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Plant License Renewal Subcommittee

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12 proceeding of the United States Nuclear Regulatory
13 Commission Advisory Committee on Reactor Safeguards,
14 as reported herein, is a record of the discussions
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16
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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

PLANT LICENSE RENEWAL SUBCOMMITTEE

+ + + + +

THURSDAY

NOVEMBER 17, 2016

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ROCKVILLE, MARYLAND

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

COMMITTEE MEMBERS:

GORDON R. SKILLMAN, Chairman

PETER RICCARDELLA, Member-at-Large

RONALD G. BALLINGER, Member

WALTER L. KIRCHNER, Member

DANA A. POWERS, Member

JOHN W. STETKAR, Member

MATTHEW W. SUNSERI, Member

ACRS CONSULTANT:

STEPHEN SCHULTZ

DESIGNATED FEDERAL OFFICIAL:

KENT HOWARD

ALSO PRESENT:

ARDEN ALDRIDGE, STP NOC

MIKE BERG, STP NOC

RUSS CIPOLLA, Intertek

PHYLLIS CLARK, NRR/DLR

YOIRA DIAZ, NMSS/DSFM

ROB ENGEN, STP NOC

MICHAEL GARNER, STP NOC

JIM GAVULA, NRR*

DAVE GERBER, SIA

RON GIBBS, STP

RAFAEL GONZALES, STP NOC

ALLEN HISER, NRR/DLR

WILLIAM HOLSTON, NRR

MATTHEW HOMIACK, NRR

LOIS JAMES, NRR/DLR

RAIHAN KHONDKER, STP NOC

BRET LYNCH, WP

JANE MARSHALL, NRR

TODD MAXEY, STP

JAMES MEDOFF, NRR/DLR

MIKE MURRAY, STP NOC

CHANCEY PENCE, STP NOC

GREG PICK, Region IV

DAVE RENCURREL, STP

BILL ROGERS, NRR/DLR

DAN SICKING, STP NOC

RICK STARK, STP NOC

DAVID STUHLER, STP NOC

MIKE SVETLIK, STP

MARK WALES, STP NOC

GARY WARNER, WP

DAVE WIEGAND, STP NOC

JAMES WILLIAMS, STP NOC

PRESTON WILLIAMS, STP NOC

JAMES C. YOUNGER, STP NOC

KEVIN REGIS, STP NOC

*Present via telephone

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

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Adjourn

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

2 8:29 a.m.

3 CHAIRMAN SKILLMAN: (presiding) Ladies
4 and gentlemen, good morning. This meeting will now
5 come to order.

6 I am Gordon Skillman. I am Chairman of
7 the Plant License Renewal Subcommittee.

8 The Subcommittee will review the
9 license renewal application for South Texas Project
10 Units 1 and 2.

11 ACRS members in attendance today are
12 Dana Powers, John Stetkar, Ron Ballinger, Peter
13 Riccardella, Walt Kirchner, and Matt Sunseri. Our
14 ACRS consultant Dr. Stephen Schultz is also in
15 attendance. Kent Howard of the ACRS is the
16 Designated Federal Official for this meeting.

17 This morning we will hear presentations
18 from the Division of License Renewal, Region IV,
19 and South Texas Nuclear Operating Company, the
20 Applicant, regarding this matter. This
21 Subcommittee will gather information, analyze
22 relevant issues and facts, and formulate proposed
23 positions and actions, as appropriate, for
24 deliberation by the full Committee.

25 The rules for participation in today's

1 meeting have been announced as part of the notice
2 of this meeting published in The Federal Register.
3 We have not received written comments and requests
4 for time to make oral statements from members of
5 the public regarding today's meeting, and the
6 entire meeting will be open to public attendance.
7 There will be a phone bridge line. To
8 preclude interruption of the meeting, the phone
9 will be placed in a listen-in mode during the
10 presentations and Committee discussion.
11 A transcript of this meeting is being
12 kept and will be available, as stated in The
13 Federal Register notice. Therefore, I request that
14 participants in this meeting use the microphones
15 located throughout the meeting room when addressing
16 the Subcommittee. The participants are requested
17 to please identify themselves and speak with
18 sufficient clarity and volume, so that they can be
19 readily heard.
20 I also request that all attendees
21 please silence your personal electronic devices.
22 We will now proceed with the meeting, and I call upon
23 Jane Marshall to begin the presentation.
24 Thank you, Chairman Skillman.
25 As stated, I am Jane Marshall. I'm the

1 Acting Director for the Division of License Renewal
2 in the Office of Nuclear Reactor Regulation. With
3 me here today are members of my management team and
4 several members of my staff. They will introduce
5 themselves as they answer questions today. Also
6 joining us by phone is Greg Pick, who is the Lead
7 Inspector from Region IV.
8 The staff's presentation will be given
9 by Lois James, who is the South Texas Project
10 Safety Project Manager. She will be joined at the
11 table by DLR Senior Technical Advisor Dr. Allen
12 Hiser and Senior Mechanical Engineer Bill Holston,
13 as well as Safety Project Manager Phyllis Clark.
14 At today's ACRS Subcommittee meeting,
15 the staff will present its review and resolution
16 path for the open item for the license renewal of
17 South Texas Project Units 1 and 2. The information
18 we will be presenting was documented in the Final
19 SER.
20 At this time, I would like to turn the
21 presentation over to South Texas Project Nuclear
22 Operating Company and Dave Rencurrel, Senior Vice
23 President for Operations, to introduce his team and
24 commence their presentation.
25 Thank you.

1 MR. RENCURREL: Good morning.

2 Yes, as you said, my name is Dave

3 Rencurrel. I am from South Texas, Senior Vice

4 President of Operations.

5 I really would like to take this

6 opportunity to thank the ACRS Subcommittee for our

7 opportunity to present our overview of our license

8 renewal application, and we do look forward to your

9 questions.

10 But, before we get started, I would

11 also like to thank the NRC reviewers for their hard

12 and diligent work in this process and for everybody

13 on the staff, everybody from South Texas, who has

14 also worked very hard in this process.

15 There it is. All right. As you can

16 see, here is an overview of the agenda, which we

17 will be presenting today. I would like to point

18 out that we are setting aside a really special time

19 or focused time to discuss the Safety Evaluation

20 Report open item for aluminum bronze selective

21 leaching.

22 With that, I would like to move into

23 the introductions of the team that we brought

24 today. I will start and, then, we will just move

25 to the left and move down our line.

1 Now my name, as I said, is David
2 Rencurrel. I'm the Senior Vice President of
3 Operations.
4 I began my career over 35 years ago, my
5 nuclear career over 35 years ago in 1981, when I
6 started in the United States Navy as a nuclear
7 officer. In 1988, I joined the South Texas Project
8 and, since then, I have had many different jobs. I
9 got hired in as a young system engineer. I have
10 went through license class, spent time in the
11 control room as a shift technical advisor. I spent
12 time as a work control supervisor, worked in
13 maintenance, system engineering manager, design
14 manager. I was ops manager for a little bit over
15 four years, VP of Engineering and Projects, Site VP
16 for over four years. Now I am in my current role
17 where I am responsible for all projects here
18 onsite.
19 I would like to hand off to Mike
20 Murray.
21 CHAIRMAN SKILLMAN: Not so fast, Dave.
22 You have a lofty position, huge influence at the
23 site and in the company. What is your vision of
24 the importance of 10 CFR 50 Appendix B?
25 MR. RENCURREL: I think that is

1 extremely important. 10 CFR 50 Appendix B is what
2 gives us that consistency and that credibility that
3 we all want. I think that is where that comes from
4 in that regard.
5 CHAIRMAN SKILLMAN: I asked the
6 question because in the course of time those of us
7 who have been in industry for a long time have
8 watched the devotees of 10 CFR 50 Appendix B fall
9 away. There is always somewhat of a move to cut a
10 corner here or cut a corner there and not recognize
11 how important the 18 points of that regulation are
12 --
13 MR. RENCURREL: Yes, sir, I understand.
14 CHAIRMAN SKILLMAN: -- to the materiel
15 condition of the unit and to the culture of the
16 unit. And so, my question is, how vigilant are you
17 of that? And what is the shadow that you cast on
18 your organization?
19 MR. RENCURREL: So, what is -- that is
20 the quality, right?
21 CHAIRMAN SKILLMAN: Yes, yes.
22 MR. RENCURREL: That's what I thought.
23 So, here's what we do in regards to independent
24 oversight of their station. Independent oversight,
25 obviously, we have the right dedication and right

1 resources assigned to that. They act independently
2 in that they report up to a company officer. All
3 right. We ensure that they have a very
4 professional relationship with the staff, that they
5 are honored by the staff and listened to by the
6 staff, that they have the capability to measure our
7 not just compliance, but also our drive towards
8 excellence.
9 We also have monthly reports, for
10 example, that come up to the executives where they
11 get to talk about oversight or the vision of
12 oversight of performance of how the station
13 performs. We have a very prescriptive program of
14 the elevation/escalation, where elevation is where
15 they bring up an issue to site leadership, plant
16 manager and such, where they can talk about
17 prolonged gaps or gaps that aren't being closed.
18 And then, it subsequently goes to escalate, if that
19 doesn't get solved, where, depending upon the
20 level, it can actually go all the way up to an
21 officer or a vice president to be accountably
22 resolved.
23 And then, you roll into the whole
24 concept of corrective actions and the idea of being
25 able to -- it is not just a corrective action

1 program; it is more of a program to ensure that you
2 have proper problem identification and real
3 resolutions that solve not just the symptom of the
4 problem, but the actual do the hard work of
5 understanding the cause of the problem. And I
6 believe that is extremely important, something we
7 measure very closely for.
8 I believe that in any organization you
9 have to have governance, proper governance, which
10 is the rules, the regulations, the traditions, the
11 meetings that we all interact with, so that you can
12 have proper oversight, so the oversight can come up
13 and measure how your governance is actually
14 operating and working. I believe in all those
15 concepts.
16 I also know that the folks I work with,
17 my boss, our Chief Executive Officer Dennis Koehl,
18 our Chief Nuclear Officer Tim Powell, also believe
19 very strongly in the Appendix B, in the 50.B
20 program. They believe very strongly in the
21 corrective action program and independent
22 oversight.
23 And having said all those words, in
24 conclusion, I would say plants/stations that
25 perform well, stations that perform with

1 excellence, stations that, quite frankly, meet the
2 business plan needs of the owners and the
3 shareholders have that healthy respect. Plants
4 that don't, they don't meet those; they don't have
5 that performance and they don't meet those business
6 goals. So, it all ties together.
7 CHAIRMAN SKILLMAN: Yes, I thank you
8 for your explanation. My real question was about
9 your office and your shadow on the QA program.
10 MR. RENCURREL: Yes, my office and my
11 shadow on the QA program is I know the QA Manager
12 personally and I actually mentor him through his
13 roles. I help him interact with folks on the
14 station. In my role right now, they don't report
15 to me. In my previous roles, they actually
16 reported to me. So, it was much more hands-on in
17 how things are working.
18 My shadow is that I believe very, very
19 strongly in the independence of QA, its
20 independence and conclusion, its independence in
21 their messaging, but we work closely with them in
22 ensuring that that message is presented in a way
23 that can be readily understood and accepted by the
24 staff.
25 I spend time; I go down and talk to the

1 folks -- they actually sit down the hall from me.
2 I go down and visit with them a lot, pretty much
3 know just about everybody there. And at times I
4 have both defended them and I both chastised them.
5 So, I think I have a very good shadow.
6 CHAIRMAN SKILLMAN: Dave, thank you.
7 Please proceed.
8 MR. RENCURREL: Okay. Thank you.
9 MR. MURRAY: My name is Michael Murray.
10 I'm the Regulatory Affairs Manager at South Texas
11 Project.
12 I have been in the industry for 41
13 years, started as an I&C tech at the Brunswick
14 Plant. I have had 31 years at South Texas Project.
15 I was there for startup of both units. So, I have
16 a long history at South Texas Project.
17 Various management positions. I was
18 I&C Manager, Systems Engineering Manager; spent
19 some time working on the Units 3 and 4 licensing
20 project as I&C, the Design Manager there. And I
21 have met a few of these folks here during that
22 process. And then, currently, I'm Reg Affairs
23 Manager at South Texas Project.
24 MR. GIBBS: Good morning. I'm Ron
25 Gibbs. My current position is the Manager,

1 Operations, Shift Operations. I'm the Senior
2 License at the South Texas Project now.
3 I've got over 30 years of nuclear
4 experience. Started out as a unit supervisor, STA,
5 at Comanche Peak. Came to the South Texas Project
6 in 1993. Got my Senior Reactor Operator License
7 there in 1995 and worked my way on shift. I
8 started as unit sup, STA, again, up through shift
9 manager. Came off shift in 2013 into an ops
10 manager role and took over as the Senior License
11 January of this year.
12 MR. ALDRIDGE: Good morning. My name
13 is Arden Aldridge.
14 I have been in the nuclear service for
15 about 38 years. I started in the nuclear submarine
16 service, consultation with some consulting groups,
17 and then, with two utilities.
18 For the last 22 years, I have been at
19 South Texas Project fulfilling various engineering
20 roles and functions. In the last 10, I have been
21 focused on license renewal applications, helping
22 our peer plants prepare three application from
23 preparation to approval. In the last five years,
24 it has been focused as the project lead and the
25 Implementation Coordinator for South Texas.

1 CHAIRMAN SKILLMAN: Thank you.

2 MR. BERG: Good morning. I'm Michael

3 Berg. I'm the Engineering Manager of Design and

4 Programs.

5 I have got 38 years in the nuclear

6 industry, 34 years at South Texas Project. I was

7 one of the original engineering supervisors that

8 took over design control from the architect

9 engineer.

10 I have had various manager roles over

11 the past 25 years and I was the manager over the

12 STP initial license renewal application submitted.

13 CHAIRMAN SKILLMAN: Gentlemen, thank

14 you. Please proceed.

15 MR. RENCURREL: Okay. What I would

16 like to do now is give a brief station ownership,

17 overview of station ownership and operation.

18 South Texas Project Nuclear Operating

19 Company is the licensed holder for the station.

20 The station is actually owned by three different

21 companies, Energy Texas, which is an investment-

22 owned utility; the City Public Services, San

23 Antonio, which is owned by the municipality San

24 Antonio, Texas, and Austin Energy, which is owned

25 by the City of Austin. So, we are owned by one

1 investor and two municipalities. To put our
2 generation in context, over 25 percent of the
3 carbon-free electric generation in the State of
4 Texas is produced at South Texas.
5 CHAIRMAN SKILLMAN: And you get no
6 credit for that whatsoever.
7 (Laughter.)
8 MR. RENCURREL: Yes, sir.
9 To go over our plant history and some
10 major investments, we received our initial license
11 in 1987 and 1988, respectively, for Unit 1 and Unit
12 2. Since that time, we have made major capital
13 investments. We have replaced our steam
14 generators, all four in each unit. We have
15 replaced our low-pressure turbines. We have
16 replaced both reactor vessel heads in both units.
17 We have also rewound our main generator stators and
18 have replaced the rotors, the main generator
19 rotors, in both units.
20 Looking forward, we have main
21 transformers done on one unit, but we are replacing
22 the main transformers in the other unit in the next
23 outage, and we are working through the replacement
24 of our feedwater heaters that show that there is an
25 ongoing investment in the major improvements of the

1 plant. Also, as you can see there, the non-welded
2 stress improvement process is being put in place,
3 and that is going to go down in 2017 and 2019.
4 The way our governance works is that we
5 have a business plan. And the way that the owners
6 commit to the long-term safe operation of the
7 station is via that business plan. This business
8 plan is approved annually for the next five years'
9 spend.
10 And so, in a sense, what goes on is the
11 money is allocated or set aside for the next five
12 years' worth of capital investments. However, our
13 plant investment plan itself goes out 20 years
14 where we have levelized out and put in all the
15 capital improvements and all the capital necessary
16 to move forward.
17 If you look at our plant investment
18 plan, you will see that our owners, we have
19 identified and our owners have committed to the
20 capital monies necessary to implement the aging
21 management plan. And so, there is that commitment,
22 not just in words, but in treasure, in regards to
23 implementing the extended license and safely moving
24 into the extended period of operation.
25 With that, I would like to turn it over

1 to Ron Gibbs, our ops manager.

2 MR. GIBBS: Good. Thank you, Dave.

3 This morning I will be giving a brief

4 description of the South Texas Project site and

5 station design.

6 South Texas Project is located about 90

7 miles southwest of Houston. You see the star here

8 on the Texas map gives a representation of our

9 location. Here in the center of this aerial map

10 you can see is the South Texas Project site. It is

11 about 12,000 acres. As you can see also in this

12 aerial view, it is largely a rural area, a lot of

13 farming in our community. We are Matagorda County

14 and about 15 miles inland from the Gulf of Mexico.

15 The large body of water here in the

16 center is our main cooling reservoir. Makeup from

17 our main cooling reservoir is the Colorado River

18 you can see here -- that is the main source -- and,

19 also, rainwater.

20 Our station, here is our main cooling

21 reservoir again on the top of the picture. Our

22 essential cooling water pond here is on the bottom.

23 That is commonly called service water in the

24 industry, and this is our ultimate heat sink.

25 Makeup to this is from well water as a primary

means of makeup and rainwater.

Just to the right here you can see our switchyard. We have nine 345-KV lines coming into and out of the switchyard. And the units here are in the center of the pictures. We have two Westinghouse four-loop PWRs, Pressurized Water Reactors. Our thermal rate of power is 3853 megawatts thermal with a design output of 1250 megawatts electric.

CHAIRMAN SKILLMAN: Ron, the essential service water pond there fed from wells, does that mean that that is freshwater --

MR. GIBBS: Yes.

CHAIRMAN SKILLMAN: -- compared with brackish water?

MR. GIBBS: That's correct.

CHAIRMAN SKILLMAN: Okay. I did not appreciate that when I was reading the application for the safety evaluation. Thank you.

MR. GIBBS: Okay.

CHAIRMAN SKILLMAN: Okay.

MR. GIBBS: Operators are licensed on both units. So, we can operate either unit, and we utilize common operating procedures.

Both containment structures are post-

1 tensioned concrete cylinders with steel liner
2 plates, hemispherical tops, and flat bottoms.
3 Each unit has three independent safety
4 trains, including piping, valves, pumps, and diesel
5 generators, our emergency supply for emergency
6 power. And each unit has four safety-related
7 auxiliary feedwater trains, three electric pumps,
8 and one steam-driven pump.
9 And next, I will turn it over to Arden.
10 CHAIRMAN SKILLMAN: Let me ask you to
11 back up a slide, please. Your aerial, the Mad
12 Island, that is the wildlife management area?
13 MR. GIBBS: That's correct.
14 CHAIRMAN SKILLMAN: And so, most of the
15 population down there are alligators and critters?
16 Is that what you've got down there?
17 MR. GIBBS: That's correct, a lot of
18 alligators, a lot of critters.
19 CHAIRMAN SKILLMAN: That's 5-6,000
20 acres, 10,000 acres, something like that?
21 MR. GIBBS: It itself, yes.
22 CHAIRMAN SKILLMAN: Yes. Thank you.
23 Okay. Okay.
24 MR. GIBBS: Next, I will turn it over
25 to Arden to walk us through our license renewal.

1 CHAIRMAN SKILLMAN: Right.

2 MR. ALDRIDGE: As I mentioned, my name
3 is Arden Aldridge. I was the license renewal
4 project lead, and I would like to just go through a
5 little chronology of where we have been in
6 preparation of this application.

7 In October of 2010, we submitted our
8 license renewal application against the
9 requirements of GALL Rev. 1. We, then, went
10 through the inspections and reviews. In 2013, we
11 received a Safety Evaluation Report with four open
12 items, and at the same time we put the safety
13 review on hold because of the uncertainty of the
14 waste confidence role on future license decisions.

15 Well, during the year that we put it on
16 hold we continued to work on the project. We
17 updated to GALL Rev. 2, the requirements of GALL
18 Rev. 2. We incorporated lessons learned from
19 License Renewal Safety Evaluation Reports and
20 performed annual updates. We also resolved three
21 of the open items going forward.

22 Here we are in 2016. We completed all
23 the reviews. The Safety Evaluation Report with
24 just one open item was issued on October of 2016,
25 and that open item is the aluminum bronze that we

1 will talk to later in the application.

2 On the next slide, just a description

3 of the programs, of how they have rolled out. We

4 had 41 aging management programs, of which 33 of

5 them were existing programs and eight new ones. On

6 that slide you will see in GALL consistency we said

7 we were 90-percent consistent with the standard

8 notes alpha through echo of GALL Rev. 1. However,

9 with the enhancements of GALL Rev. 2, that

10 consistency with GALL Rev. 2 is 95 percent against

11 the standard notes. As just a reminder, on the

12 bottom there, reinforcement, we did get reviewed

13 against standard review plan for GALL Rev. 2 and

14 those requirements.

15 On the next page, STP's program's

16 consistency with the GALL is we were consistent

17 with GALL Rev. -- the consistency table is against

18 GALL Rev. 1, but it is just an accounting

19 perspective. We had 21 aging management programs

20 that are consistent with GALL. We have 16 aging

21 management programs that are consistent with

22 exceptions, and we have four plant-specific aging

23 management programs.

24 Approximately 10 of the 16 aging

25 management programs with exceptions are due to the

1 addition of the requirements of GALL Rev. 2 and the
2 lessons learned that we incorporated. The
3 remaining exceptions would be alternate methods of
4 managing the aging effects specifically for the
5 programs that we developed.
6 As far as the license renewal
7 commitments, those are being tracked and we have 46
8 of them. This slide is just to represent the
9 different categories of commitments that we have
10 established. And up to this date, you can see
11 several of them are closed. Eight of the 46
12 commitments have been closed or have been
13 completed. That leaves us with 38 remaining to
14 implement prior to the period of extended
15 operation.
16 We have an implementation plan, a
17 schedule, and the budget that Dave mentioned to
18 complete these remaining open commitments prior to
19 their scheduled due dates in preparation for
20 entering the period of extended operation in 2027
21 and 2028.
22 CHAIRMAN SKILLMAN: Before you change
23 that slide, would you give us a little tutorial on
24 your inspections? The Unit 1 refueling water
25 storage tank welds you had some leaking, outside

1 tanks?

2 MR. ALDRIDGE: Yes.

3 CHAIRMAN SKILLMAN: You repaired those.

4 MR. ALDRIDGE: Yes.

5 CHAIRMAN SKILLMAN: You brought them

6 into conformance with their codes. You are on an

7 inspection frequency, that is, an outage inspection

8 frequency. I don't know if that is 24 months or 18

9 months. But it seems as though you found yourself

10 in a predicament with a leaking RWST. And so, you

11 have amended your procedures for inspection.

12 Please tell us more about this.

13 MR. ALDRIDGE: Thank you, Mr. Chairman.

14 We did have a plant-specific condition

15 on the refueling water storage tank on Unit 1, and

16 it was identified through external leakage. And

17 so, we did an internal inspection and repair. That

18 internal inspection and repair, then, had a root

19 cause performed on that, and we identified that the

20 cause was due to external leakage from water that

21 had entered the room from seals and there was no

22 berm around the tank. So, it had attacked the

23 exterior of the tank.

24 So, the concern for the aging effect of

25 internal stress corrosion cracking was not a

1 concern. When we did our aging management program,
2 we were committed to performing a confirmatory that
3 the repairs, confirmed that they were effective and
4 that there is no aging degradation going on on the
5 internal side of the tank. In addition, we, then,
6 every refueling outage, we look at the exterior of
7 the tank for external indications of cracking or
8 leakage.
9 CHAIRMAN SKILLMAN: What is your fuel
10 cycle length, please? Fuel cycle length?
11 MR. ALDRIDGE: Yes, 18 months.
12 CHAIRMAN SKILLMAN: You are on 18
13 months? Okay. Thank you.
14 MR. ALDRIDGE: Okay.
15 MEMBER SUNSERI: I have a question
16 while you are on this page as well. So, we have
17 been following an issue with degraded baffle bolts
18 in the industry. And in South Texas your core is
19 larger. So, I suspect you are unique from the rest
20 of the fleet within maybe the number of baffle
21 bolts and how they are put together.
22 So, my question for you is, are you an
23 upflow or downflow plant? What has your experience
24 with the baffle bolts been? And what are you doing
25 to track the issue from an aging management

1 perspective?

2 MR. BERG: I will go ahead and answer

3 that question. Certainly, we have been involved

4 with the EPRI Materials Reliability Project and

5 compliance with MRPG-27. We are an upflow design,

6 and our baffle bolts are 3/16 material. So, when

7 you look at the susceptibility, we are in the

8 lowest susceptibility associated with that.

9 We have done some inspections where we

10 just visually looked at the baffle bolts. We have

11 not found any degradation of the baffle bolts.

12 MEMBER SUNSERI: Do you do the UT

13 inspections or just the visual?

14 MR. BERG: Just visual inspection. We

15 will do the UT inspections, per MRPG-27, prior to

16 the period --

17 MEMBER SUNSERI: So, you have it right?

18 Yes, okay. I've got it. Thank you.

19 MEMBER KIRCHNER: Dick, may I ask a

20 question?

21 CHAIRMAN SKILLMAN: Please.

22 MEMBER KIRCHNER: From this long list,

23 what are the long poles in the tent? Not all these

24 are equal in terms of effort and commitment and

25 difficulty. Could you just highlight those that

1 are -- we know we have one more coming, but --
2 MR. ALDRIDGE: Right.
3 MEMBER KIRCHNER: -- excepting that
4 one, on this long list and the AMPs program, which
5 are taking more of your time or attention or
6 resources?
7 MR. ALDRIDGE: Yes, sir. When you
8 really look at, with the enhancements that we have
9 in place and have committed to, program
10 enhancements and program implementation both go
11 hand-in-hand. And we have been in the development
12 phase for all these years. So, those, just because
13 of the numbers, 26 of them remain open for
14 enhancements with nine implementation. The
15 implementation programs, not only are we developing
16 the base procedures and all the requirements that
17 we committed to in the aging management program,
18 but most of those require in-plant inspections,
19 whether they are one-time inspections or the
20 beginning of a periodic.
21 And then, from an analysis perspective,
22 we have already performed the screening on the
23 NUREG-6260 central locations. We just have to go
24 through and upgrade the program to continue to
25 monitor those new locations. So, that would be the

1 main areas.

2 MEMBER KIRCHNER: Thank you.

3 CHAIRMAN SKILLMAN: Please proceed.

4 MR. ALDRIDGE: Thank you.

5 Okay. And so, really, in conclusion,
6 the license renewal commitments are included in our
7 SAR Supplement, in our FSAR Supplement, Appendix
8 Alpha of the license renewal application. It is
9 managed by our Appendix B Program, and it is the
10 STP condition reporting process and the license
11 commitment management and administrative processes.
12 There are two processes that control those, and
13 they are being tracked for completion under those
14 programs.

15 All right. At this time, I would like
16 to transfer to Mike Berg.

17 MR. BERG: Okay. I would like to talk
18 about our Safety Evaluation Report open item. This
19 is associated with selective leaching of our
20 aluminum bronze essential cooling water system.

21 The open item focuses on wells
22 themselves. But, prior to getting into the
23 specifics of the open item, I would just like to
24 give a brief overview of the selective leaching
25 process. So, from a high-level background for

1 selective leaching of our low-pressure essential
2 cooling water system, which is commonly referred to
3 in the industry as service water system, as Ron
4 stated earlier, the material is aluminum bronze,
5 which is a copper aluminum alloy. Selective
6 leaching is a corrosion process where the aluminum
7 in the transformed phase can selectively leach out
8 when you have aluminum that is greater than 8
9 percent and exposed to wetted surfaces. Selective
10 leaching of aluminum leaves micro-voids along the
11 grain boundaries and, when progressed through a
12 wall, leakage/seepage will become visible on the
13 outside surface of the material.
14 So now, I would like to refer to the
15 slide here. So, what we are looking at here, this
16 is a section of pipe. We have a weld and, then, we
17 have got a weld-neck flange. So, the piping itself
18 -- there we go -- the piping itself is made out of
19 wrought material. It has less than 8-percent
20 aluminum, and we have not seen, nor is it
21 vulnerable to, selective leaching.
22 I want to talk about the casting --
23 MEMBER KIRCHNER: Just for perspective
24 --
25 MR. BERG: Yes.

1 MEMBER KIRCHNER: -- what is the
2 diameter of the pipe there and what is the schedule
3 and such? What are we looking at in the picture?
4 I can see nuts on the side. So, it looks like it
5 is now 4-inch or --
6 MR. BERG: I'm thinking it is 4- or 6-
7 inch diameter pipe that we are looking at here.
8 So, let's talk about the casting
9 materials themselves. They are susceptible to the
10 alloying. We first saw the alloying or cast
11 materials on our small-bore piping back in 1988.
12 All of those were replaced.
13 We do programmatically do a walkdown
14 every six months. What we are looking for is
15 copper oxide on the exterior of the pipe, like you
16 see right here. So, the green pipe, and we look
17 for a buildup of residual.
18 If I sectioned this pipe, I would look
19 at the inside of the pipe and I would see some
20 aluminum hydroxide corrosion products where the
21 aluminum has selectively leached inside the pipe
22 and, then, on the outside, again, I see the copper
23 oxide deposits that have occurred.
24 Just over a period of time, on these
25 large-bore castings we were somewhere between five

1 or ten first initial startup. Over the years, we
2 currently run somewhere between zero or two of
3 these per year, is what we see.
4 CHAIRMAN SKILLMAN: Is this phenomenon
5 limited to just the cast material?
6 MR. BERG: So, we are going to talk a
7 little bit later on the welds, which is the open
8 item. But where we have seen it predominantly is
9 in the cast materials.
10 CHAIRMAN SKILLMAN: Okay.
11 MEMBER SUNSERI: And it progresses from
12 the exterior of the pipe inward or?
13 MR. BERG: No, from the interior of the
14 pipe, selective leaching, and then, it takes the
15 aluminum, so the aluminum hydroxide on the inside
16 of the pipe. Once the aluminum comes through to
17 the outside of the wall, then you will see weepage.
18 So, we don't see a lot of leakage. It is really
19 weepage. Or, even in a lot of cases, when we will
20 do the walkdown, we will see the spots and you
21 won't even see any moisture at all. Yes, it is
22 kind of a sponge.
23 CHAIRMAN SKILLMAN: Do you want to be
24 on the record?
25 MEMBER KIRCHNER: Have you cut any of

1 these castings out and done an evaluation?

2 MR. BERG: Oh, absolutely. We have

3 done a lot of evaluations.

4 MEMBER KIRCHNER: Do you have any

5 pictures with you to show the phenomenon as it

6 progresses?

7 MR. BERG: Really, we don't have

8 pictures with us. As part of our license renewal

9 application for our casting materials, we are going

10 to replace the casting materials with materials

11 that are not subject to the selective leaching

12 phenomena. So, our commitment is we are going to

13 change all of these castings out prior to the

14 period of extended operation.

15 MEMBER KIRCHNER: Well, it begs the

16 question, then, to what?

17 MR. BERG: We will go with, if we stay

18 with aluminum bronze material, then we will have

19 material probably a wrought-type material that has

20 less than 8-percent aluminum.

21 MEMBER BALLINGER: Yes, wrought

22 material, it is a two-phase thing where they get

23 something called the gamma-2 phase which is rich in

24 aluminum. It is like dezincification.

25 MR. BERG: Right.

1 MEMBER BALLINGER: So, you get
2 electrochemical cell buildup and you selectively
3 leach out the aluminum. It is like
4 dezincification. And so, you end up with sort of
5 like a porous structure.
6 MR. BERG: Right.
7 MEMBER BALLINGER: But, if you whack it
8 with a hammer, you will find out that it is not
9 so -- that the porosity is a problem. And so,
10 wrought materials are usually not susceptible or if
11 you heat-treated casting, so that you get rid of
12 the solidification microstructure that goes on.
13 And the rates are anywhere from .05 to .5 mLs per
14 year sometimes, or even higher, depending on the
15 structure.
16 MEMBER KIRCHNER: With the current
17 material?
18 MEMBER BALLINGER: With the cast
19 material.
20 MEMBER KIRCHNER: With the casting?
21 MEMBER BALLINGER: With the cast
22 material.
23 MEMBER KIRCHNER: Right. And what is
24 the differential with the wrought?
25 MEMBER BALLINGER: You get rid of this

gamma phase. And so, you don't have the same kind of problem at all for de-aluminization. So, wrought materials are generally not susceptible to the material. And if you are less than -- you said 8 or 9 percent --

MR. BERG: Yes, 8 percent.

MEMBER BALLINGER: I think it is on the order of 8 percent, where if you look at the phase diagram, you can't get that phase.

MEMBER KIRCHNER: Yes. Thank you.

MR. BERG: Okay. So, the focus on the open item is associated with the welds themselves. So, let's move on to that particular area.

So, with the welds, we have seen -- first off, we haven't seen any since 1994, but what we see is, it actually is a cracking phenomena that occurs. Okay? So, from finding the particular condition when it does occur, and it hasn't been since 1994, just operators doing a walkdown, so you will see a light mist spray or maybe some water on the floor. So, the operators would identify that as part of the walkdown and would put in a corrective action program and handle it through that methodology.

So, we have seen 10 welds with

1 cracking. The cracking has some de-alloying
2 associated with that. We have had two of them that
3 occurred, two of the cracks that have occurred in
4 thermal welds. The rest of the cracks, though,
5 have occurred with welds with backing rings, which
6 is the focus of a lot of our work in addressing the
7 open item.
8 MEMBER KIRCHNER: What is the typical
9 corrective action, then, once you discover this?
10 MR. BERG: We would cut it out and
11 replace it. When we talk about the open item,
12 there are 10 issues associated with that. When I
13 go through that, I will talk about the specifics we
14 do on how do we do the inspection, acceptance
15 criteria, and then, we will talk about corrective
16 actions.
17 MEMBER RICCARDELLA: So, is a
18 significant percentage of this piping underground?
19 MR. BERG: Not percentage-wise, and I
20 don't know what the percentage of the welds because
21 most of the underground piping is of large sections
22 in nature, but we do have some of the welds
23 certainly that are underground with backing rings.
24 MEMBER SUNSERI: So, maybe you are
25 going to talk about this when you get to the

1 inspections, but is there an NDE technique for this
2 or?
3 MR. BERG: This really gets into our
4 corrective action. But we have been working over
5 the last few years with an NDE technique. So,
6 obviously, if it is a cracking-type phenomena that
7 is occurring, ultrasonic NDE will detect that
8 condition.
9 MEMBER SUNSERI: And are you doing it
10 any?
11 MR. BERG: So, we would do it if we
12 found a condition where we were seeing cracks at
13 the surface type of thing. Then, we would follow
14 the code requirements and we would have to go
15 characterize that, and we would go do an NDE
16 inspection.
17 MEMBER SUNSERI: Okay. Because I
18 thought I heard you say you see the misting and all
19 that stuff. So, I mean, it is a safety-related
20 system. I guess that puts you in a tech-spec
21 action statement.
22 MR. BERG: That is correct. So, we
23 would do an operability --
24 MEMBER SUNSERI: The active mode
25 versus --

1 MR. BERG: It would be an operability
2 determination associated with that, which Ron would
3 request, and we would go do the characterizations
4 in accordance with code.
5 And we are going to talk a little bit
6 later on, the proactive piece is prior to the
7 period of extended operation. I will just get to
8 it briefly now. It is that we will do an
9 inspection of -- I'm going to get this wrong -- 20
10 percent with 25 welds with backing rings and
11 without backing rings prior to the period of
12 extended operation. We will actually go in and
13 come apart and look at it.
14 We have looked at others as well. I
15 don't want to let you believe we haven't done any
16 evaluation. We have done evaluations,
17 metallurgical exams of the things where we have
18 found cracking in the past and other ones where we
19 have the castings, you know, we look at the welds
20 as well as part of that.
21 MEMBER SUNSERI: Okay.
22 CHAIRMAN SKILLMAN: Mike, let me ask
23 this: from the inspection report, the 71002
24 inspection report, the comment is, "The team noted
25 the experience regarding the loss of material

1 caused by selective leaching in aluminum bronze
2 components in the essential service water system is
3 an ongoing aging mechanism." That is from the
4 71002 inspection.
5 MR. BERG: Yes.
6 CHAIRMAN SKILLMAN: The text appears to
7 point only to the essential service water system.
8 Is th is phenomenon anywhere else in any other
9 systems?
10 MR. BERG: The answer to that is no
11 because we only use aluminum bronze in our
12 essential --
13 CHAIRMAN SKILLMAN: Let me ask you one
14 more. Your cathodic protection system is not in
15 scope. At least it isn't in the document that I
16 read. What connection have you made between this
17 phenomenon and the inoperability of your cathodic
18 protection system for what appears to be 10 to 15
19 years?
20 MR. BERG: Do you want to answer from
21 the TLA perspective?
22 MR. ALDRIDGE: Yes. Yes, sir. Let me
23 answer from the perspective of the cathodic
24 protection. The piping at South Texas is
25 cathodically protected as part of the buried piping

1 aging management program, and aluminum bronze is
2 one of the systems that is protected by the
3 cathodic protection.
4 CHAIRMAN SKILLMAN: Would it be more
5 accurate to say is now protected by, but was not
6 for a long time period? That is a yes or no.
7 MR. ALDRIDGE: No. It is always had
8 various degrees of protection. We have enhanced
9 the degree of protection since the regional
10 inspection, and now we are meeting better
11 availability and --
12 MEMBER STETKAR: Let's get specific.
13 What has the historic availability over the life
14 of the plant of your cathodic protection system
15 been?
16 MR. ALDRIDGE: Thank you, sir. We have
17 the subject matter expert present, and he can give
18 you the numbers.
19 CHAIRMAN SKILLMAN: Okay. Let's do
20 that, please.
21 MR. KHONDKER: My name is -- can you
22 hear me?
23 CHAIRMAN SKILLMAN: Yes.
24 MR. KHONDKER: Okay. So, my name is
25 Raihan Khondker. I am the Cathodic Protection

1 System Engineer at South Texas.

2 And the question being asked, what is

3 our historical availability of the cathodic

4 protection system? Over the past since the

5 inception of the plant, we have maintained the

6 cathodic protection system in the entire protected

7 area. So, we always adhere to the

8 needs/requirements back then, which used to be --

9 now it is called SBO 0169; back then it was RP. We

10 adhered to that since the beginning and we did

11 maintain the full availability as possible.

12 But, of course, over the course of the

13 years when we saw deteriorations, rectifiers out of

14 service, in some years we did see the rectifiers'

15 ability to go down. But, based on our corrective

16 action program, we have fixed those and we have

17 made sure that availability was always at the

18 higher point more than 80 percent, as we always

19 adhere to.

20 MEMBER STETKAR: I'm not sure that I

21 got a straight answer to my question. Over the

22 life of the plant, I would like to know what the

23 historic percentage availability has been if I take

24 the time up divided by the total time the plant has

25 been operating as a percentage. You have told me

1 that you had corrective action programs and things
2 were out of service for a long time. But what is
3 the average historical availability over the life
4 of the plant?
5 MR. KHONDKER: For that, I will have to
6 go through my trending database.
7 MEMBER STETKAR: Great. Thank you.
8 MR. KHONDKER: And then, I have to find
9 it out for you.
10 MEMBER STETKAR: Thanks.
11 MR. KHONDKER: But, since I took over,
12 it has been over 80 percent.
13 MEMBER STETKAR: Okay. Thanks.
14 MEMBER RICCARDELLA: Does cathodic
15 protection have any influence on this selective
16 leaching process?
17 MR. BERG: The answer is, no, it does
18 not, but our very piping is coated and it is
19 protected from that standpoint.
20 MR. MURRAY: Yes, I was going to make
21 sure we got back to that as well, to break that
22 tie. That was, for example, the picture that you
23 saw was not an underground cathodic-protected area.
24 MEMBER BALLINGER: It is very difficult
25 to use cathodic protection for this problem, yes,

1 because it is a very local system.

2 MR. BERG: Okay. Moving on, wrought

3 material is not susceptible, as we have already

4 discussed. The susceptible component population,

5 castings will be replaced. Just a feel for that,

6 400 to 450 castings in the plant. We will replace

7 those prior to the period of extended operation.

8 And again, our focus on our open item

9 is associated with welds or weld repairs with

10 susceptible weld filler material. It will be

11 managed. That includes piping butt-welds and,

12 also, weld preparers on extruded tees.

13 MEMBER STETKAR: Is that 400 to 450 per

14 unit or per the site?

15 MR. BERG: Per the site.

16 MEMBER STETKAR: Thanks.

17 MEMBER BALLINGER: But castings are

18 susceptible, but you haven't had a problem with the

19 castings, except I read in the SER you had a lot of

20 valve bodies and all kinds of things that were.

21 So, you have had that problem?

22 MR. BERG: Yes.

23 MEMBER BALLINGER: But, with the

24 welding, how are you going to get around the

25 problem with welding? Because you still have the

1 solidification issue. Are you going to post-weld
2 heat-treat? What are you going to do to get rid of
3 that problem?
4 MR. BERG: Okay. So, we will talk
5 about that when we go through the open issue, but
6 it is really with the one-time inspections and with
7 the periodic inspection, particularly the welds
8 with the backing rings.
9 What we do to address that is we would
10 use a weld filler material with nickel in it.
11 MEMBER BALLINGER: Yes, okay.
12 MR. BERG: We have found that would
13 prevent having the transformed region.
14 MEMBER BALLINGER: It is like a Class
15 IV. Okay.
16 MR. BERG: Okay. So, to get into the
17 open item, our open item, the STP has responded to
18 NRC staff's questions associated with selective
19 leach in aluminum bronze. We did send a response
20 in on September 28th.
21 Just to talk a little, we do have a
22 comprehensive aging management program that
23 addresses selective leaching. That program
24 includes inspections of walkdowns, replacements
25 prior to the period of extended operation. Then, I

1 am going to talk specifically associated with the
2 welds. It includes one-time volumetric exams,
3 periodic volumetric examination, defines acceptance
4 criteria, and has additional testing elements in
5 it.
6 The specific open item is related to
7 welds, and the Safety Evaluation Report does
8 contain 10 specific issues, which I will discuss
9 further on the following three slides.
10 DR. SCHULTZ: Mike, I've got a general
11 question related to the recent history for the
12 program. Of course, the overall discussion goes
13 back many years.
14 But, in this year, you put together a
15 fully-revised, well, I will call it a fully-revised
16 program because there were many issues associated
17 with Rev. 1 of the program. And now, this Rev. 2
18 program was submitted to the staff in June of this
19 year.
20 And my question is general, in that,
21 once that was submitted, then there were many
22 questions from the staff related to the new and
23 revised program. So, my general question is, why
24 did that happen? You had a lot of experience with
25 the program moving forward. You had the

1 opportunity or made the choice to put in a fully-
2 developed to address a number of concerns that the
3 staff had had over the years really. And yet,
4 there were a number of issues that were not, if you
5 will, fully addressed in the new program where you
6 had the opportunity to really set yourself up for
7 full success. And yet, there has been a number of
8 issues in many different areas that the staff found
9 needed additional attention. So, my question is
10 that: why did that happen? Can you give me some
11 perspective on that or give us some perspective on
12 that?
13 MR. BERG: So, there are several phases
14 that I think we have gone through here. First, our
15 first focus was on the casting-type material. I
16 said before we have got about 400 to 450 of those.
17 I believe it is about 56 of them, of the large
18 border castings that we have found that the
19 alloying on, again, as we talked about earlier,
20 with a little bit of copper oxide on the outside
21 surface so far.
22 Our real focus was on the casting-type
23 area. We did a lot of research, testing, did bin
24 testing and strength tied to the de-alloying of our
25 casting materials. Lots of correspondence and

1 interaction took place between us and the Nuclear
2 Regulatory Commission, and we just ended up in the
3 point of all of that to go to that reasonable
4 assurance to the level that was expected for that;
5 that the easiest answer to that was just to go
6 ahead and replace the castings. And we were doing
7 selective replacements just to do testing anyway.
8 So, that was a change in the program.
9 And then, the next phase came in
10 associated with the welds themselves. Okay?
11 Again, that assurance that, from a welding
12 standpoint, that we would not expect to see any
13 cracks in the future or, even more important, that
14 we don't see anything that would impact the
15 structural integrity of our essential cooling water
16 system.
17 We think we have had that, but there
18 were a series of questions that we had to go
19 through to answer and to come up with some
20 additional research or evaluation of the welding
21 itself just to demonstrate that.
22 DR. SCHULTZ: So, as you revamped the
23 program, you really went broader in terms of those
24 specific areas that you determined you needed to
25 address? So, the scope of the program grew

1 dramatically --

2 MR. BERG: Correct.

3 DR. SCHULTZ: -- based on lessons

4 learned? And you, then, look at these additional

5 items as a reasonable level of issue that needed to

6 be resolved, given that you have revamped a major

7 part of the overall program?

8 MR. BERG: That is correct.

9 DR. SCHULTZ: Thank you.

10 MR. BERG: Okay. Let's get into the

11 specific 10 issues for our particular open item.

12 So, the first one -- and I am going to do this at a

13 high level -- we added information to bound

14 extruding piping tee repairs. We have about 17

15 tees, extruded tees. Extruded tees are not

16 susceptible to selective leaching, but they do have

17 weld repairs on them. So, part of this is that we

18 will evaluate those repairs. We are just going to

19 make a conservative assumption that that repair is

20 cracked, okay, and then, look at it from that

21 standpoint of structural integrity of that tee. If

22 we cannot demonstrate structural integrity under

23 that condition, we will replace that tee prior to

24 the period of extended operation.

25 No. 2 is clarify the parameters

1 monitored to address. First is loss of material
2 due to selective leaching, which is monitored
3 through our system walkdowns and destructive
4 examinations. Cracking associated with selective
5 leaching is monitored through volumetric
6 examination of destructive evaluation. And the
7 third area is our root passes phase distribution is
8 verified to be discontinuous phase during our
9 destructive inspections.
10 Item No. 3, clarify the sample size for
11 volumetric inspections. As I said earlier, we will
12 do a one-time inspection on 20 percent with a
13 maximum of 25 welds with and also another sample
14 without backing rings prior to the period of
15 extended operation. And then, we will do periodic
16 examination every 10 years on 20 percent with a
17 maximum of 25 welds with backing rings, just to
18 validate from an aging management standpoint that
19 there is not something that we missed in there.
20 Four, clarify the thresh --
21 MEMBER RICCARDELLA: Excuse me. Is
22 that different weld, a different 25 percent for the
23 initial inspection versus the subsequent, the
24 periodic?
25 MR. BERG: An answer would be yes to

1 that because, when we do the destructive
2 examination, we will --
3 MEMBER RICCARDELLA: Oh, it is a
4 destructive?
5 MR. BERG: It is a destructive --
6 MEMBER RICCARDELLA: I'm sorry, I
7 thought it was --
8 MR. BERG: Yes. We do the volumetric,
9 but to look at the phase distribution, it is going
10 to end up being destructive.
11 MEMBER RICCARDELLA: Okay. And you
12 said there is only about 100 of these welds out
13 there?
14 MR. BERG: There is actually about 3300
15 welds in the plant.
16 MEMBER RICCARDELLA: So, you said 20
17 percent was 25 welds. I don't understand.
18 MR. BERG: Well, the criteria we use is
19 20 percent. A standard in the GALL would be 20
20 percent or 25. So, we are meeting the GALL 2
21 requirements on our sample size.
22 So, we have got about 3300 welds total.
23 About a third of those, or about 1100 of them, have
24 backing rings.
25 Sir, did you get your question

1 answered?

2 MEMBER RICCARDELLA: I thought I heard

3 you say a one-time inspection of 20 percent which

4 is about 25 welds. And I don't understand how that

5 fits with 3300 welds total.

6 MEMBER STETKAR: The criteria, the GALL

7 criteria says 20 percent or a maximum of 25.

8 MEMBER RICCARDELLA: Oh, oh, oh, oh.

9 Okay. Yes.

10 MR. BERG: So, I am staying with the

11 GALL requirements, but, in reality, it is 25.

12 MEMBER RICCARDELLA: Okay. All right.

13 All right.

14 MEMBER BALLINGER: Is that a rational

15 choice?

16 (Laughter.)

17 I mean, I can understand sticking with

18 the letter of the law, okay, but you have a known

19 issue which you think you are going to have solved,

20 which you might have. And so, to just arbitrarily

21 say we're just going to do 25 and get it over with

22 and move on just doesn't seem to me -- I mean, is

23 there a way, is there some kind of rapid expansion

24 that would occur if you see an issue that is also

25 different from the GALL requirements? You know,

1 this is a unique set of cases, I think.

2 MR. BERG: So, that does get into the

3 next item here. Okay? So, let me try to answer

4 your question a little bit more basic to start

5 with.

6 So, again, this condition, we have not

7 seen any crack in the welding since 1994. We have

8 done some research and testing that we believe that

9 we understand why that is the case. We do believe

10 it is a preexisting flaw that seems to be there.

11 So, you expect to see with a preexisting flaw

12 sometime early in life you can see the propagation

13 to the surface. So, we think we fully understand

14 why we haven't seen anything since 1994. We think

15 the 25 sample size is adequate to do confirmation

16 on what we have cut open. We have also cut open

17 some other samples of other removed castings and

18 looked at those as part of coming up with our

19 criteria. So, the 25 is to meet the GALL

20 requirements, but we do believe that that is

21 perfectly acceptable, that condition.

22 If we do find one that doesn't meet the

23 criteria, we would go back to the Generic Letter

24 90-05 criteria. And for every one that we would

25 find that doesn't meet our predictions, we would

1 increase that sample size by five until we had no
2 welds that had issues on them. So, we will follow
3 the Generic Letter --
4 MEMBER BALLINGER: By five or a factor
5 of five?
6 MR. BERG: By five.
7 MEMBER BALLINGER: By five.
8 MEMBER RICCARDELLA: How are the 25
9 samples selected?
10 MR. BERG: Okay. So, that is No. 5 on
11 the bottom of the page, and those will be randomly
12 selected from the total population of above-ground
13 welds, considering construction and size
14 distributions. We will use ASME Code criteria to
15 do that.
16 MEMBER BALLINGER: Okay. Randomly
17 selection, with this kind of phenomenon, can't you
18 get a little bit less random? Because when you do
19 welding and stuff like that, you can record heat
20 input and all those kinds of things. So, is there
21 another set of criteria which you can overlay on
22 this that says we'll do this random
23 characterization, but this particular weld and this
24 particular weld, in our judgment, may be a little
25 bit more susceptible? Can you modify the

randomness a little bit?

MR. BERG: I don't know.

MEMBER BALLINGER: Modified randomness, I'm not sure that is a good --

MR. BERG: Yes. I mean --

DR. SCHULTZ: But the question is, should you modify the GALL process?

MR. BERG: Yes, I'm not sure what criteria that we could actually use to be able to do any more. We use the standard welding process for all the pipe. Again, you are looking focused mainly on those pipes with backing rings to go after. But, because it is a standard process that we used, I am sure that we would see anything where we could say this particular welder or this particular heat, you know, is any different.

We have gone back and looked at the heats. We have looked at where we stand with respect to the amount of aluminum in our weld filler material. I'll tell you, it is pretty standard percent aluminum that goes through that whole thing.

So, I am really not aware of any criteria that we can use to try to --

MEMBER BALLINGER: But nickel aluminum

bronze weld material is going to be better, much better.

MR. BERG: Absolutely.

MEMBER BALLINGER: But right at the interface between the weld and the heat-affected zone there is going to be a wrought material which is not going to be wrought anymore.

MR. BERG: Yes.

MEMBER BALLINGER: It is going to be at the melting point and, then, it is going to be requenched. And so, I am wondering whether or not the welds will be fine, but right, you know, adjacent to the weld where that thermal transient has happened, you don't get gamma phase in the piping itself and now get yourself in an issue there.

MR. BERG: So, again, you start off with less than 8 percent. So, if you look at the phase diagram for the wrought material, you know, being less than 8 percent, you would not expect to go through a transformed region.

MEMBER BALLINGER: I agree.

MR. BERG: And --

MEMBER BALLINGER: But, again, you are going to melt some of that material.

1 MR. BERG: Right.

2 MEMBER BALLINGER: In the

3 solidification process there is a chance that you

4 will get a region during the solidification process

5 where you go where you are above 8 percent.

6 MR. BERG: Okay.

7 MEMBER BALLINGER: Okay. I am just

8 curious as to --

9 MR. BERG: For two pieces of that, I

10 have got an expert here I can call upon. But the

11 other piece is, when we look at the root pass of

12 the weld, one of the differences there, it is very

13 rapidly-cooled.

14 MEMBER BALLINGER: Yes.

15 MR. BERG: So, we have actually looked

16 at that and --

17 MEMBER BALLINGER: Okay.

18 MR. BERG: -- it looks like it is like

19 a maximum of 36 seconds to cool it down. So, there

20 is really not adequate time, even if you end up

21 with greater than 8 percent type of aluminum

22 content, to go to the transformed region. And if

23 you do get some in there, you are usually, instead

24 of at the gamma-2 phase, you are at the beta phase.

25 MEMBER BALLINGER: Okay. I'm just

1 saying usually --

2 MR. BERG: That is 25, which is less

3 acceptable and it is discontinuous in nature.

4 MEMBER BALLINGER: Okay. You know the

5 old saying: the great tragedy of science is the

6 slaying of a beautiful hypothesis by a ugly fact.

7 MR. BERG: Yes.

8 MEMBER RICCARDELLA: But as your OE

9 indicated any problems at all with the wrought

10 side, with the piping side of the weld?

11 MEMBER BALLINGER: The wrought material

12 is never a problem.

13 MEMBER RICCARDELLA: No, but it is the

14 weld. You are talking about the heat effect has on

15 the weld, but --

16 MEMBER BALLINGER: Yes, right where it

17 has been solidified.

18 MEMBER RICCARDELLA: Yes.

19 MR. BERG: The answer is no to that

20 question. And going one step further, when we have

21 seen an issue, it has been due to a weld defect

22 that was already there as part of the original

23 construction.

24 MEMBER RICCARDELLA: And it was in the

25 weld, not in the heat-affected zone?

1 MR. BERG: In the weld, correct.
2 MEMBER RICCARDELLA: Okay.
3 MEMBER BALLINGER: But don't you have
4 two issues, cracking and de-aluminization?
5 MR. BERG: Yes.
6 MEMBER BALLINGER: So, I'm talking
7 about the de-aluminization part, not the cracking
8 part.
9 MR. BERG: So, the de -- I will try to
10 get there.
11 MEMBER BALLINGER: It is too many
12 syllables.
13 (Laughter.)
14 MR. BERG: Yes. So, the de-alloying
15 going on in the casting pipe region, we are taking
16 care of that. And we have seen a lot of that
17 without any, you know, preexisting --
18 MEMBER BALLINGER: Okay.
19 MR. BERG: -- flaws or anything else.
20 When we get into the welds, we do see
21 some de-alloying in the weld surfaces, but
22 everything is telling us it is due to that
23 preexisting flaw. Probably just created an
24 environment because of the type crack and the
25 aqueous condition in there, it has created an

environment that did allow anything in the transformed region to show that de-alloying occurred, maybe weakened the material a little bit, and then, allowed cracking and, then, de-alloying and cracking as it propagates through. We don't really know that for a fact, but what we do know is all of our OE tells us there had to be a preexisting flaw there for this condition to occur.

MEMBER RICCARDELLA: Just to be clear, if we go to that slide 17, the picture, you have never had the type of problem that you have circled there on the wrought piping side of a weld?

MR. BERG: That is correct.

MEMBER RICCARDELLA: Thank you.

CHAIRMAN SKILLMAN: I would like to move on. I want to make it clear that in your prior discussion you communicated that, when you do have evidence, you file a condition report because of the way your tech specs are written. You do an operability determination, and that operability determination directs the action of the site staff?

MR. BERG: That is correct.

CHAIRMAN SKILLMAN: And with that, I believe we --

MEMBER STETKAR: Hold on.

1 CHAIRMAN SKILLMAN: Go ahead, John.

2 MEMBER STETKAR: We have got all kinds
3 of time here this morning. We don't have to rush
4 through this.

5 CHAIRMAN SKILLMAN: No, no.

6 MEMBER STETKAR: Ron, I'm not a
7 materials guy. So, you questioned first the kind
8 of random sampling notion. This is for my own
9 education.

10 In many other of these programs that we
11 have seen, not this particular one, throughout the
12 course of license renewal, where you do have a
13 large population to select from, people establish
14 what they call a risk-informed sampling program.
15 And I don't want to get into the nuances of risk,
16 but they look at places where they would be more
17 likely to find a problem, whether that is a fatigue
18 issue or whether it is cracking of small-bore
19 piping welds, or whatever, and then, sample from
20 those locations.

21 So, I'm asking you, given what we have
22 heard here, is there a more, I'll call it risk-
23 informed approach that could be used, rather than
24 just randomly selecting 25 out of 3300, in your
25 opinion?

1 MEMBER BALLINGER: See, I am not a risk
2 guy. So, I hesitate to use the word "risk," but I
3 will use it anyway.
4 That is what I was trying to get at.
5 Basically, modifying the random sample business,
6 knowing that under certain conditions the
7 possibility is that you will get a more susceptible
8 area, so that is exactly what I am suggesting.
9 MEMBER STETKAR: But, I mean, you know,
10 based on your own experience, is there something
11 that you could think of that would sort of narrow
12 down the field a bit?
13 MEMBER BALLINGER: I would take a look
14 at the welding procedures, and you already have,
15 and decide, depending on pipe size and heat input
16 and things like that, whether or not there is a
17 possibility that you get the second phase and,
18 then, focus your randomness, if you will, on some
19 of those areas, until you discover that, yes or no,
20 we don't have an issue. And this occurs over a
21 very long period of time, though.
22 MR. BERG: Correct.
23 MEMBER BALLINGER: So, it is not like
24 you are going to have some kind of catastrophic
25 failure all the time.

1 MR. BERG: Correct.

2 MEMBER BALLINGER: But you are right,

3 that is the way to do it.

4 MEMBER STETKAR: Okay. Thanks.

5 MEMBER BALLINGER: Thanks.

6 MEMBER RICCARDELLA: I'm not familiar

7 with this type of piping, but, from what I know

8 about code class piping, 25 welds out of 3300 is a

9 minuscule sample. I mean, in code class piping we

10 do typically 25 percent of the welds, and if you

11 find anything in that 25 percent, you are in doing

12 another 25 percent, and if you find anything in

13 that second 25 percent, you do 100 percent.

14 MEMBER STETKAR: But, again, that is

15 more of a question for the staff --

16 MEMBER RICCARDELLA: Yes, yes.

17 MEMBER STETKAR: -- because they wrote

18 the guidance and they are following the guidance.

19 MEMBER RICCARDELLA: Right.

20 Understood, yes.

21 MR. BERG: So, I would like to go ahead

22 and move on to slide 21.

23 CHAIRMAN SKILLMAN: Yes, please

24 proceed, yes.

25 MR. BERG: Okay. Item No. 6, we did

1 determine that there was no impact of the external
2 coatings regarding detecting buried piping leaks at
3 the surface.
4 Seven, we have identified a method to
5 monitor our trend results.
6 I would like to focus a little bit more
7 on Item No. 8, define the acceptance criteria for
8 the weld defects. For visual exams, the acceptance
9 criteria is no detectable leakage. For volumetric
10 examination, it would be no detected twiner
11 indication that is subsurface-connected unless the
12 depth of the indication is contained within the 80
13 percent of the weld root pass. And for destructive
14 examinations, no selective leaching penetrating 80
15 percent of the root pass region, and any found
16 selective leaching is non-propagating. So, it is
17 surrounded by a non-continuous resistant phase
18 distribution.
19 And then, the microstructure of the
20 weld root region will exhibit a non-continuous
21 phase distribution, which is consistent with all of
22 our metallurgical evaluation or metallurgical
23 reports that we have done so far. So, we see a
24 non-continuous phase distribution. So, if you had
25 a little localized de-alloying, it is not going to

have any depth associated with that, being a non-continuous.

Item No. 9, identify the threshold for increased inspections when adverse inspection results are detected. We talked about that a little bit earlier. That is tied back to Generic Letter 90-05.

And the last item is to identify the corrective actions to address all potential inspection results. We will remove any leaking welds and destructively exam to determine the extent of the cracks, the extent of the selective leaching, and the microstructure phase distribution, perform five additional volumetric exams, and perform a structural integrity evaluation to confirm the load-carrying capacity.

Move on to the next slide. So, this brings us into one remaining open issue associated with the corrective actions. This remaining issue concerns how to address the extended condition in the unlikely condition that structural integrity evaluation does not support the load-carrying capability or capacity.

A method and acceptance criteria to bound the extended condition is being defined. We

1 have had some initial communications with the NRC
2 staff, and we do feel comfortable that we can
3 address that concern, and it does support a pathway
4 forward and timely response and resolution.
5 DR. SCHULTZ: Mike --
6 MR. BERG: Yes?
7 DR. SCHULTZ: -- just before you get to
8 the conclusion, as you presented it, the addressed
9 issues, you have presented your response to the
10 staff and you feel you have agreement with the
11 staff that, in fact, your responses have been
12 accepted? And it is only Item No. 10 that has not
13 been fully resolved? You have provided a response,
14 but, then, the staff had additional questions
15 related to that?
16 MR. BERG: Yes, an additional question
17 is what we are working with the staff on to
18 address.
19 DR. SCHULTZ: Okay.
20 MR. BERG: And again, we do feel that
21 we have a pathway to timely resolution of that --
22 DR. SCHULTZ: On Item No. 10?
23 MR. BERG: -- item, yes.
24 MR. MURRAY: Yes, it could be
25 characterized as initial conversations on that --

1 DR. SCHULTZ: Okay.

2 MR. MURRAY: -- with the understanding

3 of the strategy.

4 DR. SCHULTZ: Thank you.

5 MEMBER KIRCHNER: I should have asked

6 this earlier. How many linear feet of pipe

7 comprises this system with the aluminum bronze and

8 how much of it is buried underground? Just an

9 estimate. I'm not holding you to exact numbers.

10 Where I am getting at is most of your visual at

11 least inspections will be --

12 CHAIRMAN SKILLMAN: Well, buried

13 underground versus buried where else?

14 (Laughter.)

15 MEMBER KIRCHNER: Well, you know,

16 inaccessible.

17 CHAIRMAN SKILLMAN: Oh, okay. Just

18 making sure.

19 MEMBER KIRCHNER: Sure.

20 MR. BERG: I would say I am really

21 giving you kind of an estimate, just based on where

22 our essential cooling water intake structure is to

23 our Class 1E structures -- you can choose a little

24 bit further away -- so, I would say about 3,000

25 foot underground would be my estimate associated

with that.

MEMBER KIRCHNER: And that, the component of piping that is underground, that is primarily welded. The flanges that you have had problems with are at the actual above-ground equipment?

MR. BERG: Yes. So, I will make it real clear. There are no castings or cast material underground.

MEMBER KIRCHNER: Okay. Thank you. Thank you.

MEMBER RICCARDELLA: But, then, above ground -- there's 3,000 feet below underground -- then, what is the remainder of the system, approximate? I'm sorry. Just ballpark, what is the remainder. If you have 3300 welds, I imagine it is a lot of feet.

MR. BERG: Yes, there's several thousand feet. We have 30-inch pipe; we have 4-inch pipe, 10-inch pipe through the plant. I'm thinking in the several thousands, 13,000-ish.

Kevin or Rick?

MR. STARK: Good afternoon. Rick Stark, the Pipe Program Engineer at South Texas.

Buried underground piping, between the

1 two units, supply and return, is just over 24,000
2 feet.
3 MEMBER RICCARDELLA: Buried? Buried?
4 MR. BERG: And that is essential
5 cooling water piping?
6 MR. STARK: That is correct. That is
7 all essential cooling water piping. There is 6-
8 inch, 10-inch, and 30-inch.
9 MR. BERG: I was off by a factor of
10 eight.
11 Thanks, Rick. Thank you.
12 MEMBER SUNSERI: Hey, Mike, I hate to
13 keep picking on this, but this acceptance criteria
14 for the weld defects, I am confused on it. When
15 you go out and do your 25 inspection, you are going
16 to look at these welds and you are going to apply
17 this criteria?
18 MR. BERG: Right.
19 MEMBER SUNSERI: Is that correct? So,
20 you are going to look at it to see if it is not
21 leaking? You are going to do a volumetric
22 examination to see if there is anything inside of
23 it? And then, you are going to cut it out to do a
24 metallurgy examination?
25 MR. BERG: A metallurgy examination.

1 MEMBER SUNSERI: So, essentially, you
2 are replacing 25 every inspection period then,
3 right?
4 MR. BERG: That is correct.
5 MEMBER SUNSERI: Okay. Thank you.
6 MR. BERG: Okay. So, in conclusion,
7 following the resolution of that remaining issue
8 related to corrective actions, the selective
9 leaching of Aluminum Bronze Aging Management
10 Program, effectively, we will manage the aging of
11 the essential cooling water cast components and
12 welds during the period of extended operation.
13 MEMBER BALLINGER: Can I get one thing?
14 I'm still fuzzy. You have got several miles,
15 kilometers, of buried piping. You are going to
16 take 25 welds, presumably not buried?
17 MR. BERG: That is correct.
18 MEMBER BALLINGER: Okay. And the
19 reason you don't have to take any of the welds from
20 the buried piping is because there is no cast
21 material buried?
22 MR. BERG: Not really. Because if it
23 is a cast material, we will replace the castings
24 prior to the period of extended operation.
25 MEMBER BALLINGER: Okay. So, you would

1 replace the castings?

2 MR. BERG: And when we replace that

3 weld, we will use the nickel-based material. So,

4 it won't be vulnerable to it.

5 MEMBER BALLINGER: So, of the

6 underground piping, that will fall into a category

7 where it has either been replaced, the casting has

8 been replaced, or it is wrought material and,

9 therefore, there is no selective leaching issue for

10 the underground piping? Is that what I'm hearing?

11 MR. BERG: For the underground? So,

12 the underground piping is only wrought material

13 already. That is what exists now. So, we will use

14 -- so, from a stress standpoint, the above-ground

15 welds are higher-stress conditions; they are more

16 vulnerable -- so, we will use our operating

17 experience from the above-ground welds for any

18 decisions associated with expansion of scope. And

19 this really ties back in the corrective action,

20 depending on what we see.

21 Again, we think all of our research

22 shows us that we have a boundedness condition and

23 we don't expect to see anything really for the rest

24 of the life of the plant, as we haven't since 1994.

25 Our aging management program will demonstrate that.

1 MEMBER BALLINGER: Thank you.

2 MR. BERG: Okay. I would now like to

3 turn it over to Dave Rencurrel for closing remarks.

4 CHAIRMAN SKILLMAN: Before we get

5 there, one of the reasons I was trying to move

6 along is I have got a couple of comments

7 independent from aluminum bronze, and perhaps my

8 colleagues have comments as well. So, may I please

9 go after those right now? I'm good for your

10 closing comments, but I would like to have this

11 opportunity with the STP staff in front to ask some

12 questions.

13 I'm in your license renewal

14 application. I'm on page 84. "Cathodic protection

15 is not in scope." Why? It is on the record in

16 your document.

17 MR. ALDRIDGE: Arden Aldridge.

18 Cathodic protection as far as in the

19 scope, let me have Mr. Warner --

20 CHAIRMAN SKILLMAN: Please do.

21 MR. ALDRIDGE: -- who can provide some

22 clarification.

23 CHAIRMAN SKILLMAN: Okay.

24 MR. WARNER: Yes, my name is Gary

25 Warner. I'm the Senior Project Manager for License

1 Renewal.

2 Cathodic protection is not in the scope

3 of license renewal because it is not one of those

4 systems that performs an intended function for

5 license renewal. It is a support system that is

6 used to allow you to protect your buried piping.

7 But, in the absence of cathodic protection, you are

8 required to inspect a lot more buried piping than

9 you would if you have adequate cathodic protection.

10 So, based on the other plants in the

11 country plus the way the rule is written, cathodic

12 protection does not perform a license-renewal-

13 intended function.

14 CHAIRMAN SKILLMAN: Thank you for that

15 explanation.

16 I want to reinforce John Stetkar's

17 question about the time availability of cathodic

18 protection because in the Inspection Report the

19 Inspection Report very clearly states that there

20 was a 10-year period that there was no cathodic

21 protection. So, I would like to get the answer to

22 John's question as soon as you can get it to us.

23 MR. ALDRIDGE: Yes, sir.

24 CHAIRMAN SKILLMAN: Another question --

25 MR. MURRAY: Just for clarity, we owe

1 you a followup on the operating experience of the
2 cathodic protection system?
3 CHAIRMAN SKILLMAN: That's correct, as
4 a percentage of time, yes.
5 On your license renewal application,
6 page 112, the statement is -- it is actually
7 2.3-27, but it is on PDF page 112 -- "The essential
8 cooling pond is included with the evaluation of the
9 essential cooling water structures in Section
10 2.4.9." Please tell us about the actions that you
11 have taken to confirm that the pond is good for
12 your projected PEO.
13 MR. ALDRIDGE: Arden Aldridge.
14 Yes, the pond is part of our aging
15 management program, the structured monitoring
16 program, and I have a subject matter expert here
17 who can give you some additional details on the
18 inspections that we have performed.
19 CHAIRMAN SKILLMAN: Please do.
20 MR. ALDRIDGE: Okay. Mark Wales.
21 MR. WALES: My name is Mark Wales. I
22 am a civil structural engineer at STP.
23 The pond, it is an underground pond.
24 That is the first thing you need to understand.
25 And it is surrounded by a berm which keeps debris

1 out of the pond. But, as far as maintenance of the
2 pond, there's not really any maintenance that is
3 required. We do periodically inspect it and use
4 biocides to prevent things from growing in it and
5 in the concrete, and we inspect it as part of the
6 structures monitoring program periodically. But,
7 other than that, there is no specific maintenance.
8 CHAIRMAN SKILLMAN: Now you stated it
9 is underground. Is it really a surface pond or an
10 underground pond?
11 MR. WALES: Below grade, that would be
12 a better word for it. The surface water is 2 feet
13 below the ground level.
14 CHAIRMAN SKILLMAN: Okay.
15 MR. ALDRIDGE: And I can add a little
16 clarification, too. It is not only with the
17 Structures Monitoring Aging Management Program, but
18 the pond is specifically managed under the Water
19 Control Structure's Aging Management Program that
20 has the different inspections that are performed
21 for silting and volume validation and conditions.
22 So, it is managed there from that perspective.
23 CHAIRMAN SKILLMAN: Okay. Thank you.
24 Let me bring your attention to page 9-
25 12 in your license renewal application. This is

1 under TLAAs. The subject is your studs, nuts,
2 flanges. But, in this particular section, you are
3 silent on inserts. And the table that you show
4 shows inserts with cumulative usage factor greater
5 than one. So, do you have someone here who can
6 explain the relationship between studs, nuts,
7 flanges, and inserts? I understand the CUF for the
8 studs, nuts, and flanges, but I do not understand
9 CUF greater than one for inserts.
10 MR. LYNCH: My name is Bret Lynch. I
11 worked on the time-limiting aging analyses.
12 For standard practice, when we were
13 developing the South Texas application, we took a
14 40-year CUF, Cumulative Usage Factor, and
15 multiplied it by 1.5 to get an estimate of what the
16 CUF would be. On that criteria, we decided either
17 the current CUF was projected to the end of the
18 period of extended operation, which was one of the
19 disposition criterias. If it was over one in this
20 case, we would have to justify managing the usage
21 factor to ensure that the 40-year one would be good
22 for 60 years. So, we were keeping the same number,
23 the design transients, from 40 years for 60 years.
24 CHAIRMAN SKILLMAN: Okay. Now hold
25 that thought. That suggests in this case, and in

1 other texts in your application, your TLAA depends
2 upon your cycle-counting program.
3 MR. LYNCH: That is correct.
4 CHAIRMAN SKILLMAN: Okay. What is the
5 pedigree of that cycle-counting program and how
6 does the plant manage that program? What is the
7 pedigree and how do you manage it?
8 MR. LYNCH: Well, we did perform a
9 baseline to get the current number of transients
10 currently. And then, it is an ongoing program at
11 the plant. I do not own that program.
12 MR. BERG: So, I will just add to it.
13 Really, it is procedurally-controlled under our 10
14 CFR Appendix B Program. Okay? And Mike Garner is
15 our engineer that does that cycle counting and
16 manages that program for us.
17 CHAIRMAN SKILLMAN: Okay. Thank you.
18 Let me see if I have any more here.
19 (Pause.)
20 I'll ask my colleagues, any comments
21 for the Applicant relative to this matter?
22 MEMBER STETKAR: Yes. They make me do
23 this. It's the voices in my head, I think. But I
24 have to ask this for every license renewal
25 applicant.

1 Inaccessible underground cables, I
2 understand and I read back in 2011-2012, as the
3 program was evolving, there were a lot of RAIs. I
4 understand that your program is now consistent with
5 GALL Rev. 2, is that correct?
6 MR. ALDRIDGE: That is correct.
7 MEMBER STETKAR: Okay. Thank you.
8 I noticed that, as I read through
9 things, you have manholes that have solar-powered
10 sump pumps in them. And as best I can tell, you
11 have committed to what is in GALL Rev. 2, which is
12 an annual inspection of manholes or I would
13 categorize it as an episodic inspection if you
14 have, you know, a typical -- I used to do
15 consulting work down at South Texas and they used
16 to call them South Texas frog floaters.
17 (Laughter.)
18 So, you had a particularly heavy rain.
19 As best as I can tell, it is says that,
20 if an inspection determines that a sump pump is
21 inoperable, you will put it into your corrective
22 action program and fix it. Are those sump pumps
23 alarmed? I mean, is there a better indication of
24 whether they are operating or inoperable than just
25 simply finding that there is water in the manhole

1 and the sump pump wasn't working?
2 MR. ALDRIDGE: Yes, sir. The short
3 answer is they are not alarmed.
4 MEMBER STETKAR: Okay.
5 MR. ALDRIDGE: However, we do monitor
6 those, and over the years we have improved our
7 inspections there. And the subject matter expert
8 is present.
9 MEMBER STETKAR: Okay.
10 MR. ALDRIDGE: And we are doing some
11 enhancements.
12 MEMBER STETKAR: The reason I am
13 curious is because not only episodic events, but
14 you have had a history of groundwater.
15 MR. ALDRIDGE: Correct.
16 MEMBER STETKAR: So, it is a pretty
17 low-lying area --
18 MR. ALDRIDGE: Yes.
19 MEMBER STETKAR: -- and groundwater
20 intrusion is pretty pervasive.
21 MR. ALDRIDGE: Right.
22 MEMBER STETKAR: So, I was curious.
23 So, if I could hear what you are doing about those,
24 I would appreciate it.
25 MR. KHONDKER: My name is Raihan

1 Khondker. I'm the cable program owner at South
2 Texas Project.
3 The question is regarding the sump
4 pumps in our manholes at STP and what we are doing
5 about it. At present, we have solar pumps designed
6 in all the manholes where we have seen water
7 submergence issues. The solar pump design that we
8 have, we have been maintaining them through our
9 preventive maintenance program. We have, depending
10 on what kind of manhole it is and how often, we
11 have seen the trend showing how often the
12 groundwater incurs. We have frequencies from four
13 weeks all the way to annually, depending on which
14 manhole it is, and we go in and inspect the pumps
15 on them.
16 And if we see that a float switch or a
17 pump or any of the control mechanisms are not
18 working, we replace it as a part of the PM. I will
19 say, if there is any water at the floor level, we
20 pump it out.
21 At present, also, what we are doing as
22 a corrective action is that we have redesigned all
23 our pumps. We have a new approved design change
24 package which is allowing me to go and replace all
25 the pumps we have. We are putting higher-duty

pumps. Like we have in the higher ones we are putting 2,000 gallons per hour. In some of them we are putting 1500 gallons per hour, and some of them are below 1,00 gallons per hour.

So, these designs are going in as we speak. We are coming out of the outage, and those pumps will be going in as solar pump designs, so that we can keep all the manholes dry.

MEMBER STETKAR: Good. That is encouraging.

MR. KHONDKER: Yes. In total, we have an estimate of 96 pumps that is going to be put --

MEMBER STETKAR: Ninety-six, wow.

MR. KHONDKER: Ninety-six solar pumps are going in manholes because we have 155 manholes, and out of them, 96 have seen historic --

MEMBER STETKAR: Since I have got you up and on the --

MR. KHONDKER: Yes.

MEMBER STETKAR: -- carpet here, you said 155 manholes. Is that 155 in scope for license renewal or just 155 total?

MR. KHONDKER: No, they are not all in scope.

MEMBER STETKAR: Yes.

1 MR. KHONDKER: It is a combination
2 because we are looking at manholes, so we look at
3 them all as similar, yes.
4 MEMBER STETKAR: Sure, sure, sure,
5 sure.
6 MR. KHONDKER: Not just in scope, no.
7 MEMBER STETKAR: Great. Thank you.
8 MR. KHONDKER: No problem, sir.
9 MR. MURRAY: This is Mike Murray.
10 I do want to point out that you talked
11 about the frog floaters. We have also improved the
12 sealing, the external sealing of those manholes as
13 well.
14 MEMBER STETKAR: Yes, I have read some
15 of the operating experience. Thank you.
16 CHAIRMAN SKILLMAN: Colleagues, any
17 further questions, please, for the Applicant?
18 MEMBER RICCARDELLA: Yes, you indicate
19 you have your plant-specific program for nickel
20 alloys. As I recall, South Texas is somewhat
21 unique in having had a cracking of the bottom head
22 instrument nozzles. Is that part of your plant-
23 specific program or is there anything special you
24 are doing on that topic?
25 MR. ALDRIDGE: Mike Garner, do you have

a specific on the nickel alloy program, on the scope? Is that what it is for?

MR. ALDRIDGE: In regards to VMI, right?

MEMBER RICCARDELLA: Yes, yes.

MR. GARNER: Are you referring to VMI?

MEMBER RICCARDELLA: Uh-hum.

CHAIRMAN SKILLMAN: Please identify yourself.

MR. GARNER: My name is Michael Garner. I'm the Site Metallurgist for STP.

The inspections for VMI will fall under the code case, the guidelines described in the code case, in 722, where we do a VE, a visual examination, an enhanced visual examination, every other year looking at 100 percent penetrations on VMI. And then, every other year that isn't a code inspection, we do a visual as well. It is not 100 percent, but it is looking for gross leakage.

MEMBER RICCARDELLA: Okay. Thank you.

CHAIRMAN SKILLMAN: Okay. Colleagues, any further questions?

(No response.)

Dave, to you, please, sir?

MR. RENCURREL: Thank you very much,

1 and we would like to thank the ACRS for your
2 questioning.
3 And I would also like to thank the
4 staff. I did not recognize our subject matter
5 experts who came here, too. We brought a little
6 bit under two dozen folks to come and ensure that
7 we had the right answers to your questions.
8 And one point I would like to make is
9 we started off by talking about the robust quality
10 assurance program, Appendix B. We are very
11 committed to the quality assurance program at South
12 Texas. As you heard here, leveraging that
13 independent oversight is one way we know that the
14 commitments we are making are being carried out.
15 With that, I would like to thank you
16 for your time.
17 CHAIRMAN SKILLMAN: Yes, sir. Thank
18 you very much.
19 With that, ladies and gentlemen, we
20 will take a 16-minute break and we will resume at
21 quarter after 10:00 on that clock.
22 We are in recess.
23 (Whereupon, the foregoing matter went
24 off the record at 9:57 a.m. and went back on the
25 record at 10:15 a.m.)

1 CHAIRMAN SKILLMAN: Ladies and
2 gentlemen, we are back in session.
3 To those who are on the bridge line, we
4 respectfully request that you put your phones, *6,
5 on mute. We can hear your family background.
6 (Laughter.)
7 We would like you to please silence
8 your phones, so that there is no background noise
9 affecting other members of the public that are
10 listening in. Would you please do that?
11 Also, Greg Pick, are you there, please?
12 MR. PICK: Yes, I am.
13 CHAIRMAN SKILLMAN: Thank you.
14 Greg is our inspector. We want to make
15 sure that our recon team is onboard. He is.
16 With that, let's begin. Lois, to you,
17 please.
18 MS. JAMES: Thank you.
19 Good morning, Chairman Skillman and
20 Members of the License Renewal Subcommittee.
21 My name is Lois James, and I'm the
22 License Renewal Project Manager for the South Texas
23 Project, or STP, license renewal safety review.
24 We are here today to discuss the review
25 of the STP license renewal application, or LRA, as

1 documented in the Safety Evaluation Report with
2 open items which was issued in October.
3 Joining me here at the table today are
4 Dr. Allen Hiser, the DLR Senior Technical Advisor;
5 Mr. Bill Holston, Senior Mechanical Engineer, and
6 Ms. Phyllis Clark, Project Manager, who will be
7 running the slides. Mr. Greg Pick, Senior Reactor
8 Inspector in Region IV, is on the phone and will
9 discuss the 71002 inspection results. Sitting in
10 the audience and the phone are other members of the
11 technical staff who participated in the review and
12 conducted several audits and inspections.
13 Next slide, please. I will begin the
14 presentation with a general overview of the staff
15 review. Next, Mr. Pick will present the 71002
16 inspection results. I will, then, present the main
17 sections of the Safety Evaluation Report. Mr.
18 Holston will discuss the open item on the Selective
19 Leaching of Aluminum Bronze Aging Management
20 Program, or AMP.
21 Next slide, please. STP Nuclear
22 Operating Company, or Applicant, submitted an
23 application for the renewal of STP Units 1 and 2
24 operating licenses for an additional 20 years. The
25 staff conducted onsite audits, offsite audits here

in Maryland, and onsite inspections. As you can see, the staff performed additional audits of the open item for selective leaching of aluminum bronze, AMP.

During the scoping and screening methodology audit, the team reviewed the Applicant's administrative controls governing the scoping and screening methodology and the technical basis for select scoping and screening results. The scoping and screening methodology audit results were documented in a report dated September 6th, 2011.

During the AMP audit, the team examined the Applicant's aging management programs and related documentation to verify that the Applicant's programs are consistent with those described in the GALL Report and with the plant conditions and operating experience. The staff reviewed the initial 40 AMPs and documented the results in a report dated September 22nd, 2011.

In January of 2016, the Applicant informed the staff of significant changes to the Aluminum Bronze Selective Leaching AMP. These changes redirected the staff's review such that the topic-specific audits conducted in 2012 and 2015

1 were no longer applicable.

2 In 2016, the staff conducted an audit

3 of the Revised Aluminum Bronze Selective Leaching

4 AMP in two parts. During the week of March 21st,

5 the staff went onsite at STP and, then, a followup

6 day on June 22nd in the NEI offices in Rockville.

7 The audit focused on material

8 information, material process information,

9 microstructure information, and structural

10 integrity evaluations regarding the welds that may

11 be susceptible to selective leaching needed in

12 order for the staff to complete its review.

13 The results of the audit were

14 documented in a report dated August 30th. Region

15 IV will discuss the activities and results of the

16 71002 inspection in a few minutes.

17 Next slide, please. The staff

18 performed its review of the STP LRA and documented

19 its results in two Safety Evaluation Reports with

20 open items. In February of 2013, the staff issued

21 an SER with four open items. We did not come to an

22 ACRS meeting because the staff continued its review

23 of the selective leaching of the Aging Aluminum

24 Bronze AMP. We were uncertain about where the

25 review was going and we thought it was premature to

1 come to the ACRS at that time.

2 As stated in 2016, the Applicant

3 informed the staff of significant changes to this

4 AMP. The staff was able to make progress in its

5 review and issued an updated SER with open items in

6 October. The Final SER will include the resolution

7 of the open item regarding the aluminum bronze

8 selective leaching.

9 Next slide, please. I will now direct

10 the presentation to Mr. Pick to discuss the

11 inspection activities associated with the license

12 renewal review.

13 Mr. Pick.

14 MR. PICK: Thank you, Lois.

15 Good morning, Members of the

16 Subcommittee.

17 CHAIRMAN SKILLMAN: Good morning, Greg.

18 We can hear you loudly and clearly.

19 MR. PICK: Thank you.

20 So, in our inspection we verified that

21 STP had properly identified those structures,

22 systems, and components included in scope and made

23 appropriate determinations of non-safety-related

24 systems and components affecting safety-related

25 components.

1 STP had established adequate programs
2 to manage aging of in-scope structures systems and
3 components, as specified in our regulations and
4 their Applicant's license renewal program.
5 The five inspectors on the team had
6 experience and expertise related to mechanical
7 systems and components, electrical systems and
8 components, and structures. Bill Holston also
9 accompanied us for one week of this inspection.
10 During our two-week onsite inspection,
11 our review included five of eight new aging
12 management programs and 14 of 32 existing aging
13 management programs. We walked down numerous
14 structures, systems, components to assess the
15 adequacy of the Applicant's license renewal
16 boundaries, in conformance with their application
17 and the Generic Aging License Renewal Report.
18 These walkdowns enabled us to assess
19 and evaluate whether the existing aging management
20 programs would be successful at managing aging
21 effects for in-scope structure systems and
22 components.
23 Next slide, please. The results of our
24 inspection. We determined that the plan had good
25 material condition. They revised two procedures.

They added susceptibility considerations when using the online fact manager, and they developed guidance in the structures monitoring program to allow for noting changes and trending. This included things such as taking measurements, providing more detailed descriptions, and the use of photographs.

They changed two aging management programs as a result of the inspection. They removed the fuel supply line evaluation as part of the Fire Protection Aging Management Program, and they initiated corrective action documents where they will begin trending requirements added for the type of test and accessible medium-voltage cables. And the type of tests, for example, would be power factor, partial discharge, time to remaining reflective time, reflect time, trending each of those types.

They changed five application commitments and the related aging management programs. They changed their sampling criteria for selecting fire water piping to flow tests. They will need a flow test 20 percent of the piping up to a maximum of 25 components during their flow testing. They will look at 20 percent or a maximum

1 of 25.

2 They are going to clarify selecting the
3 representative samples frequency inspection
4 requirements for the structures. They changed the
5 frequency for inside containment to five years, as
6 an example.

7 They are going to clarify the purpose
8 of the benchmark and the essential cooling water
9 structure. They have already done that.

10 They clarified their water control
11 structure monitoring requirements, and they updated
12 the requirements to inspect the interior of their
13 metal enclosed bus boxes. Instead of using
14 external thermography, they are going to look at
15 the internals.

16 Next slide, please. As a result of our
17 inspection, we concluded that the Applicant
18 performed the scoping and screening in accordance
19 with the rule. The information was easily
20 retrievable, auditable, and consistent with the
21 rule requirements.

22 From our reviews, we verified that
23 existing programs effectively managed the aging
24 effects. We verified that the Applicant tracked
25 the completion of enhancements and development of

1 new programs and a database, as they have already
2 described.
3 Based on our inspection results, the
4 team had reasonable assurance that the programs in
5 place or planned, as described by their commitment
6 table, with manage the aging effects and ensure the
7 intended safety and function of systems,
8 structures, and components within the scope of the
9 rule.
10 Does anyone have any questions?
11 CHAIRMAN SKILLMAN: Greg, yes, I do. I
12 want to push back a little bit on the broadness of
13 your findings. I am referring to page 54 in the
14 PDF file of the SER. And here it is written,
15 "However, upon further review, subsequent to
16 submittal of the LRA, the Applicant determined that
17 the method used did not identify all non-safety
18 SSCs with the potential to impact the performance
19 of safety-related SSCs." This goes on to read,
20 "Following this determination, the Applicant
21 performed walkdowns of the applicable MAB and FHB
22 spaces and identified additional non-safety SSCs
23 with the potential to impact safety-related SSCs,
24 and provided this additional information to the
25 staff in response to RAI 2.1-3."

1 Then, that paragraph concludes the
2 staff's concerns are resolved. What gives you
3 comfort that walking down the MAB and the FHB is
4 sufficient for thoroughness in this regard?
5 MR. PICK: When the team members walked
6 down the areas and did our reviews, what we saw
7 from using the drawings and looking at the safety-
8 related components, the things that they said were
9 in scope were in scope. So, during our individual
10 samples, we did not identify anything that they had
11 not previously identified. So, that was the basis
12 of our statement on the sample we took.
13 CHAIRMAN SKILLMAN: Thank you. No
14 further question on that issue, Greg.
15 MR. PICK: Are there any other
16 questions?
17 MEMBER STETKAR: Yes, I had one. And I
18 think I understand, but I wasn't quite sure from
19 your oral presentation what they are doing
20 regarding the fire protection system. Are they
21 doing flow tests according to the -- I don't know
22 if they are NFPA requirements -- they are probably
23 NFPA requirements -- for flow testing.
24 MR. PICK: They do do the flow tests in
25 accordance with the NFPA.

1 MEMBER STETKAR: Okay. Because you
2 mentioned --
3 MR. PICK: That is something we look at
4 during our triannual fire protection inspections.
5 MEMBER STETKAR: Okay. Good.
6 You did mention something about 20-
7 percent sampling or 25 items. What's that? That
8 is not related to flow testing, though?
9 MR. PICK: No, no. I misspoke.
10 MEMBER STETKAR: Okay.
11 MR. PICK: In the report under fire
12 water system, they had identified they were going
13 to take 10 samples for volumetric examination to
14 see if there were any issues during their
15 enhancement for blockage. What they are really
16 going to do is take a 20-percent sample of the
17 piping or a maximum of 25 samples, because that is
18 what ends up statistically being the maximum they
19 would need to take of the fire water pipe
20 locations. And they are, again, going to base it
21 on location and pipe size.
22 MEMBER STETKAR: Okay. Thank you.
23 That helps clarify. Thank you.
24 CHAIRMAN SKILLMAN: Greg, this is Dick
25 Skillman. I have a question, a little different

1 topic.

2 I'm reading from our Status Report that

3 "The staff determined that the Applicant has a

4 quality Class QC4 that was not addressed in the

5 application." What can you tell us about QC4 and

6 its applicability to our deliberations today,

7 please?

8 MR. PICK: I have no knowledge of that

9 classification and I would have to defer that to

10 the licensee.

11 MS. JAMES: Actually, we have Billy

12 Rogers coming up to the microphone to answer your

13 question.

14 CHAIRMAN SKILLMAN: Thank you.

15 MR. PICK: Thank you, Lois.

16 MR. ROGERS: Good morning. This is

17 Bill Rogers from the staff.

18 So, we looked at that when we were

19 doing the scope-instituting methodology audit.

20 Many applicants have a variety of classifications

21 for components and systems onsite. And if there

22 are multiple quality classifications that might be

23 applicable to the determination of safety-related,

24 we will review those during the audit.

25 In this particular case, there was one

1 classification, QC4, that it wasn't clear how that
2 related to the determination of safety-related as
3 it would be applied in the implementation of the
4 rule. So, we discussed that.
5 And the answer that was provided to us
6 during discussion and, then, in the followup RAI
7 was QC4 could actually refer to both non-safety-
8 related and safety-related components. So, the
9 Applicant had reviewed all of the QC4 components
10 and determined those which are identified, those
11 which were safety-related, and include them within
12 the scope of license renewal for A1, identified
13 those which were non-safety-related, and they would
14 have been included only if they were in scope for
15 A2, non-safety affecting safety; otherwise, they
16 would have been excluded. And we determined that
17 as an acceptable response and it resolved the
18 question.
19 CHAIRMAN SKILLMAN: Thank you. Thank
20 you.
21 Please proceed.
22 DR. SCHULTZ: I have one general
23 question, Dick. I would like to ask the question,
24 as one reads through the Inspection Report -- and
25 this is to be expected -- but, as we look at

1 license renewal and aging management, as you did
2 the inspection, you had the opportunity or the
3 need, of course, to look at the corrective action
4 program, the program health reports, surveillances,
5 as you did your investigations.
6 As you reflect on those programs,
7 corrective action, program health, and
8 surveillance, that are maintained by the sites, did
9 you have any issues or particular concerns related
10 to any of those programs in general?
11 MR. PICK: During our inspection we did
12 not. I also do fire protection inspections and
13 cybersecurity inspections. When we do our baseline
14 inspections, we also take corrective action program
15 samples. We do look at surveillances, and during
16 those programs we have found that the licensee does
17 follow their tech specs, technical requirements
18 manual, do proper surveillances. And when they
19 find things wrong, they enter them into their
20 corrective action program and they resolve them.
21 DR. SCHULTZ: Did you find the
22 resolution and process that they used to be robust?
23 MR. PICK: We do.
24 DR. SCHULTZ: Thank you.
25 MR. PICK: Any other questions before I

1 turn it back over to Lois?

2 CHAIRMAN SKILLMAN: Colleagues, any

3 more for our inspector? Colleagues, any more for

4 the inspector?

5 (No response.)

6 Hearing none, Lois, please proceed.

7 Thank you, Greg.

8 MR. PICK: Thank you.

9 MS. JAMES: Thank you, Greg.

10 In the next few slides I will be

11 presenting the results as described in the SER with

12 open items. SER Section 2 described the scoping

13 and screening of structures and components subject

14 to the aging management review. The staff reviewed

15 the Applicant's scoping and screening methodology

16 procedures, quality controls applicable to the LRA

17 development, and training of its personnel.

18 The staff also reviewed the various

19 summaries of the safety-related systems,

20 structures, and components, non-safety-related

21 systems, structures, and components affecting

22 safety-related functions, and systems, structures,

23 and components relied upon to perform functions in

24 compliance with the Commission's regulations for

25 fire protection, environmental qualification,

1 station blackout, pressurized thermal shock, and
2 anticipated transients without a scram.
3 Based on their review, the results of
4 the scoping and screening audit, and additional
5 information provided, the staff concludes that the
6 Applicant's scoping and screening methodology is
7 consistent with the standard review plan and the
8 requirements of 10 CFR Part 54.
9 Next slide. SER Section 3 covers the
10 staff's review of the Applicant's AMPs. For a
11 given aging management review, the staff evaluated
12 the item to determine whether it is consistent with
13 the GALL Report and meets the requirements of 10
14 CFR Part 54. Section 3.1 through 3.6 include the
15 aging management review items in each of the
16 general system areas within the scope of license
17 renewal. If an aging management review was not
18 consistent with the GALL Report, then the staff
19 reviewed the Applicant's evaluation to determine
20 whether the Applicant demonstrated that the aging
21 effects will be adequately managed, so that the
22 intended functions will be maintained consistent
23 with the current licensing basis for the period of
24 extended operation.
25 Next slide, please. The LRA identified

1 40 AMPs, and the Applicant subsequently added an
2 existing program in response to License Renewal
3 Interim Staff Guidance ISG-2013-01, aging
4 management of loss of coating or lining integrity
5 for internal coatings/linings or on in-scope
6 piping, piping components, heat exchangers, and
7 tanks issued in November of 2014.
8 The left side of the slide identifies
9 the Applicant's original disposition of the AMPs,
10 and the right side identifies the staff review of
11 the AMPs, as documented in the SER with open items.
12 All AMPs were evaluated by the staff for
13 consistency with the GALL Report.
14 Next slide, please. The staff closed
15 two open items associated with the aging management
16 review from the 2013 SER with open items under the
17 review of the aging management program.
18 The first open item. In reviewing the
19 open-cycle cooling water system AMP, the staff
20 found that the LRA did not describe the protective
21 coatings used in the essential cooling water
22 system, nor discuss site-specific operating
23 experience which would provide objective evidence
24 supporting the conclusion that the effects of aging
25 will be adequately managed during the period of

1 extended operation.

2 Between February and November of 2012,
3 the staff issued Requests for Additional
4 Information, or RAIs, on these topics and
5 documented an open item in the 2013 SER with open
6 items. Subsequently, in November of 2014, the
7 staff issued ISG-2013-01 which encompassed these
8 issues.

9 After reviewing the RAI responses and
10 changes in response to the ISG, the staff
11 determined that the open cycle cooling water system
12 AMP is consistent with the GALL Report and meets
13 the requirements of 10 CFR Part 54.

14 For the second open item, in reviewing
15 the one-time inspection AMP, the staff questioned
16 why the Applicant did not have an AMP to detect and
17 address cracking on the interior surfaces of the
18 RWST or other similar stainless steel tanks. If an
19 AMP is not necessary, the Applicant needed to state
20 the basis for why such an AMP was not necessary.

21 In response to RAIs, STP detailed its
22 activities to characterize the cracking on the Unit
23 1 RWST and its proposed methods to manage the aging
24 effects with both one-time and periodic
25 inspections. Based on the staff's review of the

1 Applicant's response, the concerns regarding the
2 cracking in the Unit 1 RWST were resolved and the
3 corresponding open item is closed.
4 DR. SCHULTZ: Lois, did you have an
5 expectation that that might be extended to other
6 tanks?
7 MS. JAMES: Yes, the program extends to
8 other stainless steel tanks.
9 DR. SCHULTZ: But the focus here was
10 just for the RWST?
11 MS. JAMES: Well, the question rose
12 from operating experience regarding the RWST. So,
13 that is where the question started.
14 DR. SCHULTZ: All right. But, in terms
15 of the AMP program going forward, they are going to
16 be --
17 MS. JAMES: Considering it --
18 DR. SCHULTZ: -- applying it to all
19 tanks?
20 MS. JAMES: Yes. Yes, sir.
21 DR. SCHULTZ: Thank you.
22 CHAIRMAN SKILLMAN: Lois, thank you.
23 Before you leave this section on open
24 items closed -- thank you, John -- before you leave
25 this slide on open items closed, there is another

1 open item that has been closed. It is open item
2 4.3.2.11-1, the Effects of Thermal Aging on Cast
3 Austenitic Stainless Steel.
4 MS. JAMES: Yes, sir.
5 CHAIRMAN SKILLMAN: And written in the
6 documentation is this statement: "Use of minimum
7 material properties do not provide adequate
8 protection in light of information from the past 29
9 years." This item was then closed. Would you
10 please provide an explanation of how this
11 determination was made that this open item can be
12 closed?
13 MS. JAMES: Can I defer that to Section
14 4?
15 CHAIRMAN SKILLMAN: Sure.
16 MS. JAMES: I will actually address
17 that on slide 17.
18 CHAIRMAN SKILLMAN: Yes, that will be
19 fine. Thank you, Lois. Please proceed.
20 MS. JAMES: Okay. I will now turn the
21 presentation over to Mr. Holston, who will address
22 the open item, the aluminum bronze open item.
23 MR. HOLSTON: So, the aluminum bronze
24 open item, as you heard the Applicant discussing,
25 initially, the aluminum bronze program was focused

1 on about 450 cast components that were susceptible
2 to selective leaching. And in January of last
3 year, they came in and said, well, we are going to
4 replace all of those castings because we had
5 questions related to what is the real strength of
6 the component when you de-alloy part of it. When
7 you saw the picture that they showed on the slide
8 with that little area of external de-alloying or
9 the indication you could see, well, how do you
10 really project what is going on inside the pipe to
11 do your operability evaluations?
12 So, those are all being replaced.
13 That, however, left, as was discussed, about 3300
14 welds. Of course, that number will be lower when
15 castings are cut out and replaced, so you are still
16 talking about 2,000 welds, somewhere in that
17 ballpark, that are susceptible to selective
18 leaching.
19 As a result of our review of the
20 changes to the program, you heard we had about a
21 10-part open item, of which nine of those were
22 closed by a submittal that changed the program. It
23 came in in September of 2016. So, I am going to
24 focus that point forward on this.
25 So, one of the key aspects that the

1 Applicant was looking at is they had not had any
2 leaks due to selective leaching in these welds,
3 these susceptible welds, since 1994. So, they did
4 some metallurgical testing. They did some
5 calculations on cooldown rates on welds and all
6 sorts of things, and then, came to postulate that
7 the root pass is less susceptible, and it is less
8 susceptible because the dilution, the higher rate
9 of dilution that occurs in the root pass and the
10 cooldown rate being higher than in subsequent
11 passes.
12 So, in effect, what would happen is
13 they have reduced the susceptibility of the overall
14 weld to selective leaching of this aluminum bronze
15 because the root pass acts as a barrier. I mean,
16 you can almost kind of think of it as, well, it is
17 kind of like a coating and it is isolating the more
18 susceptible passes of the weld from the
19 environment. If you isolate it from the
20 environment, you are not going to have selective
21 leaching occur.
22 And some, that is dependent upon not
23 having a construction-related or an in-service flaw
24 that penetrates through the root pass and, then,
25 unless you can get the environment in the

1 subsequent passes that are most likely more
2 susceptible. That is where it is postulated they
3 had the through-wall de-alloying up to 1994, was in
4 welds that had, you know, construction-related
5 flaws.
6 So, as the staff and Lois talked about
7 audits we did on site, technical data we reviewed,
8 testing results we reviewed, the root pass as a
9 barrier seemed very plausible to us. However,
10 there wasn't enough testing done. The Applicant
11 had cross-sectioned, you know, about six welds.
12 That was leaning in that direction, that that was
13 plausible. So, we proceeded from that point.
14 So, we can go to the next slide, slide
15 No. 13. I just want to talk about a couple of the
16 conclusions we derived from not only looking at the
17 Applicant's results of their destructive
18 examinations, but also in a lot of review of the
19 technical literature that is available.
20 The de-alloying process occurs at a
21 microstructure level, and it is confined for a
22 localized front at scales with a grain size. Those
23 are some really cool words, right, and he is a
24 metallurgist, but what does it really say to you?
25 If you look at the cross-section of one

1 of these welds or any material that is susceptible,
2 you basically have a front of de-alloying that goes
3 through. On one side of that front it is 100-
4 percent de-alloyed; on the other side of the front
5 it is not de-alloyed. Now, of course, if you can
6 keep exposing the environment as you pass through
7 those grains, those are going to become de-alloyed
8 eventually. However, that is what it is.
9 So, the material on either side of that
10 front that goes through the material is either in
11 its as-received material properties or it is in
12 fully de-alloyed material properties. We concluded
13 from the data that the Applicant had constructed on
14 testing of material properties for the de-alloyed
15 material within the bulk component that there was
16 insufficient data to bound the mechanical
17 properties.
18 We are very fortunate to have a person
19 on staff, Chris Sevanick, who was involved in the
20 Navy Air Program, had actually been involved in
21 developing material properties from testing, and,
22 basically, had to go through all that data.
23 So, based on the number, the size of
24 the population of tests they had, and based upon
25 some of the scatter within those results, we

1 basically came to a conclusion that you would not
2 give any credit or there would be no strength
3 credit, in other words, no tensile value, for de-
4 alloyed properties or fracture toughness credit.
5 Now the Applicant throughout, even back
6 in the eighties when they did their operability
7 evaluations and they did their calculations, never
8 credited any material properties for the de-alloyed
9 portions, right? And so, that is nothing new or
10 big, but it is important when we talk later about
11 structural integrity.
12 Next slide. So, given what we knew and
13 what the Applicant changed in the programs, I
14 wanted to highlight some of the key features of the
15 program that lead us to a conclusion that we are
16 down to just one last open item. And some of those
17 you have heard already.
18 But in the detection of aging effects
19 program element, the Applicant is going to do
20 volumetric inspections. These volumetric
21 inspections will look to see if there is weld
22 defects, weld defects that could be progressing
23 through the root pass, right? So, these are not
24 ultrasonic exams that are going to measure how much
25 de-alloying is going on. We are going to talk

1 about that maybe in a little bit, just as an
2 overview.
3 But those volumetric examinations will
4 provide information that, in fact, based upon a
5 representative sample, we aren't seeing, we haven't
6 seen from the last time they did these volumetric
7 examinations during the plant construction, that
8 there aren't weld defects that are propagating
9 through the root pass.
10 They are going to do destructive
11 examinations in addition. And in doing this, you
12 heard a lot about 25, 20 percent. Twenty percent
13 is immaterial in this case, right, because it is
14 25. So, there is going to be 25 volumetric
15 inspections for the welds with backing rings and
16 welds without. There is going to be 25 destructive
17 examinations of welds with backing rings and welds
18 without. So, in effect, we are going to see 50
19 welds cross-sectioned.
20 There will be continuing inspections
21 for leakage. How the licensee has been managing
22 this selective leaching since the days that it
23 started occurring is every six months they do a
24 walkdown of all the above-ground piping.
25 One of the pictures you saw or the

1 picture they showed you is very characteristic of
2 what you see if you see selective leaching. I
3 actually did a walkdown with one of the Applicant
4 staff members, and there was a fitting, you know, a
5 much smaller fitting. It was about a 3-inch
6 fitting that showed that little fluorescent break
7 there.
8 Then, in addition, they look at yard
9 areas to detect if there is moisture that is
10 unusual that shouldn't be there. That would seem
11 odd. How do you that? Well, we explored that with
12 the Applicant. We looked at detailed calculations
13 that demonstrated that, if you have a 10-gallon
14 permatted leak, it will get to the surface within
15 30 days. And they have a huge margin there. They
16 have about a margin of 1,000 gallons, I mean that
17 they can tolerate.
18 I am not a hydrology expert. I looked
19 at the calculations. So, fortunately, the New
20 Reactors Organization, they had a hydrology expert.
21 He reviewed those calculations and felt that they
22 were well-bounded and well-founded. So, albeit,
23 you can't look for leakage on the outside surface
24 of the components that are buried, we can observe
25 for an indirect effect and be convinced that there

1 is no leakage going on that would affect the
2 intended function.
3 Of course, when they do opportunistic
4 buried pipe inspections, they will actually go in
5 and look at the coatings for those pipes. All this
6 piping is coated that is buried. Of course, that
7 isolates the susceptible weld layers, you know, the
8 crown pass from the environment.
9 So, that is basically what is going to
10 go on with detection of aging effects. Basically,
11 at the end of that, having done the volumetric
12 examinations to show that, yes, after that
13 representative sample, we don't see any defects
14 that are challenging the root pass, and we will
15 have 50 examinations that will actually not only
16 look at is there de-alloying going on, but it will
17 look at the phase, the actual phases within that
18 cross-section that will be sufficient to
19 demonstrate that the theory, which we think is
20 true, is that root pass is more resistant to de-
21 alloying and protects the other layers of the weld.
22 And that is one reason why they haven't had any
23 leaks since 1994.
24 Yes, sir?
25 MEMBER RICCARDELLA: How does the

presence of a backing bar affect this protection --

MR. HOLSTON: Well, the backing ring does two things. It does one good thing and it does one bad thing. There are two effects that contribute to whether the welds are going to be susceptible.

One is, with the dilution, with diluting the welds, you have a lower concentration of aluminum, which with the samples they have taken they have demonstrated it. They can show a difference across the passes as you go.

The other thing is the backing ring allows you to have a greater heat sink, which cools it down quicker. If you cool it down quicker, you don't get the gamma-2 or the beta phase that are susceptible to selective leaching aluminum bronze.

The downside of having a backing ring is that it gives you kind of a notch. It gives you a localized place where it can concentrate and adverse chemistry that can cause a selective leaching. So, that is why the Applicant identified, you know, we have got a backing ring population. We are going to do 25 of those. We have got a non-backing-ring population. We are going to do 25 of those.

1 MEMBER RICCARDELLA: Okay.
2 MR. HOLSTON: So, any other questions
3 on detection of aging effects?
4 DR. SCHULTZ: Bill --
5 MR. HOLSTON: Yes?
6 DR. SCHULTZ: -- one more question. We
7 have kind of bounced back and forth between a
8 representative sample and 25.
9 MR. HOLSTON: Uh-hum.
10 DR. SCHULTZ: With regard to the
11 destructive examinations, what are the staff's
12 expectations if, when those are done, issues arise
13 as a result of the investigation? I mean, you
14 could hypothesize you do the destructive
15 examinations and you find issues.
16 MR. HOLSTON: Correct.
17 DR. SCHULTZ: What are the staff's
18 expectations of what will be done if in examining
19 25 and 25 that there are problems identified?
20 MR. HOLSTON: Can I defer that just to
21 the next slide?
22 DR. SCHULTZ: Sure.
23 MR. HOLSTON: Because I am going to
24 address that within corrective actions.
25 DR. SCHULTZ: Thank you.

1 MR. HOLSTON: So, yes, I will go
2 through acceptance criteria and, then, get to that
3 and I will answer your question I think directly.
4 Any other questions on detection, how
5 they are going to detect these aging effects?
6 MEMBER SUNSERI: Yes. With regard to
7 the underground pipe and just looking for moisture,
8 or what have you, to reach the surface, was there
9 any consideration of using other techniques such as
10 ground-penetrating radar or something like that to
11 get on top of the leaks faster?
12 MR. HOLSTON: The simple answer to the
13 question is no, because there is a huge -- but the
14 answer to why is that there is a very large margin.
15 They can detect a 10-gallon-per-minute leak. They
16 can tolerate 1,000 gallons per minute. Now,
17 clearly, if they had a 1,000 gallons a minute, that
18 is going to be washing out soil. It could affect
19 structural integrity evaluations. But selective
20 leaching is not a rapidly-propagating phenomenon.
21 You know, you are not going to go from 10 gallons a
22 minute one day and now, suddenly, you are at 500 a
23 month later, right? It is just not going to
24 happen. So, that is why we didn't --
25 MEMBER SUNSERI: Yes. Thank you.

1 MEMBER STETKAR: Bill, should I ask you
2 about the buried and underground piping program now
3 or should I ask you about it at all?
4 MR. HOLSTON: Well, you can ask me.
5 MEMBER STETKAR: Okay.
6 MR. HOLSTON: And why don't you go
7 ahead?
8 MEMBER STETKAR: Okay.
9 MR. HOLSTON: We might have Brian Allik
10 answer some of that. Brian Allik is taking some of
11 that over.
12 MEMBER STETKAR: Yes. Well, let me get
13 to where I was headed.
14 MR. HOLSTON: Sure.
15 MEMBER STETKAR: We heard earlier that
16 the license renewal application checked off a box
17 that said the cathodic protection system is not in
18 scope for license renewal. So, does that mean that
19 in their buried and underground piping inspection
20 program they are applying the -- I don't know
21 whether it is Category E or Category F of their
22 inspections. In other words, not taking credit at
23 all for cathodic protection? Or what are they
24 doing?
25 MR. HOLSTON: Yes, that doesn't mean

1 that. What it means is, when we say the cathodic
2 protection system is not within the scope, it is
3 the wires; it is the panels; it is the rectifiers
4 that aren't in scope.
5 So, what we did was we built into Aging
6 Management Program 41 for buried and underground
7 piping the measurement of the cathodic protection
8 from two perspectives. And that is what drives you
9 to those additional inspections in Category E and
10 F, as you mentioned.
11 MEMBER STETKAR: Yes.
12 MR. HOLSTON: So, the Applicant has to
13 measure the amount of time the current is turned
14 on. Somebody trips a breaker open for something
15 and it has been off for two months, that is going
16 to be a problem, right? Because if you don't pull
17 the electricity, you are not going to get the
18 cathodic protection. So, there is a criteria for
19 that, and that is 85 percent of the time it has to
20 be on.
21 We also have a criteria, then, for the
22 effectiveness of it. And that is measured by the
23 annual cathodic protection surveys. You have to
24 demonstrate that you have negative 850 millivolts.
25 Now, with our new ISG we issued, we also accepted

1 in higher resistivity soils -- that is negative 750
2 or negative 650. We also allow for actually direct
3 measurement of corrosion rates. But, if you can't
4 demonstrate that you are meeting that level of
5 protection, then you have to go to E or F --
6 MEMBER STETKAR: Right.
7 MR. HOLSTON: -- and do the additional
8 inspections.
9 And what demarcates between E and F is,
10 if your plant-specific operating experience is good
11 and meets the criteria in the AMP, then your
12 cathodic protection is upright, up-to-speed, you do
13 E, which is three every 10 years. But, if you also
14 have bad operating experience, then you have got to
15 go to six every 10 years.
16 MEMBER STETKAR: Right. So, I think
17 what I hear you saying is that they will -- I
18 always hate to say "take credit" -- but they will
19 take credit for cathodic protection with all of
20 those caveats in determining the frequency and
21 extent of their piping inspections?
22 MR. HOLSTON: Right. Because, in
23 effect, what we are doing is, rather than going to
24 the panel and seeing if it is leaking --
25 MEMBER STETKAR: No, no.

1 MR. HOLSTON: -- rather than checking
2 the wires, we performance monitor the effects of
3 the cathodic protection system with the
4 availability and the effectiveness.
5 MEMBER STETKAR: Yes. Thank you. That
6 helps.
7 MR. HOLSTON: Any other questions on
8 detection of aging effects?
9 (No response.)
10 Okay. For the acceptance criteria,
11 what they will do when they do the volumetric exams
12 is, obviously, they are looking for any plane or
13 flaw that would exceed 80 percent of the root pass
14 if it is connected -- you know, you could have a
15 plane or flaw within. So, here's your water. And
16 so, your inside diameter of your pipe, and you have
17 your pipe, you know, your outer edge of your root
18 pass. If it is up here, we are not really worried
19 about it. We are here with an environment
20 connected plane or flaw.
21 And with the destructive examinations,
22 the microstructure of the root region, we are
23 looking to see that we are reasonably certain they
24 are going to see some gamma-2 in the welds, right?
25 It is not none whatsoever at all, right? But we

1 want to see that that is surrounded by the alpha
2 phase which is not susceptible to selective
3 leaching. And if the gamma-2 or the beta phase
4 would exceed 80 percent of the depth of that root
5 pass, then we have an issue. And so, that is the
6 microstructure monitoring.
7 And I did have a typo -- I apologize
8 for that -- in the third acceptance criteria, which
9 is the walkdowns every six months. They will go to
10 monthlies if they have some other problems, but
11 those are just they are looking for leakage, is
12 what the acceptance criteria is for that.
13 CHAIRMAN SKILLMAN: Bill, has the
14 Applicant ever discovered a geyser? Have they ever
15 seen a leak great enough to really push water out
16 of the soil?
17 MR. HOLSTON: I looked at their
18 operating experience when I did the buried pipe
19 audit and saw none, no, sir.
20 CHAIRMAN SKILLMAN: Okay. Thank you.
21 MR. HOLSTON: Any questions on
22 acceptance criteria?
23 (No response.)
24 Okay. Next slide, and this gets to the
25 corrective actions I was talking about before that

1 Mr. Schultz was asking about.

2 So, if they find a problem within the

3 volumetrics for weld defects that are penetrating

4 the root pass, they have to do five additional

5 volumetric examinations until they see none. And

6 for the destructive examinations, the criteria is

7 the same. It is, if you see that phased

8 distribution not what we would expect, not

9 supportive of what the theory is, then you have to

10 keep doing five more until you don't see that

11 anymore. The five comes from Generic Letter

12 90-05, which the Applicant commented upon. It is

13 the NRC staff basic position when you find

14 something that is adverse that you look more until

15 you find the issue.

16 Does that answer your question?

17 DR. SCHULTZ: Yes. Thank you.

18 MR. HOLSTON: Okay. Now another

19 aspect, though, which is structural integrity

20 calculations conducted with the as-found

21 conditions, so, then, the question is, well, what

22 is a corrective action if you find an issue with

23 structural integrity?

24 So, the staff is concerned with that

25 because, if you find an issue with structural

1 integrity, you have an issue with the intended
2 function of the system. And so, that is where we
3 are right now with the Request for Additional
4 Information.
5 The licensee has worked with EPRI and
6 done some testing of a UT volumetric method that
7 should be able to actually take the weld and
8 measure the amount of de-alloying that is going
9 inside, from the inside, from the ID to the OD.
10 So, what you could picture, if you are
11 looking at a ring, is here it is penetrating 60
12 percent. That would be bad, right, because it is
13 through the root pass? But, over here, it is just
14 penetrating 10 percent, and there is none down
15 here. And it just is based upon reasonable theory.
16 We were aware of Vermont Yankee doing
17 the cast iron piping. We just hadn't been aware of
18 anybody doing it for aluminum bronze welding or
19 fittings.
20 And so, our RAI talks about, well, tell
21 us how you are going to demonstrate the method, how
22 you are going to quality people, what the
23 resolution of that process is, and several other
24 questions on sampling size and all of that. So,
25 that is the remaining open item, is, what are you

1 going to do for corrective actions if the
2 structural integrity evaluation isn't acceptable?
3 CHAIRMAN SKILLMAN: Bill, as a matter
4 of admin as we look into the new year, is it these
5 RAIs that will not be presented until after March?
6 MR. HOLSTON: I don't -- well --
7 MS. JAMES: We have not issued the RAI
8 yet. So, we have to issue it. They have to have
9 their 30 days to respond and, then, we need at
10 least 30 days to look at what their response is.
11 And in this instance, we have to get
12 another division involved. So, we wanted to give
13 ourselves a little extra time to review what comes
14 in, which is why we are discussing delaying the
15 full Committee from February.
16 CHAIRMAN SKILLMAN: Thank you. I
17 understand.
18 MR. HOLSTON: The RAI has been peer-
19 reviewed.
20 CHAIRMAN SKILLMAN: Okay.
21 MR. HOLSTON: It has been approved by
22 management, but we have to get it out.
23 CHAIRMAN SKILLMAN: Thank you for the
24 explanation. We were trying to get clear on timing
25 and the workload for the Committee. And this gives

us an explanation of what is happening. Thank you.

Please proceed.

Go ahead, John.

MEMBER STETKAR: I was going to say, do you have more on this?

MR. HOLSTON: No, no, that is the end of my presentation. If you have any questions --

MEMBER STETKAR: Let me go back to the, for lack of a better term, risk-informed sampling process. Is the staff good with taking a random sample, you know, throwing a random number generator in and taking a random sample of any 25 of the 3300, I think I wrote down here?

MR. HOLSTON: Yes, we are thinking there is about 2,000. Once you cut out the 400-some-odd fittings --

MEMBER STETKAR: All right. I don't want to get down too much.

(Laughter.)

MR. HOLSTON: It is a little bit less.

MEMBER STETKAR: But 25 out of a large number --

MR. HOLSTON: Right.

MEMBER STETKAR: -- randomly selected --

1 MR. HOLSTON: What we did was Matt
2 Homiack, who is back here in the room, he is in
3 Research now, did some calculations, finite element
4 heat transfer calculations to determine how
5 sensitive that is. And he is coming up to the
6 microphone, and I would like to give him credit for
7 the great work he did in that regard. I think he
8 is going to have some positive answers for you.
9 MR. HOMIACK: Thank you, Bill.
10 So, the Office of Nuclear Regulatory
11 Research has been supporting NRR --
12 CHAIRMAN SKILLMAN: Excuse me, sir.
13 Identify yourself, please.
14 MR. HOMIACK: Matthew Homiack from the
15 Office of Research.
16 CHAIRMAN SKILLMAN: And, Matt, make
17 sure you speak up in the microphone, so we can
18 hear.
19 MR. HOMIACK: Will do. Thank you. Is
20 this okay?
21 CHAIRMAN SKILLMAN: Yes.
22 MR. HOMIACK: So, there is actually two
23 -- it is a smart sample. There is two sample
24 populations, first of all. One, welds with backing
25 rings and one of welds without. And I believe,

1 Bill, each will get 25 destructive examinations.
2 And so, the reason for looking at those
3 differently is the welds with the backing rings
4 have the operating experience, and the welds
5 without the backing rings are more susceptible root
6 pass to de-alloying because they have a quicker
7 cooldown rate.
8 The Applicant has done some cooling
9 rate analyses, which the staff has done some
10 independent confirmatory calculations as well, and
11 we think their cooldown rates are conservative.
12 MR. HOLSTON: And Matt, in his
13 calculations, varied heat inputs, the exact
14 question you were asking. Because one of the
15 concerns we had was not so much some variation from
16 welder to welder, but if you are hanging upside-
17 down and trying to make that weld versus doing a
18 flat weld, doing a vertical weld, you know, as
19 well-controlled as weld procedures are, it is a
20 little tougher to make some of those welds. And
21 would they have a higher heat input or something?
22 But the calculation, it is not really
23 -- the cooldown rate is not very sensitive to a
24 reasonable range of expectations of heat input from
25 the weld. So, the random sample is reasonable.

1 Now the AMP does say, the aging management say that
2 they will take into effect construction-related
3 factors.
4 MEMBER POWERS: If I just assume that
5 they have a random population --
6 MR. HOLSTON: I'm sorry, I couldn't
7 hear you. What?
8 MEMBER POWERS: If I assume that I have
9 a random population, in other words, defects are a
10 random sort of thing, which may not be true, but
11 close enough for argument's sake, and I look after
12 three refueling inspections. So, I have a sample
13 of 75. I would probably have a 95-percent chance
14 that I have covered 90 percent of the range of
15 things.
16 So, while the number looks small, it is
17 pretty powerful if you don't have systematic
18 effects. And that, coupled with your walkdown to
19 identify systematic vulnerabilities, it appears to
20 me, though, it is 25 of a large number, the fact is
21 random sampling is a pretty powerful technique for
22 identifying outliers in that range.
23 MEMBER STETKAR: Well, except for how
24 frequently do they do this destructive examination
25 sampling.

1 MR. HOLSTON: Well, if they are going
2 to do the destructive examinations, it is a one-
3 time destructive examination. Because you want to
4 demonstrate with adequate data that that root pass
5 is less susceptible.
6 MEMBER STETKAR: So, the sample is not
7 after three refuelings. It is a one-time. It is
8 25. So, you have a little lower confidence.
9 MEMBER POWERS: Yes, it is a fairly
10 sharp function --
11 MEMBER STETKAR: Yes.
12 MEMBER POWERS: -- that moves up
13 rapidly.
14 MR. HOLSTON: The actual numbers are
15 that the 25 is a 90/90 certainty. That is the
16 number. So, where we have adopted that throughout
17 the GALL Report and several aging management
18 programs is, where you are demonstrating that an
19 aging effect is not likely to cause a loss of
20 intended function, we use 90/90.
21 Now, for example, when talking about
22 structural integrity, there is a challenge to
23 structural integrity, the certainty needs to be
24 higher. So, for these welds that we are doing
25 where we have seen some cross-sections, right,

about six welds that they cross-sectioned that support the theory, we want to have enough to say that that is reasonable, that they are not going to de-alloy through the root pass, go into the higher susceptible weld passes, and then, de-alloy through-wall. And so, that is why we are very comfortable with the 25 and the random at this point. But the RAI addresses what happens if you see more consequential results --

MEMBER STETKAR: Yes, I didn't read the RAI.

MR. HOLSTON: Yes. Yes, we haven't given that to you yet. It is not published yet.

MS. JAMES: It is not publicly-available yet. So, it will be public and it will issue in the next week or so.

MEMBER BALLINGER: So I have it clear in my head, the weld heat input and all of that stuff for the various sizes of welds, it is not that much different welds. So that there is not likely that there will be a distinction, there would be a distinction between small diameter or large diameter. That is not going to be an issue that unrandomizes things, if you will?

MR. HOLSTON: That is correct, yes.

1 MEMBER BALLINGER: Okay.

2 MR. HOLSTON: And again, we didn't just
3 -- because, well, suppose in the audience that his
4 company did some of the finite element calculations
5 for the cooldown, and we didn't just take that at
6 face value. Matt Homiack did his own independent
7 evaluations to that effect.

8 MEMBER BALLINGER: Okay. Some of us
9 remember, well, it only happens to small diameter
10 pipes. And then, well, it only happens to slightly
11 larger diameter pipes. And then, yes --

12 MEMBER RICCARDELLA: Bill, as you know,
13 the other side of risk-informing this type of a
14 selection is to look at consequences. Is there any
15 ability to distinguish from different piping
16 locations based on the consequences of failure?
17 And what are we looking at? I mean, are we looking
18 at an actual rupture that we are concerned about or
19 just a leak?

20 MR. HISER: Okay, so two parts to that.
21 We are sampling to try to demonstrate that all of
22 the 2,000 welds are okay. Are there welds that
23 would have a higher consequent? Absolutely.
24 Right, because there are welds in the main header.
25 There are welds that directly supply maybe a cooler

1 for diesel, and those would be more. There are
2 welds that are downstream of the coolers. It has
3 already done its function as long as it doesn't
4 flood the room. All it is doing is going to the
5 bay, or not the bay, to the pond, right?
6 So, we didn't factor in in any
7 selection the consequential because we are
8 confident, based upon what we have seen with the
9 testing results, also with what Matt has done with
10 the backup analyses, that what you see in a weld
11 here that is a very critical weld would be the same
12 thing because the environment is the same here; the
13 weld processes are the same, and the sensitivity to
14 the amount of heat put in with the weld is
15 virtually, you know, it doesn't really affect the
16 potential for additional beta or gamma-2. So, we
17 didn't say, make sure you do all your sampling of
18 your welds upstream or in the main header, or
19 anything like that.
20 MR. HOLSTON: Well, the consequence,
21 yes. Yes, as Allen is saying, the consequence
22 issue gets into whether what you see affects
23 structural integrity. And so, that is where we
24 have a four-page RAI to address what -- you know,
25 that is why the corrective actions for structural

1 integrity is still an open item. You know, we are
2 hopeful that this volumetric technique will be
3 something that we can accept it. Of course, with
4 the volumetric technique of that nature, they could
5 look at a lot of welds. They could zero into the
6 more consequential welds in that case. Because, to
7 date, of all the casting failures, castings are a
8 lot more susceptible than the welds are, and on the
9 weld failure side, they have not had one that
10 failed structural integrity criteria.
11 MEMBER RICCARDELLA: Question. You
12 know, when you say "structural integrity criteria,"
13 you say, well, the stresses are higher than the
14 allowable stress, or something like that. But is
15 there any concern at all about a rupture of one of
16 these or are we mainly just concerned about a leak?
17 MR. HOLSTON: Because of the very low
18 operating pressure at very low operating
19 temperatures, we are not too concerned. And they
20 have very low seismic loads, too. We looked at
21 their seismic analyses. There is nothing huge
22 there.
23 We would be more concerned with a leak
24 than we would be -- but they have done a lot of
25 analyses on the leak rates, the allowable leak

1 rates versus detectability of those leaks. And we
2 have reviewed all of that, and that is all
3 documented, that we feel they have the
4 detectability to see it before it could approach to
5 a leak that would starve the heat exchanger, or
6 whatever.
7 MEMBER RICCARDELLA: Thank you.
8 CHAIRMAN SKILLMAN: Let's proceed,
9 please.
10 Bill, thank you.
11 MR. HOLSTON: Yes, sir.
12 MS. JAMES: Okay. We are now on slide
13 16. SER Section 4 identifies the time-limited
14 aging analysis, or TLAAs. Section 4.1 documents
15 the staff's evaluation of the Applicant's basis for
16 identifying plant-specific or generic analysis that
17 need to be identified as TLAAs and determine that
18 the Applicant has provided an accurate list, as
19 required by 10 CFR 54.21(c)(1).
20 Sections 4.2 through 4.7 document the
21 staff's review of the applicable STP TLAAs as
22 shown. Based on its review and the information
23 provided by the Applicant, the staff concludes that
24 the TLAAs will remain valid for the period of
25 extended operation. The TLAAs have been projected

1 to the end of the period of extended operation or
2 the effects of aging on those intended functions
3 will be adequately managed for the period of
4 extended operations, as required by 10 CFR
5 54.21(c)(1).
6 Next slide, please. There is one TLAA
7 open item from the 2013 SER with open items that we
8 closed in this 2013 SER -- or 2016 SER. In
9 reviewing the effects of thermal aging on CASS, the
10 staff was concerned that the Applicant's thermal
11 embrittlement evaluation of CASS material in the
12 leak-before-break piping relied upon an evaluation
13 and data from 1983. The staff issued RAIs between
14 April 2011 and November 2013 and documented its
15 concerns as an open item in the 2013 SER with open
16 items.
17 In response, the Applicant stated that
18 the referenced material, fractured toughness
19 properties, for their evaluations are shown to be
20 bounding. In addition, the Applicant revised its
21 LRA to identify the fracture mechanics evaluation
22 as a TLAA and dispositioned it in accordance with
23 10 CFR 51.21(c)(1) as an analysis that remains
24 valid for the period of extended operation.
25 The staff confirmed that the Applicant

1 used a bounding fractured toughness value for its
2 leak-before-break analysis, and that the fractured
3 toughness used is applicable to 60 years.
4 Therefore, the staff concluded that the revisions
5 to the LRA are acceptable, and the open item is
6 closed.
7 Mr. Skillman, do you have more
8 questions? We have our technical reviewer in the
9 audience.
10 CHAIRMAN SKILLMAN: No. You have
11 addressed the question that I raised earlier.
12 MS. JAMES: Okay.
13 CHAIRMAN SKILLMAN: I'm good. Thank
14 you.
15 MS. JAMES: The next slide, please.
16 Pending the satisfactory resolution of the open
17 item, the staff will determine whether the
18 requirements of 10 CFR 29(a) have been met for the
19 license renewal for South Texas Project Units 1 and
20 2.
21 This concludes our staff presentation,
22 and we will now be available for any further
23 questions from the Subcommittee.
24 Thank you.
25 CHAIRMAN SKILLMAN: Lois, thank you.

1 Colleagues, I invite any questions you
2 might have for the staff at this time.
3 (No response.)
4 Hearing none, I have one. There is a
5 very interesting discussion in the Safety
6 Evaluation about whether or not there are vent
7 valves on the aux feedwater pumps. And when you
8 read the text, the text is convoluted. First of
9 all, it says there are some, then there aren't
10 some. Then, some are in and some are out. And I
11 am wondering if anybody can speak to this.
12 MS. JAMES: Okay. Your question is, do
13 the feedwater pumps have vent valves?
14 CHAIRMAN SKILLMAN: Aux feedwater
15 pumps.
16 MS. JAMES: Aux feedwater pumps have
17 vent valves and are they or are they not within the
18 scope of license renewal?
19 CHAIRMAN SKILLMAN: Yes, and it is page
20 127 in the PDR file of the SER. I don't need to
21 read the text. It just seems as though there was
22 an awful lot of traffic on this subject, and I
23 found it extremely confusing. And I said, oh, wait
24 a minute, most of these pumps do have some kind of
25 a vent valve. Most of them have some valves on

1 piping that is connected to the casing. So, it is
2 not a substance of issue, but I found the text in
3 the SER very --
4 MS. JAMES: Confusing?
5 CHAIRMAN SKILLMAN: -- confusing.
6 MS. JAMES: Okay. Well, first, I will
7 take an action item to try to make sure we do
8 something with that in the Final SER.
9 CHAIRMAN SKILLMAN: It is 127 in the
10 PDR file.
11 MS. JAMES: Is that Section 2 of the
12 SER?
13 CHAIRMAN SKILLMAN: This is.
14 MS. JAMES: It has got to be.
15 CHAIRMAN SKILLMAN: It's -87.
16 MS. JAMES: 2-, yes.
17 CHAIRMAN SKILLMAN: 2-87 is the text
18 page.
19 MS. JAMES: Okay. I guess at this
20 point I'm going to have to take that as a takeaway.
21 CHAIRMAN SKILLMAN: If you would.
22 MS. JAMES: Yes.
23 MEMBER STETKAR: Maybe South Texas can
24 tell us whether or not, indeed, the aux feedwater
25 pumps have vents.

1 CHAIRMAN SKILLMAN: Yes.

2 MR. GIBBS: We have vent valves.

3 MEMBER STETKAR: You actually have to

4 tell us on the record.

5 (Laughter.)

6 MS. JAMES: Yes. And identify

7 yourself, too. Thank you.

8 CHAIRMAN SKILLMAN: For those of us who

9 were plant operators, you would think there is

10 probably a vent valve out there, maybe two.

11 MR. GIBBS: Yes. Ron Gibbs, South

12 Texas operations.

13 Yes, we have vent valves on the aux

14 feedwater pumps. I don't want to lead anybody

15 anywhere, but we installed extra connections for

16 our flex. And maybe that is some of the confusion,

17 how the drawings got updated during this time

18 period. So, we will follow up with Lois to make

19 sure we get the right answer.

20 CHAIRMAN SKILLMAN: This is not a

21 substantive item, but I was being thorough, and I

22 would certainly like to understand what you are

23 communicating on page 2-87, please.

24 MS. JAMES: Okay.

25 CHAIRMAN SKILLMAN: Thank you. Sir,

1 thank you.

2 MS. JAMES: And we will respond to you,

3 but we will also update the SER. If you had the

4 question, I am sure someone else had the question.

5 CHAIRMAN SKILLMAN: Okay. Thank you.

6 MS. DIAZ: For the purposes of the

7 staff, could you restate the question?

8 MS. JAMES: Restate the question?

9 MS. DIAZ: Yes.

10 MS. JAMES: Okay. I was asked to

11 restate the question. The question is, based on

12 the writeup on page 2-87 of the SER, it was

13 confusing as to whether or not there were vent

14 valves on the aux feedwater pumps and were those

15 vent valves within scope of license renewal?

16 CHAIRMAN SKILLMAN: That is the

17 question. Thank you.

18 MS. JAMES: And we will have to get

19 back to you on that.

20 CHAIRMAN SKILLMAN: Thank you.

21 Colleagues, at this point the staff has

22 completed their presentation. Do any of you have

23 comments for the staff, please?

24 MEMBER KIRCHNER: Dick, I have just a

25 question. I can't find it in the SER now. I

1 believe that tests were done on the baffle region
2 for vibration of reactor internals. Can you or the
3 Applicant report back on that? It is relevant to
4 Matt's earlier question about baffle bolts and what
5 you may have found as a result of that testing. I
6 think you did a scale model test of the conforming
7 region, the baffle conforming region. I just can't
8 find it. I know it is here in the SER and I can't
9 find it.
10 MS. JAMES: Okay. Jim Medoff is coming
11 to the microphone for the staff.
12 MR. MEDOFF: This is Jim Medoff of the
13 staff. I was the lead for the reactor internals
14 and I had some assistance with Mark Hughes of the
15 staff.
16 One of the things we check as part of
17 the identification of TLAAs in Chapter 4.1 is
18 whether the preopt testing for initial plant
19 operations, whether any analyses associated with
20 preopt testing are TLAAs. So, we did look at that
21 for the application. We usually would -- in most
22 applications the vibrational analyses are below the
23 endurance limit for the components. So, vibrations
24 didn't come in as a TLAA for the internals.
25 That being said, we do rely on the

1 MRP-227 report and AMP XIM-16(a) for the internal.
2 Originally, this plant was one that did it under
3 commitment, but due to the delays in the aluminum
4 rods, we did make them update the LRA, update their
5 AMRs and AMPs. So now, we have reviewed the entire
6 AMP, their inspection plan, to make sure it is
7 consistent with MRP-227-A. That would include any
8 inspections of the baffle former region, including
9 the baffle formal bolts.
10 MEMBER KIRCHNER: Thank you.
11 MR. MEDOFF: Any more questions on
12 that?
13 CHAIRMAN SKILLMAN: No, sir. Thank
14 you.
15 Walt, thank you.
16 Colleagues, any other questions at this
17 point for the staff?
18 (No response.)
19 Hearing none, I would ask everybody to
20 remain in place. What we are going to do is to
21 open the phone line.
22 MR. HOWARD: The bridge is open.
23 CHAIRMAN SKILLMAN: The bridge is open.
24 Before we go to those who may be on the phone line,
25 I would like to ask if there are any individuals in

1 the audience that would like to make a statement,
2 please.
3 (No response.)
4 Seeing none, ladies and gentlemen, the
5 bridge line is open. If any individual is out
6 there, would you just please communicate that you
7 are there?
8 MR. GAVULA: This is Jim Gavula.
9 CHAIRMAN SKILLMAN: Good morning, sir.
10 Thank you.
11 Anybody else out there?
12 (No response.)
13 No?
14 For anyone that is on the line, would
15 you care to make a comment, please?
16 (No response.)
17 Hearing none, please close the bridge
18 line.
19 I would like to go around the room with
20 my colleagues to determine if there are any more
21 comments that my colleagues may have.
22 Ron, may I start with you?
23 MEMBER BALLINGER: No further comments.
24 I think I have badgered them enough.
25 CHAIRMAN SKILLMAN: Thank you, Ron.

1 Pete?

2 MEMBER RICCARDELLA: Likewise.

3 CHAIRMAN SKILLMAN: Thank you.

4 Steve?

5 DR. SCHULTZ: I have no further

6 comments. I would like to thank the staff and the

7 Applicant for the discussions. Thank you.

8 CHAIRMAN SKILLMAN: Okay. Dana,

9 anything?

10 MEMBER POWERS: No.

11 CHAIRMAN SKILLMAN: Matt?

12 MEMBER SUNSERI: I appreciate the staff

13 and the Applicant's participation today, and it was

14 helpful to understand what is going on. Thank you.

15 CHAIRMAN SKILLMAN: Thank you.

16 John?

17 MEMBER STETKAR: Nothing more. Thank

18 you.

19 CHAIRMAN SKILLMAN: Walt?

20 MEMBER KIRCHNER: Thank you to the

21 presenters.

22 CHAIRMAN SKILLMAN: Okay. Our

23 Designated Federal Official, Ken Howard, any

24 questions or comments at this point?

25 MR. HOWARD: None.

1 CHAIRMAN SKILLMAN: Okay. To all who
2 have participated and traveled, thank you very
3 much. I wish you a safe journey home.
4 And with that, this meeting is
5 concluded.
6 (Whereupon, at 11:20 a.m., the meeting
7 was adjourned.)
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Advisory Committee on Reactor Safeguards License Renewal Subcommittee Meeting November 17, 2016

Dave Rencurrel
Senior Vice President Operations

Agenda

- Introductions
- Station Ownership and Operation
- Site and Station Description
- License Renewal, GALL Consistency and Commitments
- Safety Evaluation Report Open Item
    - Aluminum Bronze Selective Leaching
- Concluding Remarks

Introduction

PERSONNEL IN ATTENDANCE

Dave Rencurrel	Senior Vice President Operations
Michael Murray	Manager Regulatory Affairs
Mike Berg	Manager Engineering
Ron Gibbs	Manager Operations
Arden Aldridge	License Renewal Project Lead
Plant Staff	AMP Subject Matter Experts, Licensing, Chemistry, Systems Engineering, Design Engineering, and Programs Engineering
Specialty Consultants	

Station Ownership and Operation

Operated by STP Nuclear Operating Company (STPNOC)

STP Units 1 and 2 are owned by:

- NRG South Texas LP
- The City Public Service Board of San Antonio (CPS Energy)
- The City of Austin, Texas (COA)

Plant History & Major Investments

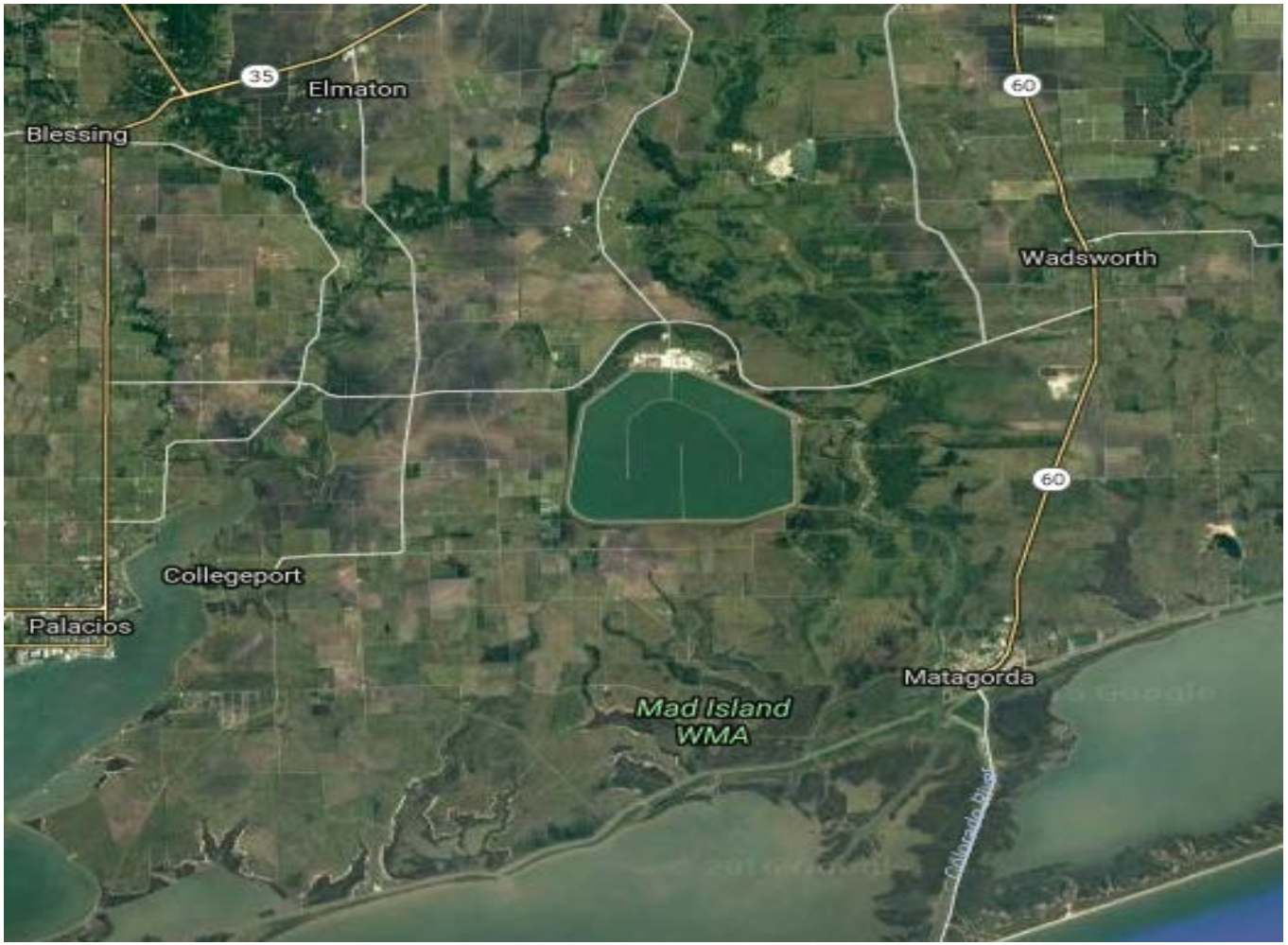
South Texas	Unit 1	Unit 2
Initial License	August 21, 1987	Dec 16, 1988
Steam Generator Replacement	2000	2002
Low Pressure Turbine upgrade	2006	2004
Replaced RX heads	2009	2010
Main Generator Stator rewind	2014	2012
Non-welded Stress Improvement Process (RPV)	2017	2019
Expiration of current License	August 20, 2027	Dec 15, 2028

Site and Station Description

Ron Gibbs

Manager Operations

SITE DESCRIPTION



STATION DESCRIPTION

License Renewal Application

Arden Aldridge
License Renewal Project Lead

License Renewal Application

License Renewal Application (LRA) submitted to NUREG 1801 rev 1	10/2010
NUREG 1800 and 1801 Revision 2 issued	12/2010
Scoping & Screening, AMP Audits completed	06/2011
Scoping & Screening, AMP Inspection completed	08/2011
Annual Updates 2011, 2012, 2013	2011-2013
Issued initial safety evaluation report (SER) with open item(s)	02/2013
Safety review paused	2/2013-12/2013
RAI's, LR-ISG incorporation into LRA	1/2014-Present
Annual Updates 2014, 2015, 2016	2014-2016
Issued safety evaluation report (SER) with open item	10/2016

Aging Management Programs and GALL

- Total Aging Management Programs – 41
  - Existing Programs – 33 (3) plant specific
  - New Programs – 8 (1) plant specific
  - Plant Specific
    - Nickel-Alloy
    - PWR Reactor Internals
    - Protective Coating Monitoring and Maintenance
    - Selective Leaching of Aluminum Bronze
- Aging evaluations are greater than 90% consistent with GALL Rev 1 and greater than 95% consistent with GALL Rev 2 (standard notes A through E)
- GALL Revision 2 lessons learned incorporated through license renewal application supplement and reviewed by the NRC using Standard Review Plan Rev 2.

GALL Consistency

Consistency Table

AMPS	AMPS Consistent	AMPS Consistent with Enhancements	AMPS Consistent with Exception & Enhancements	AMPS with Exceptions	Plant Specific
New (8)	3			4	1
Existing (33)	5	13	11	1	3
Total AMPS (41)					

License Renewal Commitments

License Renewal commitments – 46 total

- Program Enhancements (4 complete, 26 open)
- Program Implementation (1 implemented , 9 open)
- Replace 6 Standby Emergency Diesel Generator bellows (open)
- Remove Safety Related Check Valve Seal Caps (complete)
- Review NUREG/CR-6260 (Enhanced Fatigue Monitoring locations (open)
- Take ground water samples for 24 consecutive months to assure non aggressive (complete)
- Calculate Essential Cooling Water leakage rates to validate maximum flaw size (complete)
- One time internal inspection of Unit 1 Refueling Water Storage Tank (RWST) bottom and side welds. (open)

License Renewal Commitments and Implementation

License Renewal commitments are included in UFSAR Supplement (Appendix A to the LRA) and managed through the STP Condition Reporting and Licensing Commitment Management and Administration processes.

Safety Evaluation Report Open Item

Mike Berg

Engineering Manager

OI 3.0.3.3.3-2
Aluminum Bronze Selective Leaching

Selective Leaching of Aluminum Bronze Background

- Wrought Material is non-Susceptible
- Susceptible Component Population – Will be replaced with non-susceptible material prior to period of extended operation
- Welds or weld-repairs with susceptible weld filler material will be managed
  - piping butt-welds
  - weld repairs on extruded tees

Selective Leaching of Aluminum Bronze Aging Management Program (AMP)

STP responded to the NRC's open items related to Selective Leaching of Aluminum Bronze AMP by letter dated September 28, 2016, "NOC-AE-16003403".

OI 3.0.3.3.3-2 Identified ten open issues requiring closure. Nine of the ten open issues have been addressed. The final issue is still open but a pathway forward has been identified to assure timely resolution.

Selective Leaching of Aluminum Bronze Aging Management Program (AMP)

Addressed Issues:

1. Added information to bound extruded piping tee repairs
2. Clarified the parameters monitored to address loss of material, cracking, and phase distribution.
3. Clarified the sample size for volumetric inspections
   - One-time examination of welds
   - Periodic examination of welds
4. Clarified the threshold for the number of defective welds resulting in further inspections
5. Identified selection criteria for weld inspections

Selective Leaching of Aluminum Bronze Aging Management Program (AMP)

Addressed Issues:

6. Determined there was no impact of the external coatings regarding detecting buried piping leaks at the surface.

7. Identified a method to monitor or trend results

8. Defined the acceptance criteria for weld defects
   - Visual inspection
   - Volumetric examination
   - Destructive examination

9. Identified the threshold for increased inspections when adverse inspection results are detected

10. Identified the corrective actions to address all potential inspection results.

Selective Leaching of Aluminum Bronze Aging Management Program (AMP)

Remaining Open Issue:

10. Corrective actions do not address all potential inspection results.
    - Followup question is being developed by the NRC. Initial communication of the concern supports a pathway forward and timely response and resolution.

Selective Leaching of Aluminum Bronze Aging Management Program (AMP)

Conclusion:

Following the resolution of the remaining issue related to corrective actions, the Selective Leaching of Aluminum Bronze Aging Management program will effectively manage aging of the Essential Cooling Water cast components and welds during the extended period of operation.

Concluding Remarks

Dave Rencurrel
Senior Vice President Operations

END

United States Nuclear Regulatory Commission

Protecting People and the Environment

Advisory Committee on Reactor Safeguards License Renewal Subcommittee

South Texas Project

Safety Evaluation Report (SER) with Open Items

November 17, 2016

Lois M. James, Senior Project Manager
Office of Nuclear Reactor Regulation

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

Presentation Outline

- Overview of South Texas Project (STP) license renewal review
- Region IV 71002 Inspection, License Renewal Inspection
- SER Section 2, Scoping and Screening Review
- SER Section 3, Aging Management Review
- SER Section 4, Time-Limited Aging Analyses
- Conclusion

License Renewal Review
(Audits and Inspections)

- **Scoping and Screening Methodology Audit**
  - May 15 - 19, 2011 (Onsite)
- **Aging Management Program (AMP) Audit**
  - June 13 - 24, 2011 (Onsite)
- **Aluminum Bronze Selective Leaching AMP Audits**
  - February 29, 2012 (Rockville)
  - March 9 - 13, 2015 (Onsite)
  - March 21 - 23 (Onsite) and June 22, 2016 (Rockville)
- **Region IV 71002 Inspection (Scoping and Screening & AMPs)**
  - August 8 - 25, 2011 (Onsite)

SER Overview

- **SER with Open Item (OIs) issued in 2013**

- **SER with OIs issued in 2016**
  - Closed the OIs from 2013
  - Opened OI 3.0.3.3.3-2 - Insufficient details provided regarding applicant's Selective Leaching of Aluminum Bronze AMP

71002 Inspection

- **Scope**
  - Non-Safety Systems affecting Safety Systems
  - Aging Management Programs
- **Inspection**
  - August 8 - August 25, 2011
  - Team Inspection on-site for 2 weeks

71002 Inspection

- **Results**
  - Good material condition of structures, systems and components
  - Two implementing procedures changed
  - Two Aging Management Programs Changed
  - Revised Commitments and Corresponding Changes for five Aging Management Programs

71002 Inspection

- **Conclusions**
  - Scoping and screening performed in accordance with 10 CFR 54
  - Information easily retrievable and auditable
  - Existing programs effectively managed aging effects
  - Corrective and other actions being tracked for completion
  - Reasonable assurance that aging effects will be managed and intended functions maintained

SER Section 2

- **Structures and Components Subject to Aging Management Review**
  - Section 2.1, Scoping and Screening Methodology
  - Section 2.2, Plant-Level Scoping Results
  - Sections 2.3, 2.4, 2.5 Scoping and Screening Results

SER Section 3

- **Aging Management Review Results**
  - Section 3.1, Aging Management of Reactor Vessel, Internals, and Reactor Coolant System
  - Section 3.2, Aging Management of Engineered Safety Features
  - Section 3.3, Aging Management of Auxiliary Systems
  - Section 3.4, Aging Management of Steam and Power Conversion Systems
  - Section 3.5, Aging Management of Containments, Structures and Component Supports
  - Section 3.6, Aging Management of Electrical Commodity Group

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SER Section 3

3.0.3 - Aging Management Programs

Applicant's Disposition of AMPs	Final Disposition of AMPs in SER with OIs
• 8 new programs – 3 consistent – 4 consistent with exceptions – 1 plant specific • 32 existing programs – 6 consistent – 13 consistent with enhancements – 3 consistent with exception – 8 consistent with enhancements and exceptions – 2 plant specific • 1 existing program added – 1 plant specific	• 8 new programs – 3 consistent – 4 consistent with exceptions – 1 plant specific • 33 existing programs – 5 consistent – 14 consistent with enhancements – 1 consistent with exceptions – 10 consistent with enhancements and exceptions – 3 plant specific Note: The staff received and is reviewing the 2016 annual update. The final SER will be updated based on the staff's review.

SER Section 3 Open Items Closed

OI 3.0.3.2.6-2: Management of fouling of downstream components due to coating degradations upstream

- **Concern**: AMP may be inadequate
- **Resolution**: AMP was revised in accordance with staff's guidance in ISG-2013-01, "Aging Management of Loss of Coating or Lining Integrity for Internal Coatings/Linings on In-Scope Piping, Piping Components, Heat Exchangers, and Tanks."

OI 3.0.3.1.4-1: Cracking in Unit 1 Reactor Water Storage Tank (RWST)

- **Concern**: No AMP
- **Resolution**: Revised the One-Time Inspection AMP to include the internal surfaces of the Unit 1 RWST; and revised External Surfaces AMP to include visual inspections of the Unit 1 RWST every refueling cycle.

Aluminum Bronze Overview

- Applicant revised AMP in September 2016.
- Replacing all susceptible piping components that have exhibited leakage except for susceptible weld material joining nonsusceptible piping components.
- Applicant proposed a basis for why butt welds have not experienced leakage since 1994.
  - Root pass less susceptible: dilution and cool down rate
  - Root pass acts as a barrier
  - No construction related or service induced flaws in root pass, barrier remains intact
- Root pass as a barrier seemed plausible; however, basis lacked sufficient data to substantiate

Staff Conclusions

Based on review of tests and examinations conducted by the applicant, and the review of technical literature by the staff:

- Microstructure level dealloying process is confined to a localized front that scales with the grain size.
- Material on either side of the dealloying front is either in the as-received or fully dealloyed condition.
- Insufficient data to establish lower bound mechanical properties for dealloyed aluminum bronze.
- No strength or fracture toughness credit should be given to dealloyed material.

Program Element Overview

September 2016, AMP revised to address most of the OI

- Detection of aging effects:
  - Volumetric inspections and destructive examinations
  - Visual inspections for leakage
  - Opportunistic buried pipe coating inspections
- Acceptance criteria:
  - Planar defect and dealloying
  - Microstructure of the weld root region
  - Monthly walkdowns

Program Element Overview, cont.

Corrective Actions:

- Additional volumetric and destructive examinations
- Structural integrity calculations conducted with as-found conditions
- Structural integrity analysis fails – additional inspections by ultrasonic testing (UT) technique capable of detecting loss of material due to selective leaching – ***Associated Request for Additional Information (RAI) for further information***

SER Section 4

- **Time-Limited Aging Analyses**
  - 4.1, Identification of Time-Limited Aging Analyses (TLAA)
  - 4.2, Reactor Vessel Neutron Embrittlement Analysis
  - 4.3, Metal Fatigue Analysis
  - 4.4, Environmental Qualification of Electric Equipment
  - 4.5, Concrete Containment Tendon Prestress Analyses
  - 4.6, Containment Liner Plate, Metal Containment, and Penetrations Fatigue Analyses
  - 4.7, Other Plant-Specific TLAAs

SER Section 4 Open Item Closed

OI 4.3.2.11-1: Effects of thermal aging on cast austenitic stainless steel (CASS)**:**

- **Concern**: Leak-Before-Break (LBB) TLAA may not be dispositioned correctly
- **Resolution**: Revised LRA Section 4.3.2.11 to identify the fracture mechanics evaluation as a TLAA and disposition it in accordance with 10 CFR 54.21(c)(1)(i); and the material fracture toughness properties selected for use in the LBB analysis are sufficiently embrittled that they bound the amount of thermal embrittlement that will occur in 60 years.

Conclusion

Pending satisfactory resolution of the Open Item, the staff will determine whether the requirements of 10 CFR 54.29(a) have been met for the license renewal of STP.