tools that they have to address
20 procedures. So, they do speak to that. And I think
21 once you -- I'll provide the root cause analysis to
22 you, and once you review that, I'm sure a lot of your
23 questions will be answered.

24 MEMBER RYAN: Dave, it might be helpful,
25 too, to have a couple of the key relevant procedures

1 for how --

2 MR. GARMON: Absolutely.

3 MEMBER RYAN: -- the work was done. For
4 example, does the procedure specify what is the proper
5 type. My question would be if it doesn't, why not?

6 MR. GARMON: I could tell you that the
7 procedure does say what the specs are, but it doesn't
8 describe how the display operates. And that's where
9 the shortcoming was.

10 MEMBER RYAN: So, I guess -- and just to be
11 fair and try and look at all sides, I think there's
12 several different paths this story could take. And I
13 think, at least my reaction is kind of like Harold's,
14 you know, the really bad thing could be in play here
15 of really having a cultural gap somewhere along the
16 line in terms of implementation. And I think we just
17 want to understand that better, so don't feel like
18 we're taking the bat out and wacking you around a
19 little bit -- you know, it's just caught our attention
20 because I think it's something that we feel, if it is
21 minor, great. It can be fixed. But if it's -- if
22 there's something deeper than that's something else
23 that needs attention. I'm not expressing that well,
24 but that's what I think about it.

25 CHAIRMAN ARMIJO: I've never tightened a

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1 reactor vessel head, but it would seem that this is
2 not a routine thing that any guy with a wrench or a
3 machine can do it. Isn't there some sort of a
4 qualification for a crew, at least a leader of the
5 crew to have been qualified in the use of the
6 equipment and technique?

7 MR. GARMON: There is actually, sir, in one
8 of the findings from the licensee's analysis is they
9 had not held formal training in the refueling process
10 since 2000. Now, they have documented on the job, or
11 I guess Just In Time training, and they completed
12 tabletop exercises, and there's -- I guess they have
13 experience because they've obviously completed
14 refueling outages since 2000, and this event had not
15 happened since then. So, I guess they also relied on
16 the pass on of the operating -- of experience from
17 operator to operator, informal training. And that was
18 one of the findings, is that the training should be
19 formalized and the procedures should be improved, as
20 well.

21 CHAIRMAN ARMIJO: It seems to me that that
22 would be -- that's a really big, important step.

23 MR. GARMON: It is.

24 MEMBER RYAN: Just a quick question if I
25 may, sir. Were there any follow-up for extent of

1 condition?

2 MR. GARMON: They did. They mentioned that
3 in their analysis, and they found that the only other
4 evolution that they perform on the site where it
5 requires a tensioning-type process is in the
6 reassembly of the turbine. And they addressed that and
7 they found the same issues had not applied in their
8 turbine reassemblies.

9 MEMBER RYAN: Okay, thank you.

10 MEMBER SIEBER: They could have spent a
11 couple of bucks on a depth gauge.

12 MR. GARMON: Probably, sir, because --

13 (Simultaneous speech.)

14 MEMBER SIEBER: Plug it in or use
15 batteries.

16 MR. GARMON: Yes, sir. Jesse, if you
17 wouldn't mind, next slide. We kind of touched on these
18 already. We've completed a special inspection on the
19 30th, and we've completed our follow-up of the
20 unresolved item in April of this year. We determined
21 there were three findings associated with this event,
22 and each of the findings expressed or exhibited a
23 human performance crosscutting area. That information
24 will be used to assess the licensee's future position
25 in the reactor oversight process action matrix, and it

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1 also be used to influence future inspection plans at
2 the site.

3 And the final bullet talks about our
4 branch developed an internal document which
5 communicates the details of this event to internal
6 stakeholders, and uses that vehicle to store the
7 operating experience for future use. And that's all I
8 have.

9 MEMBER SIEBER: Okay, thank you.

10 MR. GARMON: Thank you.

11 MEMBER SIEBER: Appreciate it.

12 MR. GARMON: As it gets closer to you,
13 sure.

14 MR. KIRKLAND: Good afternoon. Thank you
15 for having me here this afternoon. AS Harold
16 mentioned, my name is John Kirkland. I'm the Senior
17 Resident Inspector at Fort Calhoun Station. I'll give
18 you a brief summary of Missouri River flooding from
19 last year, the impact it had on Fort Calhoun Station,
20 kind of the results coming out of that.

21 A quick outline, I'll give you a
22 description of the facility and talk about the design
23 levels for flooding at Fort Calhoun. That will also
24 include a brief discussion of a yellow violation that
25 we identified for flood mitigating strategies at Fort

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1 Calhoun in 2009-2010. And talk about the flooding
2 event itself, some of the complications that arose for
3 the licensee, their response to the event, our
4 response to the event, and then kind of how the
5 licensee is wrapping things up and taking lessons
6 learned that they got out of that.

7 First, Fort Calhoun Station is a
8 Combustion Engineering Pressurized water reactor at
9 about 500 megawatts electric. It received its
10 operating license in 1973. It got its license
11 extension approved in 2004, and next August it will
12 reach into its extended post 40-year lifetime.

13 The plant itself lies about 19 miles north
14 of Omaha, Nebraska, which is the closest metropolitan
15 area to the plant. It is literally on the banks of the
16 Missouri River. The site elevation for the most part
17 is 1,004 feet mean sea level. That cares of almost all
18 of the safety-related structures.

19 This is a pretty good overhead view of the
20 plant. You could see a pretty good defined Missouri
21 River here. You've got your intake structure right on
22 the river, and around the power block, as I mentioned
23 for the most part 1,004 feet mean sea level. The
24 ground slopes away from the river. The switch yard for
25 the most part is at 1,006 feet mean sea level so it's

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1 about two feet higher than the power block structure.
2 The one exception to that is this building right here
3 which houses switchgear-related components for 161
4 kilo volt. That was one of the first buildings that
5 were impacted by flood water last year, and that sits
6 at roughly 1,000 feet. It sits quite a bit lower than
7 the rest of the switch yard.

8 As you come back further away from the
9 River, you've got a railroad track here and then
10 there's a main highway that runs to the north and
11 south right there. And that sits about 60 feet higher
12 than the plant itself, so you can see what a huge
13 elevation difference there is for people as they
14 access the site before they come down to the site.

15 MEMBER BLEY: Just to help me understand
16 what you're going to show us in the next few slides,
17 where on the photograph, if it's on the photograph,
18 did the water first come over and start heading toward
19 that part of the site that got flooded?

20 MR. KIRKLAND: Actually, the way the water
21 really first came is it flooded the field here, and
22 then came back around and kind of wrapped around to
23 the west side of the switch yard here. And then as it
24 started to impact the actual protected area, it kind
25 of started in this northeast corner of the plant here,

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1 and then kind of moved to the south and to the west as
2 it came up.

3 MEMBER BLEY: Okay, thanks.

4 MEMBER SCHULTZ: And, John, that is an up
5 slope beyond the switch yard towards the railway?

6 MEMBER SIEBER: Yes.

7 MR. KIRKLAND: That is correct.

8 MEMBER SCHULTZ: Thank you.

9 MEMBER SIEBER: What's the normal full
10 level of the river?

11 MR. KIRKLAND: It varies. Right now it's at
12 about 990 feet mean sea level, so it's about 15 feet
13 below. That's a little lower than normal. I think in
14 a normal late spring/early summer when the rivers are
15 at their highest, I think you'd be sitting at about
16 995 to 998 would be a normal.

17 This gives a pretty good description of
18 the river itself and the river dam system. The
19 Missouri River Valley has six dams, one in Montana,
20 one in North Dakota, actually, the other four are all
21 really in South Dakota. Gavins Point, which is the
22 smallest of the six dams is closest to the site up
23 river approximately 100 or 125 miles. And the site
24 sits on the river right about here, about halfway
25 north-south in the State of Nebraska.

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1 MEMBER SHACK: How many of those are
2 earthen dams?

3 MR. KIRKLAND: Earthen dams? All six of
4 them.

5 MEMBER SHACK: All six of the dams.

6 MR. KIRKLAND: Yes. In 2009, and I titled
7 this slide, "Updated safety analysis report 2009,"
8 although it was virtually unchanged from the final
9 safety analysis report 1973. There is a paragraph that
10 talks about flood protection and includes many, many
11 different elevations. And I kind of broke it down.
12 They make a statement that the design flood elevation
13 is 1,004.2 feet mean sea level which is basically
14 grade. They have hardened structures meaning they
15 could accommodate flood levels up to 1,007 feet mean
16 sea level without any special provisions. They
17 described 1,009 --

18 MEMBER BLEY: That's no portable doors or
19 anything like that.

20 MR. KIRKLAND: Pardon?

21 MEMBER BLEY: No portable barriers or
22 anything.

23 MR. KIRKLAND: That is correct for 1,007.
24 Up to 1,009.3 which is what they described as the
25 probable maximum flood level they could protect using

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1 steel flood gates on doors to protect the safety-
2 related buildings. And then to take care of wave
3 induced action they made a statement that they could
4 protect up to 1,014 feet mean sea level using
5 sandbags, temporary earthen levies, and other methods.
6 It's also interesting to note from the core studies
7 back in the '60s that 1,014 feet is what they
8 estimated the river level at the site would be due to
9 a failure of Gavins Point dam.

10 MEMBER BLEY: That's the last dam?

11 MR. KIRKLAND: Yes, that's the closest one
12 to the site. Yes. So, what we found in our component
13 design basis inspection in 2009 were deficiencies in
14 their strategies to protect structures above 1,008
15 feet mean sea level. Now, that had mentioned at 1,014
16 feet they could protect using sandbags, earthen levies
17 and other measures. This photo right here shows one of
18 the entrances to the intake structure, and it's got a
19 steel gate there which is its protection to 1,009
20 feet. And then their strategy to protect to 1,014 feet
21 was to stack five-feet of sandbags up to the top of
22 this door on the ledge of the top of the steel gate of
23 about that wide.

24 We asked them as part of the inspection to
25 prove that, and that's about as far as they got up the

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1 door before sandbags just kept falling over, so at
2 this point from the outside of the intake structure
3 they could not protect for more than about 1,010 or
4 1,011 feet.

5 A bigger issue was the inside of the
6 intake structure, as you have water coming up the
7 cells you could flood out the intake structure at that
8 level and floor level inside the intake structure is
9 about 1,008 feet, which is where we came up with the
10 deficiencies providing protection about 1,008 feet,
11 was predominantly due to the floor level of the intake
12 structure, and the ability of water then to go below
13 and get to the safety-related raw water pumps, which
14 is what most plants will call the central cooling
15 water pumps.

16 MEMBER BLEY: This is something I don't
17 know anything about, but a lot of the parts of the
18 plant when it's designed and built you have to
19 demonstrate and test, and prove that things work. Is
20 that not generally true for extreme events, because
21 this sounds like it's the first time anybody tried to
22 do what they said they could do.

23 MR. KIRKLAND: I think that's a true
24 statement that it is probably the first time that
25 somebody had looked at doing this. If you go back to

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1 what the safety analysis report said and the bullets
2 I had with the levels, that breaks it out pretty
3 cleanly. The paragraph itself is very, very confusing
4 when it's read, so my belief is a lot of people
5 believe the way the paragraph was written that 1,009
6 feet was all they were required to protect to.

7 MEMBER BLEY: So, even if they had tried to
8 do this they would have been happy --

9 MR. KIRKLAND: That's correct.

10 MEMBER BLEY: Okay.

11 MEMBER RAY: Wait a second. I'm beginning
12 to get confused as to what the design -- you say the
13 design flood elevation is 1,004.2, so, I'm asking what
14 are you required to demonstrate above 1,004.2?

15 MR. KIRKLAND: It was kind of a -- I don't
16 want to say nuance, but it was a little different from
17 the '60s and '70s on what was actually required for
18 plants for flood protection. So, when they use the
19 word 1,004.2 feet design basis flood, they were using
20 that terminology for the design basis elevation of the
21 plant. And the 1,009.3 feet was the probable maximum
22 flood, which is what they were required to protect to
23 plus wave action above the top of that.

24 MEMBER RAY: Well, the one thing I can
25 certainly agree with is that it's confusing in that

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1 sense, because when you say required to protect, that
2 really goes to the question Dennis is asking. And it
3 has application in some of these flex and other kind
4 of things we're talking about in the future, which is
5 what do you have to demonstrate with regard to the
6 capabilities that exist beyond the design basis? So,
7 I'm really asking what the design basis is.

8 I understand your answer to be the design
9 basis is actually 1,014 feet, I guess, 1,009 plus wave
10 action. That's what it sounds like.

11 MR. KIRKLAND: That is correct. That is the
12 position that the NRC has taken, and a position that
13 the licensee has now agreed that they are required by
14 their license to protect to 1,014 feet.

15 MEMBER RAY: Okay. Well, that answers my
16 question then. Then it's legitimate to say well, how
17 was that ever demonstrated? And it goes to this
18 question of the sandbags and all that kind of stuff.
19 But I was just trying to make sure I understood that
20 the sandbags you have pictured there are actually part
21 of the design and not something to mitigate the
22 effects of above design.

23 MR. KIRKLAND: It is part of design, and it
24 is described both in the safety analysis report, and
25 the safety evaluation report itself.

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1 MEMBER RAY: All right.

2 MR. KIRKLAND: Knowing that in 1970 --

3 MEMBER RAY: Wait a minute. I licensed the
4 plant in 1970. Don't just say that that was all Mickey
5 Mouse. I --

6 MR. KIRKLAND: It's just in 1970 they
7 allowed plants to use manual methods to meet their
8 flood basis requirements, where today's requirements
9 they would essentially have to be hands off to be able
10 to get in and maintain cold shutdown.

11 MEMBER RAY: Well, we're getting too far
12 down in the weeds here, but I did want to find out
13 what --

14 MEMBER BLEY: No, I appreciate that. I
15 wanted to back you up. I want to make a comment on
16 this questioning that just went on. It sounds like you
17 and the plant have arrived at this point, which kind
18 of makes me think most other plants haven't thought
19 this thing through, not just for this event but for
20 other extreme events that might require some manual
21 activities to take care of them.

22 The other question I had was if you back
23 up one slide, maybe back up two. That's the one I
24 want. It also sounds as if it's just coincidence that
25 if the Gavins Point dam breaks you're matched at that

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1 1,014 feet, that they have no requirement to sustain
2 the break of that dam. Is that true, or did they have
3 a requirement to sustain the break of that dam?

4 MR. KIRKLAND: The way that the safety
5 analysis report, the safety evaluation report is
6 written does not look like they were required to
7 sustain a dam failure.

8 MEMBER BLEY: Okay, that's what it sounds
9 like. Now, this is hypothetical. If they had, and they
10 had picked that one, since the ones before it are much
11 larger, I suspect if one of those broke you'd over top
12 Gavins Point and have even a worse flood than you have
13 if you only lose Gavins Point.

14 MR. KIRKLAND: That would be correct.
15 Without knowing the terrain, exactly how the water
16 would come down, so I don't think you can say all the
17 volume of Fort Randall would pass through and over top
18 Gavins Point.

19 MEMBER BLEY: Certainly probably not all of
20 it, but some of it.

21 MR. KIRKLAND: Absolutely a good portion of
22 it.

23 MEMBER BLEY: There's a lot of water out
24 there.

25 MEMBER SHACK: There is an estimate of how

1 deep it gets in the dam failure report.

2 MR. KIRKLAND: that is correct.

3 MEMBER SHACK: It is deeper than 1,013.

4 MEMBER BLEY: Okay, I'll stop.

5 MR. KIRKLAND: And also part of the
6 50.54(F) letter response, will then require them to
7 look at multiple dam failures upstream, so that would
8 look at Fort Peck failing, which is the farthest one
9 north in Montana, and what effect that would have on
10 a cascading dam effect.

11 MEMBER BLEY: We're not here to talk about
12 dams, but I don't know what our rules are about how
13 you'd have to consider dam failure, and one day I'd
14 like to pursue that, but not now. I don't want to beat
15 you guys up.

16 MEMBER SKILLMAN: On Slide 7 please, next
17 slide. John, on this image on the right, are we on the
18 river flooded site or are we on the protected side?

19 MR. KIRKLAND: We are on the protected
20 side, so the other side of that door if you just kept
21 on walking you would walk into the river.

22 MEMBER SKILLMAN: Thank you, because I was
23 going to ask you about that valve. That's a fire
24 system valve. That's a gate, it's closed, and I would
25 just -- if were on the water side I was going to ask

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1 you how you're going to get that valve open.

2 MR. KIRKLAND: This is actually a delay
3 barrier is all that fence really is right there, so
4 it's just kind of a delay barrier for human beings to
5 walk into the intake structure.

6 MEMBER SKILLMAN: Thank you.

7 MR. KIRKLAND: So, leading to the event,
8 Fort Calhoun entered a scheduled refueling outage on
9 April 11th, 2011. Beginning in mid-May of 2011, the
10 Corps of Engineers due to heavier than normal snow
11 pack in Montana and North Dakota, late snow melt in
12 Montana and North Dakota, and more than a year's worth
13 of precipitation of rain over a two-week period
14 throughout the entire Missouri Valley system all the
15 way down through Omaha, the Corps determined that they
16 were going to have to increase flow rates out of each
17 of the dams to be able to maintain the integrity of
18 the dams throughout the entire flooding season.

19 As a result of that, when it became
20 apparent to Fort Calhoun that they would exceed 1,004
21 feet, they made the decision to suspend their outage
22 to primarily focus all of their attention to combat
23 the rising Missouri River level.

24 MEMBER SIEBER: I have a question. I may
25 not be accurate, but I understood at the time that the

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1 Corps of Engineers delayed releasing flood waters to
2 protect properties further down the Missouri and the
3 Mississippi River because the bank heights are
4 relatively low, and once they would overflow it would
5 spread out over hundreds or thousands of square miles
6 of farmland. And is there any kind of an agreement
7 between NRC or licensees and the Corps of Engineers
8 that the Corps would release water in order to protect
9 a nuclear power plant from a flooding event that could
10 lead to a disaster?

11 MR. KIRKLAND: Prior to this event --

12 MEMBER SIEBER: Or does the Corps just do
13 whatever they feel they ought to do?

14 MR. KIRKLAND: Prior to this event, there
15 had not been a lot of discussion between the NRC and
16 the Corps of Engineers. However, during the majority
17 of last summer we were on the phone with the Corps
18 almost daily. And the Corps, the way they described to
19 us, they were managing the river level to their master
20 manual.

21 I don't think we can answer the question
22 for the Corps to say if we came to you and said you
23 had to stop the increased release rates to save this
24 plant, would you do it? I don't think we can answer
25 that question. Their standard answer last year for

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1 everything that happened is they have competing
2 interests. They have the interest of flood control,
3 recreation, irrigation, wildlife. And one of the
4 factors is Fort Calhoun, one of the factors is Omaha,
5 Kansas City, which do sit on there. But I don't think
6 there is a hard and fast agreement that says they're
7 going to control that level, or those dam release
8 rates to whatever they have to be strictly to protect
9 Fort Calhoun.

10 MEMBER STETKAR: John, can I -- I'll ask
11 one of the NRR guys because it's not fair to ask you.
12 For years, the Agency has been actively involved with
13 electric power distributors, transmission system
14 operators because of the very, very severe concerns
15 about the demons of station blackout, losses of
16 offsite power. To the extent that there are formal
17 agreements in place, those agreements have become more
18 formalized in recent years about how people shall
19 communicate and operate systems, and inform nuclear
20 power plants, and how nuclear power plants shall
21 communicate with integrated system operators.

22 Is the Agency now aware of the need to do
23 that with the Corps of Engineers and other hydraulic
24 river system operators? And are you pursuing that? And
25 that's why I'm asking NRR because this is an Agency

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1 issue, it's not the poor guy out at Fort Calhoun.

2 MR. CHERNOFF: Send that one over this way.
3 The short answer is yes. Even before Fukushima, we had
4 established within the Agency as part of the critical
5 infrastructure work that was going on, as you're
6 alluding to across the government, dam safety officer,
7 no pun intended, and that person was George Wilson,
8 and he was very involved in coordinating and working
9 with both the Corps of Engineers, as well as other
10 agencies in looking at the issues that we're -- one of
11 which the outfalls that we're talking about today is
12 the balancing of important safety for both public and
13 the facility that we more closely regulate.

14 MEMBER STETKAR: We've had some briefings
15 about the dam safety program, and that looks at
16 inspecting dams for dam failures. I'm talking about
17 managing river systems the same way as you manage
18 electric power systems. It's a completely different
19 phenomena than just going out and determining who does
20 the -- whether it's state, or federal, or whoever, NRC
21 in some cases, whether you inspect the dam.

22 MR. CHERNOFF: You're very correct about
23 the --

24 MEMBER STETKAR: I'm asking about --

25 (Simultaneous speech.)

1 MR. CHERNOFF: It did get off into those
2 other areas, as well, and then --

3 MEMBER STETKAR: Okay.

4 MR. CHERNOFF: -- we also as part of our
5 task force that we have working with regards to
6 Fukushima after actions -- it's obviously a focus. I
7 don't know if you have anything to add with the
8 current activities.

9 MR. MILLER: The only thing I would add to
10 that is that the walkdowns we're doing right now do
11 have for manual actions that are dependent upon
12 notification from an entity like that verify that
13 there are proper agreements in place.

14 MEMBER STETKAR: That's fine. It's not the
15 question I'm asking, but in the interest of time, we
16 have to move on and hear about the rest of this one.

17 MEMBER SCHULTZ: It goes on to this slide,
18 John. This slide is demonstrating what it's all about,
19 and why you need those --

20 MR. KIRKLAND: This is a graphical
21 representation of the discharge rate out at Gavins
22 Point Dam over the summer. The red line here
23 represents the historically greatest release out of
24 Gavins Point Dam which was 70,000 cubic feet per
25 second in 1997. And toward the latter part of June

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1 they reached 160,000 cubic feet per second.

2 MEMBER STETKAR: Historically in the life
3 of that dam, or historically in the last 10 years?

4 MR. KIRKLAND: Historically in the life of
5 the dam.

6 MEMBER STETKAR: Okay.

7 MR. KIRKLAND: So, they were a little more
8 than twice the flow rate that they'd ever put out of
9 that dam. This shows the river level which it actually
10 is somewhat shaped a lot like the flow rate. There's
11 some drop off here, but the high level reached was
12 1,006 feet 10 inches was roughly achieved at the time
13 they reached 160,000 cubic feet per second. What you
14 would see after that are downstream levy failures,
15 more spreading out across farmland in both Nebraska
16 and Iowa.

17 MEMBER BLEY: And this level is right at
18 the plant.

19 MR. KIRKLAND: These are plant levels, yes.
20 So, the facility entered their abnormal operation or
21 abnormal operating procedure on May 22nd. There are
22 different levels of that procedure based on predicted
23 river levels at the site on what they needed to do.
24 When it became apparent that flow rates were going to
25 exceed 1,004-1/2 feet at the time the best estimates

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1 from the Corps was 1,009 feet on site. The site also
2 took on their own initiative as not part of their
3 procedure, they built a water filled dam known -- the
4 trade name is Aqua Dam. We predominantly call it an
5 Aqua Berm around the power block. That was
6 predominantly done for asset protection, and for the
7 ability of personnel to move with ease without having
8 to deal with water.

9 MEMBER SKILLMAN: Had that Aqua Berm not
10 been placed, would the water have entered the power
11 block?

12 MR. KIRKLAND: The water would have entered
13 up to the buildings inside the power block which we'll
14 see in another slide when the Aqua Berm that they had
15 failed and allowed that in. On June 6th, they declared
16 a notification of usual event. That is triggered at
17 1,004 feet which is its elevation. And as we saw in
18 the other slide, the river -- the highest level was
19 1,006 feet 10 inches on June 25th.

20 This is a picture of the site from the
21 west looking east, and this is in mid-June time frame.
22 As compared to the first aerial view we saw, we no
23 longer have the defined river banks on either side.
24 You can see how the water has come up around the site.
25 This right here is dry fuel storage which is why --

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1 and it's built up to 1,009 feet. So, that's showing
2 its dry. They built an earthen berm around the switch
3 yard. This is the building that I mentioned flooded
4 first. They built initially sandbag berms that didn't
5 hold very well. Then they went in with a cofferdam
6 type system to build a better earthen dam, and then
7 also backed that up.

8 DR. NOURBAKHS: So, this was done at the
9 time of this -- as they saw the water coming.

10 MR. KIRKLAND: AS they saw the water
11 coming.

12 DR. NOURBAKHS: So, they did this -- this
13 was an emergency action to get this berm built.

14 MR. KIRKLAND: Correct. The berm around the
15 switch yard was not there prior to the floods. The
16 complications, the biggest complications that occurred
17 the day after the Notification of Unusual Event. There
18 was a breaker fire in the 480 volt distribution
19 system. It was not a result of the flood. It did not
20 impact the flood; however, it took significant focus
21 away from personnel being able to mitigate the flood.

22 They also had a rupture of the Aqua Berm.
23 In the middle of the night a worker was working with
24 a Bobcat, brushed up in one corner up against the berm
25 and it tore the side of it, and then it just kind of

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1 caused a collapse all the way around. So, the berm
2 itself basically went from there keeping all of the
3 structures inside of it dry, within 15 minutes it was
4 basically a flooded site.

5 And back to your question, what that did
6 was put the water up to the buildings. The buildings
7 were sandbagged at entrances. For example, the turbine
8 building because their procedure called for that, and
9 the Aqua Berm was an asset protection feature, so they
10 were certainly within their procedures, and they were
11 certainly within their design and licensing basis with
12 all of the confusion on that on the safety analysis
13 report. And 1,006 feet 10 inches is below the 1,007
14 feet for hardened structures.

15 There were also impacts to site access.
16 With the water as we saw in the aerial view, backed
17 up, the licensee made a series of elevated walkways
18 that would get us from the top of the hill down,
19 walkways into the plant and up and over the Aqua Dam.
20 They also had security impacts where it was harder for
21 security guards to do perimeter watches. They lost a
22 lot of their IDS systems and things like that, but
23 they took adequate compensatory measures to take care
24 of that.

25 This is a pretty good photo of the Aqua

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1 Dam itself. It's about 12 feet at the base. It can be
2 filled to about 10 feet high. It kind of adjusts to
3 how much protection you need. This picture was taken
4 before the rupture. A couple of weeks after the
5 rupture the licensee successfully installed another
6 Aqua Dam. The owner of the company who was out there
7 believes it's easier to install these in flooded
8 locations anyway, and they basically built it around
9 the same power block they had before floating it on
10 top of the water, filled it with water until it rested
11 on the ground, and then pumped the water from inside
12 out to re-establish more normal access for personnel.

13 The licensee had continual assessment of
14 their on and offsite emergency response. The biggest
15 impact that they had were sirens that were in flooded
16 out areas. They did coordination with the state and
17 local authorities, our daily calls with the Army Corps
18 of Engineers, they had their daily calls with state
19 and locals. Although most of the areas where sirens
20 were flooded out were areas that were inaccessible by
21 people that would have had to evacuate by then anyway.
22 They did maintain their emergency preparedness
23 capability throughout the event, and maintain physical
24 security in accordance with the security plan.

25 The response that we had at the NRC, my

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1 resident inspector and I were on site. We were
2 augmented by other NRC staff to the point where we
3 provided 24-hour coverage during the event. That
4 started from when they declared the usual event on
5 June 6th until shortly after the second Aqua Dam was
6 installed. At that point, we went away from 24-hour
7 coverage, but we stayed in seven day a week coverage,
8 so my resident and I at that point just adjusted our
9 schedules so we covered the weekend, as well as Monday
10 through Friday.

11 MEMBER SKILLMAN: Could we talk just a
12 minute about the operating staff? Here you had this
13 flooding not just confined to the Fort Calhoun area,
14 but in the local area, as well. And I've got to think
15 that men and women who worked at the plant had some
16 challenge, or great challenges getting to work. And,
17 therefore, the site may have had difficulty staffing
18 its emergency response organization, and maybe its
19 leadership billets. Can you talk to that for a minute,
20 please?

21 MR. KIRKLAND: The majority of people who
22 had issues getting to work were the people who live in
23 Iowa. And, basically, most of the roads in Iowa were
24 flooded to the point, the main north-south interstate
25 was just completely gone.

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1 MEMBER SKILLMAN: Okay.

2 MR. KIRKLAND: So, the challenges for the
3 people that lived in Iowa were commutes that would
4 take them 20 minutes were now taking them an hour and
5 a half. Not a lot of people live in Iowa. Even Blair,
6 which is the closest town to the north had very little
7 impact to the flood. Omaha to a much lesser extent
8 which is where most of the people live. I don't ever
9 remember an operating staff or a security staff being
10 impacted by not having the people available. Omaha, or
11 Fort Calhoun's EOF is actually in Omaha, which is
12 closer to where most people would be in the event that
13 they would have to man the EOF. The TSC, which is on
14 site with the people who were there, and they generally
15 got their ERO set up that most of the TSC responders
16 live in Blair and Fort Calhoun, and most of the EOF
17 responders live in Omaha, so it did not appear that
18 the community flooding outside the plant had any
19 adverse impact on their ability to staff their ERO.

20 MEMBER SKILLMAN: Thank you.

21 MR. KIRKLAND: There were several
22 performance issues that we had coming out of the
23 flood. Obviously, the restoration of the plant itself
24 from the flood, the breaker failure and the fire, and
25 the corrective actions associated with that, vendor

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1 modifications as part of the breaker failure, and
2 equipment service life. When we took all of those
3 factors, plus the fact that the plant had been shut
4 down since April, we made an Agency decision to
5 transition to oversight in the manual Chapter 0350
6 process, which is outside the ROP. Where we're at with
7 that, we've developed an issued the charter and the
8 action plan. We've held several public meetings in
9 Omaha. We have one with the public about every six
10 weeks. We've developed the restart checklist and the
11 confirmatory action letter which will be released
12 shortly. And shortly after that, I'll get to the
13 inspection plan here on this next slide.

14 The licensee as a result of this has
15 formed a partnership with Exelon Corporation to help
16 them manage their performance improvement. They've
17 also provided a plant manager for operation of the
18 facility. The existing plant manager is on rotation at
19 INPO. We have -- or they completed a safety culture
20 assessment, the results of which have not been
21 provided to us yet. And their integrated performance
22 improvement plan, which is their overall plan to get
23 better, once they release that, we will be able to put
24 together our inspection plan to make sure all of their
25 issues are taken care of.

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1 Their commitments to restart are
2 restoration of the plant, as well as the plant systems
3 and the equipment, the equipment reliability, and a
4 detailed look at their design and licensing basis. And
5 with that --

6 MEMBER SIEBER: Are they still shut down?

7 MR. KIRKLAND: Any other questions?

8 DR. NOURBAKSHSH: Your river level, you had
9 this nice historic line on the --

10 MR. KIRKLAND: The dam?

11 DR. NOURBAKSHSH: Yes, on the flows, the
12 maximum flows.

13 MR. KIRKLAND: Right.

14 DR. NOURBAKSHSH: But you didn't have a --
15 what's the maximum historic level, what river level?

16 MR. KIRKLAND: 1,009 feet is the flood of
17 record. That flood of record was in 1952 before the
18 dam system was complete. In the history of Fort
19 Calhoun, the two biggest flood years were 1994 and
20 1997, 1997 was the last or the max flow rate. Neither
21 of those years did they enter the notification of
22 unusual event at 1,004 feet. So, once they entered
23 that, they were really in unchartered territories as
24 far as river level went.

25 DR. NOURBAKSHSH: Okay. So, post Fort

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1 Calhoun operations was always below the 104 --

2 MR. KIRKLAND: That's correct.

3 DR. NOURBAKHS: -- feet above mean sea
4 level.

5 MR. KIRKLAND: Correct.

6 DR. NOURBAKHS: And in 1954 the highest
7 one was around -- historically upon record was 109--

8 MR. KIRKLAND: 1,009.

9 DR. NOURBAKHS: 1,009, excuse me.

10 MR. KIRKLAND: Roughly in there.

11 MEMBER BLEY: Roughly.

12 MR. KIRKLAND: Thank you very much.

13 MEMBER SIEBER: Any other questions? If
14 not, thank you, Mr. Kirkland.

15 MR. KIRKLAND: Thank you.

16 MEMBER SIEBER: And the last one would be
17 H.B. Robinson.

18 MR. ROBLES: Good afternoon, everyone. My
19 name is Jesse Robles. I am in the Operating Experience
20 Branch in the Office of Nuclear Reactor Regulation,
21 and today I'm going to talk about an event an H.B.
22 Robinson involving an automatic reactor trip and
23 safety injection with fires, affecting safety-related
24 equipment.

25 A brief overview of the plant, H.B.

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1 Robinson is located near Hartsville, South Carolina.
2 It is a three-loop Westinghouse pressurizer water
3 reactor, 710 megawatts electric. It commenced
4 operations in 1971. The next slide shows a simplified
5 layout of their AC electrical distribution system. And
6 I'm going to go through their normal lineup, because
7 on the day of the event, March 20th, 2010, they were
8 at full power and normal electric lineup.

9 They have basically two transformers of
10 the unit, auxiliary transformer which feeds bus 4 and
11 bus 1, and those buses feed bus 2 and bus 5. Up at bus
12 2, that feeds a 480-volt bus E-1. The other
13 transformer is a startup transformer which feeds bus
14 3, which in turn feeds 480 bus E-2. So, there are
15 normal power lineup, as such.

16 So, March 28th, 2010, just before 7:00
17 p.m., they experienced a fault on feeder breaker to --
18 - or on the feeder cable, sorry, to bus 5. This bus
19 was installed in 1986 as a design modification and the
20 design modification package it specifies certain type
21 of cable with certain insulation and fire protection
22 properties. And the cable that they ended up
23 installing did not meet that specification. In
24 addition, when they pulled the cable --

25 DR. NOURBAKSH: Intentionally?

1 MR. ROBLES: Huh?

2 DR. NOURBAKSHSH: I mean, they knew that
3 when they installed it?

4 MR. ROBLES: No, they didn't.

5 DR. NOURBAKSHSH: Okay.

6 MR. ROBLES: I guess that's one thing, they
7 installed another thing. And when they installed it,
8 also in addition to installing the incorrect type of
9 cable, the procedure that they used for installing
10 didn't take into account the tension limits of the
11 cable, so they actually -- when they inspected the
12 cable they actually had several kinks in the cable
13 that indicated that it was installed incorrectly, as
14 well.

15 Now, breaker 24 should have opened to
16 isolate that fault, and isolate bus 5; however, a
17 failed or a defective fuse in the control power
18 circuit for the breaker prevented it from having
19 control power, so the breaker couldn't cycle open. So,
20 the fault spread to bus 5, the fast transfer starts to
21 close breaker 19 which degrades the voltage on bus 3,
22 which as you recall feeds emergency bus 2. So, what
23 happens after that is the bus separates from bus 3
24 breakers associated with that 1528 open, and then the
25 EDG starts up to power 40 bus volt E-2.

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1 MEMBER STETKAR: Jesse, I didn't see -- I'm
2 going to interrupt you for a second here. We're
3 getting a little late on time, but we can run long. I
4 didn't see anything more about that nice pretty
5 picture of the fuse that you showed there.

6 MR. ROBLES: Yes.

7 MEMBER STETKAR: Are you going to talk more
8 about that?

9 MR. ROBLES: Yes.

10 MEMBER STETKAR: Okay.

11 MR. ROBLES: Okay. So, the line up
12 following the trip and fault is the unit auxiliary
13 transformer failed, buses 4 and 5 are de-energized,
14 breaker 24 is still closed because it doesn't have
15 control power to open, breaker 20 open, 19 initially
16 tried to close for the fast transfer but it ended up
17 opening, so the start up transformers feeding buses 1,
18 2, and 3 and bus E-1 is fed by bus 2 as the normal
19 line up, but bus E-2 is being fed by the emergency
20 diesel generator.

21 Following this initial event, the reactor
22 trip, they got a generator lockout, a series of
23 equipment and human performance issues complicated the
24 event. What I didn't mention because it's in the
25 previous drawing was sort of simplified for clarity,

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1 a lot of 4160 volts of volt buses feed a lot of
2 different equipment, so they -- when that equipment
3 became de-energized, a -- the return valve for the
4 cooling water and the RCP thermal barrier heat
5 exchanger went closed, and that caused them to not
6 have flow to the thermal barrier heat exchanger, so
7 they had inadequate seal cooling. In addition to --

8 mEMBER SKILLMAN: Just if I could ask, what
9 caused that valve to close, please?

10 MR. ROBLES: When they lost the instrument
11 bus, it's powered off the 40 volt bus that they
12 momentarily lost, the one that the EVG is power, E-2.
13 They got a false high flow signal on that because it
14 was de-energized. So, the valve actually closed -- the
15 logic told the valve to close, so it actually closed.

16 MEMBER SKILLMAN: Command it closed and it
17 went closed.

18 MR. ROBLES: Yes.

19 MEMBER STETKAR: It did exactly what it was
20 supposed to do for its safety analysis.

21 MEMBER SKILLMAN: Thank you.

22 MR. ROBLES: In addition to that, due to
23 loss of a lot of the other electrical equipment they
24 -- the moisture separator reheater valve alternating
25 drain valves failed open which created a steam flow

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1 path to the condenser which caused an excessive cool
2 down. And that ultimately resulted in their safety
3 injection.

4 In addition to that, the charging suction
5 was supposed to transfer from the volume control tank
6 to the refueling water storage tank and did not do so
7 due to an improperly set I&C control module.

8 During the event, the operators were
9 trying to reset the main generator lockout which cause
10 breaker 19 to close again, which re-energized the
11 fault bus 4, and bus 5, and the fault is in between
12 those buses, so that caused a second electrical fire.
13 And that fire actually -- I'll show some pictures
14 later on, but it caused damage to both DC buses, and
15 that in conjunction with the fire prompted the
16 licensee to declare an alert at the site.

17 This is a picture of bus 5, which is -- up
18 here is where the fault started. That's where the
19 cable failed and burned. And these are just from two
20 different angles. This is basically showing the damage
21 of all the smoke and soot. And this picture is the
22 back of bus 4 where breaker 24 is, the breaker that
23 failed to open. That breaker -- that panel blew up and
24 caused damage on an adjacent panel that caused one of
25 the trains of DC got grounded because of this, and the

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1 damage to the other one got the grounds on the other
2 train of DC. And these two pictures just show the top
3 of 4160 plus 5, and the cable trays on top of that,
4 some of the soot and fire damage. And this is an
5 actual closeup of the conduit of the cable that failed
6 that started the initial faults.

7 In response to the event, the NRC and the
8 special inspection team which was subsequently
9 upgraded to AIT is the team became aware of the fact
10 that they had degraded cooling that resulted in 14
11 unresolved items, and follow-up inspection resulted in
12 multiple green findings, and two white findings. The
13 first one is for failure to follow procedures required
14 by tech specs, and failure to basically monitor plant
15 parameters when the event was happening. They didn't
16 realize that they had the flow control valve from the
17 thermal barrier heat exchanger closed. They didn't
18 monitor before they got the safety injection due to
19 the excessive cool-down. And the other one is failure
20 to adequately design and implement operator training.

21 They also got additional oversight as a
22 result of this. They would transition in the reactor
23 oversight process action matrix to COM 3, and then
24 they got out of COM 3 fourth quarter of 2011.

25 One of the operating experience products

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1 that have been generated because of this event were
2 information notice on the importance of understanding
3 circuit breaker control panel indications. This is the
4 one where the fuse that was -- it didn't -- it wasn't
5 actually a blown fuse. The fuel had a defect in it,
6 and it -- you see the picture. There's a separation
7 between basically the filament and one of the
8 terminals, so this condition existed in 2008.

9 It was discovered seven times between 2008
10 and the event. And the breaker is classified as a
11 critical component, which means that they have to
12 initiate a condition report on the condition. They
13 only opened some work requests, and it stayed in plant
14 status for all that time. And they attributed -- the
15 breaker has indicating lights that say whether it's
16 open or it's closed. Those lights were not
17 illuminated, so they changed out the bulbs as
18 corrective action initially, that didn't work so they
19 attributed it to a faulty socket. So, they left the
20 work request in an open status pending when they would
21 receive the parts for that socket. They did a fleet
22 wide --

23 MEMBER BLEY: You didn't say out loud for
24 everybody. What that really meant was there was no
25 control power for the break.

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1 MR. ROBLES: Yes, exactly. The circuit
2 didn't have power to it.

3 MEMBER STETKAR: And because most of the
4 folks here are not electrical, had the circuit breaker
5 had control power --

6 MR. ROBLES: It would have opened.

7 MEMBER STETKAR: -- we would not be
8 hearing this story.

9 MR. ROBLES: Yes. They would have one small
10 fire and that was it.

11 MEMBER BLEY: Charlie, it had -- there were
12 no indications in the control room, but down at the
13 breaker panel they noticed the lights. Somebody early
14 on blamed it on the socket, and nobody chased that for
15 a year and a half. This is one of the events that lead
16 us to keep saying that that maintenance program is
17 really important to get things in it and out of it
18 fast, and understand each failure you put into it.

19 DR. NOURBAKHS: I was failing to
20 understand why somebody didn't work on this particular
21 lack of control power. I mean, the lights are out, I
22 mean, it's --

23 MEMBER BLEY: People kept reporting it.
24 Then other people would look at it and say oh, there's
25 a work order on it.

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1 DR. NOURBAKSHSH: For a year and a half?

2 MEMBER BLEY: Yes, for a year and a half.

3 MEMBER SKILLMAN: This, to me, is the
4 poster child for why our thick magnifying glass needs
5 to be on the effectiveness of the correction action
6 program. This should have come right to the top of the
7 heap somewhere along the line, and it was just ignored
8 over and over again. It was just dismissed.

9 MEMBER BLEY: So, they're -- they've
10 changed the way they administer their critical action
11 plan now. They're probably better now than most place,
12 but before they weren't.

13 DR. NOURBAKSHSH: Nobody is ever perfect but
14 I just -- every time I hear -- I mean, I love these
15 sessions because it keeps illuminating items that -- I
16 mean, it's just like the head tensioning thing. How
17 many times do you have to make these rationalizations
18 during process of a procedure before you say why do I
19 have to rationalize what I'm doing in this procedure
20 when it's been done before? And things are -- we're
21 making little changes over cause, but that should have
22 raised a flag right away. I mean, there's another one.
23 The lights are out, a month later the lights are out,
24 seven times he just said it was noted that it had been
25 worked on.

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1 MEMBER BLEY: And it didn't have a review
2 process.

3 DR. NOURBAKSHSH: Yes.

4 MEMBER BLEY: So you can always say retrain
5 people but if you don't put a system in place to make
6 it work it doesn't do you a damned bit of good.

7 DR. NOURBAKSHSH: Well, if the toilet wasn't
8 flushing that's one thing, but when you've got major
9 breakers --

10 MEMBER SKILLMAN: That's one that gets
11 fixed by --

12 DR. NOURBAKSHSH: I'm not going to comment
13 on why.

14 MEMBER BLEY: I was involved in chasing
15 this a little bit. But one thing I learned from some
16 folks in the plant that is beyond my experience,
17 apparently there are some breakers for which those
18 lights are not indicators of control power. I didn't
19 know that but I learned that there are some. So, that
20 having those out -- I mean, to most of us when we saw
21 it it was my God there was no control power, but if we
22 read another line, apparently -- and some of the
23 people at this plant had been at other plants where
24 that wasn't true. And I'd never seen that.

25 DR. NOURBAKSHSH: Is there a label plate

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1 there that says control power? So, they're just
2 lights.

3 MEMBER BLEY: They're lights.

4 DR. NOURBAKSH: With no --

5 MEMBER BLEY: But almost everybody knows
6 they get their power from --

7 DR. NOURBAKSH: Oh, everybody knows. I
8 hate those words.

9 MEMBER BLEY: Everybody knows it.

10 DR. NOURBAKSH: It's not as well known as
11 you thought --

12 MR. ROBLES: So, basically, they discovered
13 a similar condition at Crystal River where they found
14 a bunch of breakers that the lights weren't
15 illuminated. However, they only found one that
16 actually had no control power to it. Most of them were
17 actually just light bulb issues. But the Agency felt
18 the need that we needed to issue an information notice
19 on this issue, so we did. And it highlights the issue
20 at Robinson.

21 In addition, we also issued information
22 notice on instrumentation control module hardware
23 configuration and procedure issues which addresses the
24 failure of the VCT, the charging suction, swapping the
25 volume control tank to the RWST, the configuration

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1 there.

2 MEMBER BLEY: That was during a maintenance
3 or installation of equipment --

4 MR. ROBLES: Yes.

5 MEMBER BLEY: And it was installed the way
6 the instruction for installation told them to do it.
7 That's true, isn't it?

8 MR. ROBLES: Yes.

9 DR. NOURBAKSHSH: Did anybody go back and
10 pull the string on the cables that were the wrong
11 cables installed however many years ago? I mean, they
12 called for a certain spec on the cables in terms of
13 the insulation and/or the whatever, I've forgotten
14 what you exactly said, but they got delivered
15 something that wasn't what was bought. Like I ordered
16 a Ford, I got delivered a Chevy.

17 MEMBER SIEBER: Then maybe you ordered the
18 wrong thing.

19 DR. NOURBAKSHSH: Pardon?

20 MEMBER SIEBER: Maybe you ordered the wrong
21 thing.

22 DR. NOURBAKSHSH: That's why I asked did
23 anybody find out why in the world nobody found out
24 that they got the wrong cable, because it obviously
25 couldn't stand the surface.

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1 MR. ROBLES: I think that might be -- I'll
2 have to look into it but I think it might be addressed
3 in one of the -- because they actually got an
4 inspection finding for that.

5 MR. LUBINSKI: This is John Lubinski. They
6 did pull the string on it but I don't have the answer
7 exactly what they did, but that was one of the items
8 they were looking into, is the reason that they had
9 the wrong cable in that area.

10 MR. ROBLES: It was one of the unresolved
11 items. And I believe they had a finding on it, too.

12 MEMBER SIEBER: Okay. Our package has a
13 couple of more slides which are pictures of the
14 failures.

15 MR. ROBLES: Yes, I showed them during the
16 presentation just as reference.

17 MEMBER SIEBER: Okay. Does anyone have any
18 additional questions?

19 MEMBER BLEY: Only that for the rest of the
20 members if you didn't have a chance to read everything
21 about this event, I'd urge you to do it, because
22 there's a lot of very interesting things beneath the
23 story we just heard. Not just interesting, important
24 to other things we look at.

25 MEMBER SIEBER: I imagine there is plenty

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1 of opportunities for confusion of the operators, too.

2 MR. ROBLES: During this event, yes. They
3 were in multiple procedures and responding to the
4 fire.

5 MEMBER SIEBER: Right.

6 MEMBER BLEY: There have been -- to that
7 point, Jack, there have been -- I think the NRC
8 directed some of it, but I know the utilities and
9 people they work with have done more of it, have done
10 a fair number now of simulator exercises that aren't
11 the plain vanilla stuff you usually get. They have
12 notable things going on that can confuse people, and
13 the results are indicating we've got to figure a
14 better way to make the control room work, because they
15 haven't all -- people are learning a lot from those
16 exercises.

17 CHAIRMAN ARMIJO: I have a general
18 question. What does the INPO do with an event like
19 this? Do they go out and meet with -- I'm asking my
20 colleagues as well as yourself. Do they go out and
21 meet and pull all key people together to get lessons
22 learned or vast --

23 MEMBER SIEBER: INPO?

24 CHAIRMAN ARMIJO: Is it INPO or is it some
25 other --

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1 MR. ROBLES: INPO actually put out a
2 significant event report --

3 MEMBER SIEBER: SER.

4 MR. ROBLES: And they also -- just one for
5 the event and one where they highlighted issues such
6 as this with different sites having a command control
7 or oversight.

8 CHAIRMAN ARMIJO: Is there something like
9 an annual meeting, or something that addresses these
10 kind of events industry wide that brings people
11 together and says hey look guys, these are serious
12 things that have happened. And we want everybody to
13 know that. And that does go on?

14 MEMBER RAY: Yes.

15 MEMBER SIEBER: Licensee is --

16 MEMBER BLEY: And if you recall, we had a
17 conversation with them and one of their comments was
18 they're pushing people to run drills that really run
19 much more complicated scenarios to get people used to
20 that kind of environment, because it's a tough
21 environment to operate it.

22 CHAIRMAN ARMIJO: Yes.

23 MEMBER RAY: Yes, people don't lack any
24 motivation to try and prevent stuff like this from
25 happening --

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1 CHAIRMAN ARMIJO: No, I understand that.

2 MEMBER RAY: -- at their plant. It's the
3 stuff that hasn't happened yet that's a little
4 tougher.

5 MEMBER SIEBER: Okay. Is there any further
6 questions of the staff? Well, I think these were
7 excellent presentations and we certainly appreciate
8 you coming to inform us, particularly of all the
9 detail you offered. It helps us understand and puts a
10 lot of things in more perspective as we examine what
11 the NRC is doing, and what licensees are doing, and
12 how best to -- that we can contribute to overall plant
13 safety. So, we certainly appreciate the fact that you
14 do the jobs that you do, and you come and tell us
15 about it, so thank you very much.

16 DR. NOURBAKSHSH: I have one other
17 observation, Jack, it was interesting on the Robinson
18 thing how they were -- we keep talking about single
19 failures leading to events, and yet if my mind
20 correctly counted there was at least three or maybe
21 more --

22 MEMBER BLEY: He didn't go through them
23 all. There were four or five latent --

24 DR. NOURBAKSHSH: Independent things?

25 MEMBER BLEY: Independent latent problems

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1 sitting there that really complicated this event.

2 DR. NOURBAKHS: And yet, we -- and they
3 failed in the -- they failed to operate. They didn't
4 necessarily get caused by this, therefore, they were
5 failed to operate. Well, they weren't able to operate
6 and they allowed the casualty to proceed.

7 MEMBER BLEY: And made it much more
8 complex.

9 DR. NOURBAKHS: It's the old argument
10 about single failure design basis as opposed to
11 multiple --

12 MEMBER BLEY: Isn't that resetting the '86
13 relay thing that we powered it --

14 DR. NOURBAKHS: Yes.

15 MEMBER BLEY: You know, most people when
16 you first read that, my God, why would they do that?
17 Well, they talked it over and including some fairly
18 senior people in the plant, and now it's in their
19 training. But the things they thought resetting that
20 would do didn't include what actually happened. They
21 thought it was just setting everything back up to
22 operate again, and they're training is done, and
23 actually it repowered everything, and that was a
24 surprise.

25 MEMBER STETKAR: And more importantly, it

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1 -- as an old operator and having reset '86 relays
2 there are actually things -- I mean, there -- you say
3 well, why the heck would they even reset that? There
4 are actual reasons to reset the '86 --

5 MEMBER BLEY: The procedure has you do it.

6 MEMBER STETKAR: Well, and because it
7 enables some stuff that's locked out that you kind of
8 need in a normal plant trip response, so it's not like
9 why with an electrical fire would you go out and reset
10 a lockout relay. It is something that, you know --

11 that wasn't an error. They just didn't realize what
12 other stuff that it did.

13 MEMBER SIEBER: Okay. Any additional
14 questions or comments? If not, Mr. Chairman, I turn it
15 back to you.

16 CHAIRMAN ARMIJO: Okay, thank you, Jack.
17 Well, I'm sorry I missed this. I am going to have to
18 rely on my colleagues to pump me up on this stuff. It
19 looks like good presentations.

20 We're going to take a break for 15
21 minutes. Let's be back at 20 of 3.

22 (Whereupon, the proceedings went off the
23 record at 2:22:42 p.m.)

24

25