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PUBLIC NOTICE BY THE

UNITED STATES NUCLEAR REGULATORY COMMISSION'S

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

DATE: March 4, 1991

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1 NUCLEAR REGULATORY COMMISSION

2 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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5 SUBCOMMITTEE MEETING ON TVA PLANT LICENSING AND RESTART

6

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8 Amberly Suites Hotel

9 Huntsville, Alabama

10

11 Monday, March 4, 1991

12

13 The above entitled matter convened at 2:00 p.m.

14

15 APPEARANCES:

16

17 Members, ACRS:

18

19 C. Wylie, Chairman

20 D. Ward, Member

21 J. Carroll, Member

22 C. Michelson, Member

23

24

25

STAFF: E. Igne

D. Houston

NRC STAFF:

THIERRY ROSS

ANGELO MARINOS

PAUL KELLOGG

TVA STAFF:

P.P. CARIER

D.A. NAUMAN

D.J. ZERINGUE

J.A. BYNUM

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

2 MR. WYLIE: The meeting will now come to order.
3 This is a meeting of the Advisory Committee on Reactor
4 Safeguards Subcommittee on TVA Plant Licensing and Restart.
5 I am Charlie Wylie, Subcommittee Chairman.
6 The ACRS Members in attendance are: Mr. J.
7 Carroll, Mr. Carl Michelson and Mr. Dave Ward. Mr. Al Igne
8 of the Staff on my far left, and Mr. Dean Houston is the
9 cognizant ACRS Staff Member for this meeting, on my right.
10 The purpose of this meeting is to discuss the
11 restart of TVA's Browns Ferry Unit Number 2.
12 The rules for participation in today's meeting
13 have been announced as part of the notice of this meeting
14 previously published in the Federal Register on February 15,
15 1991.
16 A transcript of the meeting is being kept and will
17 be made available as stated in the Federal Register Notice.
18 It is requested that each speaker first identify himself or
19 herself and speak with sufficient clarity and volume so that
20 he or she can be readily heard.
21 We have received no written comments or requests
22 to make oral statements from members of the public.
23 Our mission of our subcommittee is to review the
24 Staff's resolution of the safety issues related to restart
25 and TVA's ability to restart and operate Browns Ferry Unit 2

1 safely.

2 The subcommittee will report to the full committee

3 regarding these findings and recommendations on Friday, the

4 8th of March, of this week.

5 In this regard I'll ask that the subcommittee

6 members note those things that should be brought before the

7 full committee that they would like presented by the Staff

8 and TVA, and what we should report to the full committee on

9 Friday.

10 The full committee is scheduled to write a letter

11 of recommendations to the Commission at the ACRS meeting

12 this month.

13 We will proceed with the meeting now and I call

14 Mr. Terry Ross, NRR Project Manager, to discuss the NRC

15 review.

16 MR. MICHELSON: Before we get started, how much

17 time do we have for the subcommittee?

18 MR. WYLIE: Two hours.

19 MR. ROSS: Can everyone hear me? Thank you.

20 I'm Terry Ross, I'm the Senior Project Manager for

21 the Office of Nuclear Reactor Regulations for the NRC at

22 headquarters, responsible for the Browns Ferry Nuclear Power

23 Plant.

24 Today and tomorrow there is going to be a number

25 of presentations, primarily by TVA, regarding preparation,

1 final preparations to restart Unit 2.

2 Staff asked for a minor presentation on the first

3 day to introduce their Staff members and describe our

4 presentation that is going to actually be held in some

5 detail tomorrow afternoon at the end of the TVA subcommittee

6 meeting by the ACRS.

7 Can I have the second slide, please?

8 The primary presenters for the Staff are myself

9 from NRR, Mr. Paul Kellogg at the front table in the tan

10 jacket. Can you hold up your hand, Paul? He is the Section

11 Chief from Region II, our field office in Atlanta. Mr.

12 Peter Koltay, who will not be here until tomorrow, who is

13 the Team Leader for a recent major team inspection we had at

14 the site, which was the Operational Assessment Team. He'll

15 also provide a presentation of the results and findings of

16 that team effort tomorrow.

17 Next slide, please.

18 We've also brought a number of other attendees

19 from the NRC staff for technical, inspection and management.

20 At the front table we also have Mr. Angelo

21 Marinos, who is here to field questions or respond to any

22 inquiries from the ACRS regarding electrical issues.

23 Not in attendance yet, unfortunately he missed his

24 flight, David Terao. If we have any detailed questions from

25 the ACRS members regarding Seismic or Design Baseline

1 Verifications questions, we may have to defer those toward
2 the end. He's expected to arrive around five o'clock.
3 We'll field those as best we can but those of any
4 consequence that we can't handle we'll have to wait until
5 the end of the day, or he'll be here all day tomorrow and we
6 can defer those until then.
7 We have Charles Patterson who is a Senior Resident
8 at the Browns Ferry Facility.
9 From NRC Staff Management we have Bruce Wilson,
10 the Branch Chief from Region II.
11 Fred Hebdon, who is the Project Director,
12 responsible for Nuclear Reactor Regulation for Browns Ferry
13 and other TVA Plants.
14 And we have the Assistant Division Director from
15 NRR, Gus Lainas.
16 Jim Milhoan, the Deputy Administrator from Region
17 II may be here today or tomorrow.
18 Next slide, please.
19 Some of the primary purposes of the Staff's
20 participation today is to field and address any questions
21 from the ACRS subcommittee members, to essentially confirm
22 and validate statements made by TVA during the day, and to
23 make our own presentations tomorrow, toward the end of the
24 day, regarding those types of safety reviews and assessments
25 the Staff has accomplished to date regarding the programs

1 and corrective action plans developed at Browns Ferry Unit
2 2, to discuss the inspection program conducted to date and
3 in the future, and also go over the findings and conclusions
4 from the Operational Readiness Assessment Team that was
5 conducted last month.
6 Next slide, please.
7 A brief overview of the type of milestones yet to
8 be accomplished following this meeting, and final
9 preparations for restart of Unit 2. This Friday, following
10 two days of subcommittee meetings here, there will be a
11 meeting of the ACRS full committee in Washington, D.C.,
12 that's the 8th, which will be the end of this week.
13 TVA has to finish and complete implementation of
14 their Browns Ferry Nuclear Performance Plan.
15 The Staff will also have to complete and assess
16 the adequacy of those open items that still remain from the
17 Staff's reviews to date, the Browns Ferry Nuclear
18 Performance Plan, and also completion of those inspection
19 program elements that need to confirm implementation
20 activities prior to restart.
21 There are a number of license amendments that we
22 have issued to date. Some four, now five tech spec
23 amendments remain to be issued before restart. If the Staff
24 is on schedule, as anticipated, those will be forthcoming
25 this month following satisfactory completion of the Nuclear

1 Performance Plant, Staff review activities, the ACRS
2 meetings.
3 The Commission will hold a meeting some time in
4 the middle of April to approve final restart authorization
5 for the Browns Ferry facility, at which time the Staff will
6 authorize restart.
7 And the Power Ascension Program will commence at
8 the current schedule by TVA, which they will probably speak
9 to in a little bit more detail, could begin sometime the
10 latter part of April.
11 We also had some discussions about the Staff's
12 involvement in monitoring and inspecting that power
13 ascension program, which is anticipated to take a couple of
14 months.
15 That's all for my introduction.
16 MR. CARROLL: Is it a given that the Commission
17 will approve restart?
18 MR. ROSS: It's not a given at anytime, I think,
19 but --
20 MR. CARROLL: That's how you stated it.
21 MR. ROSS: The purpose of that meeting -- I think
22 the intentions would be that the Staff will recommend to the
23 Commission only if those elements that are in place to
24 support restart. You can rest assured that the Staff will
25 not recommend a Commission meeting if those preparations are

1 not in place, and that would be the intention of that
2 meeting, for the Commission to preform whatever final review
3 based on the input from the ACRS and from the Staff.
4 That ends my brief introduction today. We stand
5 ready to field any questions. Our presentation will be at
6 the end of the day tomorrow. At this time I want to turn it
7 over to Mr. Bynum, who will go ahead and introduce TVA.
8 MR. CARROLL: One question. I can't remember the
9 timing very well, but there was a transition from a special
project office to NRR.
11 MR. ROSS: Correct.
12 MR. CARROLL: And was there good continuity of
13 people, the people you introduced, that have been on this
14 thing on a continuing basis, in general?
15 MR. ROSS: The transition, actually it was sort of
16 the second stage of the transition. Originally it was the
17 Office of Special Projects, and then it was brought back
18 into NRR as a separate entity, in that it reported through,
19 you know, lastly Dennis Cruthfield was the Associate
20 Director responsible for Special Project. As of the end of
21 May, the first day of June, Special Projects was transformed
22 back into the NRR line organization. Many of those players
23 responsible, from the Region side and from NRR's
24 perspective, remain in their positions of responsibility for
25 the Plant, in regard to this transition or turnover, most

1 of the same individuals who were responsible for Browns
2 Ferry in particular, TVA in general, both at headquarters
3 and at the Region, prior to transformation back into NRR,
4 retained those same responsibilities. In some cases lines
5 of authority shifted a little bit, some titles changed. The
6 most sufficient transition occurred with the technical
7 branch. As part of Special Projects we essentially had our
8 own dedicated technical staff, but those individuals went
9 back to their respective branches in the technical side of
10 the house and have assumed all other sorts of duties. And
11 as a consequence, from Projects prospective, we had to task
12 in a matrix fashion, you know, that type of technical
13 support, and we may or may not have gotten the same
14 individuals we were working with before as part of Special
15 Projects. But as far as the Inspection Program went, and
16 Projects went, they were the same individuals.
17 MR. CARROLL: Okay.
18 MR. ROSS: Any other questions?
19 I'll turn it over to Mr. Bynum.
20 MR. BYNUM: Thank you.
21 First I would like to begin by talking about
22 Nuclear Power Manager responsible for the restart of Browns
23 Ferry Unit 2, many of whom are here today and you'll hear
24 from during today's and tomorrow's presentation.
25 If I could have the slide, please.

1 Oliver Kingsley, who is not here t Oliver
2 Kingsley is the President of our generating gr
3 many of you may recall, Oliver just previously he
4 Senior Vice President responsible for nuclear just
5 assumed the position of the President of the Generating
6 Group. Oliver, prior to coming to TVA and becoming the
7 Senior Vice President of Nuclear was Vice President of the
8 Alabama Power Company and responsible for the Farley Plant,
9 and then later Vice President of what was then Seri, which
10 was responsible for the Grand Gulf Nuclear Station.
11 As of this last Friday the Senior Nuclear
12 Executive transferred from Oliver to Mr. Dan Nauman, and Dan
13 is here with us today and he is in the center of the front
14 table.
15 Dan prior to assuming that position was the Senior
16 Vice President for CRS Serrine, and in that position was
17 responsible for the architect engineering company for their
18 power generation business. Prior to that he was a Senior
19 Vice President for South Carolina Gas and Electric where he
20 was responsible for all generating plants, which included
21 the Virgil C. Summer Station.
22 I'm Joe Bynum and I'm the Vice President of
23 Nuclear Operations, and as such I have the responsibility
24 for the Sequoyah Plant and Browns Ferry 2 restart. I was
25 with TVA for ten years and during that ten years was

1 involved in the start-ups of all three units at Browns
2 Ferry, the initial start-ups of 1 and 2, then the restart of
3 1 and 2 after the fire, and the initial start-up of Unit 3,
4 as well as the start-up of Sequoyah Unit 1. When I left TVA
5 I was Assistant Plant Manager at Browns Ferry. After that I
6 went to Arizona and was there for five years as Plant
7 Manager of Palo Verde Plant.
8 Reporting directly to me for Browns Ferry Unit 2
9 is Ike Zeringue. Ike is to Mr. Nauman's left. Ike is a
10 Site Director. He, like myself, was at Browns Ferry. He
11 was involved in the re-starts of Unit 1 and 2 after the
12 fire, as well as the initial start-up of Browns Ferry Unit
13 3. He was also the Plant Manger for the start-up of Palo
14 Verde Unit 3 in Arizona.
15 Reporting to Ike, and Lou Myers is not here today,
16 but Lou will be here tomorrow and you will hear extensively
17 from him and from his organization. Lou Myers is the Plant
18 Manager for Browns Ferry and he has experience at both
19 Florida Power and Light at the St. Lucie Plant, and he has
20 experience with Louisiana Power and Light at the Waterford
21 Plant. He most recently came to TVA from INPO where he
22 spent several years as a team manager for INPO.
23 Henry Weber is the Engineering Modifications
24 Restart Manager. Henry came to us from the Bechtel Power
25 Company where he was involved in numerous plants for

1 Bechtel, Hatch, Calvert Cliffs, Davis Bessie, Grand Gulf,
2 and Palo Verde.
3 That's the generating team responsible for the
4 restart of Browns Ferry.
5 One thing I will note, while there is a lot of
6 experience there from various places, various places that
7 have been very successful, there is also a blend of
8 experience with Browns Ferry, specific experience on the
9 original start-up and then the restart of Browns Ferry 1 and
10 2 after the fire.
11 How that organization looks from the top down, and
12 you can see that we've shown on this chart the Board of
13 Directors, of course Marvin Runyon the Chairman, and John
14 Waters the Director.
15 We go to the Executive Committee, which is
16 comprised of the three presidents, Oliver Kingsley in the
17 Generating Group being one of those presidents. And then
18 Mr. Nauman, Senior Vice President.
19 In the Nuclear Generating Group we have four major
20 areas of focus, and I think this is one of the things that
21 we've done at TVA, probably to improve our operation and
22 improve the way we do business as much as anything, and that
23 is getting good clean concise lines of responsibility. And
24 I think there is shown on this organizational chart four
25 basis areas. If you look to the left, Nuclear Assurance and

1 Licensing and Fuels, Mark Medford, this group is responsible
2 for our corporate oversight, our licensing, our fuel, and
3 Mr. Medford is here today. Mark, if you would hold your
4 hand up. Mark is responsible for that area.
5 Next is my area, and that's Operations. And
6 again, this group focuses on operations. I have the
7 operating units, both Sequoyah Operating Units and the
8 Browns Ferry Unit 2 restart effort, as well as the
9 Operations Services. Operations Services is basically those
10 corporate groups that are responsible programmatically for
11 things like chemistry, RADCON, security, those types of
12 things that support, directly maintenance and operations,
13 that directly support the operations of a plant.
14 MR. CARROLL: Joe, before going ahead why don't
15 you give us a little background on Mark, even though I know.
16 MR. BYNUM: Mark came to us from Southern
17 California, Edison, where he had several positions there at
18 Southern California Edison. The most recent in my
19 familiarity with Mark was when he was in the Licensing Group
20 at Southern Cal Edison.
21 Mark, why don't you tell us a little bit more
22 about what you had previously to that.
23 MR. MEDFORD: I a variety of positions in the
24 Licensing, Nuclear Engineering, and to a lesser extent in
25 Nuclear Assurance when I was at Southern Cal.

1 MR. BYNUM: Okay. Thank you.

2 Again, going from the Operations to the Nuclear
3 Projects, Dwight Nunn. Again, this area of responsibility
4 is for recovering construction. This is strictly, you know,
5 bulk engineering, bulk construction work, and as such is
6 responsible for Browns Ferry 3 and 1 restart projects and
7 the Watts Bar Plant.

8 In the next block over, New Generation, this is
9 where we are looking at new generation, this is generation
10 that is not actively under construction, which is our
11 Bellefonte Plant, and also looking at new technology and
12 potential for future generation.

13 So we've clearly divided up in very clear cut
14 lines operations, restart and recovery from an engineering
15 construction point of view, new generation, and then
16 corporate oversight.

17 Now we'll go to the plant organization, and there
18 are several things I want to point out on the plant
19 organization. You see it coming from myself down to Ike,
20 through Lou Myers, and then Lou's organization in the plant,
21 which is a typical plant staff, where you've got operations,
22 maintenance, radiation control, and then technical support,
23 and then the engineering and modifications restart manager,
24 where you've got modifications, project engineer, and
25 project management.

1 One of the things that we tried to show on this
2 chart were the number of management personnel that are in
3 fact new since '89, since January 1, '89. And that's kind
4 of a good news, bad news story, and I want to give you both
5 sides of that. We have brought in a lot of managers, a lot
6 of managers that have proven themselves with experience
7 elsewhere. We also have in this organization a mixture of
8 people that have been in TVA for quite some time. While we
9 have changed a number of managers out since January 1, 1989,
10 if you look at the last year all but two of the people that
11 you see on this chart in fact have been in their positions
12 for over a year, and those two are the Technical Support
13 Manager Massoud Bajestani, and he is here today, Massoud is
14 in the back, and John Rupert. John is our Project Engineer.
15 We are actually calling him -- he is actually the
16 Engineering Manager for Browns Ferry now.
17 Even though these two individuals, and Massoud
18 fairly recently, as of last month, took the position of
19 Technical Support Manager, and John Rupert in October of
20 last year, both of those individuals in fact worked in their
21 respective organizations for several years. Massoud, I
22 believe, about four and a half years, and John Rupert three
23 years in that organization, and in fact they took those
24 positions.
25 So, although we've changed out a lot of personnel

1 since January 1, this organization for the last year has
2 been very, very stable, and that was a problem in years
3 past, that many of these positions turned over, you know,
4 several times within a year, but this organization has
5 basically been in place for at least a year.
6 And then if you look on at the top, I have been
7 here three years, Ike has been here two years, the Plant
8 Manager has been here a year, and Engineering and Mods
9 Manager, Henry Weber, has been here almost two years. So,
10 while we did change out a number of people we have achieved
11 a degree of stability that is important for restart.
12 MR. MICHELSON: Now, I agree that you can get
13 stability this way, but how about corporate memory, and
14 experience, and so forth, understanding the particular plant
15 in which you're dealing with?
16 MR. BYNUM: Well, that's one of the reasons I was
17 trying to indicate that myself, and Ike, and several of
18 these people -- Alan Sorrell worked for me when I was at
19 Browns Ferry as the Assistant Plant Manager in '89. John
20 Corey has been in the RADCON organization, he actually
21 worked for Allen. Howard Crisler has been at the Browns
22 Ferry organization quite some time. Steve Rudge. Gerald
23 Turner. These other individuals that there's quite a
24 history there of Browns Ferry. And the same thing in the
25 corporate, there's quite a history in the corporate

1 organization which we don't show here. Corporate
2 Maintenance, for instance, has several ex-Browns Ferry.
3 Electrical Maintenance Superintendent from Browns Ferry is
4 now in Corporate Maintenance. Mechanical Maintenance
5 Superintendent is now in one of the corporate oversight
6 groups. So there is a considerable amount of corporate and
7 plant experience.
8 MR. CARROLL: Now, those corporate groups you were
9 talking about are part of Operations Services?
10 MR. BYNUM: That's correct.
11 MR. CARROLL: Okay. And you don't have a chart of
12 that?
13 MR. BYNUM: I don't, but we can certainly provide
14 you with one.
15 Basically what that organization has, there's a
16 Chemistry Group, a RADCON Group, Environmental Group,
17 Security, --
18 MR. CARROLL: Emergency Planning.
19 MR. BYNUM: -- Industrial Safety, Industrial
20 Engineering.
21 MR. CARROLL: Emergency Planning.
22 MR. BYNUM: Emergency Planning. All of the
23 typical support organizations for a operating plant.
24 MR. MICHELSON: If the engineering support --
25 MR. BYNUM: The engineering support is out of

1 Dwight Nunn's organization. And engineering support, and
2 you see on the chart, Vice President Nuclear Projects Dwight
3 Nunn, with a dotted line down to the Project Engineer,
4 Project Management, Mods line. Okay, Dwight Nunn, and under
5 him the Chief Engineer, and John Allen is here, John is the
6 Chief Engineer responsible for the programmatic issues with
7 regard to engineering, while John Rupert the Engineering
8 Manager, and Bob Johnson the Mods Manager, report to Henry
9 Weber, and report to Ike Zeringue. As far as
10 programmatically, you know, how we do engineering work, how
11 we do business, you know, that's defined by Dwight Nunn's
12 organization, by John Allen.
13 MR. MICHELSON: Where is it located?
14 MR. BYNUM: It's currently in transit, from
15 Knoxville to Chattanooga.
16 MR. CARROLL: Who does the merit review of Rupert?
17 MR. BYNUM: Ike Zeringue.
18 MR. CARROLL: Okay.
19 MR. BYNUM: Let's go to the next slide, and this
20 is just a quick overview, and I'm going to come back in a
21 couple of minutes to the organizational philosophy because I
22 think it is one of the important things, and talk about the
23 balance, some of the subjects we've just briefly touched
24 over.
25 This is an overview of the history of Browns Ferry

1 since September of '84 when Unit 2 was shutdown for
2 refueling, and in March of '85 there was a voluntarily
3 shutdown of Unit 1 and Unit 3. In September of '85 the NRC
4 issued their SALP reports for Browns Ferry, Sequoyah, and
5 Watts Bar, and the 50.54(f) letter to TVA, which basically
6 required corrective actions for all of the plants and
7 confirmed TVA's verbal agreement already to the NRC that
8 they would not restart the Units without NRC concurrence.
9 In March of '86 we issued the revised corporate
10 nuclear performance plan. And shortly thereafter, in August
11 of '86, we issued the Browns Ferry Nuclear Performance Plan.
12 You will hear those referred to, the corporate as Volume 1,
13 and Browns Ferry as Volume 3. Volume being the Sequoyah
14 Plant, Volume 4 being Watts Bar. The reason I say revised
15 is because there was a regulatory improvement program which
16 had been initiated in early '85, which obviously was not
17 adequate and did not correct the problems, so they were
18 completely revised into these four volumes.
19 In April of '89 we had our last INPO evaluation.
20 I think it was a very good evaluation. While it was not a
21 typical evaluation where INPO gives you a score, they used
22 the same technic, they evaluated the plant to the same
23 criteria as they do an operating plant, they gave us finding
24 just like you would in an operating plant, and in this
25 particular case there were fourteen new findings that

1 covered a variety of areas. The majority of those areas
2 were really operational type areas in the matter of
3 efficiency and effective ways of doing business and
4 completing work. The findings in fact were very typical of
5 what you would see for an operating type plant, and very
6 typical of a plant of this vintage.
7 In June of '90 we got our most recent self-
8 evaluation.
9 MR. CARROLL: Now INPO is not following their
10 normal every fifteen month program.
11 MR. BYNUM: Yes, they are.
12 MR. CARROLL: Well, fifteen months have gone by
13 then, haven't they?
14 MR. BYNUM: Yes. In fact we're having another one
15 in March. March the 11th.
16 MR. CARROLL: Okay.
17 MR. MEDFORD: To answer your question, Jay, we
18 extended that cycle a number of times. The intention was to
19 better match restart in the INPO cycle.
20 MR. BYNUM: We were trying -- we and INPO agreed
21 that it would be best to be as much in an operating mode as
22 we possibly could, and in fact originally we had looked at
23 doing post restart. But we felt like we would like to go
24 ahead and have the evaluation and INPO agreed.
25 MR. CARROLL: Did anyone ask INPO the question, if

1 this had been an operating plant back in April of '89 what
2 sort of a rating you would have gotten?
3 MR. BYNUM: We did not, primarily because we knew
4 that they would not answer us if we did, but no, we did not.
5 MR. CARROLL: Okay.
6 MR. BYNUM: The other thing they did in addition
7 to this, and again, like I said, they reviewed us like an
8 operating plant, they did review all of our shift crews,
9 which is a little bit above what they normally -- they'll do
10 two operating crews, but at the Sequoyah Plant and here at
11 Browns Ferry we had them do all of the shift crews.
12 MR. CARROLL: What kind of INPO ratings has
13 Sequoyah gotten since it started up?
14 MR. BYNUM: I don't really think we are suppose to
15 publicly give you what the rating is.
16 MR. CARROLL: Okay.
17 MR. BYNUM: But I'll certainly be more than happy
18 to do that after the meeting.
19 MR. CARROLL: Okay.
20 MR. BYNUM: In June of '90 we got our most recent
21 SALP evaluation. While it noted improvement it certainly is
22 not an evaluation that we would want to continue with.
23 There were two 3's in improving, and those two areas were
24 maintenance and surveillance, and safety assessment and
25 quality verification, those were three in improving. We got

1 a 2 in operations, security, engineering and technical
2 support. We got a 2 in improving in emergency planning, and
3 a 1 in RADCON. So, again, while it showed definite
4 improvement from the previous SALP, we obviously, it's our
5 intention to continue that to where there are no 3's, and in
6 fact getting to the 2's and all 1's.
7 MR. CARROLL: What kind of ratings has Sequoyah
8 received since they have returned to operation?
9 MR. BYNUM: Sequoyah's most recent SALP was all
10 2's.
11 MR. CARROLL: Okay.
12 MR. BYNUM: In January of '91 NUREG 1232 was
13 issued. That's the final NRC SER.
14 In February, as was indicated, we completed the
15 operational readiness assessment team inspection, and in
16 fact had that exodus from the last couple of weeks. I won't
17 go into a lot of detail since they are going to report to
18 you on that, the NRC, but we felt like that was a very good
19 assessment. There were some items that came out of that
20 assessment that obviously, you know, we need to go on and
21 improve in some areas. There were five specific items for
22 restart that we are going co complete, one of which is
23 already completed.
24 I would like to talk just a couple of minutes
25 about what I consider the basic issues, and when I say I

1 consider I'm talking about myself, and Oliver, and Dan, and
2 Ike, and the rest of the management team, of what the
3 critical issues for Browns Ferry are, and what the basic
4 problems were in the mid '80's. And I think the first
5 thing, and again, I can speak from a little bit different
6 viewpoint than a lot of people, and I was here until '82,
7 and then left, and then came back in '87, but I think
8 clearly the thing that sticks out in my mind the most was
9 the failure to establish the appropriate standards. I think
10 we've really got behind the curve, and I think the time
11 frame that we got behind the curve was during, or
12 immediately after Three Mile Island. And in looking at a
13 lot of initiatives that the industry put in place, a lot of
14 the improvements, I think we were very complacent during
15 that period of time, and that we really failed to upgrade
16 our program and keep up with what the rest of the industry
17 was doing. Again, when I say complacent, we were operating
18 Units, we had pretty good capacity factors, we had above
19 average regulatory, meeting regulatory standards, we had a
20 simulator, you know, we were way ahead of everybody on
21 simulators, we had them for both Browns Ferry and Sequoyah,
22 and a Watts Bar simulator had even been ordered. But I
23 think we really failed to keep in touch with what the rest
24 of the industry was doing. and upgrading all of our programs
25 and expecting more out of our people.

1 So I think the key thing was a failure to
2 establish the appropriate standards. And what do you do
3 about that, what have we done about it. I think, as you saw
4 in the previous slides, we have brought in a large number of
5 managers that have been at other utilities, that have been
6 with programs that are proven, that have good records, so we
7 brought in a number of people. At the same time, by
8 bringing them in and infusing them with our organization,
9 you know, we've been able to raise the standards of the rest
10 of the Staff.
11 We've also established very clear goals and
12 objectives. We have a three tiered goals and objectives
13 system, where the what we call the tier one goals come from
14 the Senior Vice President level, and they are goals that I
15 have out of that tier one goal. Then we go down to the tier
16 two goals, which each plant, each site has. There's a whole
17 series of tier two goals, a series for Browns Ferry, a
18 series for Sequoyah. And then from the tier two there's a
19 tier three, which goes down into the individual
20 organizations in that plant. Our goals are very specific,
21 they cover basically the whole spectrum of operation, from
22 industrial safety to regulatory compliance, all through the
23 different areas. A very specific set of goals, and those
24 goals in fact are used.
25 You were talking about performance reviews and who

1 does performance reviews. A large part of the performance
2 reviews are, you know, how did we do toward our goals and
3 objectives for that particular organization or group.
4 The second thing that I believe was a major issue
5 is a lack of focus of responsibility and authority to the
6 organizations and their managers, and the established
7 accountability for performance. By that I mean, clearly
8 focusing an organization and giving that organization the
9 wherewithal to accomplish, you know, what its major area of
10 responsibility in fact was, and giving them the authority to
11 make those things happen. And here is where I think the
12 organizational changes have probably done more to clear up
13 those items, as I'm sure Mr. Michelson can remember when
14 engineering was a separate organization out of Knoxville,
15 and power was an organization out of Chattanooga. Clearly
16 some of that lines of authority and responsibility did not
17 exist even within the power organization when you had the
18 plant site organizations, and there was a modifications
19 organizations that reported up through a different chain of
20 command, and the plant manager and the operating
21 organization clearly called for problems. So we have taken
22 that and structured our new organization into what I
23 consider clear cut lines that I discussed before. Clear cut
24 lines for operations and operating the plant. Clear cut
25 lines for engineering and construction, for restart

1 activities, and then for new generation, and then for
2 corporate oversight.
3 The thing that I think we've done is we've been
4 able to get the correct balance, and there's a balance
5 between what a site has, what authority a site director has
6 over his own destiny, what authority he has over his
7 engineering people, his modifications people, and the
8 consistency of standards. We talked about standards and
9 lack of standards. The one thing that we've done on the
10 corporate level is establish very specific standards, in we
11 do this with the tier one goals. But we've also
12 organizationally created the corporate organizations, and in
13 fact do insure that the appropriate standards are
14 implemented consistently at all of the sites. While they
15 don't control the program, they don't run the program at the
16 sites, they clearly are responsible for seeing that the
17 sites consistently apply the standards. So I think we've
18 gotten a good balance between the authority, the site
19 director, the plant manager, maintenance manager, mods
20 manager, engineering manager has over getting the work done
21 that he's responsible for and yet maintaining the
22 appropriate level of standards, and the oversight and
23 implementation of those standards in the corporate
24 organizations.
25 MR. CARROLL: When you use the term manager in

1 that bullet, do I read that to mean down to say the foreman
2 level?
3 MR. BYNUM: Yes. And that's an area that we
4 probably have not done as well, and we're still in the
5 process of working on the mid levels to get down to the
6 direct foreman level. We still haven't gotten that as far
7 as we want to get it, but we are working on that. And I
8 think that the area that we are focusing in right now with a
9 lot of direction are the mid level managers. It takes a
10 while to get that down and to get the sense of
11 accountability, and the sense that people in fact are able
12 to make the decisions and control their own destiny. So
13 we're not -- I don't mean to imply here that we're where we
14 want to be, or where we're going to go, but we've certainly
15 come a long ways from where we've been.
16 MR. CARROLL: Accountability is one of my favorite
17 words.
18 MR. BYNUM: Ours too.
19 But the last is really a result of the last two.
20 But since it was specifically an issue for Browns Ferry, and
21 you're going to hear a lot about the details of this today,
22 but the failure to maintain consistently a documented design
23 basis for the plant, and to control consistently plant
24 configuration within that basis, that was a major issue.
25 Again, it was an out-fall of the first two, it was an out-

1 fall of the way we conducted engineering reviews, it was an
2 out-fall of the way we conducted outages, and how we
3 documented work, and how we returned systems to service
4 following an outage
5 And again, you're going to hear a lot of detail
6 about the last bullet today. And in fact, if there are any
7 further questions for me I'll take them now, if now, I'll
8 turn it over to Jim Maddox, who is going to specifically
9 discuss a design baseline verification program and a calc
10 program.
11 But before I do, I guess I would like to ask if
12 there are any other questions for me.
13 MR. CARROLL: I would only comment that your three
14 bullets differ from the Staff's three bullets on the same
15 subject, you have one additional one, and you've combined
16 two of them into one. I'm curious as to why the Staff's
17 introduction that appears in all of the SER's is different
18 than Browns Ferry's version of it.
19 MR. WYLIE: Joe, are you going to speak to the
20 employee concerns program.
21 MR. BYNUM: I was not, but we certainly can. In
22 fact we have the people here who are responsible for that
23 program if you want to hear specifically about that.
24 MR. CARROLL: Wasn't that on the agenda?
25 MR. WYLIE: I think it would be interesting to

1 hear that, and how you handle any allegations, and things
2 like that.
3 MR. BYNUM: Okay. Would you like to do that now,
4 or --
5 MR WYLIE: Whatever is convenient.
6 MR. BYNUM: Okay. Jim, would you like to come up
7 and discuss that?
8 MR. WYLIE: You can do it now or later, either
9 one.
10 MR. THOMPSON: My name is James Thompson, and I've
11 only been in the program about a month, but I'll try to
12 handle any questions you have on it. I wasn't prepared to
13 give a speech. I can give you whatever you would like to
14 hear, I guess, on the numbers, or that sort of thing.
15 MR. CARROLL: Well, programmatically, what have
16 you done?
17 MR. THOMPSON: Well, we have two programs, we've
18 got the, we call it the new program, which handles anything
19 that may come up now. If anybody come in, or if we have
20 exit interviews, that sort of thing is handled through that
21 process. There's also the special program, which is
22 referred to as the old program, and it stems out of Watts
23 Bar. They had several concerns. They were determined, some
24 of them, to be applicable to Browns Ferry. The new program
25 also came in to being in '86, so this was -- some of the old

1 program stuff was stuff that came prior to that, and by, I
2 believe it was QCI at Watts Bar, and determinations on the
3 applicability to Browns Ferry.
4 MR. MEDFORD: James, how many employee concerns do
5 you have outstanding at this time?
6 MR. THOMPSON: We have twenty one right now in the
7 new program, three concerns and eighteen files, which of
8 course you know the concerns and files differ just over
9 significance and the level of management and attention
10 required. We have, in the special program we have twenty
11 six remaining CATD's for restart.
12 MR. CARROLL: What's a CATD?
13 MR. THOMPSON: A corrective action tracking
14 devise.
15 MR. CARROLL: That resulted from employee
16 concerns, is that what you're saying?
17 MR. THOMPSON: Yes. Currently, like I said,
18 there's twenty six to be closed, that are restart issues.
19 MR. MICHELSON: I believe you said you had only
20 been on the job a month?
21 MR. THOMPSON: Yes, sir, the 28th of January.
22 MR. MICHELSON: Who was on the job, who did you
23 replace?
24 MR. THOMPSON: Charlie Ellege. He couldn't be
25 here today, he has the flu.

1 MR. MICHELSON: But he is now on some other job?

2 MR. THOMPSON: He will be effective next Monday.

3 MR. MICHELSON: And how long was he on the job,

4 this particular activity?

5 MR. THOMPSON: He was in the original start of the

6 program, about five years.

7 MR. MICHELSON: So he was on it for five years?

8 MR. THOMPSON: Yes, sir.

9 MR. CARROLL: Does there seem to be a trend in

10 these employee concerns, or are they dropping off as matters

11 have gotten in better shape and gotten closer to start-up?

12 MR. THOMPSON: Well, we've had a few more

13 allegations of INH here recently, in January and February.

14 We did a review and we couldn't ascertain any type trend, it

15 was different sections, different --

16 MR. CARROLL: And these were actual TVA employees,

17 not contractors?

18 MR. THOMPSON: Yes, sir. The contractors can't

19 come to us, but the contractors normally have their own

20 program and we interface with them.

21 MR. BYNUM: We have some information and some

22 back-up information, we can provide that to you. It shows

23 the type of concerns, and the numbers of those concerns.

24 The allegation level, the employee concern level at Browns

25 Ferry is in fact low. Now we do see some increases, some

1 peeks, and generally they are associated with layoffs.

2 MR. CARROLL: I'm surprised.

3 MR. MICHELSON: Now, if a person goes directly to

4 the NRC with a problem, does that get on your list as well,

5 or is that not included in when you say you've got so many

6 allegations, and so forth?

7 MR. THOMPSON: No, sir, those are the ones that

8 came to us.

9 MR. MICHELSON: Those are the ones that are

10 brought to your attention.

11 MR. THOMPSON: Yes, sir.

12 MR. MICHELSON: How many have come to the NRC?

13 MR. THOMPSON: They would have to answer that.

14 MR. MICHELSON: Does the Staff have an idea of how

15 many additional allegations and concerns there are that have

16 gone directly to the NRC instead of going to TVA?

17 MR. ROSS: What time frame are we talking about?

18 MR. MICHELSON: Well, we're talking about today,

19 for instance.

20 MR. ROSS: I think today the active allegations we

21 have associated with Browns Ferry is fourteen, fifteen --

22 twenty six.

23 MR. ROSS: When we were special projects the

24 responsibility for tracking allegations at Browns Ferry was

25 at headquarters. Since the transition we have transferred

1 that responsibility to the region. The Staff has a program
2 for reviewing and coordinating all allegations that we
3 receive. We don't share those allegation activities with
4 the site. In many instances the concerned individual came
5 to the Staff because they don't want to be -- they want to
6 remain anonymous.
7 MR. MICHELSON: Are you going to tomorrow tell us
8 the nature of allegations that a person might --
9 MR. ROSS: Well, I think we will be in a position-
10 -
11 MR. MICHELSON: Well, I don't expect you to name
12 names, but I expect you to characterize.
13 MR. ROSS: Well, we can generally tell you the
14 numbers that we have, and then how many we have been
15 receiving.
16 MR. MICHELSON: I didn't realize that when an
17 allegation came to the NRC it didn't also go to TVA, and I
18 didn't realize that if they come to TVA they don't go to the
19 NRC.
20 MR. WILSON: Let me answer that. My name is Bruce
21 Wilson. It's a very confusing process, but in general the
22 answer is no. The person, the concerned individual, let's
23 say, has numerous choices that they can go to if they have a
24 concern. They can go to TVA's employee concern program,
25 they can go directly to TVA's Inspector General if it's an

1 issue of intimidation and harassment, for example, or they
2 can come directly to the NRC. In many cases, if they come
3 to the NRC directly, we will make a determination. We have
4 in the Region II an allegation review panel where the Deputy
5 Regional Administrator and other managers in Region II will
6 get together about once a week, or so, to discuss
7 allegations. In many cases we will refer the allegation to
8 TVA for resolution if it meets certain criteria that we
9 have.
10 MR. MICHELSON: Does the alleger have to approve
11 your referring it back to TVA?
12 MR. WILSON: No.
13 MR. CARROLL: But he is kept anonymous if he
14 started at --
15 MR. WILSON: Yes, he's kept anonymous.
16 MR. MICHELSON: I don't know how you keep them
17 anonymous if turn them back to TVA, how they can look into
18 it if they don't even know who is involved, or what.
19 MR. WILSON: The concern, sir, general -- we --
20 from the concern we get from the individual, we will edit
21 that version and send it back to TVA, the condensed version
22 without the name and without details for the TVA --
23 MR. MICHELSON: But those that are fed back from
24 the NRC are not a part of your list?
25 MR. WILSON: Yes, sir.

1 MR. MICHELSON: That was my question before.

2 MR. WILSON: Yes, sir.

3 MR. MICHELSON: So, the only ones on NRC's list

4 alone are those they have decided not to refer back to TVA?

5 MR. WILSON: No, sir. We keep -- our list keeps

6 them both, those that we have referred to TVA plus those

7 that we have not referred to them.

8 MR. CARROLL: Now, when you said allegation you

9 meant allegation that had gone to the NRC and got referred

10 back to you?

11 MR. WILSON: No. What allegation is, if somebody

12 comes to us with a concern, or whatever, then that is an

13 allegation.

14 MR. CARROLL: So concerns and allegations are the

15 same thing?

16 MR. WILSON: As far as TVA, the terminology that

17 he was using there is the same.

18 MR. WYLIE: I believe that in the Staff's SER they

19 make a distinction between the two.

20 MR. BYNUM: That's right, normally you see a

21 definite distinction between the two.

22 Let me put up a slide that basically shows, you

23 know, over the last few months. What this basically does,

24 these are based on exit interviews. Every time somebody

25 leaves the plant we have an exit interview. We look at that

1 person and we say, "Do you have any concerns". If they have
2 a concern it shows up on this chart. Then we take that
3 concern and we look at it and we make an evaluation.
4 Obviously first, if it's a technical issue, and you see that
5 about half of these are technical issues and about half of
6 them are management issues. If it's an technical issue, you
7 know, we immediately do an assessment of that for
8 operability. And in this case, in the Browns Ferry case, we
9 do it from a -- of course, now that we are loading fuel, you
10 know, there are certain systems required to be operable. We
11 look at operability, or does it effect restart. Is that a
12 technical issue that would keep that system from being
13 declared operable, you know, prior to restart, so we track
14 the technical issues. The management issues, and you can
15 see that about half of them are management issues, and they
16 are purely in the sense management issues, they are not --
17 they are generally related to, you know, somebody -- the
18 maintenance people that do the same thing that the
19 modifications people do don"t ever have to go in the dry
20 wells and the modifications people are the ones that have to
21 go in the dry wells all the time. There are those types of
22 issues.
23 The one block you see, the intimidation
24 harassment, it is a specific issue, and when those issues
25 come up they automatically go to the Inspector General, we

1 do not handle those at the site. If it's a intimidation
2 harassment it goes to the Inspector General.
3 So that shows you, you know, what the exit
4 interviews have revealed over the past few months.
5 One thing I would note here --
6 MR. CARROLL: Have you defined some threshold for
7 intimidation and harassment?
8 MR. BYNUM: Yes. Obviously you have to.
9 MR. CARROLL: You've got some rules?
10 MR. BYNUM: You have to look at it and review it,
11 and it's done by the employee concerns organization and it
12 doesn't go back to the line people. The line people
13 obviously are questioned, and they are interviewed, and that
14 type of thing, but that determination is made by the
15 employee concern staff, and they send it directly to the
16 Inspector General.
17 One thing I would note, that if you look at the
18 Browns Ferry numbers they are fairly typical of the Sequoyah
19 numbers also. There's not a lot of difference in Browns
20 Ferry and Sequoyah, as far as the number. You know, three
21 or four a month is pretty much average. Again, during
22 outages at Sequoyah the number goes way up because you do a
23 lot more exit interviews and the people have a lot more
24 comments.
25 MR. CARROLL: You said this is only based on exit

1 interviews when people leave, or --

2 MR. BYNUM: Well, it's based on exit interviews,

3 and if anybody happens to come in and say, "Hey, I've got a

4 concern".

5 MR. CARROLL: Okay, that's what I thought, that's

6 not what you said.

7 MR. BYNUM: But the majority of these things

8 actually come from exit interviews, but certainly anything

9 someone comes in from the outside with are included in these

10 numbers, yes.

11 MR. WARD: Joe, could you characterize the

12 significance of these. I mean, are some of great importance

13 and others of no importance.

14 MR. BYNUM: I think the best way to do that is if

15 you look, there are currently twenty five open issues, none

16 of those will require resolution prior to restart. So it

17 basically says that in spite of the number of hardware

18 issues, and again, half of them are going to be hardware.

19 In fact, probably of the twenty five open ones, probably the

20 majority of those are hardware because the management

21 issues, you know, we close fairly quickly, so the majority

22 of those twenty five are going to be hardware, but they

23 obviously don't effect the operability of the system or else

24 they would be restart.

25 MR. CARROLL: And the Staff agrees with you on the

1 twenty five?

2 MR. BYNUM: You would have to ask the Staff that.

3 I assume that they do because they review some of these same

4 issues.

5 MR. WILSON: We will tracking the allegations that

6 are received by the NRC by what we call a 94-300 type

7 letter. It's similar to a letter that is used NTOL class.

8 And we have classified all of the allegations that have any

9 technical issues as resolutions prior to restart. That does

10 not necessarily mean that they are terribly important safety

11 significant issues. Myself and several others have looked

12 at them and determined that we will find whether or not

13 there is any substance to the allegations for restart.

14 That's approximately half of them.

15 Those issues that involve DOL, Department of Labor

16 cases, we will probably not be able to make a resolution on.

17 MR. CARROLL: I notice mention of DOL cases. When

18 does something become a DOL case?

19 MR. WILSON: It becomes a DOL case when it becomes

20 discrimination, as defined in 50.7, if someone has been

21 discriminated against they can take the complaint to the

22 Department of Labor.

23 MR. CARROLL: I'm familiar with that.

24 MR. BYNUM: One of the things I'll point out, too,

25 and Charles, help me here, but for the hardware issues we

1 keep a major punch list of all of the outstanding hardware
2 issues on every system, and you're going to hear about a
3 process called a spot process, and that systems the
4 operability check list. As a part of the master list of all
5 of the issues outstanding we would carry any employee
6 concerns issues, and they get evaluated again for
7 operability or impact on operability for that system, and
8 then that determination is made. I think the NRC has
9 reviewed the punch list, and reviewed our cause on that
10 punch list to verify that we did in fact make the right
11 operability, or potential operability cause, and the
12 hardware issues were a part of that list. Is that not
13 correct, Charles?
14 MR. PATTERSON: As far as each system is returned
15 to service, there was a determination made on each of those
16 employee concerns, as far as returning that system to
17 service.
18 MR. ROSS: In regard to the program in general,
19 and their twenty five issues, the Staff has evaluated and
20 reviewed their program on how to disposition employee
21 concerns, and the Staff has even conducted inspections on
22 how they do exactly that. But clearly the Staff is not
23 tracking their employee concerns program for them, we are
24 not maintaining in how they disposition them. We evaluate
25 the program when inspecting and how they do disposition

1 them. And some of that is detailed in the Staff's SER.

2 MR. CARROLL: Right. And it is your intent to

3 keep this program going after you get the three units ready?

4 MR. BYNUM: Yes. In fact, Sequoyah still has the

5 program going.

6 MR. NAUMAN: I think there is a significant point

7 that the Board of Directors asked for a independent audit of

8 this program, and I've been appraised of that as part of my

9 turnover process, and gone through that. The independent

10 assessment that was issued made some recommendations, and

11 one of those was to elevate the reporting level of the

12 employees concern program, so Tom Cosby now reports to me

13 and is on my staff, he has a full time staff of seven

14 people, one of which is at Browns Ferry here.

15 I think that the other issue was that he made

16 recommendation that we be sure and rotate these people so it

17 not be perceived as a career dead end, so that's why we're

18 seeing some of the people rotate. Tom himself is coming on

19 and is rotating, and you can verify for yourself that the

20 people coming off of this assignment are going to good jobs,

21 good solid jobs. So the level of expectation is high.

22 MR. CARROLL: Okay.

23 MR. ZERINGUE: I think the trends on the chart

24 here are very interesting. You see the two top two, it says

25 a large number of exit interviews. Well, these were times

1 where we had large layoffs, and you can see the spike and
2 then it tapers down. The other end you can see where it's
3 tapering up and then it dropped down. That's the result of
4 a de-staffing.
5 MR. CARROLL: What does the guy say, when he is
6 leaving and has all of these problems, to the question, "why
7 didn't you raise these while you were still on the payroll"?
8 MR. ZERINGUE: We will have to defer to our
9 employee concerns, we don't answer those questions.
10 MR. BYNUM: I can't answer any real specific
11 Browns Ferry ones, but I know, having followed very closely
12 this same process through Sequoyah, about half the time he
13 says that he did, and then you go talk to his supervisor and
14 his supervisor has never heard of the problem before, and
15 then about half the time he says, well, you know, he just
16 never thought of it, now that you ask me. So it's about
17 half and half when they say they did, but then in the
18 majority of cases when we go to try to verify that we can't
19 verify it.
20 MR. ZERINGUE: On two occasions, now, we put out
21 site bulletins requesting anyone to identify any problem
22 areas that they may have prior to restart. That's been done
23 twice. That hasn't had much of an impact on the traffic
24 through the employee concerns area. And in particular in
25 the engineering and the modifications area we requested each

1 employee to document any concerns that they may have so that
2 we could get ahead of this and clearly understand up front
3 any problems. We have been trying to solicit this kind of
4 information.
5 MR. WYLIE: This program is documented in the
6 corporate program plan?
7 MR. CARIER: In the nuclear performance plan, yes.
8 Both the old and the new program are described in it.
9 MR. WYLIE: And I believe the Staff, in the SER
10 that they issued, is satisfied that this program works.
11 MR. ROSS: (Affirmative nod.)
12 MR. CARIER: If there are any more questions in
13 this area, if you have some more questions we'll be glad to
14 give a short briefing on employee concerns tomorrow.
15 MR. WYLIE: I guess not. Maybe we would like to
16 have a copy of your chart.
17 MR. CARIER: We'll be glad to furnish a copy of
18 the chart.
19 MR. ROSS: Joe, I've got a suggestion here, it
20 looks like you're just about to wind down. The following
21 presentations that you have, would it be possible to take
22 the DBVP and the Calcs Program and put that after a couple
23 of presentations that seem to be self-contained, and give a
24 chance for our Staff member to arrive later this afternoon,
25 or are your following presentations contingent on what

1 precedes them?

2 MR. CARROLL: The ACRS meeting are always very

3 rigidly structured, you can't do that.

4 MR. CARIER: Well, if that's the case, what we

5 would like to do is start off with the Seismic and Civil

6 Calculations Program, and with that I would like to

7 introduce our Engineering Manager --

8 MR. BYNUM: Let me point out one other thing

9 organizationally that just occurred to me when the question

10 came up about contractors while these guys figure out who

11 should go next.

12 But the question on contractor, one of the things

13 that rung a bell, and I think since the last time we met

14 with the ACRS, you know, we have no contract managers, you

15 know, whatsoever, in our organization. In fact, contractors

16 in general in the plant organization, and when I say the

17 plant organization I'm talking about the plant managers

18 organization, you know, excluding engineering, where we do

19 use a number of contractors and engineering. We only have

20 about thirty contractors, period, in the whole plant

21 organization, so we have completely gotten away from the

22 mode of reliance, totally gotten away from the mode of

23 reliance on contract managers, and gotten away from reliance

24 on contractors, you know, as far as supplementing our normal

25 organization of the plant staff.

1 With that I'm going to turn it over to Jim Hutson,
2 who is our Chief Electrical, and discuss electrical issues.
3 MR. HUTSON: Good afternoon. As Joe said, I'm Jim
4 Hutson, I'm the Chief Electrical Engineer involved in the
5 resolution of the Unit 2 electrical issues.
6 Today I would like to provide a brief discussion
7 of the electrical issues, the resolution and the status.
8 Next slide, please.
9 The electrical issues are identified in Volume 3
10 of TVA's Nuclear Performance Plan for Unit 2 restart. These
11 issues are cable installation, flexible conduit, cable
12 ampacity, thermal overloads, cable splices, and fuses.
13 Next slide, please.
14 The issue of cable installation for Browns Ferry
15 Unit 2 has resulted in an extensive effort which evaluated
16 the major aspects for cable installation. This issue
17 involves concerns regarding cable adequacy due to
18 installation practices and techniques in the area of
19 jamming, sidewall bearing pressure, vertical support, bend
20 radius, and pullbys. These issues evolved from the employee
21 concern program, which you've heard quite a bit about up to
22 this point, and also various conditions adverse to quality
23 not only in our Browns Ferry site, but also from our Watts
24 Bar and Sequoyah facilities.
25 Next slide, please.

1 MR. CARROLL: There was no instance of failures
2 that was attributed to some of these causes, it was just
3 strictly employee concerns that led you to look into this?
4 MR. HUTSON: Yes. It came by primarily from our
5 Watts Bar facility as a result of the employee concern
6 program there, the insert cable installation techniques that
7 we've been using.
8 The effort undertaken to resolve these issues
9 involved the comparison of TVA and industry standards with
10 the Browns Ferry Unit 2 installation. As a result of TVA's
11 effort at Sequoyah the specifications for design and
12 installation of cables in general have been significantly
13 revised. These revisions have been made in accordance with
14 the applicable industry standards and as such have been used
15 in the review of the cables required for Unit 2 restart.
16 In order to perform this review a walkdown of the
17 cable installation was necessary. A walkdown team was
18 assembled that consisted of a TVA employee and outside
19 consultants experienced in this area. The walkdown's
20 objective --
21 MR. CARROLL: Where would you typically get such a
22 consultant?
23 MR. HUTSON: The individuals we have involved have
24 been heavily involved with the insulated conductors
25 committee from the IPEEE. One of the gentleman involved is

1 the chairman of the insulating committee, which is the
2 industry organization that handles cables.
3 MR. CARROLL: Okay. And what's his affiliation?
4 MR. HUTSON: Affiliation with TVA, or --
5 MR. CARROLL: No, who does he work for.
6 MR. HUTSON: Oh, it was Reinhold Luther, who came
7 from one of the cable manufacturers themselves. I'm sorry,
8 Reinhold came from the Northeast Utilities.
9 The walkdown objective was to evaluate Browns
10 Ferry physical installation to the standards and
11 requirements, and also to observe the overall installation
12 with regard to craftsmanship. The craftsmanship review was
13 integral due to TVA's vintage and the fact that the
14 industry's standards with regard to cable installation have
15 been extensively updated.
16 MR. CARROLL: Now this original installation was
17 all done by TVA employees in your construction division?
18 MR. HUTSON: That's correct, yes.
19 MR. CARROLL: It wasn't an outside contractor?
20 MR. HUTSON: I'll say a majority of that work was
21 performed, and to my knowledge we had no outside contractors
22 involved.
23 MR. CARROLL: Okay.
24 MR. HUTSON: In addition to the walkdown, a review
25 of the Browns Ferry installation with respect to the program

1 undertaken at Sequoyah was performed. This review focused
2 on similarity of the Browns Ferry and Sequoyah installation
3 with the objective to prove that the Browns Ferry
4 installation was bounded by the extensive and successful
5 effort that we had undertaken at Sequoyah.
6 Although the physical comparison with Sequoyah was
7 favorable Browns Ferry has performed some DC Hi-Potential
8 In-Situ tests for vertical support, bend radius, and
9 pullbys. The tests for vertical support and bend radius
10 were identified from the comparison I just discussed, with
11 the testing for possible pullby damage being initiated due
12 to the identification of cable pullby damage at our Watts
13 Bar facility in the summer of 1989.
14 MR. CARROLL: So what you're saying here is you're
15 doing DC Hi-Pot test on samples that represent bend radius,
16 and that sort of thing.
17 MR. HUTSON: That's correct, and I'm getting ready
18 to discuss, it will be the type of sampling technique that
19 was applied to the conduit we needed to test.
20 MR. CARROLL: Okay.
21 MR. HUTSON: For vertical support, the review
22 concludes that Sequoyah test were not applicable to Browns
23 Ferry. Therefore, we performed an additional walkdown to
24 identify all of the Class 1E medium voltage power cables,
25 that is, our kv power cables, that did not meet the

1 acceptance criteria for vertical support. That basically is
2 a footage criteria that you apply based upon the type of
3 cable, that the cable can stand in free air without any type
4 of support in a conduit system. As a result of this effort
5 eight conduits were tested in accordance with IEEE standard
6 400 1980, which identified the test voltage to be at 20
7 thousand volts DC. This is the test that's recommended for
8 periodic maintenance for these types of cables. Seven of
9 these conduit's were within the manufacturer's
10 recommendation for vertical support, but not in accordance
11 with the acceptance criteria that we applied, with the
12 acceptance criteria coming from the National Electrical
13 Code. And with a support for the eighth conduit that was
14 not within this manufacturer's recommendation, so we have
15 actually modified the conduit to add a support at the top of
16 the conduit.
17 MR. CARROLL: I'm having a little problem getting
18 a physical picture of the problem here. You're talking
19 about cable that is under its own eight hanging --
20 MR. HUTSON: Under its own weight hanging in a
21 conduit.
22 MR. CARROLL: Hanging in a conduit.
23 MR. HUTSON: Yes.
24 MR. CARROLL: And when you talk about supports
25 you're talking about what?

1 MR. HUTSON: A support at the top of the conduit
2 to relieve the stress and tension that you put on the
3 installation material, due to the weight of the installation
4 itself.
5 MR. CARROLL: And what does that look like?
6 MR. HUTSON: In this particular situation we've
7 put what's known as a Kellums Grip, which is basically a --
8 it looks like a netting device that you interweave into the
9 cable itself, into the cable bundle, and you basically
10 attach the individual cables and then strap it off inside
11 the conduit, or some fixture in the conduit itself.
12 MR. CARROLL: All right.
13 MR. HUTSON: With regard to bend radius again the
14 comparison with Sequoyah is not supportive of the Browns
15 Ferry installation; therefore, the review of the Class 1E
16 medium voltage cables that we performed for vertical support
17 was expanded to include the ben radius concerned. From this
18 walkdown the population of conduits were ranked with regard
19 to bend radius severity and the top 15 conduits were once
20 again subjected to the DC Hi-P st. This test voltage,
21 once again, was at 20 thousand volts in accordance with the
22 IEEE 400 standard for this type of cable.
23 MR. MICHELSON: The cable installation you're
24 talking about is only that within conduits?
25 MR. HUTSON: Yes, that's correct.

1 MR. MICHELSON: Not in the open cable trays that
2 are vertical?
3 MR. HUTSON: The open cable trays we have a
4 vertical -- it would have been in the program, but the type
5 of cable trays that we have used here are a roll type tray,
6 which provides that support that you are looking for.
7 MR. WYLIE: Provides the required bend radius.
8 MR. HUTSON: Yes.
9 MR. WYLIE: Okay.
10 MR. CARROLL: Now, when you say in the case of
11 bend radius, for example, that the test at Sequoyah didn't
12 support what you found at Browns Ferry, what does that mean?
13 MR. HUTSON: What that means is that we had cable
14 in the conduit systems physically bent to a more severe or
15 lower radius than we actually saw at our Sequoyah facility.
16 For example, you may have had a power cable with only a bend
17 radius of say three to four times of the OD of the cable,
18 specifically what you apply. And in our Sequoyah facility I
19 think the smallest that we saw was like six to eight times.
20 MR. CARROLL: So you did find more severe
21 conditions at Browns Ferry?
22 MR. HUTSON: We did find more severe conditions at
23 Browns Ferry, that's correct.
24 MR. CARROLL: Okay.
25 MR. HUTSON: As I mentioned earlier, the initial

1 review of the pullby concern concluded that it was not
2 present at Browns Ferry. However, due to the findings at
3 our Watts Bar facility and additional review of this item
4 was warranted. The objective of this review was to identify
5 the top 10 conduits with respect to sidewall bearing
6 pressure during pullbys and to perform in-situ DC hi-pot
7 tests to verify the cable's insulation integrity. Our
8 concern here was primarily the low voltage cables. The low
9 voltage cables are in application of 120 AC, 250 volts DC,
10 and where you see pullbys occur. The power cables you
11 typically do not see pullbys in those areas.
12 MR. CARROLL: You've got to help me out again,
13 what's a pullby?
14 MR. HUTSON: A pullby is where you have cable
15 sitting in a conduit, they are called resident cables, and
16 you pull a new cable in over the top or around that cable.
17 MR. CARROLL: Okay.
18 MR. HUTSON: So you're basically pulling it by.
19 MR. CARROLL: And because of friction you can
20 damage --
21 MR. HUTSON: That's correct, because of friction
22 in the pulling situation you put the cable through, and the
23 bends of the conduit, etcetera, you can generate some pretty
24 hot forces in that situation.
25 MR. CARROLL: And then the insulation?

1 MR. HUTSON: That's correct.

2 The applied test voltage for these types of cables
3 that we were testing were 240 volts DC times what we call
4 the environmental qualified anomaly insulation thickness.
5 However, as a lesson learned from our Sequoyah test, we did
6 set a maximum test voltage for this particular test. The
7 maximum was set at 7200 volts DC, or eighty percent of the
8 original factory test voltage. Each of these cables are
9 tested through a DC hi-pot condition prior to their
10 shipment, and we're limited to eighty percent of their
11 original test voltage.

12 If you recall, in our Sequoyah test we did
13 actually get up to ten thousand eight hundred volts on some
14 of our cables up there. From lessons learned we did cap the
15 voltage at Browns Ferry.

16 The next issue I would like to discuss is flexible
17 conduit.

18 MR. CARROLL: Why is eighty percent good enough?

19 MR. HUTSON: Eighty percent good enough from the
20 standpoint of verifying the insulation?

21 MR. CARROLL: Yes.

22 MR. HUTSON: What you're dealing with, as I
23 mentioned, is low voltage power cables. These cables are
24 typically being used at 120 volts AC or 250 volts DC. We
25 feel very confident that the test voltage we are applying,

1 which is significantly higher than their test, where the
2 actual application ensures adequate insulation.
3 MR. CARROLL: Okay.
4 MR. HUTSON: The next issue I would like to
5 discuss is flexible conduit. Again, this issue was
6 identified as a result of the employee concern program and
7 involves an issue regarding the minimum and maximum flexible
8 lengths for other flexible conduit, for thermal and seismic
9 movement. Flexible conduit is used between the rigid
10 conduit system and other components to accommodate physical
11 misalignments and for ease of installation. However, care
12 must be taken to ensure that the length is acceptable such
13 that the flexible conduit is seismically supported and at
14 the length allowed for thermal expansion during plant
15 operation.
16 In order to resolve this issue at Browns Ferry an
17 effort was undertaken to determine the area of concern.
18 Similar to the effort at Sequoyah, the Browns Ferry effort
19 focused on the electrical devices that are required for the
20 10CFR50.49 harsh environment electrical equipment program.
21 This population is Class 1E conduits, and also the conduits
22 of concern, also those that are being included in the A-46
23 seismic program.
24 MR. CARROLL: Now what kind of application is this
25 being used on in terms of voltage?

1 MR. HUTSON: This can be all voltage ranges, it
2 can be your power ranges, you 4KVAC, down to 40 volts AC,
3 down --typically it's used in your control power circuits,
4 which is your 120 AC and 250 volt DC.
5 MR. CARROLL: But there is a higher voltages in
6 some cases?
7 MR. HUTSON: You can see that, yes.
8 MR. CARROLL: Okay.
9 MR. HUTSON: Based upon this approach a walkdown
10 was performed of all the harsh environmental electrical
11 devises with conduit connections to identify discrepancies.
12 As a result of this evaluation over 300 conduits have been
13 or will be modified during the system return to service
14 program. We still have a work remain in our return to
15 service program, that I will show you in just a minute, the
16 status for this particular issue.
17 MR. MICHELSON: What do you mean by modified?
18 MR. HUTSON: What we do is we go in and actually
19 change out the conduit to increase the length, or decrease
20 it accordingly, in order that we have the support necessary.
21 MR. MICHELSON: And how does that correct the
22 problem?
23 MR. HUTSON: Your concern is typically the seismic
24 movement of expand of conduit between supports, so you may
25 have to go in and add a support, or if the conduit is too

1 long you may get into external expansion issues, so you may
2 have to actually shorten it some.
3 MR. MICHELSON: These are the flexible conduits,
4 not the original?
5 MR. HUTSON: This is the flexible conduit, yes.
6 MR. WYLIE: These on the ends.
7 MR. HUTSON: These are at the devices themselves.
8 MR. CARROLL: And the concern under seismic
9 exaltation is that its going to do what?
10 MR. HUTSON: Well, your concern is making sure
11 that you have it adequately supported such that it will
12 withstand the seismic events. You look at the --
13 MR. CARROLL: What does withstand mean, though,
14 what's going to happen bad to it?
15 MR RUPERT: The question regarding the seismic
16 qualification, if it's too short you have a deferential
17 movement between the component and the conduit.
18 MR. CARROLL: You can pull it out? But if it's
19 long enough it's not a problem.
20 MR. RUPERT: See, you look at the movement and if
21 there is sufficient slack in that then it's not an issue.
22 MR. CARROLL: Okay.
23 MR. HUTSON: The next issue I would like to
24 discuss is cable ampacity. This issue involved a concern
25 regarding the adequacy of a cable's ability to provide the

1 required amperage during electrical components operation.
2 In order to resolve this concern at Browns Ferry an
3 extensive walkdown was performed to determine the actual
4 configuration of the cable installation. Since Browns Ferry
5 has installed a flame retardant protective coating on cables
6 in the tray system signal tracing was necessary. This
7 involved the injection of an electrical signal and
8 physically following the signal with a receiver throughout
9 the raceway. A review of the cables identified that only
10 power cables required evaluation. Power cables being 40
11 volts AC and medium voltage cables, as well as any type of
12 control power circuits that may have had a protective device
13 greater than 30 amps.
14 MR. MICHELSON: Now, what did the flamastic
15 coatings do to the ampacity?
16 MR. HUTSON: Of course we had to take into account
17 a derating factor, and dependent upon the thickness of the
18 flamastic it could have got a D rating up to twenty eight
19 percent of the cables ampacity.
20 MR. MICHELSON: And how do you know how thick the
21 flamastic is?
22 MR. HUTSON: Basically you do a tray profile, we
23 call it a physical profile tray, and you add up the number
24 of cables that are in there and the area that they would
25 take up in the tray itself, and you subtract from that the

total area and that's the area of the flamastic --

MR. MICHELSON: You mean you dimension the outside of the flamastic?

MR. HUTSON: That's correct. That's the only way to determine it.

MR. CARROLL: Now, you said 40 AC, don't you have some DC MOV's?

MR. HUTSON: 250 volt DC. Those circuits would have been evaluated if they were in a 5 amp or greater application, those would have gotten routed up into the power trays, as we call them.

MR. CARROLL: So an MOV would -- a DC MOV would be evaluated?

MR. HUTSON: Would be evaluated, yes. The calculations were performed utilizing the walkdown data and in accordance with our TVA's standards that had been updated to reflect present day industry requirements, with a discrepancy identified for disposition and for miscalculation effort.

As a result of the calculations 89 cables have been identified as being improperly sized and have been replaced.

The next item I would like to discuss today is thermal overloads. This issue involves a concern regarding thermal overloads being incorrectly sized.

1 MR. MICHELSON: Could you tell me what thermal
2 overloads you are going to talk about. Are you talking
3 about those in the breaker compartments.
4 MR. HUTSON: Yes, these are the ones in the
5 breaker compartments that we have in conjunction with --
6 MR. MICHELSON: These are not fuses now, these are
7 actual --
8 MR. HUTSON: These are actual thermal overload
9 heater elements, these are true heater elements.
10 MR. MICHELSON: Okay. This is down to motor
11 control centers --
12 MR. HUTSON: Motor control centers, yes, those
13 applications.
14 MR. CARROLL: And on your MOV's do you bypass
15 these on a real signal?
16 MR. HUTSON: No, we do not.
17 MR. CARROLL: You do not.
18 MR. HUTSON: We do not bypass on an access signal
19 here.
20 MR. CARROLL: I thought that was a very strong GE
21 recommendation.
22 MR. HUTSON: I'm not aware of it being a very
23 strong GE recommendation, but I know that we have reviewed
24 our TOL program with GE and we have not had any difficulty
25 with that.

1 MR. HUTSON: As I said, this issue involves the
2 sizing of the thermal overloads initially. Initially the
3 thermal overloads were sized as a part of the installation
4 by construction, and a review of the installation procedures
5 identified that they are generally undersized. As a result
6 of concerns in the industry by NRC, and TVA, an effort was
7 undertaken to re-evaluate the sizing criteria and analyze
8 the overloads.
9 MR. MICHELSON: Aren't those sized in terms of the
10 capacity of the motor control center. In other words, they
11 are generally rated in some kind of amp.
12 MR. HUTSON: The TOL is typically just sized to
13 the motor itself, the motor operator. You look at the motor
14 operator and its size. But one of the items that has come
15 out of the industry review is that they have also been
16 finding some undersizing problems with the TOL's.
17 The objective of this effort was to perform an
18 analysis of all Class 1E overload elements based upon the
19 sizing criteria and compare these results with the installed
20 overload heater itself.
21 An effort has identified the improperly sized
22 overloads and they have either been reset or replaced in
23 accordance with this criteria. This effort, as previously
24 discussed, is the result of the employee concern program and
25 as such the resolution at Browns Ferry is very similar to

1 the Sequoyah effort. The results from this effort
2 identified the need to reset or replace over a 100 thermal
3 overloads. And as a result of our evaluation we have also
4 removed six thermal overloads to ensure the safety functions
5 of the valves. The thermal overloads that we removed we
6 removed them on two RHR valves, these are the Torus Cooling
7 Valves that the safety function had been performed. And
8 also on the RHR service water, on the heat exchange, or
9 outlet valves. These valves, the heat exchange outlet
10 valves are used for a throttling situation. So the
11 difficulty that you have in sizing an overload heater to
12 allow the throttling effect to take place, you end up sizing
13 the heater for the multiple starts and stops of the motor
14 operator to the point where you don't have any motor
15 protection anymore. So what we've undertaken there on these
16 particular MOV's, is we've undertaken an effort through our
17 MOVAX program to look at the signature of the motor
18 operator, and each time that they perform the MOVAX for
19 these particular valves, that will be prepared against the
20 baseline signature to make sure that the motor is still
21 functioning properly.
22 Next slide, please.
23 Cable splices is an issue involving the improper
24 installation of heat shrinkage tubing over electrical
25 splices and terminations. Potential problems involving this

1 improper installation were identified as a result of reviews
2 performed in response to NRC Information Notice 86-53.
3 Based upon this concern the installation
4 requirements were revised to incorporate the vendor
5 requirements and to reflect the lessons learned from the
6 industry. The focus for this effort was, once again, was
7 the harsh environment electrical equipment from our
8 10CFR50.49 program. And also, this population included a
9 Class 1E device that would be submerged during a design
10 basis flood. This focus identified the components that
11 would be adversely affected due to improper installation.
12 The process involved a walkdown and visual inspection
13 process very similar to Sequoyah, with the objective to
14 identify unacceptable splices for replacement.
15 Results of this effort have identified that all
16 splices in the population of concern, which number over 600,
17 require modification.
18 MR. CARROLL: Now, you're saying that you're
19 concerned about the design basis flood. How have you dealt
20 with land break kind of situation that is going to get
21 splices wet? Has that been looked at?
22 MR. HUTSON: From a harsh environment standpoint
23 that would have -- those circuits require to mitigate that
24 event, or to obtain safe shutdown, depending upon the
25 situation. Those components have been identified and have

1 been put into our harsh environment program and those
2 splices have all been replaced.
3 The last electrical item I would like to discuss
4 with you from the Nuclear Performance Plan is fuses. This
5 issue involved a concern regarding the improper substitution
6 of Class 1E fuses. This issue has evolved at TVA as a
7 result of fuses being replaced without a proper engineering
8 evaluation. The scope of this effort was to perform an
9 engineering evaluation to determine the required fuse for
10 all the applications, and this evaluation would then be
11 prepared to the actual installation. The fuse requirement
12 was documented from this evaluation and issued as design
13 output in the form of a fuse tabulation drawing. The
14 installation was inspected to the tabulation and incorrect
15 fuses were identified for replacement and/or further
16 evaluation. This effort is very similar to Sequoyah, like
17 the rest of the electrical issues are.
18 As a result of this effort over 1500 fuses have
19 been replaced.
20 MR. CARROLL: Now, wait a minute. Improper
21 substitution implies to me that a fuse blew and somebody put
22 the wrong size fuse in.
23 MR. HUTSON: That's correct.
24 MR. CARROLL: I can't believe there have been 1500
25 of those.

1 MR. HUTSON: Well, when we compare the required
2 fuse, or the originally designed fuse, that's what we have
3 found, is that the fuse that is setting there in the
4 installation does not match up with the original design.
5 MR. CARROLL: So it wasn't necessarily fuses
6 blowing, it was construction.
7 MR. HUTSON: It could have been for any reason,
8 the original design was not installed correctly to began
9 with, or it could have been a blown fuse.
10 MR. BYNUM: Some of that may have been original
11 installation. There may have been a substitute fuse made,
12 you know, based on field information.
13 MR. HUTSON: That's correct.
14 MR. CARROLL: Okay.
15 MR. MICHELSON: Now, these are fuses in Class 1E
16 circuits, there isn't a Class 1E fuse, per se, is there?
17 MR. HUTSON: Yes, there is.
18 MR. MICHELSON: There is?
19 MR. HUTSON: Yes, sir, there is, we do have
20 vendors that provide them.
21 MR. MICHELSON: Well, was the problem here, then,
22 because it wasn't a Class 1E, it was proper amperage
23 capacity but not a 1E.
24 MR. HUTSON: It could have been both of those,
25 Carl. It could have been the fact that the fuse is no

1 longer on the Class 1E list of qualified fuses, or it could
2 have been the wrong size fuse to begin with.
3 MR. ZERINGUE: Or there was no documentation to
4 verify that it was a Class 1E fuse.
5 MR. MICHELSON: Can you tell the difference
6 between a non-1E and a 1E fuse by just looking?
7 MR. ZERINGUE: No, you just pay more money for it.
8 MR. MICHELSON: Some of these are 1 amp fuses,
9 aren't they?
10 MR. HUTSON: Yes, they are. You're talking about
11 control circuits where you do get that small of a fuse.
12 MR. MICHELSON: And somehow you've got a box, I
13 guess, that says these 100 milli-amp fuses are 1E's.
14 MR. ZERINGUE: It's easier to simply replace them
15 than try to verify the qualification of the fuse.
16 MR. MICHELSON: But there is no way otherwise.
17 Now, what's the difference between a 1E fuse and a non-1E
18 fuse from the manufacturer?
19 MR. HUTSON: Paper, and that's it.
20 MR. MICHELSON: But what does the manufacturer do
21 to make a difference? Is there more test required to
22 establish the rating, or -- what's the difference.
23 MR. HUTSON: The test program they typically go
24 through is one and the same, but you do have quality control
25 requirements that you place on it, and the technique on the

1 assembly line has to be --

2 MR. MICHELSON: Okay, that's the only difference.

3 MR. HUTSON: Yes.

4 Next slide, please.

5 What I would like to do now is provide the status

6 of the cable installation issue.

7 MR. CARROLL: A good time for me to ask my

8 questions. I guess I look at this and I say, Gee, these

9 guys had an awful lot of problems. Is that unique to TVA?

10 If I went out and looked at plants that were of the vintage,

11 with the microscope that you've been looked at, or you've

12 looked at your own situation with, would I find the same

13 kind of problems with plants that have been done by other

14 architect engineers other than TVA?

15 MR. HUTSON: I'm not sure I can answer that

16 question, I've worked my full career at TVA. I would have

17 to let someone that has worked at the outside industry

18 answer that question.

19 MR. CARROLL: Well, was a lot of this that TVA had

20 messed up standards, engineering standards and construction

21 standards, compared to what you found was common in the

22 industry, or was it --

23 MR. HUTSON: I can talk in terms of cable

24 installation. The industry was evolving on cable

25 installation back in the late '70's, early '80's. TVA

1 really never got onboard with that effort until the mid
2 '80's, so we were behind the times with that, the rest of
3 the industry was ahead of us, and we brought our cable
4 installation standards up to date, to what the rest of the
5 industry is doing.
6 The rest of the issue, I really don't have any
7 comparison I can give you on that.
8 MR. CARROLL: Maybe when the Staff gets up
9 tomorrow they can give me --
10 MR. MARINOS: Well, I can answer right now. Based
11 on the safety evaluation regarding this cable installation,
12 TVA did research all standards used at the time of Browns
13 Ferry installation, and they came up with the conclusion
14 that the industry standards were no better, in fact they
15 were worse, than what TVA used to do the cable installation
16 of Browns Ferry.
17 MR. HUTSON: That being the early '70's vintage,
18 with the industry evolving in the late '70's, early '80's.
19 MR. CARROLL: So what has the Staff decided to do
20 about that situation generically?
21 MR. MARINOS: We have not done anything yet.
22 MR. WARD: When you say yet, that implies that
23 there is something being planned?
24 MR. MARINOS: Well, a recommendation have been
25 made to look into that issue, yes.

1 MR. CARROLL: When were those made?

2 MR. MARINOS: We made those recommendations last

3 November.

4 MR. CARROLL: And have there been a response?

5 MR. MARINOS: No, not yet.

6 MR. CARROLL: Okay.

7 MR. ROSS: As a point of clarification for the

8 ACRS members, the Staff presentation is probably not going

9 to revisit any of the program areas that TVA is presenting.

10 Any questions that the ACRS members have, I would recommend

11 that you make at those times with the Staff and we stand

12 ready to entertain those, but we probably will not be

13 revisiting these areas during our presentation.

14 MR. CARROLL: Understood. This was one that

15 jumped out at me.

16 MR. ROSS: By all means, when these come up, you

17 know, resource the Staff.

18 MR. MICHELSON: Let me ask then, on the Class 1E

19 fuses, are other utilities consistently exercising care to

20 make sure that every fuse in the plant in a 1E circuit is a

21 1E fuse and has some means of knowing they are 1E fuses?

22 MR. MARINOS: TVA's case was sort of unique that

23 they were given credit for fuses to be Class 1E devise.

24 Most of the other utilities, to my knowledge, are not taking

25 that credit, or not giving a credit of using that fuse.

1 MR. CARROLL: Now, what was unique about TVA that
2 they required this credit?
3 MR. MARINOS: I do not know the history, I wasn't
4 involved at the time, I just reviewed what was given to TVA
5 on the basis of the quality of the fuse.
6 MR. HUTSON: From the TVA standpoint, we have been
7 designing fuses in our control circuits and power circuits,
8 in my experience, even back on our fossil plants, and we
9 still use them today.
10 MR. MICHELSON: And I thought everybody else did
11 too.
12 MR. WARD: But that's apparently not unique.
13 What's unique is getting some sort of safety regulatory
14 credit for them in some way, that's what I --
15 MR. MICHELSON: Well, apparently you don't have to
16 control the quality of the fuses unless you've taken some
17 kind of a special credit, and that I don't understand.
18 MR. NAUMAN: I can tell you as having been at one
19 other plant, that cable bend radius and fuses were exactly
20 the same issue there. It is a lot more complicated than it
21 appears here, and I think the issue that's important to
22 recognize is that's it's probable that the 1500 that we've
23 replaced were as good as the ones that we put back in.
24 MR. MICHELSON: And it's probably that everybody
25 else has got a lot of fuses that they really don't know the

1 vintage of.

2 MR. NAUMAN: There were a combination of effects,

3 slow blow fuses, for example. There were areas where you

4 had construction fuses that were put in and weren't replaced

5 with 1E's. And I think it was an industry problem, and an

6 easy way to solve it was to take the fuse out whether or not

7 you could prove it was good and replace it with one you knew

8 had the documentation that it was good. I participated in a

9 testing program in that circumstance, and I can tell you

10 that the results of that said that all of the fuses that we

11 had pulled were as good as the ones we put back in.

12 MR. MICHELSON: What do you do in a case of vendor

13 supplied fusing?

14 MR. NAUMAN: That was part of the problem, skid

15 mounted equipment, you could not confirm the adequacy of the

16 installed fuses even if the name was okay, even if the name

17 and number was okay.

18 MR. MICHELSON: I can't believe that's unique to

19 TVA.

20 MR. NAUMAN: It was not.

21 MR. ZERINGUE: For the 1500 that we talked about,

22 we went to one fuse vendor, we bought certified fuses from a

23 single vendor, we went in the plant and took out everything

24 that was in there and put all new ones in.

25 MR. CARROLL: You set yourself up for a common

1 mode failure.

2 MR. MICHELSON: Is there unique color codes on

3 these new fuses, or something that makes them clearly

4 qualified?

5 MR. HUTSON: Well, each of the fuse blocks

6 themselves, the fuses have been uniquely identified with

7 regard to the circuit they are applied in.

8 MR. MICHELSON: But if I walked up to that circuit

9 how do I know whether it has got the new fuse or the old

10 fuse in it?

11 MR. HUTSON: What you will do is take the fuse

12 tabulation drawing that we've issued as the design output

13 that is used by the operations and maintenance people, they

14 will take that document, and that's what will tell them what

15 fuse should be there.

16 MR. MICHELSON: But you don't put a little red

17 spot on it, or anything like that?

18 MR. MARINOS: After the completion of the program

19 we audited the information on fuses and actually went into

20 the circuit and evaluated the size of the fuse, and we did

21 not find any fuses that were the wrong size.

22 MR. MICHELSON: I wasn't particularly concerned

23 about size so much as how you control the difference between

24 a 1E and a non-1E fuse of the same size.

25 MR. ZERINGUE: Carl, let me verify it, but I

1 believe all of the fuses bought by this particular vendor,
2 certified fuses, that we can verify the type by looking at
3 who made the fuse.
4 MR. BAJESTAN: That is correct. My name is
5 Massoud. We have identification of every one of these fuses
6 that tells you what type of fuse it is suppose to have, and
7 the fuse that we bought, like Ike was saying, they all come
8 from one vendor.
9 MR. MICHELSON: And that vendor doesn't have any
10 other fuses in your plant?
11 MR. ZERINGUE: Carl, I can't verify, but I think
12 all of the fuses we buy are qualified fuses.
13 MR. MARINOS: And an additional clarification,
14 Carl, TVA is not unique in having used that, I may have
15 given that impression. Utilities with plants of the vintage
16 of Browns Ferry would be there with this allowance. But
17 since Browns Ferry we have not allowed the fuses to be
18 interrupting devices unless you have redundant circuits.
19 MR. MICHELSON: Well, what he suggested there,
20 redundant circuits --
21 MR. MARINOS: It would not be allowed, no.
22 MR. MICHELSON: I thought there was a regulatory
23 guide that said fuses are acceptable.
24 MR. CARROLL: Almost every instrument circuit has
25 a fuse in it.

1 MR. MICHELSON: No, not all.

2 MR. MARINOS: There is a regulatory guide, I'm not
3 familiar with it right now, but it does not allow the fuses
4 to be isolation devices for circuits.

5 MR. CARROLL: Well, a fuse isn't an isolation
6 device, it's a circuit interrupting device.

7 MR. MARINOS: You could use isolation device in
8 order to separate a non-safety system that may be taking
9 power supply from the protection system supply. If there is
10 a fault in that circuit a fuse would be to isolate. The NRC
11 does not allow the isolation of that circuit.

12 MR. CARROLL: Okay, I understand that.

13 MR. MARINOS: That is the use of that.

14 MR. MICHELSON: I thought they did allow redundant
15 -- I think it requires redundant fusing, but fusing --

16 MR. MARINOS: No, you we do not allow fuses at all
17 to isolate a non-safety circuit from a safety supply.

18 MR. HUTSON: That's right, present day design
19 would not allow that.

20 MR. WARD: But the Browns Ferry design before that
21 did permit that, is that what you told us?

22 MR. MARINOS: Yes.

23 MR. WARD: Now this has become a major issue at
24 Browns Ferry and they have apparently spent a lot of money
25 on replacing the fuses, although maybe it isn't, but you're

1 pursuing this with the Staff, and should this be a generic
2 issue, we've got a lot of plants out there.
3 MR. MARINOS: No, we do not take the credit away.
4 All plants who have the same design are allowed to maintain
5 those designs.
6 MR. MICHELSON: As long as they went to 1E fuses.
7 MR. WARD: Have they gone to 1E fuses?
8 MR. MARINOS: I'm not familiar with that.
9 MR. HUTSON: I think one of the things you'll find
10 in the electrical distributions system functional
11 inspection, EDSFI's, are presently ongoing and fuses is a
12 major item that's reviewed in that effort. They do look at
13 the fuse application. It's interrupting capabilities, all
14 the pertinent parameters for a fuse, and that is being
15 reviewed. I've seen the inspection reports. I've read from
16 other facilities as well as having gone through this type of
17 inspection at Sequoyah. That is an item that's looked at.
18 The status of cable installation is that our
19 comparison and testing is complete. The installation
20 anomalies that were encountered during the test itself have
21 been resolved. One of the anomalies we encountered was, we
22 did have some difficulties with some cables where we routed
23 the cable through a fire seal itself and the removal of the
24 fire seal during the recovery effort for other cables to be
25 routed through there or the replacement of other cables. We

1 did do some damage to the insulation. We have resolved that
2 issue. As a result the insulation issue has been submitted
3 and resolved with the Staff. So all cable issues at the
4 present time are resolved.
5 In summary --
6 MR MICHELSON: Excuse me. When you have to
7 remove a cable from the penetration, how long before you go
8 back and seal up the penetration where you remove the cable?
9 MR. HUTSON: Well, the actual removal and the
10 repair to the seal would be part of the work plan we are in
11 there doing work for and just be driven by the schedule
12 doing that work.
13 MR. MICHELSON: So it's done almost immediately?
14 MR. HUTSON: Almost immediately. I would say the
15 recovery effort is being done at the same time.
16 MR. CARROLL: And if the seal has to be replaced,
17 how do you detect whether it's a good seal and whether there
18 is airflow going through it? Do you still use candles and
19 things like that?
20 (Laughter)
21 MR. HUTSON: No, we do not use candles anymore.
22 I'd have to defer to our plant people for the inspection
23 process for the seals.
24 In summary, an exhaustive evaluation has been
25 performed in support of the Unit 2 restart effort for the

electrical systems. As identified, the cable ampacity, thermal overloads and fuse efforts are complete. For flexible conduit and cable splices the remaining modifications required will be completed as part of the system return to service program with the majority of these modifications presently identified in the main steam system.

MR. MICHELSON: Excuse me, the cable splices you are referring to, where would they be located? These are not -- Are these splices within the cable trays?

MR. HUTSON: No. We do not splice in the trays. The splices we have done have been off the tray systems themselves. It would be typically in junction boxes or at the equipment themselves.

The last issue I would like to discuss is a new issue that's been identified during the recovery effort at Browns Ferry and that's with regard to station blackout. Station blackout issue involves the plant's ability to withstand a loss of all AC power and obtain safe shutdown in an acceptable amount of time or restore the AC power. For Browns Ferry the acceptable amount of time based upon the evaluation of the offsite power circuits and the diesel generators required for safe shutdown as identified in Unit 2 must cope at 4 hours. Based upon this and Browns Ferry's vintage, a coping analysis has been performed to determine the plant's DC system's ability to power the required loads

1 during the loss of AC event.

2 In order to perform the analysis, the load

3 requirements for the DC system were identified and the

4 coping analysis was performed to determine the battery's

5 capability. Since the Brown Ferry design basis for loss of

6 all AC was originally two hours and 30 minutes for an

7 accident condition the results have identified that load

8 shedding will be required for Unit 2 operation. For a

9 multi-unit operation, the analysis indicates the physical

10 modifications will be required.

11 MR. MICHELSON: Excuse me --

12 MR. CARROLL: What does that mean?

13 MR. HUTSON: It means we'll probably have to go in

14 and actually either upgrade the battery system to the point

15 of putting in a larger battery system or we may possibly

16 have to actually remove some loads. We may have so many

17 loads we just can't take them off. It'll be dependent upon

18 the situation we encounter.

19 MR. CARROLL: Now, Browns Ferry -- I'm trying to

20 remember -- there's a few early GE plants that have a seal

21 LOCA problem on loss of power. You are not one of them, I

22 don't think.

23 MR. HUTSON: Does anybody have the answer to that?

24 MR. CARIER: I'll try and get the answer for that.

25 MR. CARROLL: I'm pretty sure you're not. I think

1 it's Oyster Creek and maybe Big Rock or something. I'm not
2 sure.
3 MR. MICHELSON: The four hours that you quoted for
4 restoring AC power, have you gone back and done room heat up
5 calculations and so forth to determine that the electronics
6 will survive the four hours of elevated temperature?
7 MR. HUTSON: As one of the parameters looked at in
8 the analysis, yes.
9 MR. MICHELSON: Because you've added a lot of
10 extra heat removal capabilities up in the control building
11 area and so forth, presumably because you've increased some
12 loads, and you've gone back and have recalculated the heat
13 up rates so you'll know what temperatures you'll reach at
14 the end of four hours in these various areas?
15 MR. HUTSON: Looks like, Carl, I'll have to get
16 the answer for you on that.
17 MR. MICHELSON: I would like to know how, you
18 know, you are extending the sign out and does the equipment
19 survive the longer period. Particularly electronics, that
20 would be the main target.
21 MR. HUTSON: The status of the station blackout
22 effort is identified that the analysis is complete for Unit
23 2 restart and is presently under review by the Staff.
24 MR. CARROLL: Now, if I remember reading the SER,
25 you've got to rely on non-Unit 2 diesels.

1 MR. HUTSON: That's correct.

2 MR. CARROLL: Under station blackout conditions.

3 MR. HUTSON: That's for a normal loss of offsite

4 power conditions.

5 MR. CARROLL: Yeah. Now, are those diesels in

6 areas of the plant that are under construction? How do you

7 keep some construction guy from messing up the diesels?

8 MR. ZERINGUE: Later in the presentation I believe

9 we are going talk about Unit 2 and 3 separation. For those

10 particular cases the diesel rooms, the construction forces

11 will not have key cards that will allow entry into those

12 rooms.

13 MR. CARROLL: How about supporting systems that

14 are external to the rooms that would be over on Unit 3?

15 MR. ZERINGUE: All of those items will be tagged.

16 We'll talk about it somewhat but each component that has the

17 support Unit 2 operation will have a orange and black tag on

18 it identifying the fact that it's required and where

19 physically possible that component will be locked in

20 position. Piping, for instance, will be marked with orange

21 stripping to clearly identify its use for Unit 2 support,

22 but we will have a presentation sometime tomorrow, I

23 believe, on Unit 2 and 3 separation.

24 MR. MICHELSON: Is that going to -- Will that be

25 the time when you'll also discuss fire protection features

1 as they may relate to Units 2 and 3 -- I mean, Unit 1 and
2 Unit 3 supporting Unit 2?
3 MR. CARIER: We have a fire protection
4 presentation right after this.
5 MR. MICHELSON: I didn't know if you were going to
6 get into what you do when you do all this construction on
7 Unit 1 or Unit 3 while you are running Unit 2 and what
8 happens when you have a fire over in the construction area
9 as whether or not -- to determine this will not effect in
10 any way Unit 2's shutdown capability.
11 MR. ROSS: We'll cover that. That'll be next.
12 Also the Unit 3 diesels have been put it the text specs.
13 MR. CARROLL: I'll bet the constructions guys
14 don't read the text specs though.
15 MR. ROSS: But I do.
16 MR. ZERINGUE: We spent the last two months going
17 through a very, very detailed process to identify equipment
18 in Units 1 and 3 necessary to support Unit 2 operation. In
19 addition we have identified the equipment in Units 1 and 3
20 that are not to be energized. So there are special efforts
21 underway to mark or tag the plant. There's some 3000 tags
22 to be hung. There are special color coded drawings that are
23 being made now to be hung in the control rooms, technical to
24 EOF and other places, but there is a fairly detailed effort
25 underway right now to insure adequate separation of units 2

1 and 3, including physical barriers.

2 MR. CARIER: Tomorrow we will be ready to give you

3 a presentation on Unit 3 and 2 separation and also includes

4 Unit 1, also, what we've done to separate it from Unit 2.

5 We will be ready to discuss that with you.

6 MR. HUTSON: As identified in our commitments with

7 regard to station blackout Unit 2 will be in full compliance

8 within one year after issuance of the SER. This will

9 include the necessary revisions to plant procedures for the

10 required Unit 2 load shedding and any other procedures that

11 may be necessary to cope with the event.

12 In regard to multi-unit operation, similar efforts

13 will be undertaken at the time of restart of the respective

14 unit.

15 This concludes my presentation. I will be glad to

16 answer any additional questions at this time.

17 MR. MICHELSON: Was there a station blackout

18 report written by TVA in which you wrapped up your

19 discussion of how you handled station blackout?

20 MR. HUTSON: Yes, there is. There's a submittal

21 to the Staff on it.

22 MR. MICHELSON: And Staff has reviewed that

23 station blackout?

24 MR. MARINOS: It's been reviewed, yes.

25 MR. ROSS: The Staff hasn't completed it.

1 MR. HUTSON: They are in the process.

2 MR. MICHELSON: Well, when the Staff reviewed the
3 station blackouts, did you look at the environmental
4 temperature rises at all?

5 MR. MARINOS: I did not personally review it or
6 any member of my staff. It was someone else. Maybe Terry
7 has some additional information on it.

8 MR. MICHELSON: Maybe by tomorrow you could find
9 out if you looked into the temperature rise question.

10 MR. ROSS: We will address that.

11 MR. MICHELSON: Certainly you would want to.
12 That's kind of a fundamental issue.

13 MR. ROSS: You know, I think, Jim, for the benefit
14 of the members -- I don't know if you are prepared -- you
15 might summarize cable separation problems you identified at
16 Browns Ferry?

17 MR. HUTSON: Okay. As a result of a modification
18 that we were making on the Unit 2 during recovery we
19 identified some separation problems on the penetration
20 itself into Unit 2 vessel. The cable separation
21 requirements had not been maintained. That is, we had a
22 non-Class 1E circuit being routed between our redundant
23 trains or redundant divisions.

24 MR. CARROLL: This is into the dry well vessel?

25 MR. HUTSON: Into the penetration, yes, into the

1 dry well. As a result of that an extensive effort was
2 performed to evaluate cable separations. The primary
3 concern being the low voltage control cables. And we did
4 that to evaluate several hundred circuits. These circuits
5 had been either identified through our Appendix R program or
6 being identified through actual routing or it was identified
7 from the cable ampacity effort where we're out signal
8 tracing cables. We've got the installed configuration of
9 the cables. We got the actual installation information and
10 compared it to the original design requirements. As a
11 result of that we did end up modifying circuits to either
12 reroute -- to reestablish the required separations or we
13 ended up providing redundant over current protection. And
14 Browns Ferry being the vintage facility that it is, that was
15 allowable for its design.
16 MR. WYLIE: You either re-route it or you provide
17 it additional protection.
18 MR. HUTSON: That's correct.
19 MR. MICHELSON: The problem was in part, I guess,
20 the wiring was going through one of your conoseal (ph)
21 penetrations or whatever you are using.
22 MR. HUTSON: Yes, going through --
23 MR. MICHELSON: And how did you take care of that?
24 Since you've still got to somehow find a go through?
25 MR. HUTSON: I think on that particular circuit we

1 actually modified and added additional fuses. We provided
2 redundant overcurrent protection for that.
3 MR. MICHELSON: Okay. You just beefed up the
4 protection on it.
5 MR. HUTSON: The actual protection, yes.
6 MR. MICHELSON: But you still used --
7 MR. MARINOS: In the case of associated circuits
8 where they did not obey the separation of the different
9 division and jumped on a second division and then they added
10 the additional protection, meaning a second fuse the device
11 for -- and put a second fuse or a circuit breaker depending
12 on the case they had.
13 MR. HUTSON: That's correct.
14 MR. CARROLL: You kind of jogged my memory. I
15 noticed in a number of places that there are issues that are
16 being deferred beyond restart to the next refueling outage
17 and so forth. Does the Staff have any list of all of these
18 items in one place?
19 MR. MARINOS: All the electrical issues --
20 MR. CARROLL: No, I'm talking about all of -- all
21 the issues being deferred beyond restart.
22 MR. MARINOS: All post restart issues, most of
23 which are identified in the Staff's SERs, --
24 MR. CARROLL: Yeah, I know, but I didn't take the
25 trouble to write them down as I read them.

1 MR. ROSS: What I was going to say is some of them
2 are actually not in the Staff's SERs too. A number of the
3 efforts that we did in the context of special projects were
4 scoped within quasi inspection type of safety evaluation
5 reports, which may have only been legally referenced by the
6 Staff's SER. What we have done since then is put together,
7 and it's not a formal docketed correspondence, but Staff has
8 a list of post restart items associated with the Staff's
9 review of Browns Ferry Nuclear Performance Plant.
10 MR. CARROLL: Could you make that available to us?
11 MR. ROSS: I hadn't brought that with me. I will
12 have to provide that to you when we return back to DC, but I
13 can do that.
14 MR. CARROLL: Is it a big long list or --
15 MR. ROSS: If I recall it's three dozen. A lot of
16 them have to do with the USIA-46, which is a long term
17 resolution of the seismic issues, one of which, as I recall
18 is a -- came out of the cable installation program, which is
19 one of the anomalies that they discovered during the high
20 pot testing. They determined some, I guess, contamination-
21 type products and brand Rex cables for which they are going
22 operate for one more fuel cycle while they attempt to
23 qualify those type of cables. That would be an example of a
24 post restart issue.
25 MR. CARROLL: Okay.

1 MR. HUTSON: If I could clarify that statement
2 about contamination. It's larger particles of what should
3 have been there. Those are particles. I have to do that
4 because of some discussion we've had with the cable vendor
5 on this.
6 MR. ROSS: But we can provide that list.
7 MR. CARROLL: You can just bring it to the meeting
8 Friday.
9 MR. ROSS: Yeah.
10 MR. WYLIE: I noticed in this regard that some of
11 the -- in the Staff's SER that some of the items of cable
12 that were identified that they were good for -- because of
13 the ampacity problem that they were good for at least two
14 more years.
15 MR. HUTSON: That would be the low voltage cables
16 and the application for bend radius vertical support, yes.
17 MR. WYLIE: Now, what's the intent with that? At
18 the end of two years you take another look at it or --
19 MR. HUTSON: That's it, Charlie. We are going to
20 look at the situation and see if there's additional testing
21 we can do or further evaluations to justify the condition
22 that we have or may actually end up modifying. That was the
23 intent.
24 MR. WYLIE: Let's take a ten minute break.
25 MR. CARIER: Before we take a break can we talk

1 about the agenda and where we are going to go?

2 MR. WYLIE: Sure.

3 MR. CARIER: I propose that after we've done the

4 electrical issue that we go on to Appendix R and then follow

5 it through with Environmental Qualifications and then go

6 back to DBBP and Seismic and hopefully by that time the

7 Staff member might be here and will be ready to go on.

8 MR. WYLIE: That's fine with us.

9 (Whereupon a break was taken)

10 MR. WYLIE: Now that we've had our ten minute

11 break, we're going to resume.

12 We have to vacate this room by 6:00. There is

13 another activity to follow our meeting today. So we'll have

14 to move right along with our agenda. So let's get started.

15 MR. TEMPLE: Good afternoon. My name is Tom

16 Temple. I work for Nuclear Engineering at Browns Ferry.

17 This next area of presentation is actually split

18 up in two parts under the general heading of Fire

19 Protection. We have coverage of the Appendix R shutdown

20 portions specifically and then Max Herrell, the Operations

21 Manager, will be discussing the operability of the fire

22 protection systems as well as management attention placed on

23 the system to maintain focused attention.

24 When Browns Ferry was shut down in late 1984 early

25 1985, there were three basic issues we had. One was non-

1 compliance with Appendix R regulations. We had questions
2 concerning the operability of the actual fire protection
3 systems and about adequate management and protection. Like
4 I say, I will be covering the first part of that and Max
5 Herrell will be covering the second.
6 To bring Browns Ferry Unit 2 in compliance with
7 Appendix R we formed a multi-disciplined, multi-
8 organization team with support from General Electric. The
9 tear consisted of personnel from engineering, tech support,
10 operations, licensing as well as modifications. This team
11 controlled the Appendix R program in the areas of design
12 modification as well as the program implementation. These
13 are areas -- or specific areas I will discuss this
14 afternoon.
15 From a design standpoint, first of all we
16 established the functions that were required to achieve and
17 maintain safe shutdown. From there we established the scope
18 of equipment including cable that we needed for the safe
19 shutdown functions. From there we reviewed the predicted
20 damage from a given fire to make sure that at least one
21 train of each of the safe shutdown functions would survive a
22 fire. These functions are such as core cooling, torus
23 cooling, the instrumentation requirements, HVAC, etcetera.
24 The equipment to satisfy those functions were the specific
25 systems like RHR, RHR service water, the use of generators,

1 the supporting equipment on EECO duty, and from there we
2 reviewed the equipment and cable for each of those systems
3 from a given fire and made sure that at least one train
4 would survive.
5 MR. MICHELSON: Excuse me. On doing your analysis
6 for fire did you trace the heat and smoke from the fire and
7 any water being placed on the fire from various possible
8 mitigating systems? Was that traced out to make sure you
9 still had a safe tripped on situation?
10 MR. TEMPLE: Yes, sir. We did a -- I'll take the
11 second one first. We in turn performed a specific
12 evaluation for each given fire to see when the fire systems
13 went off for that fire how the redundant trains we were
14 going use for that fire would survive, and that evaluation
15 concluded that the required equipment for that given fire
16 location would survive with one --
17 MR. MICHELSON: Now, in doing that analysis did
18 you account for where the water goes after it comes out of
19 the sprinkler nozzle and ends up on the floor and falls down
20 the stairways and so forth?
21 MR. TEMPLE: Yes, sir, we did. We looked at that
22 given fire location. We looked at the equipment we were
23 using for that given fire, where it would cascade down the
24 stairwell, as well as open hatches, and concluded that the
25 required equipment was indeed available after that fire.

1 As far as the smoke and heat remover that you
2 mentioned first,--
3 MR. MICHELSON: I was particularly interested in
4 smoke -- pardon me -- heat from the viewpoint of elevating
5 room temperatures in other areas and possibly there being
6 electronic equipment in that room which now becomes effected
7 because it doesn't take a very high temperature elevation to
8 start effecting certain types of solid state control
9 equipment.
10 MR. TEMPLE: Let me -- From a smoke removal and
11 smoke standpoint a given fire location would shutdown the
12 HVAC equipment for that area both going in and out to make
13 sure that the fire damper is closed securely and also it
14 helps to prevent smoke from migrating through that area.
15 MR. CARROLL: Do you do this as an operator action
16 or --
17 MR. TEMPLE: Right.
18 MR. CARROLL: -- you do this automatically?
19 MR. TEMPLE: Right. There is a procedure we have
20 in the plant that's implementing from a fire. After a fire
21 occurs that procedure is implemented to take those HVAC
22 shutdown actions.
23 MR. MICHELSON: So you are trying not to remove
24 smoke from the fire area?
25 MR. TEMPLE: Right. Because we don't go back into

1 that area except in two specific cases, one in the reactor
2 building. We have to re-enter into the reactor building to
3 take some manual actions and open up some small valves and
4 that occurs at least two hours after the fire occurs. And
5 the reactor building floor space is a general open area that
6 has hatches and stairwells so the smoke should migrate up.
7 So those actions would be available.
8 MR. CARROLL: But in other areas where you shut
9 off the ventilation doesn't that in effect push the smoke
10 into other areas of the plant?
11 MR. TEMPLE: I'm not quite following that
12 question.
13 MR. CARROLL: If I have a fire in a particular
14 fire area and I shut the ventilation off --
15 MR. TEMPLE: For that particular area?
16 MR. CARROLL: Yeah. -- where does the smoke go?
17 MR. TEMPLE: Well, it primarily stays in the room.
18 I guess it can migrate to some extent slightly past the fire
19 dampers and stuff that seal the room.
20 MR. MICHELSON: Well, many of these were not
21 rooms, of course. Some of these were very large areas --
22 MR. TEMPLE: Right.
23 MR. MICHELSON: -- just by the nature of the
24 layout.
25 MR. TEMPLE: Right. There's also as part of the

1 fire recovery effort, the shift commander -- I'm not sure
2 exactly what title it is -- implements and considers smoke
3 removal, whether he has to implement portable fans or
4 whatever they have to get the smoke out of the areas. So,
5 you know, if it's in an area or something and migrates more
6 than we might predict, the operations personnel would
7 implement procedures to prevent that smoke from being a
8 problem. Is that -- I think I understand the question.
9 MR. CARROLL: Yeah, I think what both Carl and I
10 are worried about is the smoke getting from that area into
11 another area.
12 MR. TEMPLE: Right.
13 MR. CARROLL: And there is a lot of equipment that
14 is sensitive to a city fire.
15 MR. TEMPLE: Right.
16 MR. CARIER: We'll take that question and we'll
17 get you an answer, where the heat and smoke, as far as what
18 happens to it and where we go with it after a fire.
19 MR. MICHELSON: In getting the answer look
20 particularly at what happens if you -- if the heat and smoke
21 migrates and gives you the two parameters required to
22 actuate fire protection in other areas which then wets down
23 the equipment which is probably not qualified after being
24 wet down.
25 MR. CARIER: Okay. We'll look into that for you.

1 MR. BYNUM: What's the question?

2 MR. CARROLL: Do smoke detectors do anything more

3 than alarm? Do any of them actuate fire protection systems?

4 MR. TEMPLE: The cross zoning that we have would

5 allow the deluge valve to actually open up.

6 MR. MICHELSON: How many deluge systems do you

7 use? Do you use them in very many places yet? Deluge

8 system, you realize, one of which after actuation it

9 starting spraying generally fairly extensive areas.

10 MR. TEMPLE: When I say deluge valve I'm talking

11 about a preaction valve that opens up.

12 MR. MICHELSON: Okay. The preaction only. Okay.

13 MR. TEMPLE: Right.

14 MR. MICHELSON: But you do also have deluge

15 systems, spray systems on certain components like the HPCI

16 turbine, probably --

17 MR. TEMPLE: In the HPCI room we do have an open

18 head system.

19 MR. MICHELSON: And it takes only smoke to actuate

20 or both smoke and heat?

21 MR. TEMPLE: I'll have to get that answer to you

22 because I'm not positive. Rashid or -- Is HPCI room

23 required just smoke detection to actuate the deluge system

24 down there or heat and smoke?

25 MR. ABBAS: No, it's only got heat detectors.

1 MR. TEMPLE: Just heat detectors.

2 MR. ABBAS: Yes.

3 MR. MICHELSON: So once that room gets hot then it

4 starts spraying water on it?

5 MR. ABBAS: Right. On the HPCI room, that's

6 correct.

7 MR. TEMPLE: For a fire in that location, also, we

8 don't use the HPCI system so --

9 MR. MICHELSON: But the problem is the fire isn't

10 in that location. The fire is in another location but the

11 heat and smoke came over and actuated the fire protection

12 systems.

13 MR. ZERINGUE: We will get the answers, the

14 analysis is down through a department basis, the three hour

15 rated or whatever it is, fire barriers to prevent the heat

16 transfer, but we will get the specifics.

17 MR. CARROLL: I guess the question -- I still

18 don't think I understood your answer, or maybe you didn't

19 answer it. It was, do smoke detectors actuate fire

20 protection equipment.

21 MR. TEMPLE: They actuate the preaction valves.

22 MR. ABBAS: The answer is yes. Smoke detectors

23 will automatically actuate the fire pumps. They will alarm

24 and they will actuate preaction valves or deluge valves.

25 MR. HERRELL: They also isolate some smoke dampers

1 in the ventilation systems.

2 MR. CARROLL: I'm talking about actually spraying

3 water or releasing CO2 or whatever.

4 MR. ABBAS: Right. They will do that.

5 MR. MICHELSON: On smoke alone, though, I think

6 was the question.

7 MR. ABBAS: I'm Rashid Abbas, Fire Protection.

8 MR. TEMPLE: The closed sprinkler heads won't

9 actually open for that given fire unless it's hot enough to

10 open up.

11 MR. CARROLL: That's the point I wanted to

12 understand.

13 MR. TEMPLE: The preaction valve may open up and

14 charge it, but unless --

15 MR. CARROLL: The smoke detector charges the

16 system, but you still need heat to get water into an area.

17 MR. TEMPLE: Except in the HPCI room where --

18 MR. MICHELSON: Except where they have a deluge

19 system and then you don't need -- the preaction essentially

20 is the deluge valve.

21 MR. WARD: That was the heat detector though in

22 the HPCI room?

23 MR. MICHELSON: Yeah.

24 MR. WARD: Not the smoke detector.

25 MR. CARIER: Rashid, would you come up please?

1 MR. ABBAS: I guess your question was when you
2 have protection via smoke detectors. That would initially
3 alarm the local alarm panels in the main control room and at
4 the same time it's a cross zone system, and both zones are
5 protected and smoke is going to actuate the preaction valves
6 and will also actuate the fire pumps.
7 MR. CARROLL: Okay. But so far I haven't sprayed
8 any water into any part of the plant?
9 MR. ABBAS: No. Depending on if you have a
10 preaction system you have not sprayed any water. The system
11 is charged. The lines will fill up with water and the heat
12 in the area will actually go and fuse the fusible links on
13 the sprinkler head and then actuate water only in the area
14 where there is fire.
15 MR. CARROLL: That's what I wanted to hear.
16 MR. MICHELSON: But not all systems in this plant
17 are designed that way, are they?
18 MR. ABBAS: The majority of the systems are.
19 MR. MICHELSON: Majority, but what are the
20 exceptions?
21 MR. ABBAS: The exceptions are in the switch yard,
22 transformer yard, where we have a deluge system, which is a
23 fairly large system and that is the standard method of
24 protecting transformers.
25 MR. MICHELSON: That isn't actuated by smoke

1 detectors.

2 MR. ABBAS: No, that's actuated by heat detection.

3 MR. MICHELSON: And the HPCI protection spray is

4 also by heat?

5 MR. ABBAS: By heat detection, yes.

6 MR. MICHELSON: And how about your CO2 systems

7 MR. ABBAS: CO2 are also by heat detectors.

8 MR. MICHELSON: Only by heat?

9 MR. CARIER: Tom?

10 MR. MICHELSON: Does it requirs both smoke and

11 heat or either one or -- In the spreading room, for

12 instance, where you've got CO2, what actuates the CO2?

13 MR. ABBAS: Heat and smoke and the cross zones.

14 MR. TEMPLE: But it's a manual --

15 MR. MICHELSON: But heat and smoke to me mean

16 both. Heat and smoke mean both. Heat or smoke mean either

17 one will do it. Now, which is it in, say, the spreading

18 room?

19 MR. TEMPLE: We can give that in specific details.

20 They are manual systems, however. Even after all that goes

21 off, they manually initiate the CO2.

22 MR. MICHELSON: Well, they now have it manually

23 only.

24 MR. TEMPLE: Right. We changed that.

25 MR. MICHELSON: Are the electrical board rooms, is

1 that the same too? That's manual?

2 MR. ABBAS: The entire control building is a

3 manual system.

4 MR. MICHELSON: You have no automatic CO2? You do

5 in the diesel compartments.

6 MR. ABBAS: In the diesel building, yes.

7 MR. MICHELSON: How is it actuated?

8 MR. ABBAS: That's actuated by heat detectors.

9 MR. MICHELSON: Only?

10 MR. ABBAS: Only. Right, but I don't think it's a

11 smoke detector, but we will confirm that.

12 MR. CARROLL: So my question is, if I went into

13 your plant with a smoke -- a supply of smoke bombs and set

14 them off, not a drop of water would come out.

15 MR. ABBAS: Generally that's true.

16 MR. CARROLL: No, I want to know whether it's true

17 or not true.

18 MR. ABBAS: With the exception of HPCI --

19 MR. CARROLL: No, you said HPCI was heat.

20 MR. WARD: That was heat.

21 MR. MICHELSON: He's got a smoke bomb.

22 MR. CARROLL: I've got a smoke bomb.

23 MR. ABBAS: Right. That's true.

24 MR. CARROLL: Okay.

25 MR. MICHELSON: That's a better way of asking it.

1 (Laughter)

2 MR. CARIER: We'll get a response. We'll get a

3 good response and get back to you.

4 MR. CARROLL: I think we got one.

5 MR. MICHELSON: Well, he'll check it.

6 MR. CARIER: On the one Mr. Michelson asked, we'll

7 get back to you.

8 MR. MICHELSON: I would like to know just how hot

9 that CO2 system is rigged up.

10 MR. DAVIS: My name is Tom Davis. I'm a Senior

11 Fire Protection Specialist. The CO2 except in the diesel

12 generator buildings is manual. So it's alarm only for the

13 areas in the spreading room. All the existing rooms, the

14 computer rooms and the CO2 systems in your diesel generator

15 rooms are two out of three logic, all heat detectors.

16 MR. MICHELSON: Now in the diesel compartment on

17 the heat logic, does that go back to an electrical panel in

18 the cardox system to actuate the CO2?

19 MR. DAVIS; Yes.

20 MR. MICHELSON: Now is that electrical panel, a

21 seismically qualified circuitry?

22 MR. ABBAS: I'll have to check on that.

23 MR. MICHELSON: Well, the problem is if you don't

24 have a seismically qualified circuitry what prevents the

25 system from actuating the CO2 and all diesel compartments at

1 the same time from an earthquake, and then when you do you
2 shut off the air to the diesels. You bottle up the room and
3 then you fill it full of CO2.
4 MR. CARROLL: I don't think you shut off the air.
5 MR. WARD: Do you shut off the air to the diesels?
6 They have an external air intake, don't they.
7 MR. MICHELSON: Well, a CO2 wouldn't do any good
8 if they don't shut it off.
9 MR. ABBAS: When the CO2 is actuated any HVAC
10 dampers -- they are automatically shut off. So that area is
11 isolated from other areas.
12 MR. MICHELSON: Totally isolated. Maybe for
13 tomorrow you can get an answer to that one.
14 MR. CARIER: I didn't catch the question. You are
15 asking about all four of them?
16 MR. MICHELSON: Yes, from the non-seismic control
17 system, which the cardox control, I think, is. You
18 seismically hung some pipes, but you didn't seismically
19 qualify the control system to not spuriously actuate--
20 MR. WARD: Well, if the CO2 shuts off, the damper
21 is closed.
22 MR. CARROLL: And heat up the room.
23 MR. WARD: Well, they shut off the air supply, he
24 said.
25 MR. CARROLL: No, the air supply must be from the

1 outside.

2 MR. MICHELSON: No, no, no. The air to the room,

3 you saw it in there.

4 MR. CARROLL: But you are going to overheat the

5 generator.

6 MR. WARD: Does the intake air to supply the

7 diesels come from the room or from an external duct?

8 MR. ABBAS: That's externally.

9 MR. WARD: Okay. Now, if you have a fire is that

10 duct closed off?

11 MR. ABBAS: There are fire dampers, yes.

12 MR. DAVIS: Not through the area start system.

13 MR. WARD: Okay. So if you get this false fire

14 signal, is the diesel going to be able to keep running or

15 not? That's the point Mr. Michelson is trying to make.

16 MR. MICHELSON: The diesel and generator.

17 MR. WARD: Yeah, diesel and generator.

18 MR. MICHELSON: And the equipment in the room.

19 MR. ZERINGUE: Let's get a list of the questions

20 and we'll get the technical people together and get that

21 information for you.

22 MR. MICHELSON: Well, the question is very

23 straightforward.

24 MR. ZERINGUE: The impact of the non-seismically

25 qualified actuation system.

1 MR. MICHELSON: Causing spurious actuation on all
2 four generators at a time when you've got a seismic event
3 which maybe disturbing off site power.
4 MR. CARIER: And then the diesels run --
5 MR. MICHELSON: Yeah. If you can say that
6 everything runs fine then, that's a good answer. If you've
7 looked at it -- And I think that's probably either got fixed
8 cardox or you've got to show that everything runs fine even
9 though you've actuated it.
10 MR. WARD: One of the problems with a cardox
11 system, or the old ones at least, is they've got Mercoid,
12 which is in them which is not very good from a seismic point
13 of view. So I guess I'd like to know whether yours has been
14 upgraded or never had mercoid, which is --
15 MR. MICHELSON: Now, Peach Bottom discovered that
16 they have a generator trip, a diesel engine trip, on the
17 fire signal and it was coming from a mercury switch, and
18 that's not so good because you trip all four units.
19 MR. CARIER: We'll get an answer and put it on the
20 record.
21 MR. TEMPLE: In order to ensure safe shutdown
22 functions in a fire event and could actually be controlled
23 after the fire we had to implement certain modifications.
24 These shown here are the general areas of modifications. We
25 had to re-route certain cables for separation requirements.

1 We had to install emergency lighting and upgrade our
2 emergency lighting system. We had to provide
3 compartmentation by upgrading or replacing doors, dampers,
4 penetration seals, fireproof structural steel and fire wraps
5 also for separating the cable.
6 We upgrading the high pressure fire protection
7 system inside the Unit 2 reactor building. Both the general
8 and preaction system for area coverage and installed draft
9 stops and water curtains. We upgraded our phone system and
10 provided air supervision on our preaction and foam systems.
11 That's all inside the Unit 2 reactor building.
12 MR. CARROLL: What is the context of high pressure
13 fire protection? What pressure is that?
14 MR. TEMPLE: The operating pressure of that system
15 is 130 -- 40 pounds of pressure.
16 MR. CARROLL: And you also have a low pressure
17 system?
18 MR. TEMPLE: No. We call the lower pressure CO2
19 system. We only have one fire protection system -- water
20 system. Okay.
21 MR. CARROLL: Where do you use foam?
22 MR. TEMPLE: On certain specific electrical
23 hazard. Like in the recirc MG sets, we have foam spray.
24 Just certain select electrical hazards we've got foam spray
25 on.

MR. MICHELSON: Is your practice on water curtains to put these sprinkler heads at the ceiling?

MR. TEMPLE: I will refer back to Rashid on that one too.

MR. MICHELSON: Are they a floor to ceiling curtain, in other words?

MR. TEMPLE: Well, we have them installed up on the -- like right here (indicating), spraying down.

MR. MICHELSON: Well, that would be floor to ceiling for a doorway, but if it were that height in this room, it wouldn't be floor to ceiling. The reason I pursue it is because heat and smoke go over the water curtain, but you can perhaps argue that you temperate the heat and smoke if it has to pass through the water curtain. Are your water curtains floor to ceiling?

MR. ABBAS: The water curtains are located, yeah, at the ceiling level.

MR. MICHELSON: Are always at the ceiling level?

MR. ABBAS: At the ceiling level, yes.

MR. MICHELSON: Okay. That was the question. Thank you.

MR. CARROLL: I once had a bad experience -- back to foam systems -- at a fossil plant where we sat there fat, dumb and happy with a foam system until somebody had the bright idea that we ought to actually test it in the plant.

1 We had test connections from this out building where the
2 foam system was. It turned out it took about a half an hour
3 for the foam to get to an in plant location because of the
4 long lengths of piping. Have you ever checked the --
5 MR. TEMPLE: The actual operation of the foam
6 system physically operated?
7 MR. CARROLL: Yeah. In terms of when foam
8 actually gets to hose stations?
9 MR. TEMPLE: I'll need to refer to Don or Tom. Do
10 you understand the question about the foam system? Do we
11 physically test it to see when the foam actually gets
12 produced on the equipment?
13 MR. SMITH: My name Don Smith, Fire Protection
14 Engineering. We have not run that test to the best of my
15 knowledge. However, the foam system is located on the same
16 elevation as the fire hazard itself. It's within the
17 immediate proximity of it.
18 MR. MICHELSON: It's a short run, you're saying?
19 MR. SMITH: Yes.
20 MR. WARD: And that's the only place you use foam?
21 MR. SMITH: Yes, sir.
22 MR. MICHELSON: Where was it?
23 MR. WARD: MG set for the recirc pumps.
24 MR. MICHELSON: That was the only foam.
25 MR. SMITH: That is our only foam system.

1 MR. CARROLL: Why was the foam chosen for that
2 application?
3 MR. SMITH: Because of the high wall hazard in the
4 area.
5 MR. CARROLL: Okay. And that's those nozzles way
6 up in the ceiling that brought the --
7 MR. SMITH: Yes, sir.
8 MR. CARROLL: Okay.
9 MR. TEMPLE: We also upgraded the preaction
10 systems for each of the unit battery and battery board
11 rooms, which was located on elevation 593 of the control
12 board. So those are the general areas of modifications that
13 we had to implement.
14 As far as implementing our program. We have
15 integrated our Appendix R program into the overall plant
16 operations to assure continued compliance. We developed a
17 safe shutdown program which is referenced in our technical
18 specifications or will be upon final staff approval. This
19 program document identifies the required safe shutdown
20 equipment for an Appendix R fire event. It requires that it
21 must remain operable. It identifies the compensatory
22 measure to take if that equipment is out of service. It
23 also identifies the testing and surveillance intervals for
24 that equipment.
25 MR. MICHELSON: In the case of your spreading room

1 which we looked at this morning, that's protected by CO2
2 which was apparently manually actuated. Experience with
3 people with electrical fires elsewhere including very recent
4 experiences even have indicated that CO2 just won't put it
5 out. It'll slow it down, smother it a while, but it flashes
6 back. What's your plan on protecting those rooms in the
7 event that the CO2 doesn't work?
8 MR. TEMPLE: Do we not have a water spray system
9 in that same --
10 MR. ABBAS: Yes. We have an automatic preaction
11 system.
12 MR. MICHELSON: In the same room?
13 MR. ABBAS: In the same room.
14 MR. MICHELSON: All right. And now is it going to
15 be manually actuated or is it just a normal preaction
16 design?
17 MR. ABBAS: The preaction system in the spreading
18 room is an automatic system.
19 MR. MICHELSON: So it may come on before you ever
20 decide whether to actuate CO2 or not because it takes time
21 to get to the spreading room to decide and then if it's a
22 significant fire it may have already set off the preaction
23 system, is that right?
24 MR. ABBAS: Well, again, it's a preaction system
25 which --

1 MR. MICHELSON: Well, the thermal links -- There's
2 a fire. There's a real fire somewhere and it's heating it
3 up a couple of links and it's -- so you really will spray
4 the spreading room with water.
5 MR. ABBAS: Water. Well, even on the CO2 system,
6 you know, it's designed for deep seated fires, which means
7 the concentration of the CO2 should be sufficient to put out
8 a fire.
9 MR. MICHELSON: Has the experience -- Do you have
10 experience that indicates the CO2 will put out the deep
11 seated fires?
12 MR. ABBAS: Well, if you have sufficient
13 concentration, yes.
14 MR. WARD: And maintain it.
15 MR. MICHELSON: And maintain it long enough.
16 MR. ABBAS: And maintain it long enough. That's
17 right.
18 MR. MICHELSON: You are acquainted with the
19 McGuire problem on the -- That wasn't -- Which one was that?
20 The breaker fire out in the turbine building? Was that
21 Oconee?
22 MR. CARROLL: No, sir.
23 MR. WYLIE: That was not in an enclosed room.
24 MR. MICHELSON: No, no.
25 MR. WYLIE: And it wasn't an installed system.

1 MR. MICHELSON: No. It was manual.

2 MR. CARROLL: Yeah.

3 MR. WARD: Why isn't the automatic water system

4 adequate in there? Why do you need the CO2?

5 MR. ABBAS: Well, in the past history, some of the

6 commitments made, we had some code deficiencies in the -- in

7 our CO2 system. So we had to add the preaction systems.

8 MR. MICHELSON: Well, the CO2 was there to begin

9 with though. I guess you just left it there.

10 MR. ABBAS: Right.

11 MR. WARD: But it sounds like the water is going

12 to come on automatically, right?

13 MR. MICHELSON: If it a hot fire it will.

14 MR. WARD: If you have a real fire, yeah.

15 MR. ABBAS: I think it was part of the fire

16 recovery plan, the additional system.

17 MR. CARROLL: But having CO2 in there inhibits

18 human efforts to go in and see what's going on and perhaps -

19 -

20 MR. ABBAS: Well, again, it's a manual system. So

21 can it can be decided by the --

22 MR. MICHELSON: Oh, oh.

23 MR. CARROLL: Yes, manually. But you really

24 wonder what good will it --

25 MR. WARD: I'm still struggling with the need for

1 the CO2 system. Oh, it was already there?

2 MR. ABBAS: It was already there. It was part of

3 our recovery plans. We added the sprinkler systems. And

4 there was some controversy as far as which system has to be

5 automatic and which system has to be manual, but finally it

6 was decided that the CO2 would remain a manual system, and

7 preaction would be an automatic system.

8 MR. CARROLL: I think I'd cut the pipe and put --

9 MR. MICHELSON: Since it's a --

10 MR. WARD: It sounds like sort of, by god, you are

11 not going to have a fire in there again, right? Is that the

12 approach?

13 (Laughter)

14 MR. MICHELSON: Since that room's a very heavy

15 density in terms of several trays vertically and so forth,

16 how do you use a water spray? Is it all just at the

17 ceiling?

18 MR. ABBAS: Well, again, we have to look in detail

19 as far as the adequacy of the existing preaction system. It

20 will spray water but not with the density which may be

21 required, but we have identified those deficiencies and will

22 remove the code deficiencies.

23 MR. MICHELSON: Do you mean you are going to add

24 more sprinkler heads? Is that what you mean?

25 MR. ABBAS: Well, there's different types of

1 deficiencies. There's spacing. There's closeness to the
2 ceiling and their arrangement.
3 MR. MICHELSON: Yeah. It's not clear how you
4 arrange sprinkler heads with such high density of --
5 MR. ABBAS: Well, you have to have underneath, an
6 intermediate level --
7 MR. MICHELSON: You've got to put some
8 intermediate -- You've got to put some more sprinkler heads
9 in.
10 MR. ABBAS: That's correct.
11 MR. MICHELSON: Are you going to do that, or
12 what's the plan on it?
13 MR. ABBAS: Well, as the first step what we did
14 was the existing sprinkler heads. We changed to the quick
15 response type. So our calculations indicated that these
16 sprinkler heads would respond about four or five minutes
17 quicker than the standard type of sprinkler heads.
18 MR. MICHELSON: But will they get the water to
19 where the fire is? With all the instructions and putting
20 all that flamastic umbrella over the top of the --
21 MR. ABBAS: Right.
22 MR. MICHELSON: -- and the higher cable trays and
23 assuming the fire is in the lower cable tray, how does the
24 water get down to the fire?
25 MR. ABBAS: It will eventually cascade down to the

1 lower trays.

2 MR. MICHELSON: I looked at some of those trays,

3 looked like they are solid flamastic. How does it cascade

4 through that? It just runs off the side and down and that

5 doesn't get in underneath the tray where the fire is, does

6 it?

7 MR. ABBAS: Well, the -- Again, it will eventually

8 cascade down to the trays.

9 MR. MICHELSON: Did the staff look at that?

10 MR. ROSS: What? The particular issue?

11 MR. MICHELSON: Yeah. The issue of fire

12 protection in the spreading room, which is where the Browns

13 Ferry fire started, of course.

14 MR. ROSS: The Staff has looked at their fire

15 protection program and Appendix R. We didn't bring the

16 Staff reviewer that was involved with that, and any question

17 of that detail, we'd have to defer to we get back.

18 MR. MICHELSON: Maybe on Friday you could bring

19 them.

20 MR. ROSS: Sure.

21 MR. MICHELSON: Okay.

22 MR. CARROLL: Now, if they are going to be making

23 modifications to those sprinkling and the cable spreading

24 room, why don't I see this on the post re-start commitments?

25 MR. ROSS: Could you repeat that?

1 MR. CARIER: You are probably looking at the
2 project plan there?
3 MR. CARROLL: Yeah.
4 MR. CARIER: That's not an all inclusive list of
5 all -- we were tracking some of the bigger items on that
6 project plan. We have in our tracking system NFDA upgrades
7 for the next cycle we have committed to the staff. It's a
8 project that's been allocated for the next cycle.
9 MR. CARROLL: Okay.
10 MR. ROSS: This is an example, Jay, of some of the
11 items they are carrying.
12 MR. CARROLL: Okay. I would have thought that was
13 a major item.
14 MR. CARIER: From a regulatory standpoint.
15 MR. CARROLL: From a historical standpoint, or an
16 emotional standpoint.
17 MR. CARIER: I'll grant you --
18 MR. SMITH: The heads in the spreading room -- the
19 cable spreading room are intermediate and ceiling overhead.
20 MR. MICHELSON: That was part of the question that
21 wasn't clear.
22 MR. SMITH: They were not just all ceiling.
23 MR. MICHELSON: You looked at all the potential
24 prior locations and put in a fire sprinkler system that can
25 spray those locations or at least water that can get to

1 those locations?

2 MR. SMITH: The system was installed as part of

3 the fire recovery plan. This is a code def cient system as

4 identified on the upgraded program. We will be replacing

5 that entire system.

6 MR. MICHELSON: But it does appear to me that

7 flamastic is a water barrier, keeping water from the ceiling

8 from getting down through the tray levels and the trays are

9 stacked one on top of the others and several --

10 MR. ZERINGUE: We'll get the detail of the

11 analysis, but it also provides a barrier for fire too, the

12 flamastic.

13 MR. MICHELSON: That's what it does, yeah.

14 MR. CARIER: We don't consider the trays of

15 flamastic as a potential source of fire, but obviously if

16 you had some --

17 MR. MICHELSON: But I'm just trying t figure out

18 how you get the fire out eventually.

19 MR. CARROLL: But when you create a welding

20 machine in a cable tray, I'm not sure what happens then, as

21 has happened.

22 MR. MICHELSON: Uh-huh (affirmative).

23 MR. CARIER: I don't believe you could fit one in

24 cable spreader.

25 MR. CARROLL: No, no, I was thinking, for example,

1 of the San Onofre fire. In effect they had a lot of amps
2 going through that thing.
3 MR. MICHELSON: That's right. 250 DC will do nice
4 things.
5 MR. WYLIE: Yeah, but that was a case where you
6 had undersized cable completely way undersized cable that
7 was energized at the maximum current. That's a different
8 situation than what you are talking here.
9 MR. CARROLL: Well, in a screwed up protection
10 system with those fuses.
11 MR. TEMPLE: In addition to that safe shutdown
12 program, by the way, does include the unit 1 and 3 as well
13 as common equipment required to support Unit 2. Y'all had
14 referred earlier to questions about how we control Unit 3.
15 This is one of the avenues of making sure the Unit 3 will be
16 identified and kept operable for Unit 2.
17 We also created safe shutdown instructions which
18 are operating procedures. They are located in the main
19 control room as well as strategic areas in the plant. They
20 are prepared and controlled and trained to similar to the
21 EIO's, or emergency operating instructions. They are
22 trained. There are yearly walkdowns performed per the safe
23 shutdown instructions. They were developed from the
24 engineering and calculations identifying what equipment had
25 to operable -- I'm sorry -- which equipment is used for each

1 prior location, the time frame to get the equipment
2 energized, how we are going to operate it from the control
3 room locally, from the board, etcetera, and they are part of
4 the operations procedures and training.
5 We also integrated it, our Appendix R program,
6 into our design change policy, that's what Jim Maddox will
7 be talking about later, in that we developed criteria
8 statements to guide us in when we are preparing for a plant
9 modification package. We develop criteria statements to
10 determine whether or not our appendix or analysis would be
11 effect, i.e., by cable rerouting or something for EQ or some
12 other reason whether that reroute would in fact effect the
13 appendix or analysis. So that is part of our every design
14 change package we put out. We have to go through and make
15 sure our analysis is kept up to date.
16 As far as Appendix R status, Browns Ferry Unit 2
17 is in compliance with Appendix R, and all Appendix R
18 modifications needed for Unit 2 are complete.
19 MR. MICHELSON: Let me ask. Since there are
20 portions of Units 1 and 3 that are required to certain kinds
21 of events in Unit 2, is this a good time to find out whether
22 you have done analysis in which the prior perhaps is not in
23 Unit 2 at all but is in Unit 1 or 3? Is that going to be
24 covered later or --
25 MR. TEMPLE: No, I can address that.

1 MR. MICHELSON: Now, how did you -- Have you
2 looked at the fires that might be caused, say, by
3 construction on Unit 3 and what effect they would have on
4 the safe shutdown of Unit 2?
5 MR. TEMPLE: Sure. Unit 1 and Unit 3 are two
6 separate fire areas in our program. We postulate that fire
7 and in effect all the contents of the reactor building, we
8 assume were burned up and we guaranteed a redundancy
9 shutdown path for each function was indeed available.
10 Likewise for Unit 3, we assumed that whole building was
11 burned up, and all the equipment was lost, and we guaranteed
12 a redundancy of shutdown path was provided.
13 MR. MICHELSON: Of course, when equipment burns
14 up, in the process of burning up somewhere along the line it
15 starts to fail and produce spurious actuations and whatever.
16 MR. TEMPLE: That's right. We looked at spurious
17 operations and service heated circuits.
18 MR. MICHELSON: On all the circuits n Unit 3?
19 And what effect they may have on Unit 2.
20 MR. TEMPLE: In some cases we had identified the
21 required equipment for a staged Unit 3 fire. We used Unit 1
22 and 2 diesel generators and supplies over to the -- We may
23 not necessarily have looked at every cable failure in Unit
24 3, but we did look at all the cables that we were actually
25 going to use to say the power circuits and control circuits

1 for the fire pump and looked at all the associated circuits
2 for that equipment and made sure they were not in Unit 3
3 that were not -- that did not trip our equipment out. So,
4 yes, we have postulated fires in Unit 1 and Unit 3 and
5 guarantee that the safe shutdown path for that fire was
6 available. And that equipment, let's say this -- As you
7 know, the Unit 1 and 2 diesel generator building is located
8 over there close to Unit 1. So for fires in Unit 1, we used
9 the Unit 3 diesel generators and used the cross type feature
10 to power up to equipment. And those -- that Unit 3
11 equipment that's needed for that fire event is included in
12 our safe shutdown program.
13 MR. MICHELSON: The ability to supply power from
14 the Unit 3 diesels to the Unit 2 board, you've checked to
15 make sure it doesn't in any way loop through Unit 1 areas in
16 the process?
17 MR. TEMPLE: That's correct. We had to perform
18 certain modifications too to make sure that those circuits
19 were not trip out our breakers.
20 MR. WARD: Tom, your first bullet there says you
21 are in compliance, but we heard earlier that the spray
22 system in the cable spreading room doesn't yet meet certain
23 code requirements. How do you square those two?
24 MR. TEMPLE: Well, that is an NFPA code compliance
25 issue. Appendix R, we assume the whole spreading room was

1 indeed burned up. We used back up control, which is
2 physically removed from the control building. So Appendix
3 R, we are in compliance. There are certain NFDA code
4 deviations that we have, but our Appendix R, we still have
5 compliance for that. For instance, like I'm saying, we
6 assume that spreading room was burned up and all the cables
7 are in it.
8 MR. MICHELSON: In doing your Unit 2 analysis did
9 you also consider possible spurious operations caused by the
10 fire in Unit 2?
11 MR. TEMPLE: Yes, we did.
12 MR. MICHELSON: In other words, the unwanted
13 actions generating by the fire, and --
14 MR. TEMPLE: Yes, sir.
15 MR. MICHELSON: -- keeping in mind that fire may
16 just be heat in some parts of the building and not anything
17 more, and the heat is on solid state electronics in some
18 cases, or other kinds of devices that are heat sensitive,
19 and you looked at that to see what kind of actions would be
20 generator by the elevated temperature in the vicinity of
21 that equivalent?
22 MR. TEMPLE: I believe that basically one of your
23 earlier comments that we were going to get back with you
24 earlier. You were talking about the heat from the fire
25 causing temperature elevations in other areas.

1 MR. MICHELSON: I'm asking the same question a
2 little differently, but it's the same question. Okay. We
3 will hear it tomorrow.
4 MR. CARROLL: Now, I guess one thing I'm curious
5 about, it sounds like this is a fairly recent effort.
6 MR. TEMPLE: Well, -- Go ahead.
7 MR. CARROLL: And I thought a great emphasis --
8 Okay. You weren't an operating plant. That's the reason.
9 Okay. I think most of the operating plants had a wrap up
10 Appendix R a long time ago, but since you weren't in
11 operation, that's why it's been delayed here. Is that--
12 MR. ROSS: Also from the assessment too, from the
13 original fire at Browns Ferry, the industry initiatives and
14 the rule came out after a lot of the initiatives began at
15 Browns Ferry. So the Staff and TVA had to reconcile what
16 was acceptable from the fire recovery plan and what did we
17 now need to meet the Appendix R? But you're right, the
18 final completion, the Staff has reviewed the program and
19 inspected complying to Appendix R, and all that has been
20 very recent.
21 MR. CARROLL: Okay.
22 MR. CARIER: When we were shut down -- When we
23 shutdown in '85 we were in the middle of negotiating with
24 the Staff how we were going to implement Appendix R, and
25 then we subsequently made a commitment that we would not

1 start up until we met Appendix R.

2 MR. CARROLL: Have you ever read the San Dia Fire

3 Risk Scoping Study, which goes beyond Appendix R in terms of

4 raising some concerns?

5 MR. TEMPLE: If I have read that personally it's

6 been some time ago, and I'm not sure whether any of the fire

7 protection people specifically have reviewed that report. I

8 don't --

9 MR. CARIER: Are you talking about external

10 events? What they consider external events? Outside fires?

11 MR. MICHELSON: No, no, no.

12 MR. WARD: Well, in PRA talk it's external events,

13 yeah. Right.

14 MR. CARROLL: But I'm talking -- They basically

15 looked at Appendix R and asked the question, does it go far

16 enough in some areas, and --

17 MR. MICHELSON: Virtually all fires are external

18 events.

19 MR. CARROLL: It's interesting reading. After you

20 finish Appendix R it makes you wonder whether you did as

21 much as you should.

22 MR. CARIER: That's where I think IPEEE has taken

23 us. IPEEE, the effort that the industry has gone through.

24 It's going to look at some of that also.

25 MR. MICHELSON: That's right. That Five Program.

1 MR. CARIER: Right.

2 MR. CARROLL: I think one of my hobby horses is I
3 just don't believe fires are that big of a concern in
4 nuclear power plants, and the data base that one uses to do
5 the -- to do a fire PRA just seems to me to be totally out
6 to lunch. Have you participated in a -- or have you done a
7 fire PRA?

8 MR. CARIER: At this time we have not done a fire
9 PRA. Most likely we will end up doing one as part of the
10 IPEEE effort.

11 MR. CARROLL: Okay. Most likely you will. No, it
12 ends up with most plants where fire is a major, major
13 contributor to core damage frequency, and it's --

14 MR. WARD: Alleged.

15 MR. CARROLL: Allegedly. And it's because, you
16 know, a waste basket fire gets included in the data base
17 that at least suggests that that can go from a waste basket
18 fire to burning the plant down, and I just don't think the
19 people that have done those data bases have been very
20 circumspect about how they deal with degrees of fire. Okay.

21 MR. TEMPLE: Are there any other questions?

22 (No response)

23 MR. TEMPLE: If not, I'll turn it over to Max
24 Herrell, who will discuss the other improvements we've made
25 for the fire protection systems above the Appendix R

1 specifically as well as the improvements we've made in
2 management structure to maintain focus on fire protection.
3 MR. HERRELL: Good afternoon. I'm Max Herrell.
4 After meeting the Appendix R and other regulatory
5 requirements Browns Ferry has taken steps to continue to
6 improve its fire protection program.
7 We contracted with the fire protection engineering
8 firm to perform an engineering comparison study of the
9 branch technical position CMEB 9.1-5 of our programs.
10 In addition TVA performed a comparison of the
11 Browns Ferry fire protection systems to the National Fire
12 Protection Association, NFPA, codes. From these we
13 developed the fire protection report. This report
14 consolidates Browns Ferry fire protection program,
15 documentation and commitments into a single document. This
16 report has been developed in accordance with the guidelines
17 of the NRC's generic letter 86-10, and brings Browns Ferry
18 into compliance with the NRC recommendations for documenting
19 the fire protection program and commitments.
20 This report was submitted to the NRC on April 4,
21 1988 for review and approval to supersede the previous
22 Browns Ferry Fire Recovery Plan.
23 This report contains the Fire Protection Plan,
24 which describes the organization supporting the Fire
25 Protection Program, the plant fire protection systems and

1 features, the fire loss prevention procedures and
2 administrative controls, the plant emergency response
3 organization and the fire protection equipment operating and
4 surveillance requirements. It also includes the Appendix R
5 Safe Shutdown Analysis, which includes 10 CFR 50, Appendix R
6 submittal and the supplemental information, which forms the
7 basis of Browns Ferry compliance with Appendix R, Sections
8 III, G, J, and L.
9 We also have the fire hazards analysis. This
10 provides a compilation of the fire hazard analysis in safe
11 shutdown evaluation for all the prior areas in zones
12 identified for Browns Ferry. The evaluation of each area
13 describes its compartmentation, its combustible loading, its
14 available suppression and detection systems and the safe
15 shutdown capability for that area in a fire.
16 We also looked at the branch technical position
17 comparison. That documents the degree of Browns Ferry Fire
18 Protection Program conformance with the guidelines of the
19 branch technical position. Included is the summarization of
20 identified deviations from NFPA codes and standards present
21 in Browns Ferry fixed Fire Protection systems. Deviations
22 are being evaluated for modifications under the Browns Ferry
23 Fire Protection Upgrade Program.
24 The Browns Ferry Fire Protection Upgraded Program
25 compiles the changes to the Fire Protection systems to which

1 TVA is committed and other changes in which TVA is in the
2 process of evaluating. One of these is our procedure
3 upgrades. Browns Ferry has conducted a complete review of
4 all our fire protection procedures, administrative controls
5 and surveillance instructions with special emphasis on the
6 technical accuracy and the technical specification
7 compliance.
8 In addition by June 15th of this year, we will
9 have incorporated all fire protection SI's, surveillance
10 instructions, into our plant's quarterly surveillance
11 schedule in process. Thus providing appropriate visibility
12 and management attention to fire protection SI's. As part
13 of these additional improvements we have worked very closely
14 with our insurance representatives and they have had very
15 favorable endorsements to our programs.
16 Also with these software upgrades we have
17 completed a number of hardware improvements beyond those
18 required for Appendix R and other regulatory requirements.
19 Additionally during the performance of preventative and
20 corrective maintenance we will continue to upgrade to UL
21 listed components and NFPA code requirements where possible.
22 As an example of some of these additional upgrades
23 that we have done, we currently have two fire trucks on
24 Browns Ferry premises and two ambulances.
25 Some additional hardware improvements we've had,

1 Units 1, 2 and 3 CO2 systems were refurbished to improve the
2 system reliability and increase the soak times for several
3 of the protected areas. Approximately 98 percent of the
4 solenoid and the flow control valves were rebuilt with
5 Teflon and neopr·· e rebuild kits versus the old leather seat
6 material present in the valves.
7 Two of the three electric fire pumps were rebuilt
8 by the manufacturer. All three electric fire pumps were
9 tested satisfactorily for capability and are currently tech
10 spec operable.
11 MR. CARROLL: Now, do you in addition to electric
12 fire pumps have diesel pumps?
13 MR. HERRELL: We have one diesel fire pump. We
14 have skit mounted diesel fire pump in the warehouse that we
15 can bring out. We have a telesquirt on the front of our
16 fire truck and we can go out into the river and supply
17 water. We have a number of alternate means besides those
18 installed fire pumps.
19 MR. CARROLL: Is the installed diesel pump the
20 same size as the electrics?
21 MR. SMITH: It is slightly larger.
22 MR. HERRELL: Yeah, just a little bit bigger.
23 MR. MICHELSON: Do you use Halon at all on the
24 plant?
25 MR. HERRELL: We use some Halon in the computer

room. I believe that's the only place we have it.

MR. MICHELSON: In the computer room, and that's the only place.

MR. SMITH: Well, the training center.

MR. MICHELSON: Training center.

MR. SMITH: Outside the plant.

MR. CARIER: That blue building you were in has Halon.

MR. SMITH: We have no Halon systems.

MR. MICHELSON: Which you are using CO2 in those areas then where all the solid state controls are.

MR. HERRELL: Inside the power block we use CO2.

MR. MICHELSON: Maybe you can tell us -- Well, I'll ask when we are talking environmental qualification about qualification of that equivalent if you actuated to CO2.

MR. HERRELL: Additionally 43 underground roadway valves have been replaced with UL listed valves and post indicators. Approximately 95% of underground valves within the protected area were part of this replacement. Nineteen fire hydrants and their isolation valves were also replaced with UL listed components. One hundred percent of the hydrants and hydrant isolation valves within the protected area were part of this replacement.

MR. CARROLL: Why were you all rated to begin

1 with?

2 MR. HERRELL: Don, can you answer that question?

3 Why were you all rated to begin with?

4 MR. SMITH: This system is, keep in mind, a 20

5 year old system. The specifications at the time did not

6 install UL listed components for our underground system. We

7 have replaced those components with the UL listed

8 components.

9 MR. CARROLL: And that was okay with your

10 insurance underwriter --

11 MR. SMITH: Probably not.

12 MR. CARROLL: -- back in those days?

13 MR. SMITH: Probably not.

14 MR. CARROLL: Okay.

15 MR. MICHELSON: Well, I'm a little puzzled. You

16 added an awful lot of fire protection after Browns Ferry

17 fire. Did you use the same yard system, the same water

18 distribution system as you had before?

19 MR. SMITH: Yes, sir.

20 MR. MICHELSON: It was big enough even to supply

21 all the additional demands of these new systems that were

22 added?

23 MR. SMITH: The yard system is a 14 inch --

24 MR. MICHELSON: I don't care about size, but the

25 capacity is such that -- it was overdesigned by quite a bit

1 then for what they -- because there wasn't all that much
2 except mainly, I guess, hose racks.
3 MR. SMITH: We have three electric fire pumps and
4 one diesel fire pump, but according to fire protection text
5 specs we have to one electric and one diesel.
6 MR. MICHELSON: So you've got -- And you've got
7 plenty of pumps?
8 MR. SMITH: Yes, sir.
9 MR. MICHELSON: Even with all the automatic
10 systems?
11 MR. SMITH: Yes, sir.
12 MR. HERRELL: And we have a separate outside loop
13 for a lot of our outside protected areas, buildings with its
14 own separate fire supply header.
15 MR. MICHELSON: Now, correct me if I'm wrong, but
16 I vaguely recall reading an LER sometime back -- maybe it
17 was a couple, three years ago, in which you had your clapper
18 valve on a deluge system had fouled up because of loss of --
19 I think it was control air in that case to the clapper
20 valve and you deluged quite a bit of equipment and then you
21 said you replaced it all -- you replaced the system. You
22 done away with it. Was that on TVA? Did you have that
23 event?
24 MR. ABBAS: I'm not sure. I think you may be
25 referring to the star valves we had for the spray systems,

1 and those we have decommissioned for Unit 2.

2 MR. MICHELSON: Then you had an event in which one

3 of those went off and you lost -- you dumped a lot of water.

4 I think it was 15,000 gallons, or something, that got dumped

5 from the deluge.

6 MR. ABBAS: I know we dumped water. Exactly

7 what or where --

8 MR. MICHELSON: At any rate, it may not have been

9 TVA. Somebody else. But anyway, you don't have any those

10 type systems anymore?

11 MR. ABBAS: We have decommissioned those systems

12 because of our sprinkler upgrading.

13 MR. HERRELL: Additionally we've replaced 16 power

14 block distribution header isolation valves with UL listed

15 components. All of our switchyard transformer deluge valves

16 have been refurnished. Our flow control and isolation

17 valves are replaced with new components.

18 During the extensive plant modifications we had

19 numerous fire watches posted in the plant as required by

20 tech specs. Upon completion of this modification work our

21 fire protection systems were returned to service to support

22 the Unit 2 restart.

23 MR. CARROLL: How many comp measures would I find

24 out there today if I walked around?

25 MR. HERRELL: Right now today we have three LCO's

1 dealing with fire protection. We have two -- it may have
2 changed by now -- we have two roving fire watchers in the
3 reactor building and one of the roving fire watchers in the
4 control building and one roving fire watch in the turbine
5 building for all three units.
6 MR. CARROLL: Okay.
7 MR. HERRELL: Flow testing was performed of all
8 our flow control valves and hose stations to prove
9 operability of the water delivery system thus proving that
10 there were no operability concerns due to MIC buildup. This
11 testing activity is every three years.
12 As part of our overall restart program the high
13 pressure fire protection and carbon dioxide systems have
14 been SPOCed. SPOC stands for System Preoperability
15 Checklist. The fire rated barriers and penetrations would
16 be SPOCed this week thus completing, returning to operable
17 status all our fire protection systems.
18 We now have a dedicated fire protection
19 organization. This organization is made up of two parts
20 each one acting as a check for the program. This ensures
21 that the fire protection program is maintained at a high
22 level of visibility and management attention.
23 The first component is the fire protection
24 operations section. Browns Ferry has taken the innovative
25 approach by establishing an emergency response organization

1 that performs surveillance testing and minor maintenance of
2 the fire protection equipment and systems. This dedicated
3 organization supports all fire protection surveillances,
4 inspections and minor maintenance activities while providing
5 a full time onsite emergency response group for fire,
6 medical and hazard material emergencies. This organization
7 has been placed in the operations section in order to
8 provide a better interface with the on-shift shift
9 operations supervisor during plant emergencies and while
10 performing fire protection system surveillances.
11 MR. CARROLL: How many people?
12 MR. HERRELL: There are 25 full time fire fighters
13 in that group, and they are led by one senior reactor
14 operator, licensed individual.
15 MR. CARROLL: Is it envisioned, or are the
16 operators still getting fire fighting training to supplement
17 this group or do they just stand and watch the fire?
18 MR. HERRELL: No, the operations AUO's used to be
19 go to the 40 hours a year training up at the Mick Jack
20 Training Center and maintain their fire protection policy.
21 Now that we have the dedicated fire organization, that fire
22 organization goes through all that training and maintains
23 that qualification. We do have an onsite fire trainer who
24 does provide some limited fire training to the operators,
25 but the primary fire focus is in the dedicated group of

1 individuals.

2 MR. CARROLL: But is it envisioned that operators

3 will have sufficient training that they can supplement that

4 group if you had a really bad fire or are you limited to the

5 five people that would be on shift?

6 MR. HERRELL: At the current time we are not

7 supplementing that fire protection training, I don't

8 believe.

9 MR. ZERINGUE: The existing AUO's do not have the

10 full 40 hour fire protection training for certification.

11 They do receive fire protection training and they can

12 provide assistance to the five men fire fighting crew.

13 MR. HERRELL: They can do things like be hose man

14 and stuff like that.

15 MR. MICHELSON: How many technically qualified

16 people respond to the fire with this fire brigade which is

17 the dedicated brigade?

18 MR. HERRELL: Basically what we do for a fire, we

19 have a Fire Captain and four fire fighters that respond out

20 of the fire protection organization. We have a senior

21 reactor operator, licensed. ASOS, assistant shift operating

22 supervisory, who responds as an incident commander. He kind

23 of coordinates any back-up efforts that he needs or anything

24 of that. Security typically also responds to all fires.

25 MR. MICHELSON: My point I guess is, who tells the

1 fire brigade Captain whether it is permissible to spray this
2 or that piece of equipment?
3 MR. HERRELL: Fire Brigade Captains do have
4 systems training in the plant and are very knowledgeable of
5 the plant systems. The incident Commander also backs that
6 up.
7 MR. MICHELSON: How much training do they
8 typically get in this area?
9 MR. HERRELL: The systems area?
10 MR. MICHELSON: The systems area of understanding
11 the importance of the susceptibility of that system to what
12 they might be about to do.
13 MR. HERRELL: I don't know off the top of my head,
14 sir. I'll find that out.
15 MR. ZERINGUE: We mentioned that we have an
16 incident Commander. He is a senior reactor operator.
17 MR. CARROLL: But he's not on shift, right?
18 MR. ZERINGUE: Yes, he is.
19 MR. HERRELL: Yes, he is.
20 MR. CARROLL: Oh.
21 MR. HERRELL: He is on shift and he responds.
22 MR. MICHELSON: But I thought he was going to do
23 some coordinating back with the rest of the crew, and that
24 was my question. Who is with the brigade that tells the
25 brigade what to do or what not to do and particularly what

1 not to do.

2 MR. HERRELL: Okay. We have basically --

3 MR. MICHELSON: In a technical sense, now.

4 MR. HERRELL: The fire Brigade Captain has some

5 knowledge in that area, but the incident Commander is down

6 there with the brigade during the fire. They are in radio

7 contact. He is right there to tell them just like you said.

8 Don't do this or don't do something else.

9 MR. MICHELSON: So he is the technical man right

10 on the spot that makes sure that they don't do the wrong

11 thing.

12 MR. CARROLL: And he's an SRO.

13 MR. HERRELL: SRO. He's an assistant shift

14 operating supervisor on the rotating shift.

15 MR. CARROLL: But that's not his only duty?

16 MR. HERRELL: No, sir.

17 MR. MICHELSON: But in case of fire can he --

18 MR. HERRELL: He responds.

19 MR. MICHELSON: -- abandon whatever he is doing

20 and go?

21 MR. ZERINGUE: We maintain an extra SRO for this

22 purpose. Well, for a variety of purposes.

23 MR. MICHELSON: Okay. So you've got a fire and

24 you're in a tough operating situation. What is his charter?

25 Is he supposed to stay with the fire or come -- shift

1 manager or whatever you call him, say, "Hey, let those guys
2 put the fire out. Come back to the control room, I need
3 help"?
4 MR. ZERINGUE: By procedure he is required to
5 respond to the fire. As I said, we exceed the text spec
6 requirements in that for operation of Unit 2 we'll have
7 three senior reactor operators on shift, dedicated to Unit
8 2.
9 MR. CARROLL: Okay. Do you intend to -- How do
10 you intend to carry that out with three units?
11 MR. ZERINGUE: We have the shift operation
12 supervisor. He's the man in charge. We have one assistant
13 shift operations supervisor who is essentially in charge of
14 the control room. We have a second fellow, Assistant Shift
15 Operations Supervisor, who we refer to as the outside man.
16 MR. HERRELL: So each unit will have its own
17 assistant shift operation supervisor who can respond to a
18 fire or an emergency on that unit.
19 MR. MICHELSON: He's the outside man?
20 MR. HERRELL: He's the outside man, yes, sir.
21 MR. MICHELSON: And he is chartered now to stay
22 with the fire or -- Responding is one thing but staying with
23 it is another.
24 MR. HERRELL: Yes, sir, he stays with the fire or
25 medical emergency until he's no longer needed.

1 MR. MICHELSON: Okay.

2 MR. CARROLL: The concern obviously is the typical
3 fireman can do a lot of damage with his hose and his ax,
4 which you may not want to have happen.

5 MR. HERRELL: Part of the advantage of having
6 these firemen do the surveillances and other minor
7 maintenance, it makes them very knowledgeable of the systems
8 out there in the areas where they are working on their fire
9 protection systems.

10 This dedicated organization has been trained in
11 accordance with the fire training requirements of the NFPA
12 1001, Hazardous Materials and Confined Space Rescue
13 Training, identified by OSHA in 29 CFR 1910 and they have
14 received emergency medical technician certification from the
15 State of Alabama.

16 This dedicated fire emergency response
17 organization offers several advantages over a typical
18 organization. It reduces the conflict in priorities
19 between fire protection and other important maintenance
20 surveillance activities. It provides a specialized trained
21 group who performs surveillance testing and minor
22 maintenance on fire protection equipment systems. It makes
23 adequate resources more available to support daily
24 activities of surveillance testing and maintenance
25 activities on the fire protection systems. It greatly

1 enhances Browns Ferry fire, medical and hazardous material
2 response capabilities and it reduces the amount of site
3 personnel required to receive emergency response training.
4 The second component of this organization is the
5 engineering support fire protection organization. The fire
6 protection engineering responsibilities have been placed in
7 the technical support organization. This approach
8 significantly increases the fire protection engineering and
9 technical capabilities by utilizing, on an as-needed basis,
10 additional engineering and technical manpower that is
11 provided by the technical support organization. Technical
12 support organization provides system engineers for the
13 programmatic controls, the electrical and the mechanical
14 support of the fire protection organization.
15 As you can see from this organization chart --
16 MR. CARROLL: That's okay. If you can read
17 backwards.
18 (Laughter)
19 MR. HERRELL: As you can see from this
20 organization chart the fire protection operations
21 organization contains the fire fighters, medical services
22 technicians, the shift foremen, and reports up to the plant
23 operations managers.
24 MR. CARROLL: What kind of people are these?
25 MR. HERRELL: If you will flip back to that slide.

1 MR. CARROLL: I mean in terms of background.

2 MR. HERRELL: Okay. What you have is, in this

3 group right here, you typically have two professional fire

4 fighters and two craft people, an electrician, a

5 boilermaker, an AUO, something along that line. So you

6 typically make up 50/50 with professional fire fighters and

7 plant people with an interest in fire fighting who have been

8 on those jobs and have been selected for it. The shift

9 foreman, there's a real mixed bag of people in there. It

10 basically depends upon performance and the individual. We

11 have some shift foremen that were AUO's. Some that were

12 boilermakers. Some that were professional fire fighters.

13 MR. CARROLL: And the professional fire fighters

14 you've hired from on the outside?

15 MR. HERRELL: From outside, yes, sir. Next slide.

16 The technical support organization, as you can

17 see, reports up to the technical support manager. Both the

18 technical support manager and the plant operations manager

19 report directly to the plant manager.

20 In summary, we have not just met the standards

21 through our fire protection report and upgrades to meet the

22 Appendix R requirement, but in many cases we have exceeded

23 the regulatory requirements in our preparations to restart

24 Unit 2, and we have committed significant efforts and

25 resources to continue a ling term upgrade of our fire

1 protection systems.

2 MR. MICHELSON: Let me ask you a brief question.

3 I think it was about a year and an half or two years ago

4 that you experienced a dry well fire? Is that right.

5 MR. HERRELL: I wasn't here a year and a half ago,

6 sir. I couldn't tell you.

7 MR. CARIER: Yes, sir.

8 MR. MICHELSON: You know about the dry well fire?

9 MR. CARIER: Yes, sir.

10 MR. MICHELSON: My question is, I thought a lot of

11 this was already in place at that time. Why did that fire

12 burn as long as it did and as extensively as it did with all

13 this fine protection?

14 MR. CARIER: I'm not the expert on that, but I

15 know part of the answer, and then somebody will have to step

16 in, but it was the inside of the dry well, and inside the

17 dry well we don't have our protection equipment in there.

18 MR. MICHELSON: But you have all your trained

19 people, your fast response, your equivalent. I think that

20 was one way -- You've tried CO2 quite awhile and gave up

21 and had to eventually bring in water, I believe, on that one

22 and it burned, what? Twenty or thirty feet of links on the

23 cable in the area? There was some auxiliary fuel around

24 that helped it along, but with -- you know, I wondered why

25 it took so long with a good system like you have here to put

1 it off. MR. DAVIS: My name is Tom Davis. At that point
2 in time I believe the response time, if my memory -- was
3 like 20 minutes before the dedicated response did get to the
4 dry well. They didn't use --
5 MR. MICHELSON: I see.
6 MR. DAVIS: They didn't use any CO2 used at that
7 point in time. It was basically the support from standby
8 systems.
9 MR. MICHELSON: I thought they tried CO2? They
10 had a local extinguisher there and it didn't work.
11 MR. DAVIS: Not to my knowledge.
12 MR. MICHELSON: Maybe not. But the water was
13 eventually the --
14 MR. DAVIS: Water as fog or water nozzle.
15 MR. MICHELSON: But now you will have a system
16 that responds much quicker than 20 minutes? Would that be
17 the difference or is it just that any fire that gets started
18 like this is going to do that much damage before you do
19 something about it?
20 MR. HERRELL: At the present time, as evidenced by
21 some people who have been hurt in the dry well, we think we
22 have about a five to seven minute response time of the fire
23 brigade and emergency response people, once notified. We
24 have changed some of the entry requirements. RadCom now
25 lets the people go directly in. We don't have to suit up

1 or do any of that stuff like that. So we have a relatively
2 quick response now once notified.
3 MR. MICHELSON: Was that -- In the other case was
4 there a problem that they had to suit out and everything
5 first. That was where the 20 minutes came from?
6 MR. HERRELL: Yes, that was part of the
7 contributing factor. They were trying to suit up and go in.
8 MR. MICHELSON: And that was the delay. That was
9 a very extensive burn for -- I mean, everybody saw it
10 starting, you know, and yet it burned that much..
11 MR. DAVIS: Also at that point in time our
12 operations was our sole fire response organization at that
13 time.
14 MR. MICHELSON: So this came after that dry well
15 fire?
16 MR. DAVIS: Right, came afterwards.
17 MR. MICHELSON: Which was about two years ago now;
18 is that right?
19 MR. CARIER: The dry well fire? No. It's more
20 than that. It's like three.
21 MR. MICHELSON: Time goes by for me in a hurry.
22 Was it three years ago?
23 MR. CARIER: Three years ago.
24 MR. MICHELSON: So this all past?
25 MR. CARIER: Right.

1 MR. HERRELL: Could I take any other questions,
2 sir?
3 MR. CARROLL: If I were to go out and look at your
4 two fire trucks where would I find the ignition keys?
5 MR. HERRELL: I'm going to say you would find the
6 ignition keys in the ignition. That's on the days I've been
7 out there.
8 MR. CARROLL: That's what we once thought at
9 Diablo except some guy had just inadvertently stuck them in
10 his pocket and was up having a coke in the lunch room or
11 something when we needed the fire truck. Think about it. A
12 key ring helps.
13 MR. ZERINGUE: We have redundant fire trucks.
14 (Laughter)
15 MR. CARROLL: But are they diverse?
16 (Laughter)
17 MR. HERRELL: They are stored in two different
18 locations, yes.
19 Thank you.
20 MR. CARIER: If there are no further questions in
21 the area of fire protection, I would like to introduce Henry
22 Jones who will be giving a discussion on environmental
23 qualifications 54.49.
24 MR. JONES: Good afternoon. I'm Henry Jones,
25 Nuclear Engineer, Nuclear Engineering Organization, Browns

1 Ferry Nuclear Plant.

2 Browns Ferry has established and implemented a
3 program for qualifying electrical equipment in accordance
4 with 10 CFR 50.49 requirements.

5 The initial activities accomplished by Browns
6 Ferry personnel to environmentally qualify equipment was not
7 effective. This was due to a lack of understanding the full
8 technical and organizational requirements necessary to
9 obtain and maintain a valid environmental qualification
10 program.

11 In August of '86, TVA accomplished a major step to
12 correct this situation with the implementation and formation
13 of the environmental qualification project.

14 The project has the responsibility to establish
15 and implement the EQ program. The project consists of full
16 time dedicated individuals with the sole responsibility to
17 implement this program. This concept of the project is
18 consistent with the Sequoyah approach to environmental
19 qualification and Browns Ferry has utilized lessons learned
20 from the Sequoyah experience and work accomplishments.

21 The environmental qualification project works
22 includes the project mission. The project mission assures
23 a structured process and also development of documentation
24 that is in a format to undergo audits with positive results.

25 The project also developed the scope of equipment

1 necessary to mitigate postulated events which create harsh
2 environments. This list also includes the equipment that
3 must not change state to ensure its proper function for
4 environmental qualification.
5 The project also determined the harsh
6 environments. State of the art calculations were utilized.
7 They were developed and issued to insure that we had
8 established environments following postulated events.
9 MR. MICHELSON: Henry, are these environmental
10 outside of containment?
11 MR. JONES: They include the environments where
12 any safety related equipment is located.
13 MR. MICHELSON: And you then have made the
14 calculations of the nature of the environment in the various
15 locations out in the reactor building and --
16 MR. JONES: That is correct.
17 MR. MICHELSON: -- control building, or wherever?
18 MR. JONES: Wherever safety related equipment is
19 located used to mitigate these postulated events.
20 MR. MICHELSON: And environment means temperature
21 --
22 MR. JONES: Pressure, humidity, radiation,
23 submergence, chemical sprays. At Browns Ferry we do not
24 have chemical sprays.
25 MR. MICHELSON: And that includes condensing

1 atmospheres?

2 MR. JONES: Yes. Yes.

3 Now, the harsh environments were documented in a

4 set of issued drawings. These drawings are in a user

5 friendly format and define the specific environmental

6 parameters for each areas containing safety related

7 equipment.

8 The project developed and assured implementation

9 of EQ process procedures. These procedures include the

10 standards for the accomplishment of this work and provides

11 assurance of a consistent and quality product.

12 The EQ project was also responsible for training.

13 The critical aspects of the environmental qualification

14 process have been highlighted in a video tape. This video

15 tape is shown to individuals involved with the environmental

16 qualification activities, including engineering,

17 maintenance, operational personnel.

18 The project also developed the organization

19 interfaces. Environmental qualification is a site-wide

20 activity. The organizations involved include nuclear

21 engineering, operations, maintenance and quality assurance.

22 This insured that all the organizations had the information

23 it needed and they concurred in the program implementation.

24 MR. MICHELSON: When talking harsh environments,

25 now, are these environments resulting from pipe breaks

1 outside of containment?

2 MR. JONES: That was a part of the program also.

3 That's right.

4 MR. MICHELSON: Did you include the harsh

5 environments resulting from fire or was that a separate

6 consideration?

7 MR. JONES: That is a separate activity. It

8 included the environments created by the postulation of pipe

9 breaks.

10 MR. MICHELSON: You are focusing on pipe breaks,

11 low energy and high energy, and what kind of environment

12 they created?

13 MR. JONES: That's correct.

14 MR. MICHELSON: Okay. But the fire questions are

15 separate and I think you are going to tell me a little more

16 tomorrow --

17 MR. JONES: That's a separate issue.

18 MR. MICHELSON: -- how you handled the environment

19 from a fire, and when you do that tomorrow, also, if I

20 haven't asked, what is the effect of the inadvertent

21 spraying on equipment? Is your equipment designed for the

22 actuation of fire protection sprays? GDC-3 says it is. It

23 says you shall handle both pipe breaks and inadvertent

24 actuation, but I'm not sure people are quite doing that.

25 But at any rate, look to see is your equipment qualified for

1 inadvertent actuation of spray in terms of operability. And
2 of course that equivalent means not on water but CO2, which
3 was also the creator of an adverse environment.
4 MR. JONES: An integral part of the implementation
5 of our environmental qualification program was also the
6 identification or the scope of equipment necessary to
7 perform safety functions. This list was developed. It
8 includes over 4000 components. Some examples are obviously
9 cables, valve operators, limitorque operators, solenoid
10 valves and instrumentation. The implementation of our
11 environmental qualification identify approximately 2500 of
12 these components which had to either be modified or
13 replaced. A total of approximately 300 design changes were
14 implemented and closed to modify or replace these
15 components. These modifications and replacements were
16 accomplished -- established to design control process and
17 procedures.
18 MR. MICHELSON: Could you tell me just briefly and
19 typically what kind of problems you ran into that required
20 that you go back and modify equipment? Is there some
21 categorization of these?
22 MR. JONES: We've talked about the splice issue.
23 There were approximately 600 splices that had to be
24 replaced. Some of the components, it was a case we could
25 not obtain nor could we do the testing to insure

1 qualification. So we took the step that is necessary and
2 said we are going to replace the equipment with qualified
3 equipment. That is correct.
4 ARROLL: How about an example of that. Give
5 me an example of that.
6 MR. JONES: An example of that one? Fuses. Some
7 cables fell in that category also. I can't think of any
8 other examples off my head.
9 MR. MICHELSON: Were there any major components
10 that required extensive modification or replacement as a
11 consequent of this check? Any big components?
12 MR. JONES: The one that comes to mind is Ellison
13 Watts air conditioners for the shutdown board rooms where we
14 had to environmentally qualify those. A lot of cables
15 associated with the particular unit itself. Control panels.
16 MR. MICHELSON: What was the trouble with the air
17 conditioning units?
18 MR. CARROLL: And this was in a package?
19 MR. JONES: It was in a package and we
20 environmentally qualified the entire subset of components
21 within that package.
22 MR. MICHELSON: You didn't replace the package but
23 rather qualified all the components?
24 MR. JONES: We replaced many of the components
25 that were part of that package.

1 MR. MICHELSON: And that was because you'd bought
2 that a. a vendor supplied package and without -- I assume
3 you bought it to be qualified but it turned out not to be.
4 MR. JONES: We bought it to be qualified and
5 during our review we determined that it was not
6 environmentally qualified and indeed it was Part 21 written
7 --
8 MR. MICHELSON: You went back to the vendor and he
9 couldn't substantiate the qualifications?
10 MR. JONES: That is correct. Couldn't substantiate
11 the origin of components within his device that was supplied
12 to us.
13 MR. MICHELSON: Okay.
14 MR. JONES: Technical bases were developed to
15 document the qualifications. We have assembled 84
16 qualification packages. Each of these packages contains
17 information and justification which is analysis
18 justifications, qualification documents, field verification
19 data and qualification maintenance data sheets. These
20 documents are procedurally controlled and are a part of our
21 design control process.
22 In addition, our essential activities are also
23 documented. This includes the manufacturer's data including
24 such things as special storage considerations, essential
25 vendor instructions. We also include here the physical

1 configuration of the components and also the maintenance to
2 insure continued environmental qualification. Plant
3 walkdowns were actually performed to insure that the as
4 installed equipment is supported with the associated testing
5 and analysis. Again, this is all in an auditable format.
6 MR. MICHELSON: I always worry about the
7 maintenance. Do you have a work planning system that is --
8 Is that where this gets controlled by the work planners or--
9 MR. JONES: Yes, that's correct.
10 MR. CARROLL: And these guys are very smart about
11 EQ.
12 MR. JONES: That's correct. They're an integral
13 part of our EQ program. They are trained. They are an
14 integral part of the procedural development as a site-wide
15 organization, including maintenance, with a responsibility
16 to maintain the equipment for the life of the plant in this
17 qualified state. And again, the EQ program is integrated
18 between design, procurement, power stores, maintenance.
19 It's an integral part of our procedure and process systems.
20 In conclusion Browns Ferry has developed and
21 implemented a valid and procedurally controlled process.
22 This process assures environmentally qualified equipment is
23 installed in the plant to mitigate postulated events.
24 MR. MICHELSON: Let me ask, I think, a simple
25 question. If you have a piece of equipment setting at room

1 temperature and you have environmentally qualified it for --
2 Let's say it's qualified for 150 degree centigrade, 90
3 percent relative humidity, if I were to suddenly expose that
4 equipment to 150 degree gas, steam, water, whatever in the
5 humidity condition, doesn't that condense the water out
6 inside the equipment which is still cold? That's how it
7 gets heated up. It started out at room temperature, 80, 90
8 degrees, whatever, but it's heated by the condensation of
9 the moisture from the hot gasses coming in contact with the
10 equipment. Is that -- Has this equipment been
11 environmentally qualified under the transient condition or
12 only under the steady state condition?
13 MR. JONES: It has been qualified under the
14 transient condition and indeed, it necessitate in our case
15 some equipment like junction boxes and things that we
16 actually had weep holes in them to insure that this does not
17 accumulate water in the device itself. You know, water
18 can't drain out after it is heated up.
19 MR. BURRELL: That's correct. We do evaluate the
20 difference in the transient condition and evaluate for that
21 condition.
22 MR. MICHELSON: Because when I look at this,
23 environmental qualifications, I always see these nice
24 numbers like 150 degree, 160 degree, whatever, and 90
25 percent humidity. Well, equipment exposed at that condition

1 might survive where it won't survive the transient because
2 it gets a lot of water depositing out on the cards or wires
3 or whatever.
4 MR. BURRELL: That was recognized.
5 MR. MICHELSON: You do analyze that. Now how do
6 you -- I guess you don't have any solid state equipment
7 where you going to be exposed to that kind of environment, I
8 guess?
9 MR. BURRELL: We have two -- one area where we had
10 that situation and that's in HPCI room and we have it
11 evaluated for the humidity as well to support the
12 temperature.
13 MR. MICHELSON: Is the woodward governor?
14 MR. BURRELL: It's on the speed control. Yes,
15 sir.
16 MR. MICHELSON: And you are assured that it won't
17 condense inside?
18 MR. BURRELL: We have some testing experience that
19 GE did and we are satisfied.
20 MR. MICHELSON: So it's grammatically sealed, I
21 guess, it would be correct to say.
22 MR. BURRELL: It's not grammatically sealed.
23 MR. MICHELSON: You don't want a weep hole in it
24 because that's how the gas gets in and then it condenses so
25 it's got to be sealed up so it heats itself before it starts

1 playing condenser on the inside.

2 MR. BURRELL: For the accident that we are looking

3 at where this has got to operate, it's not for the break in

4 the HPCI room. It's for a break in the tunnel and the

5 temperature in that room gets up in the neighborhood of 115

6 degrees. So it's not a very harsh area.

7 MR. JONES: Our environmental qualification is

8 design complete. 84 qualification packages are complete

9 except for some confirmatory information that we will obtain

10 after the reactor pressure vessel hydro testing. And when I

11 say design complete I mean the fact that we have indeed

12 identified the environments that are postulated to occur.

13 Qualification testing is complete and also design

14 documentation identified and required modifications and

15 replacements have been issued.

16 Four design changes are still required to be

17 accomplished prior to restart. These four design changes

18 will be accomplished before restart and close and we will

19 also issue our certification letter in April of this year.

20 MR. WARD: Henry, this program seems to get you up

21 to speed with the, you know, the present regulatory position

22 on EQ, but what about the next generation of EQ concerns?

23 That is, where we are not concerned with equipment, just

24 surviving the high pressure line break or LOCA, but we're

25 concerned, let's say, what is being called an excellent

1 management program with certain pieces of equipment being
2 able to survive even harsher environments. Hydrogen burns
3 or high aerosol loadings and so forth. Have you -- Does TVA
4 have a program at Browns Ferry that begins to think about
5 this?
6 MR. CARROLL: That's, of course, limited to stuff
7 inside the dry well.
8 MR. JONES: I understand. Of course, a lot of our
9 equipment is obviously qualified to higher temperatures by
10 testing that we do positively, but as far as a program like
11 you are explain, no, not to my knowledge.
12 MR. CARROLL: Okay. Well, that's around the
13 corner. Well, I guess a separate topic, but how about Reg
14 guide 1.97? You are okay there except for the neutron
15 monitors?
16 MR. JONES: Yes. It is an integral part of our
17 environmental qualification program. We talk about binders,
18 equipment necessary for Reg Guide 197, an integral part of
19 our binder program, and they are handled in the same type of
20 procedural process.
21 MR. MICHELSON: The only thing you are lacking is
22 --
23 MR. BURRELL: Pardon me, Dave Burrell, Electrical
24 Engineers. There are a couple of items that are cycle six
25 items. There's an indication on secondary dampers, but for

1 all the equipment that's got 1 and 2 variables within our
2 restart scope is qualified under our EQ Program, those that
3 are required to be qualified.
4 MR. ROSS: This is on the restart list and the
5 post restart list. I don't think you're going to see it
6 there. It's not in the level of detail, but the Staff's
7 review of the Reg Guide 197 program, some items have been
8 deferred to the next cycle of operation. That schedule has
9 been reviewed and approved by the Staff.
10 MR. CARROLL: Yeah, I saw that. One other EQ
11 question which I believe you are going to answer tomorrow is
12 the question of EQ for conditions existing during our
13 station blackout four hour period. There is that EQ
14 question.
15 MR. JONES: Thank you.
16 MR. CARIER: Jim Maddox will discuss our design
17 baseline program and calculation program.
18 MR. MADDOX: Good afternoon. My name is Jim
19 Maddox and I am the Engineering Support Manager at Browns
20 Ferry Nuclear Plant. My presentation today will cover
21 issues related to configuration control, which we define as
22 the process of maintaining the physical plant and those
23 controlled documents required to support plant operations
24 consistent with selected design documents.
25 In 1985, TVA recognized it had problems with

1 implementation of its Configuration Control Program.
2 Details of these problems surfaced in a series of studies,
3 inspections and reviews, which were conducted by TVA,
4 Gilbert-Commonwealth, INPO and the NRC. These reviews
5 identified problems relating to the adequacy of the
6 maintenance of the Plant Design Basis and loss of
7 configuration control.
8 The areas affected by these concerns included the
9 accuracy of the plant's as-constructed drawings, design
10 criteria, calculations and the design control process.
11 To resolve concerns identified by these reviews,
12 TVA instituted a design basis reconstitution program at
13 Browns Ferry.
14 TVA is an industry leader in the development and
15 implementation of Design Basis Reconstitution Programs,
16 having successfully implemented programs at Sequoyah and
17 Browns Ferry nuclear plants. The Browns Ferry program was
18 based on the Sequoyah program using lessons learned at
19 Sequoyah to refine the program.
20 The Browns Ferry Design Basis was reestablished
21 through implementation of the Design Baseline and
22 Verification Program and various interfacing programs such
23 as The Essential Calculation Program, the 79-14/02 Program,
24 the Torus Integrity Program, the System Plant Acceptance
25 Evaluation and the Restate Test Program.

I will discuss the Design Baseline and Verification Program, the Essential Calculation Program, the drawing improvement program, and implementation of our new Design Control process. Most of the other interfacing programs have already been discussed.

The Design Baseline and Verification Program's objective was to verify the functional adequacy of the plant configuration, to ensure that the plant configuration was supported by engineering analysis and documentation and to provide confidence that plant configuration is in conformance with the Licensing commitments.

The Design Baseline and Verification Program was implemented in two phases: Phase I included the evaluation of systems and portions of systems required for safe shutdown. These systems were identified by evaluating the abnormal operational transients, design basis accidents, and special events addressed in Chapter 14 and other pertinent chapters of the Browns Ferry Final Safety Analysis Report (FSAR) and by determining the safety functions necessary to mitigate these events. Phase II will be completed after restart and will include implementation of the remaining modifications of systems not required for startup, completion and revision of the safety related design criteria documentation, completion of system evaluations, and implementation of corrective actions to

1 other systems as required. Currently, scoping and planning
2 for Phase II is scheduled to begin in October of '91.
3 Major program elements of the Design Baseline
4 Verification Program included verification of plant
5 functional configuration for flow, schematic control and
6 single line drawings, reconciliation of the configuration to
7 design documents, reconciliation of the configuration to the
8 FSAR and Licensing commitments, system evaluation reports
9 for system configuration, production of revised control room
10 drawings including the flow, control, schematic and single-
11 line drawings and the implementation of an improved design
12 control process to prevent recurrence of past design control
13 problems.
14 MR. WARD: Jim, the revised control room drawings,
15 were these the only drawings that were revised?
16 MR. MADDOX: We'll talk a little more down the
17 line. We have about 1575 drawings in the control room,
18 classic flow, controls, schematics. All of those were
19 walkdown or verify the testing as part of the program and
20 brought up current and we maintain them on a real time
21 basis. We've also got a program in place to look at an
22 additional set of about 500 drawings that we call essential
23 non-control room drawings. It's the terminology I've used
24 here that are drawings that the operations people deemed
25 that they needed to tag-outs and clearances. We are

1 bringing those up current also coming out of restart and
2 maintaining them real time. We have some longer term
3 programs to deal with some of the other drawings.
4 MR. WARD: So the emphasis is not on
5 reconstituting all of the design drawings, but on the
6 drawings that are used in support --
7 MR. MADDOX: Support of design basis, really. It
8 would be the upper tier, top drawings.
9 MR. MICHELSON: Now, while you were in the process
10 of doing this did you end up with a real equipment list for
11 the plant? The seventy or hundred thousand components in
12 the plant? Do we know what each one of those are now?
13 MR. MADDOX: We've got a Q list which equates --
14 MR. MICHELSON: No, no, no.
15 MR. MADDOX: Well, our Q list resides in what we
16 call EMS, Equipment Management System data face. It's really
17 akin to the TVA equipment list. I think there is about
18 80,000 components in it today.
19 MR. CARROLL: So you're getting down to --
20 MR. MADDOX: By component listing, valves,
21 whatever.
22 MR. CARROLL: Okay.
23 MR. MADDOX: Next I would like to briefly discuss
24 the Essential Calculation Program. Essential Calculations
25 are defined as calculations which address existing plant

1 systems or features whose failure could (1) result in a loss
2 of reactor coolant system integrity, (2) result in a loss of
3 ability to achieve safe shutdown, or (3) result in a release
4 of radioactivity offsite in excess or 10 CFR 100 guidelines.
5 The calculation review effort was performed in
6 each discipline. Its objectives were to identify the set
7 of required Essential Calculations, Some numbers there,
8 there are about 289 mechanical, 365 nuclear, 112 electrical,
9 14,000 civil essential count. A lot of analysis there. To
10 ensure essential calculations support the plant licensing
11 commitments and Design Basis requirements. Ensure that
12 Essential Calculations are technically adequate and
13 consistent with the plant configuration and to implement a
14 Calculation Control system.
15 The major program elements of the Essential
16 Calculation Program included a detailed review by each
17 discipline to determine the Essential Calculations necessary
18 to support the design of those systems or portions of
19 systems within the restart boundary of Phase I of the Design
20 Baseline and Verification Program. A review of open
21 conditions adverse to quality, potential generic condition
22 evaluations and employee concerns to identify and resolve
23 open issues on Essential Calculations. Conditions adverse
24 to quality are like non-conformance reports, things -- and
25 potential generic condition evaluations are occurrences that

1 might have happened at Watts Bar or Sequoyah and it's our
2 review to see if that could potentially impact our plant
3 here. Development and implementation of the Calculation
4 Cross Reference Index System which tracks calculations
5 supporting engineering changes and interactions between
6 those calculations. Issuance of new or revised Essential
7 Calculations and implementation of a Design Control Process
8 to ensure long term maintenance of Essential Calculations.
9 MR. WYLIE: These all had independent reviews
10 under your QA Program, is that right?
11 MR. MADDOX: Yes.
12 MR. WYLIE: That's all.
13 MR. MADDOX: TVA also implemented a Drawing
14 Improvement Program with the objective of ensuring that
15 Control Room drawings used by plant operations personnel
16 reflected the plant configuration.
17 The major elements of the Drawing Improvement
18 Program included the update of control room and essential
19 non-control room drawings for all implemented design changes
20 prior to System Return to Service. The resolution and
21 closure of Unit 2 related Drawing Discrepancies that effect
22 those drawings. Drawing discrepancies is a form we use to
23 identify whenever anyone is out in the plant and they find a
24 problem between a drawing and a physical piece out there.
25 That's a document we use to document that and run it through

1 the system so we cleaned up all the drawing discrepancies
2 that we had on the books. An engineering review of Control
3 Room drawings for consistency and adequacy. We had some
4 long standing problems with symbology on the drawings. Some
5 inconsistency between controls and flow diagrams and things
6 like that. We did a review to bring all that back and get
7 it straight. The identification of high use and essential
8 non-control room drawings. We've identified a subset of
9 about 3600 what we call high use drawings. Drawings that
10 maintenance and operations identified as drawings they need
11 to do their day to day work and the development of a long
12 term plan to deal with remaining drawings.
13 MR. MICHELSON: Now, is a drawing in your
14 nomenclature a vendor's manual, for example? Is that why
15 you get so many --
16 MR. MADDOX: A drawing in our nomenclature is a
17 classic drawing. It could be vendor or TVA generated
18 drawing, but it would be drawing. We have a separate
19 program that deals with vendor matters.
20 MR. ZERINGUE: We have a vendor manual upgrade
21 program. We haven't discussed that.
22 MR. MADDOX: We don't consider a drawing in the
23 vendor manual a working document. They are INPO only.
24 We'll take the drawing out of the vendor manual and put it
25 in the control system so we only deal with drawings

concerned with doing the work.

MR. MICHELSON: Now, how are you going to handle the non-control room drawings?

MR. MADDOX: Basically what we've done is we've set those up in several categories. Like I say, we -- the 3600 non-control room drawings are the first priority. Coming out of restart we'll have worked about 550 of those.

MR. MICHELSON: Well, really the plant has tens of thousands of drawings.

MR. MADDOX: It's about 20,000 drawings if you figure every drawing.

AUDIENCE: If I was in maintenance and I wanted to pull up a secondary drawing explain how I would use DCTDS and explain what that is, please.

MR. MADDOX: What we have done is we've implemented a tracking system. We call it DCTDS, a QA tracking system. The drawings that aren't up there, we went in and posted as our terminology are listed all the revisions that have been implemented in the plant that haven't been incorporated under the S instructor drawing yet, so I can go pull that drawing up and I can see those two or three changes that will tell me what change package they are in and I can go get copies of those.

MR. MICHELSON: But you have a program that assures that all those changes are already on the drawing

listed?

MR. MADDOX: They're not -- They are on what we call secondaries or the non-essential drawings. They're not physically drafted onto the drawing --

MR. MICHELSON: I don't know what's essential and what's non-essential. They are non-control room drawings.

MR. MADDOX: Right. They are not physically drafted on, but we have a program in place that allows me to get that drawing and get those two pieces of change paper that go with it so I'll know what is different on that drawing.

MR. MICHELSON: The reason that you have to depend upon that listing is because you haven't had time to bring them up to date?

MR. MADDOX: Right. We've got a plan over the next two years to get all those drawings caught up to speed.

MR. MICHELSON: And within the next two years then all the drawings will be up to date?

MR. MADDOX: All the drawings that we'll decide will be the drawings we will keep long term. We are culling out some of the drawings as not being necessary, but within two years we'll have a set of -- a population of drawings that we'll maintain for this plant.

MR. MICHELSON: And those will be several thousand in number? Ten thousand or something?

1 MR. MADDOX: Probably in the 20,000 range total.
2 MR. MICHELSON: That's nearly all of them then?
3 MR. MADDOX: There's actually I think maybe 60,000
4 on the books, but a lot of that is there are three drawings,
5 one for each unit and a lot of that kind of stuff, or
6 duplicates, design and as constructed drawings.
7 MR. MICHELSON: But you are keeping these up on a
8 unit basis though?
9 MR. MADDOX: Yes. Right now we are talking
10 primarily Unit 2, and Unit 1 and 3 drawings that are related
11 to the operation of Unit 2.
12 The last issue that I will discuss with you today
13 is implementation of Browns Ferry improved Design Control
14 Process.
15 The main objective in implementation of a new
16 Design Control Process was to ensure that procedures and
17 controls were in place to adequately maintain the design
18 basis reestablished by the Design Baseline and Verification
19 Program.
20 Some of the elements of the Design Basis are
21 control room drawings, essential calculation, design
22 criteria, other design documents, such as construction
23 specs, vendor manuals, setpoint and scaling documents,
24 etcetera -- design change document tracking system, which is
25 what we've just discussed to track the outstanding changes.

1 The major program elements of the current Design Control
2 Process include major program changes, and I emphasize that
3 word because we basically just threw away what we were using
4 and started over, which essentially implement INPO good
5 practices, 85-013 (Plant Modification Control Program) and
6 90-009 Guidelines for Conduct of Design Engineering. The
7 establishment of required initial, midcourse, and final
8 Design Reviews with plant organizations such as Operations,
9 Maintenance and Technical Support. Implementation of a
10 plant modification Acceptance Evaluation and an Engineering
11 Return to Service Evaluation prior to system operability and
12 implementation of a single drawing system.
13 Some of our problems stem from the fact that we
14 were maintaining a design drawing in our design organization
15 and we were designing and adding revs and moving along with
16 current designs while the plant was maintaining an as
17 constructed drawing, and we got out of sequence with each
18 other. So we weren't always working from the same basis.
19 MR. MICHELSON: Now you have components that are
20 vendor supplied rather -- for which you probably have --
21 hopefully have detailed drawings of the wiring and so forth,
22 and from time to time you go in and make changes to those
23 components, probably changing some of the internal wiring,
24 yet that doesn't show on a normal TVA drawing. It's on a
25 vendor drawing. How do you control the vendor drawings?

1 MR. MADDOX: We now take ownership of that vendor
2 drawing and we would revise it as part of the change just
3 like it a TVA drawing.
4 MR. MICHELSON: Do you give it a TVA number then?
5 MR. MADDOX: We call it a 900 series revision to
6 the drawing. It'll keep its vendor number and we'll keep it
7 in the contract --
8 MR. MICHELSON: But it becomes a TVA drawing.
9 MR. MADDOX: We maintain it. So we'll do a
10 revision to that drawing as far as the design change.
11 MR. MADDOX: And the final slide really sums up
12 the status of all the various -- It talks about in the
13 design baseline and verification program we've got about 40
14 restart punchlist items that remain open. They are mostly
15 closing ECN's that are yet to be implemented tied to restart
16 or closing CAQ's or licensing commitments. They'll all
17 close out as we finish return to service on the remaining
18 systems. There are about 200 of the control room drawings
19 that need a revision to change the number. We changed the
20 numbering sequence. The drawings are current. We are just
21 going through the revision to distinguish them from the old
22 drawings. That will happen over the next two to three
23 weeks. The essential calculation program is complete.
24 Drawing improvement program of the essential non-control
25 room drawings, we've got about 250 to implement in. The

1 last changes right now we're doing that as we return to
2 service. We updated them to a certain point in time and
3 then we're keeping them current as we bring the systems on
4 service.
5 MR. MICHELSON: How many of them haven't been
6 updated yet?
7 MR. MADDOX: They've all been through the update
8 for the last four or five years. We did that approximately
9 in November with the contractor and we're closing the gap
10 now.
11 MR. MICHELSON: So you think as of November -- as
12 of November they had all the changes in?
13 MR. MADDOX: Yes.
14 MR. MICHELSON: At least listed.
15 MR. MADDOX: They were incorporated in the drawing
16 and listed the other revisions--
17 MR. MICHELSON: But the contractor didn't do the
18 drafting work to make the drawing modifications.
19 MR. MADDOX: Right. And he also -- we just told
20 him to do as of everything that was implemented on a given
21 date and we're closing the gap now to get them current
22 between November and then for some of the later changes that
23 have come in. It's just a matter of getting them into the
24 sequence so that they'll be kept up on a real time basis.
25 MR. ZERINGUE: Those systems that we have returned

1 to service, those drawings are in fact updated.

2 MR. MICHELSON: Well, for instance, all your

3 electrical connections diagrams, are those all updated to --

4 I mean, are those real drawings now?

5 MR. MADDOX: That's what most of these 512

6 essential secondary's are, the connection diagrams.

7 MR. MICHELSON: Are those considered control room

8 drawings?

9 MR. MADDOX: They are not now, but like I said,

10 the bulk of these essential non-control room drawings or

11 the connection diagrams, they'll be treated the same way.

12 We'll update them within two days of the implementation of

13 the change in the field. So we're talking real time updates

14 on those in the future.

15 MR. MICHELSON: Now, when you took this --

16 undertook this very large effort here, did we get input from

17 the operators as to what they wanted to have in the way of

18 electrical schematics?

19 MR. MADDOX: The list came from --

20 MR. ZERINGUE: Let the operators answer that.

21 MR. HERRELL: Yes. We went and we looked through

22 our drawings to decide what drawings we needed to provide

23 the list to engineering saying, "These are the essential

24 drawings, and we want to see them." So, it was primarily

25 operations and maintenance driven. In fact, it was

1 operations and maintenance driven.

2 MR. CARROLL: Good for you.

3 MR. MICHELSON: These were 1500 roughly?

4 MR. MADDOX: If I may, there were about 3600

5 drawings and then we broke out about 550, in that range, to

6 be the real time updates.

7 MR. MICHELSON: But the control room drawings, how

8 many are there?

9 MR. MADDOX: There's about 1552 or 3 in the

10 control room itself.

11 MR. MICHELSON: And those are all up to date --

12 MR. MADDOX: They are all current, up to date,

13 right now.

14 MR. MICHELSON: Any time a change is made within a

15 couple of days that change gets on those drawings?

16 MR. MADDOX: We incorporate the change before the

17 system is put back in service. That is part of the turnover

18 process.

19 That concludes my presentation unless there is

20 additional questions.

21 MR. WYLIE: Thank you very much.

22 I'd like to ask anyone that has a written or typed

23 statement or presentation that they made today to give it to

24 the court reporter.

25 MR. CARIER: I'd like to make sure I clarify a

1 couple of points that were made earlier to make sure we are
2 clear.
3 MR. MICHELSON: Is it clear what Charlie said
4 first? He wants all your slides, a copy of the slides if
5 you used slides in presentations or that sort of thing. I
6 don't think you want their written speech, do you?
7 MR. WYLIE: Well, the court reporter wanted that.
8 MR. CARIER: If there is a written speech, we will
9 provide that.
10 MR. MICHELSON: Okay. And clearly all the slide
11 material.
12 MR. CARROLL: Including back up slides. There
13 were a few used.
14 MR. CARIER: When we were talking about station
15 blackout we mentioned the Unit 3 diesels. I believe you
16 asked the question, do you need the Unit 3 diesels for
17 station blackouts? I want to make sure it was clear. It's
18 not for station blackout we need it. We need them for loss
19 of offsite power in LOCA, okay?
20 The other thing that we talked about was on the
21 foam system. We talked about how it was on the same
22 elevation as the recirc pump. It's actually one level below
23 and it's a 18 foot run up pipe, correct? Eighteen foot run
24 up pipe so it's very close proximity. I just wanted to be
25 sure that's clear.

1 MR. WYLIE: Thank you very much. I'd like to
2 thank TVA and the staff for very good presentations and we
3 will resume the meeting tomorrow at 8:30.
4 (Whereupon, the meeting was adjourned at 6:00
5 p.m.)
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REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission

in the matter of:

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PLACE OF PROCEEDING: Huntsville, Alabama

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Susan M. Brunine

Official Reporter
Ann Riley & Associates, Ltd.