ORIGINAL

OFFICIAL TRANSCRIPT OF PROCEEDINGS

Agency: Nuclear Regulatory Commission

Title: Alabama Power Company (Joseph M. Farley Nuclear Plant, Units 1 and 2)

Docket No. 50-348-CivP, 50-364-CivP
ASLBP No. 91-626-02-CivI

LOCATION: Bethesda, Maryland

DATE: Wednesday, February 19, 1992 PAGES 784 - 963

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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In the Matter of: : Docket No. 50-348-CivP

ALABAMA POWER COMPANY : 50-364-CivP

[Joseph M. Farley Nuclear Plant, : ASLBP No. 91-626-02-Civ1

Units 1 and 2] :

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Nuclear Regulatory Commission

5th Floor Hearing Room

East-West Towers

4350 East West Highway

Bethesda, Maryland

Wednesday, February 19, 1992

The above-entitled matter came on for hearing, pursuant to notice, at 9:32 o'clock a.m.

BEFORE: THE HONORABLE G. PAUL BOLLWERK III, Chairman of Atomic Safety and Licensing Board

THE HONORABLE DR. JAMES H. CARPENTER, Member of Atomic Safety and Licensing Board

THE HONORABLE DR. PETER A. MORRIS, Member of the Atomic Safety and Licensing Board

APPEARANCES:

On behalf of the Alabama Power Company:

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NUCLEAR REGULATORY COMMISSION, OFFICE OF THE EXECUTIVE LEGAL DIRECTOR
by: RICHARD G. BACHMANN, ESQUIRE
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ROBERT M. WEISMANN, ESQUIRE
Nuclear Regulatory Commission
Washington, D.C. 20555

[continued next page]

On behalf of Bechtel Corporation:

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Bechtel Corporation
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I N D E X

E X H B I B I T S

Exhibit Number	Description	Identified	Received
APCO 107	T-Drain	895	
APCO 108	Letter from R.P. McDonald, Senior Vice President of APCo. 8-30-87, to Dr. J.N. Grace, 931		947
APCO 3	Emergency and remedial action 946.		947
APCO 4	IE Circular 78.08.		
APCO 5	Transmitting the Farley response to IE Circular 78.08.	946	947
APCO 6	2-8-79, regarding IEB 79-01.	946	947
APCO 9	CLI-80-21, dated 5-27-80.	946	947
APCO 13	letter to Mr. F.L. Clayton from Thomas M. Novak, 2-13-81	946	947
APCO 15	Safety Evaluation Report for Unit 2.	946	947
APCO 17	Technical Evaluation Report.	946	947
APCO 22	letter to Mr. S.A. Varga from Mr. R.P. McDonald, 1-28-85.	946	947
APCO ~~Staff~~ 1, 3 - 6, 9 - 22 39, 108			947
APCO ~~Staff~~ 24, 27			962

P R O C E E D I N G S

[9:32 a.m.]

JUDGE BOLLWERK: Good morning, everyone. Why don't we be seated so we can get on our way.

A preliminary procedural matter I would like to take up with Mr. Miller, is the question of physical exhibits that you presented us with. What we need are two of each. And I think we have two of the 5-to-1 splices, and two of the V-splices. What we only have is one T-drain, if you intend to identify that and put that into evidence as well.

MR. MILLER: We can get you another T-drain.

JUDGE BOLLWERK: Okay. And the way I would like, if possible, to have these -- I'll use the word "processed" -- if we could get some kind of a tag that would fit with our exhibit stamp. And also some kind of a large envelope for each one, meaning we would need six -- in other words, one for each one that we can also stamp with our exhibit stamp.

If you could do that, we would appreciate it. That will, hopefully, keep everything together.

MR. MILLER: We can do all that.

MR. BACHMANN: Judge Bollwerk, the staff would also like one of each, with an indication that they are identical to the ones being presented into evidence.

JUDGE BOLLWERK: Okay. Can you produce one for the staff, as well?

MR. MILLER: We'll have to ask for some time on the 5-to-1. But I think that those are the only two we have made up. But we'll get another one made up. I don't we have extra -- we'll have to get them made up, I guess.

JUDGE BOLLWERK: Okay.

MR. BACHMANN: We would like to have those prior to -- if this is going to be admitted into evidence -- prior to the rebuttal testimony, in sufficient time for our people to be able to use those, to examine them, and perhaps use them in the rebuttal.

JUDGE BOLLWERK: All right.

MR. MILLER: We can do that.

JUDGE BOLLWERK: All right.

MR. MILLER: A couple of housekeeping matters: We've now taken reduced versions of Exhibit 92, to conform them to the larger version, and are prepared to offer them into evidence at this time.

JUDGE BOLLWERK: All right.

MR. MILLER: We move the admission of Alabama Power Exhibit 92.

JUDGE BOLLWERK: Which has previously been identified as your time-line?

MR. MILLER: Yes, sir.

[Alabama Power Company Exhibit 92 was identified for the record.]

JUDGE BOLLWERK: Any objection from the staff?

MR. BACHMANN: No objection.

JUDGE BOLLWERK: All right. Alabama Exhibit 92 is received into evidence.

[Alabama Power Company Exhibit 92 was received into evidence.]

MR. MILLER: We have something of a procedural snafu. As it turns out, Dr. Bolt came to Washington. Our best explanation was he had gotten his tickets. He has his wife, and he decided that he would just come and go sightseeing. It is absolutely unfair to the staff, because the person who is going to cross-examine has gone off to do something else. And we're going to stand by all that we said on that.

And we will just continue with what we agreed to, unless the Board wants to bring him out here. Whatever anybody wants to do, is fine with us. He called us last night and said: Well, I'm here.

JUDGE BOLLWERK: Let me ask the staff if they have any thoughts one way or the other, about what they'd like to do with Dr. Bolt?

MR. BACHMANN: To the extent that the Board has no questions for Dr. Bolt, we would be inclined to just proceed as usual and not put him on the stand as agreed prior to this.

MR. MILLER: That's fine with me.

JUDGE BOLLWERK: All right. And you'll have an affidavit, then, from him regarding his testimony?

MR. MILLER: Yes, sir.

JUDGE BOLLWERK: All right. Why don't we go ahead and do that, then.

MR. MILLER: All right.

JUDGE BOLLWERK: I hope Dr. Bolt is enjoying his time in Washington.

MR. MILLER: We can tell Dr. Bolt that he can take --

JUDGE BOLLWERK: At the expense of Alabama Power.

MR. MILLER: That's exactly right.

Would you mind passing that down, please, sir.

JUDGE BOLLWERK: All right. Any other preliminary matters that we need to take care of this morning?

If not, I think we have the last staff panel on Chico A/Raychem Seals?

MR. HOLLER: That's correct, Judge Bollwerk.

The panel, on behalf of the NRC staff concerning the Chico A/Raychem Seals is seated. I note that Mr.

Luehman has been sworn in, but Mr. Wilson has not.

Whereupon,

JAMES G. LUEHMAN

and

RICHARD C. WILSON

were called for examination concerning Chico A/Raychem Seals by counsel for the Nuclear Regulatory Commission staff and, having been first duly sworn, were examined and testified as follows:

DIRECT EXAMINATION

BY MR. HOLLER:

Q I would ask if each member of the panel would state their name and current position?

A [Witness Wilson] Richard C. Wilson, Senior Reactor Engineer, in the Offender Inspection Branch of NRR.

A [Witness Luehman] James G. Luehman, Senior Enforcement Specialist, Office of Enforcement.

Q I'll ask the panel: Does each member have before him a copy of the testimony of Richard C. Wilson and James G. Luehman on behalf of the NRC staff concerning Chico A/Raychem Seals?

A [Witness Wilson] Yes.

A [Witness Luehman] Yes, I do.

Q I would ask you if each of you has participated in the preparation of this document?

A [Witness Wilson] Yes.

A [Witness Luehman] Yes, I have.

Q At this time I would ask if there are any corrections to the document?

A [Witness Wilson] Yes.

Q Mr. Wilson, would you please tell us the corrections?

A [Witness Wilson] I have several, all on the same topic. The first one is on page 9, the 8th line from the bottom. Delete the phrase: did not apply pressure during the specimen heat-up period.

The next one is on page 16. Delete the last paragraph on the page, which begins: Now that I have.... -- and which concludes on page 17, line 4.

Also on page 17, the 5th line from the bottom. Delete the phrase: But not during a slow 45-minute heat up.

On page 19, the 4th line -- this is unrelated to the others, it's a typo -- change the reference from question 11, to question 8.

MR. HOLLER: Just as a point of clarification, Mr. Wilson, is that the 4th line of answer 12?

A [Witness Wilson] It's the 2nd line of answer 12, the 4th line on the page.

MR. HOLLER: Oh, I see. And the 4th line of question 12, that still stays --

A [Witness Wilson]" That should also change, from question 11, to question 8.

And finally on page 29, there are two deletions: the 5th line from the bottom. Delete: There was no initial temperature ramp in the Bechtel test.

The next line, delete: Over a period of as long as 45 minutes.

And that's all of the changes that I have.

JUDGE MORRIS: If I may ask a question on page 13, Mr. Wilson, in the first line of the paragraph labeled (c), is failure the correct word there?

WITNESS WILSON: Failure is the correct. The word before it is incorrect. Increases should be increase. Thank you, Dr. Morris, that is another typo.

JUDGE BOLLWERK: I'm sorry. Could you give me the first one that you had again? I missed it. The very first correction you had, sir?

WITNESS WILSON: On page nine?

JUDGE BOLLWERK: That's correct.

WITNESS WILSON: The eighth line from the bottom. The line begins: "Did not simulate the initial thermal shock of the LOCA." Then delete the next phrase: "Did not apply pressure during the specimen heat-up period."

JUDGE BOLLWERK: Thank you.

WITNESS WILSON: Dr. Morris, you are correct in

your question. I think both of those words are wrong. It should read the slow initial temperature increase fails to simulate.

JUDGE BOLLWERK: Let me understand that. It should read the slow initial temperature increase fails to simulate?

WITNESS WILSON: Yes. Correct.

BY MR. HOLLER:

Q Mr. Luehman, do you have any corrections to the testimony?

A [Witness Luehman] No. I do not.

Q Okay. At this time I will ask each member of the panel, with the corrections made, is the document before you testimony of Richard C. Wilson and James G. Luehman, on behalf of the NRC staff concerning Chico A/Raychem seals true and correct to the best of your knowledge and belief?

A [Witness Wilson] Yes, it is.

A [Witness Luehman] Yes, it is.

MR. HOLLER: The staff moves to bind into the record the testimony of Richard G. Wilson and James G. Luehman on behalf of the NRC staff concerning Chico A/Raychem seals as is read.

JUDGE BOLLWERK: Any objection?

MR. MILLER: No objection.

JUDGE BOLLWERK: Then the testimony of Richard C.

Wilson and James G. Luehman concerning Chico A Raychem seals will be bound in the directory.

[The direct testimony of Richard C. Wilson and James G. Luehman concerning Chico A/Raychem Seals follows:]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket Nos. 50-348-CivP
ALABAMA POWER COMPANY	)	50-364-CivP
	)	
(Joseph M. Farley Nuclear Plant, Units 1 and 2)	)	
	)	
	)	(ASLBP NO. 91-626-02-CivP)

TESTIMONY OF RICHARD C. WILSON AND JAMES G. LUEHMAN
ON BEHALF OF THE NRC STAFF CONCERNING CHICO A/RAYCHEM SEALS

Q1. State your full name and current position with the NRC.

A1. Richard C. Wilson, Senior Reactor Engineer, Vendor Inspection Branch, Division of Reactor Inspection and Safeguards, Office of Nuclear Reactor Regulation

James G. Luehman, Senior Enforcement Specialist, Office of Enforcement.

Q2. Have you prepared a copy of your Professional Qualifications?

A2. (Both) A copy of each of our Professional Qualifications is included in Staff Exh. 1.

Q3. What is the purpose of your testimony?

A3. (Both) The purpose of our testimony is to support the Staff's position regarding the violations of the environmental qualification (EQ) requirements for the Chico A/Raychem Seals at the Farley nuclear plant as set forth in the Notice of Violation (NOV), dated August 15, 1988 (Staff Exh. 2), and the Order Imposing a Civil Penalty), dated August 21, 1990 (Staff Exh. 3).

Q4. What are the EQ requirements that the Staff alleges were violated?

A4. (Both) The EQ requirements and the nature of the violations are stated in the NOV, page 2, under the heading "Violations Assessed A Civil Penalty" (Violation I.B.2) as follows:

> 10 CFR 50.49 (f) and (k), respectively, require in part that (1) each item of electric equipment important to safety shall be qualified by testing of, or experience with, identical or similar equipment, and that such qualification shall include a supporting analysis to show that the equipment to be qualified is acceptable; or (2) electric equipment important to safety which was previously required to be qualified in the accordance with NUREG-0588 (for comment version), Category II, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment" need not be requalified to 10 CFR 50.49. NUREG-0588, Category II, Section 5.1(1), states in part that, "the qualification documentation shall verify that each type of electrical equipment is qualified for its application and meets its specified performance requirements, and data used to demonstrate the qualification of the equipment shall be pertinent to the application and organized in an auditable form."
>
> Contrary to the above, from November 30, 1985 until the time of the inspection which was completed on November 20, 1987:
>
> 2. APC did not document qualification of the Chico A/Raychem seals used for limit switch and solenoid valve cable entrance seals in that the available file was incomplete and test data and supporting analysis provided by the licensee was insufficient to demonstrate qualification. Specifically, the testing performed did not consider possible chemical interactions and the temperature profile used in the testing did not simulate the initial thermal shock of a loss of coolant (LOCA) transient.

Q5. What was your role, if any, in the November 1987 inspection referenced in the NOV?

A5. (Wilson) I was the NRC assistant team leader, with responsibility for two review areas: (1) solenoid valves, limit switches, and cable entrance seals for these components and others such as transmitters, and (2) instrument accuracy. In both areas I personally

reviewed files and also interfaced with other members of the NRC inspection team. The plant walkdown inspection during the week of November 2, 1987 had revealed unconventional cable entrance seals, and virtually all other licensees had replaced in-containment instrument terminal blocks with environmentally qualified splices years earlier. Since I was the senior headquarters inspector on our team, the team leader and I agreed that I would address these areas because they had potential to be the most challenging and difficult review areas.

Q6. Did you inspect the qualification files for the Chico A/Raychem cable entrance seals used at Farley?

A6. (Wilson) Yes, to the very limited extent that such files existed. I also asked questions and conducted interviews to attempt to obtain additional information concerning the design and qualification of the seals.

Q7. What do you recall regarding the information you reviewed to support qualification of Chico A/Raychem cable entrance seals used at Farley?

A7. (Wilson) When I began review of the Chico A/Raychem seal qualification during Wednesday, November 18, 1987, I asked for all of the file information. I can recall initially only being given a portion of the 1981 Bechtel test report (Staff Exh. 33). Within the next day I believe that the licensee provided the remainder of that report; Wyle report 58730 (Staff Exh. 34); Raychem report EDR-6063 (Staff Exh. 35); information relating to the Southwest Research Institute tests; and four sheets of a plant

installation drawing. I do not recall any additional written material. In response to questions, general information regarding the scope of use of the seals and an unsatisfactory hand-written attempt to explain the response of the leakage pressure instrument during the Bechtel test were provided. During discussions, considerable additional information was conveyed including the position of the Raychem keeper sleeve in the seal.

Totally lacking was any written documentation of the plant application requirements, comparison of test conditions and specimen designs with plant conditions and equipment, and the other elements of any documentation of environmental qualification. Simply stated, even if there were a basis for qualification, it was not documented. Even worse, the information provided in writing and orally clearly could not support qualification, no matter how it was assembled.

During discovery in this proceeding, APCo provided a two-inch thick qualification file for the Chico/Raychem seals containing the following:

(a) Table of Contents, undated but showing Revision 5, (Staff Exh. 36)

(b) System Component Evaluation Worksheet (SCEW sheet), Bechtel sign off November 30, 1987, no APCo signature, (Staff Exh. 37)

(c) Environmental Qualification Report Evaluation #29G, Revision 3 dated March 23, 1988 (Initial APCo sign off bears November 18, 1987 date, but this document was never shown to the NRC to my knowledge until discovery in 1991; further, it is inadequate to document qualification as noted below), (Staff Exh. 38) --This evaluation is riddled with flaws; e.g., where section 1.1a and the table in Attachment 2 address

whether test pressures envelop plant LOCA pressure, test pressures of 66 and 74.7 psig are cited, both in excess of the plant LOCA peak of 48 psig, but the peak pressure for the Chico cement steam test by SWRI of only 30 psig was not cited, even though page 2 of the attachment to APCo's January 8, 1988 letter states without further substantiation that "Chico A alone provides a pressure seal inside the conduit nipple." The evaluation also states in section 1.3 that the Chico compound is protected from chemical spray by the Raychem sleeve; that has not been demonstrated.

(c) Wyle report 58442-2 (Staff Exh. 39)

(d) The 1981 Bechtel test report for Farley (Staff Exh. 33)

(e) The Southwest Research Institute test package for Chico cement (Staff Exh. 40)

(f) Raychem Report No. EDR-5040, "Analysis of Heat Aging Data on -52 Molding Material to Determine Pre-Aging Conditions For Nuclear Qualification Testing," October 15, 1981, (used as a basis for aging evaluation of Raychem material) (Staff Exh. 41)

(g) Bechtel letter to APCo dated March 11, 1987, referencing a February 10, 1987 letter from Crouse-Hinds, the Chico cement supplier, stating that the Chico A compound was essentially unchanged over the previous 15 years, (Staff Exh. 42)

(h) Bechtel drawing A-177541, "Joseph M. Farley Nuclear Plant Tray & Conduit Details and Notes, about 200 sheets, various revisions, (Staff Exh. 43) -- The NRC inspector particularly noted sheets 23K, 23S, and 23U, which had been provided during the inspection in response to requests for plant installation drawings. Sheet 23K,

Revision 3 dated August 16, 1989, had been completely redrawn and did not show either earlier versions nor descriptions of changes (sheet 23K still did not show the Raychem keeper sleeve). Sheets 23S-1 and 23S-2 were both voided in Revision 1 dated August 16, 1989. Sheets 23U and 23U-1 apparently were redrawn in Revision 1 with no date shown and then voided in Revisions 2 and 3 respectively. Although the NRC inspector did not review this drawing in detail, since it was obviously well after-the-fact and the vast majority of it had nothing to do with Chico A/Raychem seals, sheet 23P was noted to be applicable.

Q8. What were your findings regarding qualification of Chico A/Raychem seals?

A8. (Wilson) The deficiencies in APCo's attempted use of each test report they have cited are summarized below. In this listing, "deficiencies and discrepancies" refers to APCo's attempted use of the test report, and not necessarily to the test report per se.

a. "QUALIFICATION TESTING OF RAYCHEM ENVIRONMENTAL SEALS FOR ALABAMA POWER COMPANY JOSEPH M. FARLEY NUCLEAR PLANT," Bechtel, December 30, 1981, transmitted by Bechtel letter AP-6704 to APCo dated December 31, 1981.

Major deficiencies and discrepancies: no steam or other moisture; no chemical spray; no simulation of initial LOCA temperature rise; failure to apply pressure during initial heatup of test specimen; no electrical performance measurements; very crude assessment of seal performance, including unsatisfactory explanation of pressure measurements intended to assess seal performance and dubious accuracy of gauge; failure

to monitor performance for 30-day post LOCA required operating time (which in the plant would represent a long-term "soak" for chemicals and moisture); inadequate definition of test specimen design and assembly, and its similarity to installed plant equipment. APCo failed to analyze the deficiencies, discrepancies, and anomalies.

b. Wyle Laboratories Report No. 58730, "ENVIRONMENTAL QUALIFICATION TEST REPORT OF RAYCHEM NEIS NUCLEAR ENVIRONMENTAL INTERFACE SEAL KITS FOR RAYCHEM CORPORATION," June 22, 1982.

Major deficiencies and discrepancies: only 6 of 12 specimens reported to demonstrate acceptable performance; all specimens reported to have extensive degradation of the zinc galvanizing on the pipe nipple, including the area under the Raychem material; no steel compression fitting on test specimen. Based partially on this testing, Raychem decided not to market the in-containment seal. APCo failed to analyze the deficiencies, discrepancies, and anomalies.

c. Raychem Report No. EDR-6063, "ENVIRONMENTAL QUALIFICATION TEST REPORT OF RAYCHEM NEIS ENVIRONMENTAL INTERFACE SEAL KITS ON STAINLESS STEEL PIPE, October 22, 1982.

Major deficiencies and discrepancies: Inconclusive test data, because of problems with seal attachment to the test vessel; pipe nipple was type 316 stainless steel, unlike the galvanized steel used for Farley; no steel compression fitting on test specimen. APCo failed to analyze the deficiencies, discrepancies, and anomalies.

d. Bechtel Eastern Power Company Job No. 7597-03, Accession No. U-400948,

Title "SWRI PROJECT NO. 03-4974-001 TEST PROCEDURE AND SWRI LETTERS DATED FEBRUARY 1, 1979 AND JULY 13, 1979 (Chico cement testing by Southwest Research Institute).

Major deficiencies and discrepancies: steam pressure only 30 psig versus 48 psig for Farley LOCA; leakage was measured but not assessed, and there were no electrical measurements; no evidence of Chico bonding to metal or cable jacket was provided; cable jacket material not identified; Chico X fiberglass was used, but is not used in Farley design; no metal compression fitting; very different design employed conduit fitting with threaded sealing plugs that allowed compressing the Chico cement. APCo failed to analyze the deficiencies, discrepancies, and anomalies.

e. Wyle Report No. 48842-1, "NUCLEAR ENVIRONMENTAL TEST PROGRAM ON ...," October 1987, Proprietary test report for Plant Hatch.

Major deficiencies and discrepancies: no chemical spray; split Raychem boot; materials and features not present in the Farley design could have alone produced successful test results. APCo failed to analyze the deficiencies, discrepancies, and anomalies.

f. NUREG-CR2812 and NUREG-CR3361, Sandia National Laboratories reports of corrosion of galvanized steel by chemicals, cited in the attachment to APCo's January 8, 1988 letter to the NRC (Staff Exh. 47).

Major deficiencies and discrepancies: does not address bonding between Raychem adhesive and galvanized steel (the Staff has no concern with corrosion of the metal; only with the bond). APCo failed to analyze the bonding concern; thus, reference to the

Sandia reports does not support qualification of the Farley Chico A/Raychem seals.

Summarizing this information, the licensee has not demonstrated qualification of the Farley Chico A/Raychem seals for the reasons listed below. These are basically the same reasons stated on pages 40-42 of the report of the November, 1987 NRC inspection (Staff Exh. 12), even though the present analysis takes into account all of the material obtained and submitted by the licensee in the subsequent four years. In fact, the licensee has never addressed some of the ten concerns raised in the inspection report, such as design control.

The assembly and installation of plant and test specimens were under so little control that similarity of and ability to reproduce hardware from one specimen to another cannot be established with confidence.

The overall design was never tested with a limit switch or other means of measuring the seal's success in the test.

The only test of the complete design also lacked moisture (steam) and chemicals, did not simulate the initial thermal shock of a LOCA, ~~did not apply pressure during the specimen heatup period~~, and did not simulate the plant requirement for 30-day post-LOCA exposure (to residual moisture and chemicals).

Specimen failures, anomalies, and differences in test conditions or specimen designs in reports of tests performed by others were ignored as detailed above, yet credit was taken for those test reports.

"Analyses" provided by the licensee to extrapolate tests of different designs under different conditions do not address those differences; instead, they merely claim credit

for any favorable bits and pieces of support that can be found in the reports.

(Both) The Staff's findings regarding the Chico A/Raychem seals are summarized in NRC Inspection Report Nos. 50-348/87-30 and 50-364/87-30, dated February 4, 1988 (Staff Exh. 12).

Q9. What was your role in the preparation of the Inspection Report?

A9. (Wilson) I prepared, among other parts, Section 6.i.(32) of Inspection Report 50-348, 364/87-30 (Staff Exh. 12). The Staff's findings, as modified below, which I adopt as part of my testimony, are as follows:

> (32) Chico Seals Package 29G for NUREG 0588 Cat. II.
>
> The licensee stated that [t]his cable entrance design is used only for Namco limit switches qualified to NUREG 0588 Cat. II. The design is similar to the cable entrance described above for the Target Rock RCS head vent valves, in that a Raychem cable breakout seal kit is applied over a one inch pipe nipple and under 1-1/4 inch flex conduit fittings. Although not shown in the drawings, the licensee's contractor explained that a Raychem sleeve was installed over the breakout boot (and under the compression fitting) and the sleeve is clamped to the metal nipple. None of the drawings provided during the inspection clearly show this configuration; in fact, the inspector drew the design on a whiteboard to ensure understanding. In addition, Chico A inorganic cement mix is injected into the boot from the limit switch side to fill and seal internal voids. The design was developed by Bechtel for Farley, and is not a Raychem design. No statements from Raychem concerning qualification of this design were provided to the inspectors.
>
> The file contained three qualification type test reports. Wyle Report 58442-2 dated April 3, 1981 covers LOCA type-testing of a Raychem 403A112-52 cable breakout seal; it covers a cable breakout application (sealing individual insulated conductors emerging from a [truncated] cable jacket) but does not address a

device entry application involving metal pipe nipples and conduit fittings. A second report covers a 1981 test of the Farley Chico seal design performed for the licensee; it is further described below. A third test report describes testing of the Chico A material by Southwest Research Institute (Project No. 03-4974-001) for Grand Gulf Nuclear Station. Although the Grand Gulf design is very different from Farley's, the report does confirm that the Chico A materials are not damaged by the Farley total radiation dose. Finally, although not included in the package provided to the inspector for review, upon questioning, the licensee did provide a four-page 1981 Bechtel qualification report, drawings, and other documentation. The Chico seal qualification was also discussed in some detail. Additional information provided during a November 25 meeting at NRC Region II offices did not contribute any additional basis for qualification beyond the documentation and discussion at the plant site during the inspection.

The 1981 Bechtel qualification report states that "since the breakout had been qualified previously, the Farley configuration needed only to be tested for pressure and temperature with time dependent variations approximating the postulated Farley LOCA profile." The test actually performed exposed one sample of the Farley seal design to compressed air in an electrically heated chamber whose dimensions are not stated. Seal leakage was monitored by a pressure gage connected to the inside of the pipe nipple by an unspecified length of piping or tubing. In response to questioning, the licensee stated that "any increasing building of pressure indicative of a pressure boundary breach would have been unacceptable;" however, an initial increase of uncalculated magnitude was expected due to expansion of trapped air in the leakoff volume". Since the sequence specified in the test procedure had resulted in catastrophic failure of specimens without Chico cement, the Chico test specimen was instead subjected to the following test sequence: The open chamber was electrically heated to 310°F. The chamber cover, with test specimen attached, was installed and within about one minute, compressed air was admitted to bring the chamber to 60 psig. After seven minutes, the pressure was ramped down at about 0.5 psig per minute, and the temperature at roughly 1.0°F per minute. After 1 1/2 hours, the pressure was held at 15 psig and the temperature at 200°F for about 3 hours, then both were further reduced. The test was terminated after 24 hours, the last 15 1/2 hours of which were

generally at or below 5 psig and 130°F. At no time was moisture or chemical spray introduced into the test chamber. Furthermore, no electrical performance measurements of any type were made.

The gauge monitoring seal internal pressure initially read 0.4 psig on a 0 to 30 psig scale. It's reading steadily increased to 1.0 psig 51 minutes after installing the test sample, at which time the chamber pressure had decreased to 35 psig and the temperature to 254°F. The leakage pressure than steadily dropped to 0.2 psig over the next two hours, read from 0.4 to 0.6 psig for the next 4-3/4 hours (chamber down to 5 psig and 140°F, then generally read 0.2 psig thereafter.

The test described above must bear the full burden of LOCA qualification for the Farley Chico seal design (other than for radiation). Raychem's qualification testing the sealing ability of its cable breakout kit is irrelevant because of the major differences in application of the Raychem plastic with metal in the Farley design. In fact, the metal compression adapter bearing down on a Raychem sleeve surrounding a metal pipe nipple at elevated temperature must be regarded as a negative design feature until proven otherwise.

The inspectors conclude that the type test of the Farley Chico seal design does not adequately simulate Farley LOCA conditions for the following reasons:

(a) No steam or moisture of any sort was present even though moisture leakage is a frequent cause of electrical equipment LOCA test failures.

(b) No chemical spray was used, even though the effect of these chemicals on bonding of the Raychem seal to the metal pipe nipple is of considerable concern. The licensee addressed this concern only by stating that Raychem's type test showed that the spray does not react with the adhesive; however, the Raychem test does not address the bond between the adhesive and the metal pipe nipple, and the licensee further cautions that the spray may react with the nipple's zinc coating to form a gray powder that could further challenge the adhesive bonds. The inspectors note in this regard that the Raychem NEIS conduit seal kit has been successfully qualification tested for high energy line

breaks outside containment (no chemicals), but LOCA qualification is not claimed and a stainless steel pipe nipple is used.

(c) The slow initial temperature ~~increases failure~~ increase fails to simulate the initial thermal shock of the LOCA transient as it would affect rapid differential thermal expansion of the metal, plastic, and cement portions of the seal. Additionally, the nature of the test appears to avoid simultaneous application of peak pressure and temperature as is true of the plant LOCA profile, so that the most severe combination is not simulated. The test in fact is nonconservative because softening of the Raychem plastic by temperature will occur after the pressure peak.

(d) Although not mandatory for qualification to Category II of NUREG 0588, category I qualification (as for the Target Rock solenoid valves) could not be based on this test because of failure to age the test specimen, failure to perform the complete test sequence on a single specimen and numerous QA/QC-related deficiencies.

The inspectors also concluded that the data taken during the test did not support qualification of the Farley Chico seal design for the following reasons:

(1) The dry chamber atmosphere and lack of electrical performance measurements of any type constitute a failure to monitor the performance of the seal design in its major function - keeping electrical circuits dry.

(2) The 0 to 30 psig leakage gauge appears to be of dubious value for detection of small, short-term leaks (and the absence of moisture and chemicals greatly reduces the probability of small, long-term leaks). In fact, the increase in measured pressure for the first 51 minutes of the test, while the chamber pressure and temperature decreased significantly, suggests that the seal did leak. The subsequent increase in measured pressure, maintained over an additional 4 3/4 hours, also suggests a leak. A conclusion that no leakage occurred appears to be unfounded.

The inspectors also concluded that the licensee's procedures for installing the Chico seal did not adequately control the uniformity of the seals, for reasons including the following:

(1) Drawing A-177541 sheet 23S-1, Rev. 0 does not control the minimum quantity of Chico mixture. It specifies injecting 1 1/2 ounces into the pipe nipple, and cautions against using more than 1 1/2 ounces to ensure against forcing the mixture into the limit switch housing. Since the Chico mixture is injected through the side of the limit switch into the assembled Raychem boot and conduit, using a hypodermic syringe and tubing, the technician cannot easily see when the seal cavity is filled.

(2) Procedures provided to inspectors did not cover details known to be important in Raychem-designed applications of their seals, such as surface preparation, detailed use of a heat gun, and selection of properly dimensioned kits.

(3) Similarity of the test specimen to plant equipment was also not established. The test procedure references drawing A-177541 sheets 23K, 23L, and 23P all Rev. 0, whereas the inspectors were given sheets 23K Rev. 2, 23M Rev. 1, and 23U Rev. 1. The inspectors noted that the quantity and type of Chico cement are included in "clouds" on two of the drawings, and the Raychem cable breakout kit number on one. No explanation of differences was provided.

(4) Information provided by the licensee concerning the metal compression adapter applied over the Raychem sleeve contains conflicts. The 1981 test procedure material list calls out a "Greenfield compression fitting or equivalent." Drawings provided during the inspection show a "Greenfield adjustable type compression fitting" for both the Chico seal and the Target Rock SOV. At the Region II meeting, the drawing provided calls out an "adjustable type compression fitting," and the test report provided refers to an "Appleton compression adapter." In no case is a model number specified.

In summary, the Chico seal package provided for review fails to document qualification, and review of additional material provided

during and after the inspection also fails to establish qualification. Chico seals constitute failure to adequately demonstrate qualification for violation 50-348, 364/87-30-15.

Q10. What NRC regulation or regulations provide the basis for the Staff to determine that the deficiencies described were an EQ violation?

A10. (Luehman) Nothing specifically requires the cable entrance seal to be environmentally qualified. What has to be qualified is the limit switch of which the entrance seal is a sub-component and qualification of those limit switches is required by 10 C.F.R. § 50.49.

(Wilson) Some licensees have elected to treat the seals as components, place them on the EQ master list, and maintain qualification files for them. Others have elected to treat the seals as ancillary equipment necessary for the qualification of master-listed equipment such as limit switches. Other "generic" equipment such as cable splices, connectors, junction boxes, and even cable have been treated both ways by different licensees, with the choice often based on whether the items have plant tag numbers or are shown on wiring diagrams.

APCo chose to treat the cable entrance seals as ancillary equipment required to support qualification of limit switches. In so doing, to the best of my knowledge APCo did not identify the Chico A/Raychem seals to the NRC and we first became aware of them during the November, 1987 plant walkdown inspection.

Q11. Why did the Staff conclude that the information in the file failed to show that testing

simulated the initial thermal shock of a LOCA?

A11. (Wilson) Before answering this question, it is important to recognize that it is of concern solely because it is one of many differences between the Farley plant conditions and APCo's qualification basis that must be addressed by APCo. It refers to the Bechtel seal testing in late 1981, which attempted to show that the seal could prevent adverse moisture and chemical effects on instrument circuits without any moisture, chemicals, or electrical measurements in the test.

As one of ten specific concerns regarding the Bechtel tests, page 40 of NRC Inspection Report 50-348/87-30 (Staff Exh. 12) stated that the slow initial temperature increase failed to simulate the initial thermal shock of the LOCA transient as it would affect rapid differential thermal expansion of the metal, plastic, and cement portions of the seal. The Farley LOCA profile shows an initial temperature rise from about 130 to 316°F, or 186F°, in about 55 seconds. The NRC criticism was based on the test procedure's statement that the test specimen and chamber cover were installed on the pre-heated chamber, shortly before pressure was applied.

~~Now that I have had time to re-read the Bechtel test report (Staff Exh. 33), and without benefit of any attempt by APCo to clarify this matter, I have found that the test distorted differential thermal expansion transient effects even more severely than I believed at the time of the inspection. As described on page 2 of the test report, one of several deviations from the test procedure was that "the test specimen was exposed to elevated temperatures for as long as 45 minutes prior to the application of air pressure." It appears reasonable to me to assume that the specimen~~

~~pre-heating was done slowly (in the absence of any test procedure or data, and given the statement "as long as 45 minutes"). If so, the adverse transient effects of differential thermal expansions of metal, plastic, and cement portions of the seal were totally eliminated by the crude simplifications of the test.~~

In the Farley Chico A/Raychem seal the Raychem polyolefin material is filled with inorganic Chico cement and is tightly clamped between steel parts intended only for metal-to-metal conduit connections. Both are unique features of the Farley Chico A/Raychem seal design unproven by any test or experience. Concerns with this novel design during the initial rapid temperature rise of the Farley plant LOCA include the following: (1) Near 300°F the Raychem polyolefin material is quite soft, and it will shrink unless it is fully recovered (shrunk), which cannot be determined from any seal assembly, installation or inspection records since none were provided by APCo. (2) The differential thermal expansion coefficient of the polyolefin is more than 20 times that of steel, which means that the Raychem material will expand much more than the pipe nipple and compression fitting. (3) The heat conductivity coefficient of steel is far greater than for cements or plastics, which means that the pipe nipple and compression adapter will heat much faster than the Raychem material during a rapid LOCA transient ~~but not during a slow 45 minute heatup~~. (4) The Bechtel test applied no pressure during the transient heatup period, whereas the LOCA transient pressure reaches 40 psig in a few minutes (well before seal temperatures and dimensions would stabilize).

These and probably other factors illustrate why the Bechtel test failed to

simulate the effects of a LOCA transient on a Chico A/Raychem seal; the test simply did not address the rapidly-changing temperatures, thermal gradients, dimensional changes, pressure-temperature-time relationships, and resultant transient stresses on the Raychem material. Not only was the test inadequate to address these factors, but APCo has never provided any analysis to attempt to extrapolate the test to Farley plant conditions. We simply have no basis for addressing fundamental concerns such as whether the Raychem sleeve split, as it did in most tests involving steel pipe nipples, or was cut through by the steel compression adapter, or whether it bonded to the steel. And we must remember that the Bechtel test never used steam or made any electrical performance measurements. A much better test and/or extensive analysis is clearly required.

Again, it is important to remember that the NRC inspector does not have to provide this analysis. Rather, this is just one more difference between test and plant conditions that must be addressed by APCo as part of demonstrating qualification. A licensee who departs from actual plant equipment designs, applications, and conditions in performing qualification tests must address the departures through test and/or analysis. The LOCA thermal shock concern, however, is a significant issue for APCo to address because no one, to my knowledge, has ever demonstrated LOCA qualification of Raychem material clamped between metal conduit fittings as in the Farley design.

Q12. At the time of the inspection, what test data or documentation did APCo have in its

files to explain why chemical interaction and initial thermal shock were not concerns for the entrance seal design at Farley?

A12. (Wilson) No such information was shown to the NRC inspector. In fact, as cited in the response to Question 11 above, APCo had a Raychem test report showing clear evidence of considerable chemical interaction and multiple LOCA test failures (Staff Exh. 34). Also as described in the response to Question 8 above, the Bechtel test departed from the test procedure by separately heating the test specimen prior to installing it in the test chamber. The stated purpose had nothing to do with thermal shock or attempting to simulate the rapid initial temperature rise of the Farley LOCA profile; rather, the testers recognized that the chamber heaters were incapable of rapidly increasing the test specimen's temperature. By separately heating the test specimen, the testers were able to correct one deficiency in their test plan--raising the test specimen to the peak LOCA temperature early in the test--but in so doing they introduced the major deficiency of completely eliminating the initial LOCA temperature rise transient of more than 180°F in less than one minute.

Q13. In your opinion, was it unreasonable to conclude from the information in the file that too tortuous a path existed for significant moisture intrusion to happen if chemical interaction on the bonding were to occur?

A13. (Wilson) This question cuts to the very heart of the cable entrance seal's safety function. Whether or not the seal prevented moisture or chemical ingress under design basis accident conditions is not a matter for speculation based on conflicting

test results, particularly when the more optimistic results cover items least like the components installed in Farley. Furthermore, the arguments advanced by APCo fail to consider any electrical concerns.

The answer to Question 14 cites three different test reports in Farley's possession at the time of the inspection which document actual test failures of devices quite similar to the Farley design, in that all involved Raychem boots over steel pipes or nipples (all other test data cited by APCo cover test specimens significantly different than the Farley design). One of these reports, Wyle test report No. 58730 dated June 22, 1982 (Staff Exh. 34), was shown to the NRC inspector during the Farley inspection. It covered testing of twelve test specimens with galvanized steel pipe nipples. It stated that only six of the twelve specimens demonstrated acceptable performance, and that "all specimens exhibited extensive degradation of the zinc galvanizing on the pipe nipple, including the area under the NEIS [Raychem splice type] kit seal." Raychem chose not to market this product, and also a stainless-steel counterpart, for in-containment use. Yet APCo chose to ignore a quality vendor's precedent and use a similar design with no additional testing that addressed this concern. APCo states in their Environmental Qualification Report Evaluation #29G (Staff Exh. 38) for the seals, at page 1 of attachment 4, that there is no bonding problem because chemicals do not attack Raychem's adhesive. Undamaged adhesive does not ensure a bond. If the adhesive merely adheres to a powdery zinc residue there is no seal. Test results of this type demand positive assurance that a novel, unproven design for safety-related equipment is in fact capable of performing its

safety functions by performing a suitable test.

Q14. Why should APCo have been aware that the deficiencies the Staff identified were a concern for the qualification of the Chico A/Raychem cable entrance seals used at Farley?

A14. (Luehman) APCo should have known about the deficiencies because 10 C F.R. § 50.49 explicitly requires consideration of temperature, pressure, moisture (humidity) and possible chemical spray interaction.

(Wilson) Information Notice 84-57, "Operating Experience Related to Moisture Intrusion in Safety-Related Electrical Equipment at Nuclear Power Plants," July 27, 1984, (Staff Exh. 44) cited an NRC study of 53 operational events caused by safety-related equipment failures resulting from moisture intrusion, and referenced report AEOD-C402 (Staff Exh. 45) for details of the study.

Farley plant records also show that the licensee was clearly aware of the need to environmentally seal cable entrances to safety-related equipment. The only test ever performed to attempt to environmentally qualify the Chico A/Raychem design used at Farley ("Qualification Testing of Raychem Environmental Seals for Alabama Power Company Joseph M. Farley Nuclear Plant," December 30, 1981, Bechtel) (Staff Exh. 33) begins with the following words:

> "When NAMCO CONTROLS [sic] environmentally qualified their model EA 180 series limit switches, the interior of the switch was sealed against the test environment by using rigid conduit to bring the conductors outside the test chamber. As a result, when the switch is installed in a safety-related system in a harsh environment, means must

> be provided to seal the switch internals from that environment, and at the same time provide electrical connections to the switch. As a result of NRC's I & E Bulletin 79-01A, Alabama Power Company committed to replace all Class 1E limit switches in Unit 1 containment during the first refueling outage. Since time was limited, it was decided to develop a switch seal with materials that had already been environmentally qualified...."

Bulletin 79-01A (Staff Exh. 27) had, in fact, specifically highlighted in-containment limit switch qualification in advance of the more general Bulletin 79-01B (Staff Exh. 24).

In the early 1980's device manufacturers such as Namco did not manufacture their own cable entrance seals, so environmental qualification testing was conducted with whatever test lab provisions could be made to provide a seal; the qualification report would then state that the user must provide an equivalent barrier, so that the device manufacturer did not have to assume responsibility for another company's seal. Other examples are Rosemount transmitters, ASCO solenoid valves, and Target Rock solenoid valves. The practice was common and was widely known. The difficulty of achieving an acceptable seal was also well-known, and when Conax qualification-tested its ECSA seal it was widely purchased and used in spite of its weight, bulk, cost, and difficulty of installation and replacement. Years later, some of the component manufacturers developed their own cable entrance seals; e.g., the NRC inspector was advised during the Farley inspection that Namco and Rosemount seals were in use at Farley.

Farley had further reason to devote careful attention to the Chico A/Raychem seal qualification because every test report cited by APCo to attempt to qualify a seal

combining Raychem splices with metal fittings showed test failures. These reports include the Bechtel report cited previously in the response to this question, Wyle Report No 58730 of June 22, 1982 (Staff Exh. 34), and Raychem Report No. EDR-6063 of November 8, 1982 (Staff Exh. 35). Farley also should have known that the only Raychem-to-metal seal to perform well in Raychem's environmental testing used a type 316 stainless steel pipe nipple instead of the galvanized steel nipple used at Farley, and that Raychem refrained from marketing a metal seal for in-containment use because test results did not adequately support qualification.

By way of summary and with reference to the four factors in the Section II of the Modified Enforcement Policy (Staff Exh. 4):

(1) The licensee had no vendor-supplied documentation that demonstrated that the seals were qualified; on the contrary, Raychem-supplied documentation showed test failures for a somewhat similar configuration, and Raychem chose not to market such a product.

(2) The licensee has never provided any receiving or field verification inspection records to determine that the configuration of the installed equipment matched the configuration of the equipment that was qualification-tested by the licensee and his architect-engineer. In fact the licensee's qualification arguments have multiple deficiencies in this regard. First, the design specifications for both the plant equipment and the Bechtel test specimen were incomplete in that the compression fitting part number (and in some instances, the vendor) was not specified, the configuration of Chico

cement in the seal was not controlled, the drawing numbers given in the test report were discrepant with plant drawings provided to the inspector, the longitudinal overlap of Raychem material on the pipe nipple was not specified, etc. Second, no evidence has been provided that Raychem design and installation instructions such as usage (diameter) range and surface preparation were followed. Third, the licensee has attempted to take credit for test reports of other designs without even identifying, let alone evaluating the impact of, differences in configurations and materials. Fourth, the plant installation drawings provided by the licensee in discovery, bearing 1989 dates, deleted the instructions for inserting Chico cement into seals in 1982. This is understandable, because the original seals were installed in the plant without Chico cement, which was later added via veterinary syringe and tygon tubing; it is to be hoped that this crude assembly technique would not be continued. The licensee has never provided any analysis of the effect of changed assembly method on qualification.

(3) The licensee had prior written notice that equipment qualification deficiencies might exist, as specified in the beginning of my answer to this question.

(4) Nearly all other licensees identified similar problems and corrected them before the deadline. While I was in private industry in late 1981, the engineering department that I managed provided design change packages to a licensee specifying the use of Conax ECSA cable entrance seals that were

environmentally qualified for the application. By the November 30, 1985 deadline the use of Conax and other qualified cable entrance seals was commonplace.

Q15. What, if any, analysis did APCo proffer to you during the inspection to show that chemical interactions and the initial thermal shock of a LOCA transient were not necessary to demonstrate qualification?

A15. (Wilson) During the inspection, APCo provided the previously-mentioned 1981 Bechtel test report (Staff Exh. 33), which stated that the new seal design would only use "...materials that had already been environmentally qualified...", so that "...the Farley configuration needed only to be tested for pressure and temperature with time dependant variations approximating the postulated Farley LOCA profile." I do not recall any other substantive information on chemical interaction or thermal shock being provided, written or oral.

One must recognize that the files were very scanty during the inspection. Initially, only a portion of the Bechtel test report was available, and no drawings of either the test specimen or plant equipment. As the NRC inspection report states, the NRC inspector had to draw the design on a whiteboard. The questions asked by the inspector, and the responses provided by APCo, were of the nature of "what does the design look like, do you have any drawings, do you have the rest of this report, what other reports do you base qualification on, how," and the like. Information was very slow in coming from the licensee during this inspection in the areas of solenoid valve

qualification and instrument accuracy. As a result, review of the Chico A/Raychem seal design did not even begin until some time on November 18, 1987, and little more than a full day was available for that review. Most of the review took the form of discussions and requests for very basic information. Although the licensee cooperated fully, it was obvious that a qualification basis for the seals had not been assembled.

Q16. What, if any, APCo analysis to demonstrate qualification did you review after the inspection?

A16. (Wilson) After the inspection, APCo provided a three-page package at the management meeting at the NRC Region II offices on November 25, 1987 (Staff Exh. 46). The package was faxed to my office and I reviewed it the same day. It contained no additional basis for qualification; for example, the claim was made but not supported that the Chico cement provides a moisture seal. For the first time, a drawing was provided showing the position of the Raychem "keeper sleeve" in relation to other portions of the seal; however, this information had been obtained during the inspection (with regard to the whiteboard sketch cited above), and the sketch provided on November 25 was not used to fabricate either plant equipment or test specimens. I prepared a three-page critique of the package and phoned it to Region II the same day.

Also after the inspection, APCo submitted a letter dated January 8, 1988, transmitting a 19-page package concerning Chico A/Raychem seals (Staff Exh. 47). This package provided a brief description of the design (three double-spaced pages

and the same sketch provided November 25) with no additional basis for qualification, together with a chemical spray effect evaluation.

The January 8 package cited Raychem and Wyle (for Plant Hatch) tests of assemblies combining Raychem boots with steel pipe nipples, but failed to mention factors that rendered those tests virtually worthless for qualifying the Farley design. The Raychem test report is actually Wyle report number 58730 (Staff Exh. 34) for Raychem, discussed in the answers to Questions 13 and 14, where it is noted that only six of twelve test specimens were acceptable, that all specimens showed extensive degradation of the zinc galvanizing including under the Raychem material, and that Raychem did not choose to market the product. The other Wyle report is their report number 48842-1, and is proprietary; it has been reviewed by the NRC, and we have determined that it not only reports a split Raychem boot on a metal pipe nipple and the absence of chemical spray (as noted by APCo), but also that the tested seal contains materials and features not present in the Farley design that alone could produce successful test results.

The January 8 package also cited Sandia and Raychem material tests that address the interaction between chemical sprays and galvanized steel. These data are of little value for the Chico A/Raychem seal, particularly given the repeated failures of test specimens using Raychem boots over steel pipe nipples, because they do not address the bond between the Raychem adhesive and the steel.

APCo made a presentation on Chico A/Raychem seals at the March 15, 1988, enforcement conference at Region II. As described in the answer to Question 20, no

new basis for qualification was introduced at that time.

APCo made a presentation concerning Chico A/Raychem seals at the Region II offices on March 24, 1988 which I did not attend. I was briefed via telephone by Tom Conlon of Region II the next day. Mr. Conlon advised me that the presentation centered about a newly prepared seal specimen, presumably using new assembly techniques (e.g., Chico cement not inserted through the limit switch via veterinary syringe and tygon tubing), and tentative plans for testing Chico A/Raychem seals.

APCo's NOV Reply of November 14, 1988 (Staff Exh. 15) (Attachment 1 page 10) states that the specified performance requirement of the Chico A/Raychem seals is to prevent sufficient moisture intrusion into the Namco limit switch to avoid an electrical short circuit. This statement does not accurately reflect the performance criteria of a position instrument circuit.

APCo's NOV Answer of November 14, 1988 (Staff Exh. 15) (Attachment 2 pages 39-42) on page 40 quotes the NRC inspection report out of context in such a manner as to claim that the NRC inspector raised a concern actually expressed by the licensee. Page 40 of Inspection Report 50-348/87-30 (Staff Exh. 12) states "the licensee further cautions that the spray may react with the nipple's zinc coating to form a gray powder that could further challenge the adhesive bonds." Page 40 of the APCo Answer states "the inspectors believed that chemical spray 'may react with the nipples' [sic] zinc coating to form a gray powder ' at could further challenge the adhesive bonds.'" Further, degradation of the zinc galvanizing is not a matter of conjecture; it is documented in Wyle test report 58730 (Staff Exh. 34).

APCo's NOV answer also repeated arguments from the January 8, 1988 submittal (addressed above) claiming that it is only necessary to individually test the separate parts of a seal in isolation and considering only some of the environmental parameters and no functional performance requirement, rather than performing a proper test of the complete seal to address interactions and bonds, supported by analysis as necessary to extrapolate from the test specimen design and test conditions to the plant application. The argument that only a gross electrical short circuit need be prevented is repeated.

Attached to APCo's NOV answer of November 14, 1988 (Staff Exh. 15), as part of enclosure 5, is an affidavit signed by Messrs. Noonan, DiBenedetto, and LaGrange. On page 34 this affidavit states the following:

> The thermal tested configuration began [emphasis in original] at 310°F and thus was more severe than the actual environmental profile. In our opinion any thermal shock or differential thermal expansion would have been more severe in the tested configuration. It should be noted that, based on our experience, tested configurations which are ramped steeper than the environmental peak profile temperature, as is the case here, are more conservative than the norm for testing and should have been accepted by the staff without further concern.

The review of these consultants was apparently incomplete. As described in the answer to Question 11, ~~there was no initial temperature ramp in the Bechtel test;~~ the specimen temperature was increased ~~over a period of as long as 45 minutes~~, without benefit of an applicable test procedure and with no documentation of the actual temperature-vs.-time profile. Because of this lack of understanding of the test documentation, the consultants' opinion concerning thermal shock severity becomes

worthless. The subsequent statement, that the staff should readily accept an instantaneous test ramp to peak LOCA temperature, is correct except that test laboratories have generally found it difficult or impossible to increase temperatures as rapidly as calculated LOCA profiles; accordingly, the statement that the consultants' experience includes such fast ramps is dubious without specific supporting evidence.

Page 35 of the affidavit states that the NRC inspection report indicates some concern regarding the possible interaction of chemical spray with the metal pipe nipple. In fact, page 40 of Inspection Report 50-348/87-30 (Staff Exh. 12) clearly states "No chemical spray was used, even though the effect of these chemicals on bonding of the Raychem seal to the metal pipe nipple is of considerable concern." The affiants then continue:

> From our experience at the Staff, and from auditing numerous such files an engineer evaluating this documentation can correctly, and easily, conclude that there was reasonable assurance that no adverse effects impacting bonding would be present from Chemical spray on the Chico A/Raychem seal configuration. Even assuming some chemical interaction on the bonding (a point which is impliedly rejected in Raychem test report 58730 dated June 22, 1982, and a Sandia Lab Report [NUREG-CR2812]) there is too tortuous a path ...

At this point the affiants do appear to recognize the NRC inspector's concern with bonding between different pieces. However, in my opinion, their understanding of the test reports they reference is faulty. Wyle (not Raychem) report 58730 (Staff Exh. 34) is the one where only 6 of the 12 test specimens demonstrated acceptable performance, and it also states that all of the test specimens exhibited extensive degradation of the zinc galvanizing on the pipe nipple, including the area under the

Raychem material; this information does not "impliedly reject" concerns about the bond. The Sandia report does not even address Raychem material or bonding. Arguments of this sort may easily lead an engineer to a conclusion, but not correctly. Finally, the tortuous path is addressed in the answer to Question 13.

The consultants, in my opinion, failed to notice other significant test deficiencies spelled out in the answer to Question 8, such as the failure to apply pressure until after the test specimen had reached thermal equilibrium.

The analyses addressing chemical interactions and the initial LOCA thermal shock were apparently performed after the inspection and the November 25 meeting, and before January 8, 1988.

Q17. Why is the Staff's concern about moisture intrusion into the limit switch an important consideration if the switch worked during the various tests referred to by APCo?

A17. (Wilson) There was no limit switch in some of the tests relied on by APCo including the only test of the Farley configuration (Staff Exh. 33). Therefore, all of the NRC concerns, including no moisture in the test, remain pertinent.

Q18. In your opinion, how long had the deficiencies you allege existed? How did you determine this?

A18. (Wilson) Based on the information given below, it would appear that Chico A/Raychem seals were installed in safety-related applications at Farley from about the summer of 1982 until at least November 30, 1987. This period spans more

than three years before the November 30, 1985 EQ deadline and at least two years after.

During the NRC inspection APCo provided drawing A-177541, sheet 23S-1 of 29, Revision 0, dated July 16, 1982 (Staff Exh. 43), which described the procedure for inserting Chico cement into already-installed limit switches with Raychem boots, using the veterinary syringe and tygon tubing. The drawing states "ISSUED FOR CONST. INCORP. PCN 8-82-1184-3." It is presumed that this modification was performed relative to the Bulletin 79-01A (Staff Exh. 27) commitment cited in the answer to Question 14 above, sometime very shortly after July 16, 1982. Then, during the walkdown at Farley during the week of November 2, 1987, the NRC inspectors observed limit switch cable entrance seals of a design unfamiliar to them, and were told that they used Chico sealant, a Raychem boot, and a pipe nipple. Then, the SCEW sheet dated November 30, 1987 (Staff Exh. 37) that APCo produced in discovery listed numerous installed Chico A/Raychem seals.

Q19. Describe the components or systems affected by the Chico A/Raychem cable entrance seals used at Farley that the Staff determined had a deficient qualification file.

A19. (Wilson) During the NRC inspection the Chico A/Raychem file did not list the specific plant applications of the seals. By reviewing other files and asking questions, the inspector learned that the seals were used in all NUREG-0588 (Staff Exh. 23) Category II limit switches and in no other applications.

In discovery in this proceeding, APCo provided a version of the

Chico A/Raychem seal qualification file. The file included a SCEW sheet dated November 30, 1987 (Staff Exh. 37). The SCEW sheet listed 51 safety-related applications in Unit 1 (all on Namco limit switches), and 59 Namco limit switches and 4 Target Rock head vent valves in Unit 2. Of these, 20 limit switches in Unit 1 and 27 in Unit 2 were listed as inside containment; the other limit switches were listed for the main steam room. Although specific systems were not identified, the listed functions include PORV (power operated relief valve) position; regenerative HX (heat exchanger) and "reac cl drn tk" (reactor coolant drain tank) discharge and outlet lines; reactor cavity cooling system; accumulator tank discharge valve; containment sump pump discharge; containment minipurge supply and exhaust; containment purge supply and exhaust; RCP CCW (reactor coolant pump component cooling water); excess letdown heat exchanger; "wps to prt" (waste processing system to pressurizer relief tank); and sampling lines for pressurizer liquid and steam, steam generator blowdown, RCS (reactor coolant system) hot leg, and accumulators. In general, the seals were associated with valve position indication measurements for safety-related lines penetrating the reactor containment, and both measurements in redundant pairs of lines were affected.

In addition to the 47 in-containment applications cited above, the additional 63 applications in the main steam room that were identified in the November 30, 1987 SCEW sheet (Staff Exh. 37) were not reviewed by the NRC because of the seriousness of the in-containment qualification deficiencies. These additional applications were addressed by Region II from an operational standpoint, after the

inspection, and additional instances of unacceptable or missing seals were identified. By early April 1988 a total of 152 limit switches and solenoid valves in Unit 2 alone were identified as lacking qualified seals.

Q20. Describe your participation in any enforcement conferences or other meetings with APCo regarding this violation.

A20. (Wilson) I participated in the March 15, 1988, enforcement conference at the NRC Region II offices. In response to a general discussion by APCo, I asked a number of specific questions which were not specifically answered. When the APCo speaker stated that he didn't know what else they could do to address our concerns, I responded that APCo had yet to address any of the ten concerns spelled out in the inspection report. My sense of the presentation was, and is, that APCo continued to avoid defining a clear, detailed rationale for qualifying their seals because they were unable to do so, and probably also because the effort would simply emphasize the weaknesses in their argument.

Q21. What, if any, APCo analysis was considered before citing APCo for a violation involving Chico A/Raychem cable entrance seals?

A21. (Wilson) All of the information provided during the inspection, whether written or oral, was fully considered. The information presented during the November 25, 1987, management meeting at Region II was faxed to me and I determined that it contained no additional basis for qualification (for example, the claim was made but

not supported that the Chico cement provides a moisture seal); at that time I prepared three pages of hand-written critique which were phoned to Norman Merriweather at Region II. APCo's letter dated January 8, 1988 (Staff Exh. 47) was reviewed sometime before the March 15, 1988, enforcement conference in order to determine that the letter addressed only a small portion of the concerns raised in the inspection report, and that the only new data presented applied to chemical spray interaction with galvanized steel (and not to the bonding of Raychem adhesive to the steel). Otherwise, the January 8 letter only provided a qualitative description of the design without supporting data to verify that the design objectives had been verified. The morning after the March 15, 1988, enforcement conference Region II asked me to prepare a few "bullets" concerning the Chico A/Raychem seal violation. I prepared the following notes, and phoned them to Region II:

> After review of the information on Chico seals in the January 8, 1988 APCo letter the staff concludes that qualification is still not demonstrated because of failure to satisfy the specific concerns listed in the inspection report. The following major deficiencies exist in the APCo presentation:
>
> • The LOCA test of the Farley design included no steam or chemical spray, and no electrical measurements were made
>
> • Reference to tests of three other seal designs all lack evaluation of design differences and each has at least one other significant omission
>
> • Reference to Sandia corrosion testing is irrelevant to resolving the bonding concern because no Raychem material was included
>
> • Control of installed seal design was inadequate, as described in inspection report (p 41)

(Luehman) The analysis provided by APCo was considered but it was rejected because a) some of the licensee's arguments were clearly only made after-the-fact, b) even with the information provided subsequent to the inspection it has not been demonstrated that the seal configuration could survive in a full LOCA environment for the reason discussed earlier.

Q22. Described how you determined that this violation, under the provisions of the Commission's Modified Enforcement Policy, was sufficiently significant, standing alone, to be considered for escalated enforcement?

A22. (Wilson) The documentation provided during and shortly after the inspection, together with other information available to the inspector, not only was insufficient to demonstrate qualification, it strongly suggested that the seals could not be qualified. The documentation provided during the inspection and during the subsequent four years, together with other information available to the inspector, not only is insufficient to demonstrate qualification, it strongly suggests that the seals could not be qualified.

(Luehman) Because this was more than a minor file deficiency it meets the criteria for escalated enforcement under the modified policy.

Q23. Does this complete your testimony regarding this matter?

A23. (Both) Yes.

MR. HOLLER: There are several exhibits associated with his testimony, particularly, those that have been marked for identification as Staff Exhibit No. 27 and Staff Exhibits No. 33 through and including Staff Exhibit No. 46. If it please the Board, I will identify these separately when we move to have them admitted into evidence at the conclusion of testimony.

JUDGE BOLLWERK: That's fine.

MR. HOLLER: At this time, the panel, on behalf of the NRC staff, concerning Chico A/Raychem seals is ready for cross examination.

JUDGE BOLLWERK: All right. Who is going to be doing the cross?

MR. MILLER: I will be doing it, sir.

JUDGE BOLLWERK: Mr. Miller.

CROSS EXAMINATION

BY MR. MILLER:

Q Mr. Wilson, on the change that Judge Morris saw, page 13 --

A [Witness Wilson] Yes.

Q -- at item (c), that is a quote, is it not?

A [Witness Wilson] Yes, it is.

Q Does that mean that this item (c) appeared in its unchanged condition in the inspection report?

A [Witness Wilson] I have the inspection report

here. Let me check that.

Q Why don't we determine what the inspection report said? And tell us what --

A [Witness Wilson] They say words that I wrote nearly four and a half years ago. And --

Q Yes, sir.

A [Witness Wilson] Okay. What the inspection report said was the slow initial temperature increase failure to simulate. So, the word increase was correct in the inspection report, but it had a typo, with regard to the word failure.

Q All right. But the point, I take it that this (c) is trying to make is that the Farley EQ test of this component had a slow initial temperature increase?

A [Witness Wilson] Yes.

Q Okay. I need to change just for a second.

Mr. Luehman, I don't want to do any significant revisiting, but we were confused a little bit about what you said at the end of yesterday's session about how the modified enforcement policy works. Since you're going to apply it on these components and in this case, let's make sure that we understand what you told the board yesterday.

As we understand it, if a qualification document is there at the time the inspection is conducted, there will be little or no effort by the staff inspectors to determine

whether that document existed in the file as of November 30, 1985.

A [Witness Luehman] I think that that's --

Q That's a true statement?

A [Witness Luehman] As far as it goes, yes, I think that's a true statement.

Q Okay. Let's see if we've got a fix on what else you said about a licensee that self-identifies and then -- and communicates this identification to the staff. If there is, for example, an LER that is sent in to the staff, under the modified enforcement policy, as you understand it and are implementing it, that LER will be used and can be used as a basis for imposition of a civil penalty. Is that a true statement?

A [Witness Luehman] What I think I said is that, in touching on both of those, is that the direction that the inspectors got was largely to inspect the files as they existed at the time of the inspection. If it was clearly evident that, in large part, the files had been constructed and testing had been done after the deadline, that the inspectors would then pursue those items similar to, as far as being equipment not qualified as of the deadline, similar to the way that they would handle items previously identified by the licensee and reported to the NRC.

I guess, as part of every inspection, the team

leader would be aware of any licensee-identified items of equipment that the licensee identified after the deadline that were submitted to the NRC in forms of LERs, and those would be followed-up.

What I meant to say, or I think I did say, about the files is that the expectation, on the part of the staff, was not, unless there was clear evidence that the files were -- and the testing was done after the deadline, was not for the inspectors to do an extensive amount of investigative work to determine exactly when files were done, if it wasn't evident that they were either clearly done before or after the deadline.

Q Okay. All right. What we were trying to understand is your response to Judge Bollwerk's question where there was some discussion about a licensee who does not send in an LER but goes down and makes the modifications to the qualification file. In that instance, the staff would, in all likelihood, accept the modifications and move on. Is that so?

A [Witness Luehman] I think if the staff didn't have any reasonable way to determine that -- that that licensee would probably --

Q Get the benefit of its duplicity?

A [Witness Luehman] -- get -- well, I mean, if we had any indication that there was actual -- you know, an

actual attempt, on the part of a licensee to deceive the NRC, then that would be a different matter. And we don't expect our inspectors to act as investigators. So, I would say that that's true, that there may have been cases where files were substantially completed after the deadline, inspectors didn't pick up on that, and an individual licensee would have gotten the benefit of that during the inspections.

That's one of the problems with doing inspections. We have limited resources. We can only do one at a time. And we were doing them as late as 1988. So, clearly, some licensee that got inspected late in the process might well get away -- I don't want to say get away with -- but would have the benefit of that.

Q The flip side of it, though, is if a licensee submits an LER, even though the LER says the licensee thinks the equipment is qualified, the Staff feels free to use that LER against the licensee under the modified enforcement policy. Is that a true or false statement?

A [Witness Luehman] I think that that's true not only --

Q All right.

A [Witness Luehman] -- under the modified policy, but it's true under the regular enforcement policy. The NRC can't un-know what it knows.

Q All right.

A [Witness Luehman] If it knows of a violation, it pursues it.

Q We're just trying to see how this reward system works. That's all we're trying to understand. And to carry that philosophy of enforcement another step further to make sure we understand what you said yesterday, and using the gems as an example, does the Staff agree that, as of November 30, 1985, it has no facts that the gems level transmitters were missing any silicone oil?

A [Witness Luehman] As I stated yesterday, I think that the appropriate person to talk to about that are the inspectors that did the inspection and --

Q They have come and gone. Tell me your understanding of the Staff's position.

MR. HOLLER: I would object, Your Honor. We had offered a panel --

JUDGE BOLLWERK: I think we're getting a little beyond. I think this is something that can be taken up in rebuttal.

MR. MILLER: I agree and don't mean to revisit gems, but as part of the understanding of how the modified enforcement policy operates, we would like to at least have an offer of proof that if there is no evidence on the point, it goes against the licensee under the modified enforcement

policy.

If there is evidence presented by the licensee in an LER, it goes against the licensee under the modified enforcement policy. I want to at least have the record clear that this is not a fair and reasonable enforcement policy, and that's part of what this line of questioning is designed to prove.

JUDGE BOLLWERK: Well, I mean, you're characterizing the record in the way you see it, obviously, whatever comes out here.

Do you want to say something, Mr. Holler?

MR. HOLLER: I would just ask -- to the best of my recollection, we have not introduced nor has the licensee introduced an LER associated with gems. If counsel wants to ask a hypothetical question with regard to LERs, that's one thing, but to ask it specifically with regard to gems without establishing a foundation, I would object to that.

JUDGE BOLLWERK: I am going to guess his reference to the LER refers to the --

MR. MILLER: The V-type splices.

JUDGE BOLLWERK: -- V-type splices. I think that's -- in other words, this goes back to some of the first testimony we heard.

MR. MILLER: Perhaps I could just ask this question, and we'll try and move on.

BY MR. MILLER:

Q Can you tell us, Mr. Luehman, from anything you know, whether you have any facts that, as of November 30th, 1985, there was a low oil level in the gems level transmitters, and if you have no facts, do you contend that the modified enforcement policy should operate against the licensee in that circumstance?

MR. HOLLER: Again, I'm going to object on the grounds that it's outside the scope of the testimony that the panel is here today for.

MR. MILLER: And he's here on the modified enforcement policy. I would like to know how that policy operates.

JUDGE BOLLWERK: Well, I am going to sustain the objection, but I'm going to make it clear I think there is a question here, and frankly, I think, in terms of the Board, we expect to see some information on rebuttal regarding this matter, okay? And if there's surrebuttal testimony on that, that's something we'll also look at.

BY MR. MILLER:

Q Mr. Wilson, would you be so kind as to take a copy of your testimony and turn to Page 2.

A [Witness Wilson] All right.

Q We see there your reference to the notice of violation, do we not?

A [Witness Wilson]" Yes.

Q And there under Item 2, your discussion or, I should say, instead of your discussion, the words of the notice of violation relative to the issue we are here on today.

A [Witness Wilson] Yes.

Q It says there, and I'll summarize briefly, but let's make sure we get the substance of it correct, that Alabama Power Company did not document qualification of the Chico A/Raychem seals. Isn't that the substance of this violation?

A [Witness Wilson] Yes.

Q And to carry it further, it goes on to say that the available file was incomplete and test data in supporting the analysis was insufficient to demonstrate qualification.

A [Witness Wilson] Yes.

Q It then gives the specifics that we'll discuss later, being possible chemical interactions and temperature profile.

A [Witness Wilson] Yes.

Q Can we agree at the outset, Mr. Wilson, we are here, at least under this issue, because of an alleged document deficiency? That is, after all, what it says.

A [Witness Wilson] I think that's taking a narrow

interpretation of the concern, particularly based on the rest of this panel's testimony.

Q I understand that the panel's testimony goes in other directions, but at least the NOV speaks in terms of a document deficiency.

A [Witness Wilson]" That is correct.

Q Okay. And let's see if we, by using the NOV, can identify these specifics. I see possible chemical interactions. I said it right, did I not?

A [Witness Wilson] That's what it says.

Q And as we come to see it, that refers to the absence of chemical spray in the test chamber?

A [Witness Wilson] To what test chamber are you referring?

Q I should have --

A [Witness Wilson] You have referenced multiple tests in your argument and your testimony.

Q Let's try it this way. The possible chemical interactions. Does that refer to your concern that when Bechtel did its qualification test, there was no chemical spray in its test chamber?

A [Witness Wilson] That is a portion of it. The concern is that there has never been a test of the seal design in the presence of chemicals.

Q Okay. Have you a copy of your deposition?

A [Witness Wilson] No, I have not.

Q I'll ask the staff if they would give Mr. Wilson a copy of both volumes of his testimony. While they are doing that, Mr. Wilson, can we say, though, that the reference there to the temperature profile used in the testing -- the phrase "the testing" refers to the Bechtel test of December 1981?

A [Witness Wilson] In this case, I believe it does because that again is the only test of the seal design that has been offered by the licensee, to my knowledge.

Q It goes on to say that the testing, the Bechtel testing, did not simulate the initial thermal shock of a loss of coolant transient.

A [Witness Wilson] Yes.

Q And does that mean that it's your understanding, the Bechtel test failed to meet the LOCA profile for Farley nuclear plant?

A [Witness Wilson] With --

Q I should have said for the temperature of the LOCA profile.

A [Witness Wilson] With respect to the test specimen, that is correct.

Q Okay.

A [Witness Wilson] May I expand on that?

Q Do you have your deposition in front of you?

MR. HOLLER: We do not have a copy of Mr. Wilson's deposition with us here.

MR. MILLER: Okay.

BY MR. MILLER:

Q Then let's focus on your understanding of the Bechtel test, Mr. Wilson. Have you previously testified -- and let's read it together to make sure that the record is absolutely clear -- have you previously testified --

A [Witness Wilson] I don't read sideways.

Q -- in words to this effect -- I'm going to read it --

A [Witness Wilson] All right.

Q Since you and I have to face it in the same way, I'll read it, you tell me if I read it correctly, that on July 23rd of last year, did you not testified, "I believe that, when the test chamber cover and the test specimen were installed in the test chamber, that this additional room-temperature thermal mass pulled down the temperature of the chamber"?

A [Witness Wilson] That is correct.

Q "I believe that the test specimen," quoting you, now, "did not immediately heat to 310 degrees Fahrenheit."

A [Witness Wilson] That is correct.

Q "I believe that the electrical heaters probably took some time to heat stagnant air in order to raise the

temperature of the test specimen to 310 degrees Fahrenheit."

A [Witness Wilson] That is correct.

Q Okay.

Can we say --

MR. HOLLER: May I ask Counsel for the page?

MR. MILLER: Oh, I'm terribly sorry. It's page 317, lines 6 through 14.

MR. HOLLER: Thank you, sir.

BY MR. MILLER:

Q Can we say, just so we'll have a good jumping-off point, that what we read here is a general but fair description of what is meant by the temperature profile not simulating initial thermal shock of a LOCA?

A [Witness Wilson] Yes, it is.

Q All right.

Is it your understanding that, when Bechtel conducted the test, the test specimen was -- strike that, and I'll ask it to you this way: Is it your understanding that, when Bechtel conducted the test, it took the top off the test chamber to insert the test specimen?

A [Witness Wilson] No.

Q Tell us your understanding of how that occurred.

A [Witness Wilson] My understanding is that the test specimen was attached to a portion of the test chamber --

Q Go ahead.

A [Witness Wilson] -- and the assembly of the test specimen and a portion of the chamber were placed on top of the preheated test chamber such that the specimen was not preheated, and when the LOCA test began, the specimen was actually at room temperature.

Q And is it your concern that, because the test specimen was at room temperature, the laws of thermal dynamics resulted in the test chamber dropping to a temperature below 310 degrees?

A [Witness Wilson] The chamber may have. That's not my concern. My concern is what was the temperature profile of the test specimen, which was intended to represent plant equipment experiencing a loss-of-coolant accident.

Q Okay.

Have you seen or are you aware of a temperature/time profile of the test that we are describing?

A [Witness Wilson] Yes, I have. Most recently I saw one in the licensee's testimony which indicated that, at 1/10th of a second, the temperature was 310 degrees Fahrenheit. I don't believe the specimen was at that temperature at that time.

Q Okay.

You're saying, though, as we understand it -- and

you correct us if we're wrong -- that the test specimen was not heated to 310 degrees even though the test chamber may have been.

A [Witness Wilson] That's correct.

Q All right.

Is it your contention that, in order to have a qualified test, the test specimen must be heated to 310 degrees?

A [Witness Wilson]" Yes, and the reason -- that's the purpose of the test, is to demonstrate that the specimen will perform during loss-of-coolant conditions, where rapidly-moving steam is in direct contact with the specimen, not stagnant air.

Q Just so we'll understand it, though, it's not enough for the test chamber to meet the LOCA profile. You say the component -- in this case, the Raychem/Chico seal -- must go to 310 degrees.

A [Witness Wilson] When you talk test chamber, I am not sure which portion of it you're talking, at which point in time. There has never been a description provided of things like the dimensions or materials of the test chamber.

Q I see.

A [Witness Wilson] I haven't questioned that because my interest is in the test specimen, not in the test chamber.

Q That's okay.

You saw no photographs of the test chamber.

A [Witness Wilson] I saw a very blurred xerox photograph of it. It didn't indicate dimensions or materials.

Q You could not tell the dimensions from the photograph that you saw.

A [Witness Wilson] I could not.

Q You have not seen a better copy of that photograph.

A [Witness Wilson] And again, it's not of much importance to me. I am interested in the specimen conditions.

Q Okay.

I'll ask you, if you will, to turn to the December 1981 test conducted by Bechtel, which I believe is Staff Exhibit either 33 or 34, I believe.

A [Witness Wilson] Exhibit 33, qualification testing of Raychem environmental seals for Alabama Power Company, Joseph M. Farley Nuclear Plant. I have it.

Q Is this the test report that you saw while you were at Farley Nuclear Plant?

A [Witness Wilson] Yes, it is.

Q Okay.

Incidentally, are you familiar with Bechtel Power

Corporation?

A [Witness Wilson] Am I familiar with them?

Q Yes, sir.

A [Witness Wilson] I know of the company, yes.

Q All right, do you recognize that Bechtel Power Corporation is a worldwide engineering firm, active in the nuclear power industry?

A [Witness Wilson] I understand that.

Q Would you agree with me that Bechtel is certainly familiar with environmental qualification requirements as promulgated by the Nuclear Regulatory Commission?

A [Witness Wilson] That's difficult to answer, because I think the topic that we're here to discuss indicates, in my mind, quite a serious failure to qualify equipment.

Q I see, so it is your belief that Bechtel Power Corporation is not familiar with the EQ requirements, as you understand that?

A [Witness Wilson] I didn't say that.

Q Tell us what you said, then?

A [Witness Wilson] I said that the topic that we are here to address, the qualification of Chico A/Raychem sales -- I think the qualification was poorly handled and not demonstrated. Beyond that, I have not attempted to generalized and comment about Bechtel.

Q Will you agree that the DOR guidelines in NUREG 0588 allow the use of qualified materials supplemented by partial testing and analysis?

A [Witness Wilson] Absolutely not.

Q And tell me what makes you say that?

A [Witness Wilson] The concept of qualified materials is totally irrelevant to DOR guidelines or NUREG 0588. Materials are not qualified in a vacuum.

Q So it is your testimony that what I described, qualified materials, use of qualified materials, supplemented by analysis and partial testing is absolutely forbidden?

A [Witness Wilson] As it was performed in this case, it does not satisfy any of our regular regulatory criteria, even the most lenient.

Q I am not asking you about the performance in this case; I'm asking you about NUREG 0588 and the DOR guidelines.

Do you testify that what I have described as the use of qualified materials and supplemented by analysis and partial testing is forbidden under either of the two documents we just identified?

A [Witness Wilson] I cannot answer yes to that, and the reason is that the concept of qualified materials, regardless of function, application, any such matters, is

not recognized in our criteria.

Q If you cannot answer, yes, can you answer, no?

A [Witness Wilson]" No, because it is possible that people can use any material at all, and with proper testing and analysis, demonstrate qualification of it.

Q Just by --

A [Witness Wilson] But if the person is taking credit for qualified materials and restricting the testing and analysis that he provides, such that he does not demonstrate qualification of the component for its function, then he has not qualified it. My point, again, is that qualified materials is --

Q Yes, sir, excuse me, Mr. Wilson --

A [Witness Wilson] -- an inapplicable phrase to EQ.

Q Excuse me, sir. I'll ask you whether or not the Raychem boot used -- well, I'll strike that and ask it to you this way:

Do you accept and recognize the validity of the Raychem boot testing performed by Wylie Laboratories and reported in their test report 58442-2?

A [Witness Wilson] Within the scope of application of that boot to cables, I certainly do.

Q All right. Do you not recognize that within the scope of that application, the Raychem boot is then qualified for EQ as an EQ material?

A [Witness Wilson] Only for the applications addressed in that qualification test report, and in reasonable analyses appended to the report.

Q You admit, then, that the Wylie test report we are discussing can form the basis of reasonable engineering analysis?

A [Witness Wilson] For what purposes?

Q For purposes of qualification of equipment used -- or Class 1-E equipment.

A [Witness Wilson] I agree it certainly forms the basis for qualifying application of that boot to cables. Beyond cables, I would have t see the analysis before I would agree that a successful qualification analysis could be performed.

Q I see, so you would not reject the analysis out-of-hand; you would want to see it first?

A [Witness Wilson] That's right.

Q That tells us there's at least a possibility in your mind that such an analysis can be done satisfactorily?

A [Witness Wilson] Yes.

Q Now, let's go back to December of 1981, and I'll ask you whether or not at that time, there was a deadline imposed on licensee such as Farley Nuclear Power Plant to qualify its equipment by June 30, 1982?

A [Witness Wilson] Yes, there was.

Q Will you agree with me that at the time, Farley Nuclear Plant has no visble alternative to qualifying a seal for its EA-180 NAMCO limit switches, except to develop its own?

A [Witness Wilson] No, I don't agree.

Q Well, you don't have your deposition.

A [Witness Wilson] I don't need it. I'm aware that at the time there were environmentally qualified applications of CONAX seals in other plants, just to name one seal that was being used at that time.

Q You have identified the CONAX seals?

A [Witness Wilson] Yes, the CONAX seals.

Q Yes. Just a second. I show you now Volume II of your deposition, page 368, and ask you if you will not look at the question and answer beginning on Line 5, which I will read?

The question from me was, "Right, but the point there is that Farley had no alternative but to develop its own test procedures -- either it or somebody on its behalf?"

And your answer -- if you will go ahead and read your answer?

A [Witness Wilson] My answer was, "As far as I know, in 1980, it had to do that -- maybe in '81."

Q And then you said, "So people were doing whatever they could in those days to make that seal, yes?"

A [Witness Wilson] Yes. And in those days, I was referring to 1980 and maybe in 1981.

Q I see.

A [Witness Wilson] I know that by the Fall of '81, the CONAX seal was available and was being used.

Q I understand. Well, you are not suggesting that it is inappropriate or not acceptable for Farley Nuclear Plant and Bechtel to devise its own test procedures and its own seals; are you?

A [Witness Wilson] Not at all. I think in the deposition you just showed me, I indicated that people were doing that, and we did accept seals at other plants that were designed for plant-specific applications.

Q So, it is -- you know, it's entirely possible -- and we know it's a point of debate here, but it's entirely possible and appropriate for a licensee to develop its own seal to be used in the EA-180 NAMCO limit switches?

A [Witness Wilson] Of course. It was not necessary by the end of 1981, but it was certainly appropriate and possible.

Q Tell me when you have Staff Exhibits 34 and 33 in front of you.

A [Witness Wilson] I have both.

Q And will you describe for the record what Staff Exhibit 33 is?

A [Witness Wilson] 33 is the one I read the title of a few minutes ago, testing performed for Farley in December 1981.

Q And what is 34?

A [Witness Wilson] 34 is Wyle Laboratories test report number 58730, which describes testing of a Raychem NEIS, Nuclear Environmental Interface Seal, kit.

[Pause.]

BY MR. MILLER:

Q Let me show you what I have marked for identification purposes as Alabama Power Company Exhibit 60, which I will identify for the record as the Environmental Qualification Test Report of Raychem Nuclear Cable Breakout and End Sealing Kits for Raychem Corporation, and it is dated April 3, 1981, and ask you if you will hold that in front of you, please, sir.

A [Witness Wilson] All right.

MR. MILLER: Let's get the copies for the Board.

JUDGE BOLLWERK: Let the record reflect that APCo Exhibit 60 has been marked for identification.

[APCo Exhibit No. 60 was marked for identification.]

BY MR. MILLER:

Q Let's take Staff Exhibit 33, which is the Bechtel report, and turn to Appendix B. Tell me when you're there.

A [Witness Wilson] All right.

Q It may help if I hold up and show that the pertinent part of Appendix B is this handwritten page that's towards the end of the test report.

[Pause.]

JUDGE BOLLWERK: That has what page number?

MR. MILLER: 005554, which is are unified number.

BY MR. MILLER:

Q Tell me when you're on that page, please, sir.

A [Witness Wilson] Go ahead.

Q Now, will you agree with me that, on that page, it shows that, at 0846, military time, the vessel temperature was 310 degrees, and the test specimen was installed?

A [Witness Wilson] That's what it says.

Q And tell us what it says at 0847 military time.

A [Witness Wilson] It says "vessel temperature 310 degrees, vessel pressurized to 60 F," 60p something. The xerox obliterates the rest of it.

Q I see.

A [Witness Wilson] "Began . . ." -- oh, that's the next time. I presume it's going to say "vessel pressurized to 60 psi," if the entire thing were here.

Q I think that's a fair evaluation.

Can we look at, though, Mr. Wilson, and understand that the test chamber stayed at the constant temperature

after the test specimen was installed?

A [Witness Wilson] I don't know that.

Q You cannot look at that and make that determination.

A [Witness Wilson] I don't know the details of the thermocouple installation. I don't know whether it was a ground-to-junction thermocouple or not. I don't know the thermocouple time response.

Q Have you any facts to suggest that the vessel temperature was not 310 degrees at 0347 on the day of this test?

A [Witness Wilson] I don't believe it's my job to produce those facts. I believe the testers should document how they perform their test.

Q And what you're telling us is that this line is an inadequate level of documentation for your purposes.

A [Witness Wilson] Which I would speculate probably goes along with an inadequate measurement of specimen temperature.

Q I understand and so, your view that the level of documentation is inadequate is illustrated, at least in one example, by this line right here, because it fails to mention the things that you can think of and have questions about.

A [Witness Wilson] That is correct. Not only is

the test report incomplete in that regard but the licensee has provided no analysis, no calculation of specimen temperature versus time, which he may well have done to supplement the test.

Q That's what you have to say, and I take it, from that, we can learn that, without such analysis, you deemed this qualification test report to be, in the words of the NOV, inadequate. Is that so?

A [Witness Wilson] That is correct, and I'm not attempting to suggest that a test report requires analysis in that area. This particular one does.

Q I see.

Will you also look at the bottom of page 005554 and the top and all of the next page --

[Witness Wilson] Yes.

-- as well as the top part of 005556, and I will ask you, sir, is that not a time/temperature profile?

A [Witness Wilson] Yes, it is.

[Pause.]

BY MR. MILLER:

Q Let us turn to page 29 of your testimony.

A [Witness Wilson] All right.

Q Down where you made your corrections, the sentence should read this way, as I understand it: "As described in the answer to question 11, the specimen temperature was

increased without benefit of an applicable test procedure and with no documentation of the actual temperature-versus-time profile." Did I read it correctly?

A [Witness Wilson] Yes.

Q We had talked earlier, Mr. Wilson, about the possible chemical interaction, and just to make sure we are on focus with that, I think you told me earlier that refers to chemical spray.

A [Witness Wilson] Chemical spray in the Farley plant as -- as part of LOCA mitigation is the source of chemicals with which we're concerned, yes.

Q And by chemical spray, do you mean moisture intrusion?

A [Witness Wilson] No. I mean the chemicals that are injected into the Farley containment as part of the LOCA mitigation engineered safety features.

Q What function will chemical spray interfere with or stop or halt or affect?

A [Witness Wilson] What function with regard to the Chico seals?

Q Yes, sir.

A [Witness Wilson] I am speculating here.

Q Don't speculate.

A [Witness Wilson] I believe it's the licensee's job to make his case. Now, having said that, I will

speculate that --

Q Well, let's wait just a minute. We don't want you to speculate. We can't make a decision based on speculation. If you know, say so. If you don't know, say I don't know.

A [Witness Wilson] Would you repeat your question, please?

Q What function will chemical spray interfere with or stop or halt or affect?

If you know, please answer. If you don't know, just say you don't know.

A [Witness Wilson] Would you repeat it again, please?

Q I'd be happy to. What function will Chemical Spray interfere with or stop or halt or affect?

A [Witness Wilson] What functions. And we're talking about the Chico seal?

Q Yes, sir?

A [Witness Wilson] The function that I would be concerned about would be the ability of the seal to maintain the electrical integrity of the limits; what circuits during and after the LOCA transient, which would relate to the ability of the seal primarily to exclude moisture during and after the LOCA.

Q When we then read about chemical interaction or

chemical spray, is that not another way of saying moisture intrusion?

A [Witness Wilson] They're certainly related. I'm not suggesting that chemical spray is necessary in order to have moisture intrusion.

Q If there was some way to address moisture intrusion, would that not simultaneously address the major problem associated with chemical spray?

A [Witness Wilson] Not if the chemical spray, for example, affected the bonding of the Raychem adhesive to the galvanized pipe metal, that it needs to be bonded to maintain a seal.

Q Bonding then is one of your concerns?

A [Witness Wilson] Absolutely. And that was raised during the inspection.

Q And the lack of bonding would result in moisture intrusion?

A [Witness Wilson] Possibly. I don't know.

Q Okay.

A [Witness Wilson] There's no test or analysis addressing that.

Q We'll turn our attention to that in a minute. I will ask you to look at your deposition, volume two, taken on July 23rd, 1991, page 352, lines 12 through 16. And I will ask you this question again -- one that is precisely

identical to the one I just asked you. And if there was some way to address moisture intrusion, would that not simultaneously address the major problem associated with chemical spray? Please read your answer.

A [Witness Wilson] This is not the question you just asked me.

Q Please read your answer.

A [Witness Wilson] Okay. I'll read my answer. My answer to this question is: I believe so. That is not the question you just asked me.

Q You deny that I asked you that question within the last five minutes?

A [Witness Wilson] You've asked several. But the one you just asked me was whether chemical spray and moisture intrusion were essentially the same thing.

Q All right.

A [Witness Wilson] That's not what this question is. Q All right. Let's make sure we understand what you're telling us.

A [Witness Wilson] If you'd let me give you a complete answer, I would try to do that.

Q I'd be happy to. Perhaps we can do that by me asking you this question.

You have told us that the test reports with which you are familiar do not address chemical spray on the

Raychem boots; is that true, Mr. Wilson?

A [Witness Wilson] Absolutely not.

Q Then tell us the test reports --

A [Witness Wilson] That is not true.

Q -- with which you are familiar that do address chemical spray on the Raychem boot.

A [Witness Wilson] On the Raychem boot?

Q Yes, sir.

A [Witness Wilson] You've handed me a Raychem test report which I haven't reviewed in detail. But, my recollection is that it does.

Q That it does address the results of chemical spray?

A [Witness Wilson] The Raychem boot on a cable.

Q On a cable. And would it be fair to say that the results of that test -- that is, the chemical spray of the Raychem boot on the cable, revealed no deficiencies and qualified the boot for that application?

A [Witness Wilson] That's my recollection. And I have not reviewed the report this morning.

Q I understand. If you wish, you may take the time to review that. We don't wish to deny you that opportunity.

A [Witness Wilson] I don't do two-minute reviews.

Q Well, just how many minutes does it take you to do that?

A [Witness Wilson] It would take probably two hours I would think, since I have reviewed it in the past.

Q I see. Well, we'll let it speak for itself on that point.

Are you familiar with any test report that discusses the application of chemical spray of a Raychem boot over a galvanized pipe?

A [Witness Wilson] Yes. There is a Raychem test report that does that and you've culled it out a few minutes ago. It's Staff Exhibit 34.

Q I see. Is that the same thing as report number EDR6062?

A [Witness Wilson] I don't know. It's identified as Wyle report 58730.

Q All right. I guess we've got to get a cross-check to see if that's the same as the Wyle test report. 58730 you said?

A [Witness Wilson] Yes.

Q Okay. All right. Here we go.

Now, let's make sure we understand what you're telling us on this, Mr. Wilson. I understood -- strike that.

Is it your position that because the Bechtel test did not have chemical spray they failed to account for its corrosive effects and, hence, the Bechtel report is

inadequate?

A [Witness Wilson] That is one of several reasons, yes.

Q With respect to the issue of chemical spray, did I state the reason correctly?

A [Witness Wilson] Within that narrow framework, yes. I agree.

Q And will you then focus on Chemical spray. And I'll ask you whether or not you recognize this test report, Staff Exhibit 34, as one that qualifies the Raychem boot for use on galvanized steel?

A [Witness Wilson] No. I don't recognize that.

Q And tell me why that is so?

A [Witness Wilson] Because of the 12-specimens that were tested, six failed.

Q Let's begin on page one. Do you not recognize that, as it says right below item number seven, the kits were installed on one-half inch galvanized rigid steel conduit nipples?

A [Witness Wilson]" That's what is says. And that's a different size than what Farley has.

Q All right. Can we not agree though that what I hold in my hand and what we'll identify for the record as Alabama Power Company Exhibit No. 102 is an example of the EA-180 seal used at Farley nuclear plant when you were

there? Take whatever time you need to.

A [Witness Wilson] No, it doesn't.

Q That's not one of them?

A [Witness Wilson] The design at Farley had an external conduit clamp on it that's not present here.

Q Before we start cluttering the record with numbers, I'll show you this design and ask you if that is not what that description --

A [Witness Wilson] It could well be. I did not perform the plant walkdown inspection at Farley. So, I did not see the seals. I was leading another inspection at that time.

Q You know, that's interesting. You mean that you never saw the seals at Farley.

A [Witness Wilson] That's right.

Q If I identified for the record -- strike that. If I substituted what I now hold in my hand for Exhibit 102, can you tell me that's the first time you've seen the Farley configuration in the EA-180 NAMCO limit switch?

A [Witness Wilson] Yes, it is.

Q You then say that, until today, you have not seen a smaller or cut-away version, such as I hold in my left hand.

A [Witness Wilson] That is correct.

Q And that means the opinions you have given in the

test -- I'm sorry -- the inspection report and your testimony in your deposition have all been without benefit of the observations you re making right now.

A [Witness Wilson] That is correct.

MR. MILLER: For record purposes, I would like to substitute the full version and call it Alabama Power Company Exhibit 102.

JUDGE BOLLWERK: You identified the first one, the smaller one, as a cutaway?

MR. MILLER: Yes, sir.

JUDGE BOLLWERK: You don't intend to put that in, I take it.

MR. MILLER: I think it would be easier to have the large one in.

JUDGE BOLLWERK: All right. Why don't we consider 102 withdrawn, and we'll put that in as 103? How is that?

MR. MILLER: All right.

JUDGE BOLLWERK: Because you've talked about both, and I'm concerned there's going to be some confusion.

MR. MILLER: All right. Then we'll do that. The large version will be 103.

JUDGE CARPENTER: Do you mind letting the Board look at the cutaway?

MR. MILLER: We'll keep 102 as the cutaway.

JUDGE BOLLWERK: Again, we've got to have two

copies of all these, and that's going to cause a problem.

MR. MILLER: We'll mark them for identification purposes, the cutaway being 102, the full version being 103.

JUDGE BOLLWERK: Exhibit No. 103 is the full version of the EA-180 seal?

MR. MILLER: Yes, sir. It's the NAMCO limit switch with seal attached.

JUDGE BOLLWERK: Let the record reflect that APCo Exhibit No. 103 has been marked for identification.

[APCo Exhibit No. 103 was marked for identification.]

WITNESS WILSON: Could I ask what drawings or instructions these exhibits were assembled according to?

BY MR. MILLER:

Q Mr. Wilson, you're interested to know the drawings or the material supporting how those were constructed. Is that what you said?

A [Witness Wilson] Yes.

Q Have you not seen those?

A [Witness Wilson] Seen what?

Q The drawings that you are referring to.

A [Witness Wilson] Yes. I've seen conflicting drawings giving different assembly methods, but I wondered whether these examples were made to any drawing that the plant equipment was made to.

In other words, seeing these specimens today, do I know what plant equipment looked like in 1981, '2, '3, '4, or '5?

Q Let's be absolutely fair about it, Mr. Wilson. Those are the kinds of questions you could have asked back in 1987.

A [Witness Wilson] I wasn't doing an inspection in '87. I'm sorry. I was. I wasn't shown those specimens in '87. I did ask for drawings, etcetera, in '87, and my testimony addresses that.

What I am asking -- since you're making a point of my never having seen your samples, I'm asking are the samples like the plant equipment at that time?

Q I will show you Alabama Power Company Exhibit 104, which I have marked for identification purposes and which I will describe for the record as drawing A-177541, Rev 0, dated July 16, '82, entitled "Procedure for Applying Chico-A4 compound to the Nipple of NAMCO EA-180 Limit Switch Where Raychem Breakout is Attached," and I'll provide six copies of that.

JUDGE BOLLWERK: Let the record reflect that APCo Exhibit 104 will be marked for identification.

[APCo Exhibit No. 104 was marked for identification.]

BY MR. MILLER:

Q Take a moment to look at that, Mr. Wilson, and then, when you have had that time, I am going to ask you whether or not you have seen and reviewed that before.

A [Witness Wilson] [Reviewing document.]

Q I may need to correct the description. This is a series of drawings.

A [Witness Wilson] [Reviewing document.]

What I am doing is comparing this drawing number with the inspection report and then looking at page 14 of my testimony. There is an item number 3 which addresses similarity of the test specimen to plant equipment and says it was not established.

According to the inspection report, there was one set of drawings referenced in the test procedure, the one that we've been talking about, which is Staff Exhibit 33, I believe.

Also, according to the inspection report, when I asked for drawings of the plant installed equipment, I was given another set of drawings. There are some differences between them and the set referenced in the test procedure.

Q All right.

A [Witness Wilson] The drawing you have just handed me is in neither of those groups. It is very similar to what I looked at during the plant inspection.

Q You can say that it is very similar to what you

saw but cannot say that it is exactly what you saw.

A [Witness Wilson] I know it is not what I saw, because the sheet number is different. I was never given sheets 23 S-1 and -2 during the inspection.

I'm sorry. I'm sorry.

Q Turns out that you have?

A [Witness Wilson] Looking up there, it is there. Okay.

Q Just so we'll all know, Mr. Wilson, you have seen --

A [Witness Wilson] In item 1, it does reference this sheet, yes.

Q All right.

A [Witness Wilson] So, it's not only similar to what I saw, it is what I saw.

Q All right.

Let's see if we can move away from that little detour, and I want to back up and bring our focus back into the bonding question, and are you with me so far?

A [Witness Wilson] Yes.

Q And the bonding question, I take it, is -- strike that, and I'll ask it to you this way: Isn't one of your concerns that there will be a loss of bonding between the Raychem boot and the galvanized steel nipple?

A [Witness Wilson] Yes.

Q Is that lost of bonding a product of the chemical interaction or chemical spray?

A [Witness Wilson] Possibly. Because the Wyle Laboratories' report that we were talking about a little bit earlier, Exhibit 34, has a statement in that regard, where they ran a chemical spray test of Raychem material on a galvanized steel nipple. That report says all specimens exhibit extensive degradation of the sink galvanizing on the pipe nipple, including the area under the NEIS kit seal, which is the Raychem adhesive.

Q I understand. Now, let's --

A [Witness Wilson] So, for that reason, if no other, there was a concern in that regard.

Q There was a concern of yours that the bonding had been jeopardized?

A [Witness Wilson] Yes.

Q Can you tell me, by referencing this test report 58730, whether or not any of the seals failed as a result of this corrosion or extensive degradation you just read to us about?

A [Witness Wilson] No. I cannot tell you that.

Q Will you agree with me that there was no leakage indicated in the test specimens as reported in this test report?

I'm going to withdraw the question and make sure I

ask it correctly.

Will you not agree with me -- and we are looking at paragraph 1.0 summary, page two, where it reports on the test results for the 12 test specimens -- will you not agree with me that in six of the 12 test specimens, leak rates were at six times 10 to the minus five and there was no leakage indicated during the LOCA main steam line break exposure?

A [Witness Wilson] That's what it says.

Q Will you not agree with me that two more specimens showed no evidence of leakage during the environmental exposure, but had higher helium rates after the test?

A [Witness Wilson] I don't know if that's two more or is it simply two of the total.

Q I see. Okay. Will you not agree with me that one test specimen had slight leakage, but that was determined to result from a leak in the insulated wire?

A [Witness Wilson] That's what it says.

Q And then three evidence leakage resulting from leaks at the threaded flange connection?

A [Witness Wilson] You've skipped something so I'm not with you.

Q All right. You better -- let's go back and make sure we say it right. Why don't you read that -- those last two sentences into the record?

A [Witness Wilson] "There were three remaining specimens that evidenced leakage during the LOCA/MSLB and had high post-LOCA/MSLB helium leak rates. Post-test investigation of these specimens revealed evidence of leakage during the LOCA/MSLB at the threaded flange connection."

Q At the threaded flange connection and not the Raychem boot?

A [Witness Wilson] That's what they say. "Post-test investigation revealed evidence of..." that's correct.

Q Okay.

A [Witness Wilson] This test exhibit is one of the reasons why it is difficult to attempt to qualify, based on test failures.

Q Yes, sir.

A [Witness Wilson] And why the DOR Guidelines says you should not do that. May I read the pertinent sentence from the DOR Guidelines to clarify my concern there?

Q Can't you agree with me, Mr. Wilson, that the failures here were not attributed to a failure of the bonding of the Raychem boot to the galvanized steel?

A [Witness Wilson] In this test report, there's no indication that they attributed the failure to that cause. I agree with that.

Q Okay.

A [Witness Wilson] Which is not the same thing as saying that may not have been a failure cause.

Q I understand. But at least the test report doesn't say that, does it, sir?

A [Witness Wilson] No, it doesn't. It simply says that six of the 12 passed.

Q Okay. Mr. Luehman, would you mind looking on page 21 on the testimony, question 14 and answer 14?

A [Witness Luehman] I see it.

Q Is that the basis for the staff's contention that Alabama Power Company clearly knew or should have known of this violation?

A [Witness Luehman] That's a summary of it, yes.

Q All right. There is no other testimony by you on the issue of should have known in this testimony, is there, sir?

A [Witness Luehman] No, I don't think so.

Q I can't help but note, Mr. Luehman, that in your answer, you said APCo should have known about the deficiencies. I know you say more, but that's the starting point of your sentence; correct?

A [Witness Luehman] Yes.

Q Do you now wish to correct the record to say APCo clearly should have known or did you intentionally leave that word out?

A [Witness Luehman] No. I think that that should say clearly.

Q Well, you have had an opportunity to make corrections, have you not?

A [Witness Luehman] Yes, I have.

Q And earlier you said you had none.

A [Witness Luehman] That's correct.

Q And until I pointed that out to you -- unless I had pointed that out to you, you would have done nothing, would you?

A [Witness Luehman] That's true.

Q So, what you tell us now is this should read clearly should have known?

A [Witness Luehman] That's correct, or we wouldn't have made this a violation, if that hadn't been the staff's position.

Q Okay. Incidentally, Mr. Wilson, I meant to ask you if prior to going to Farley nuclear plant, you reviewed the Franklin TER?

A [Witness Wilson] I may have briefly. It certainly was not in-depth, and I saw nothing in it with regard to the Chico A/Raychem seals in particular.

Q How long did you spend with Mr. Merriweather discussing the Franklin TER?

A [Witness Wilson] Oh, my. I have no idea, but it

would have been very brief, if at all.

Q By any chance, did you take with you to the inspection your materials from the Sandia seminar in August of 1987?

A [Witness Wilson] There's probably something that I would have taken, such as a copy of 10 CFR 50.49, something generic like that. I doubt that I took anything else from that seminar.

Q You had been on how many EQ inspections prior to coming to Farley nuclear plant?

A [Witness Wilson] Probably 20.

JUDGE BOLLWERK: Are we at a point to take a break?

MR. MILLER: Yes, sir.

JUDGE BOLLWERK: Do you want to finish this line of questioning?

MR. MILLER: Let's take our morning break, yes, sir.

JUDGE BOLLWERK: Why don't we take 10 minutes and we'll come back at 11:00.

[Brief recess.]

JUDGE BOLLWERK: Let's go back into session. Everyone can be seated, please.

BY MR. MILLER:

Q Mr. Wilson, I'm going to show you what we have

previously marked as Exhibit 102, Alabama Power Company Exhibit 102. You have -- we have talked today about moisture intrusion -- and I know that this is the first time you have seen this, sir, but will you describe for me, how the moisture is going to intrude through this material, if you can do that, sir?

A [Witness Wilson] What happens is that the Raychem boot with extensions for two wires -- I thought there were four -- the other two are in the other half of that section?

Q Yes, sir.

A [Witness Wilson]" Okay. The boot is shrunk very tightly over a thread of galvanized steel pipe metal.

Q Yes, sir.

A [Witness Wilson] There doesn't appear to be any particular rounding of the edge of this nipple, and I don't remember in your installation procedures seeing that specified. But this is a pipe metal; it's not an electrical cable fitting, okay?

I would be very concerned about what would happen to this Raychem boot material, and its intimate contact with this pipe metal.

Q Your bonding concern that we discussed earlier?

A [Witness Wilson] Not only bonding concern. I'm concerned about thermal shock, differential expansions, things of this type. Is this Raychem material going to

maintain its integrity during and after a loss of coolant accident?

I'm concerned about back here, whether this Raychem adhesive is going to remain bonded to the galvanized steel.

Q All right.

A [Witness Wilson] The adhesive itself has been tested by Raychem, joining the boot to a plastic cable jacket, and it's worked very fine there. They had an early design problem with the boot and they resolved that by putting a keeper sleeve over it, which the Farley seal design also has.

Q Just to bring us into focus now, what we're trying to do is get moisture inside that chico, and as we understand it so far --

A [Witness Wilson] This is what I'm talking about, possible moisture entrance paths.

Q First it has to get through the Raychem boot?

A [Witness Wilson] Are you going to answer your question, or would you like me to try it?

Q I'm trying to make sure I understand what you're saying, and have you not told us that it first has to get through the Raychem boot?

A [Witness Wilson] Well, in your words, I guess I might have said that, yes. May I try it in my words; do you

mind?

Q I have to confess that --

A [Witness Wilson] I'm concerned about the boot rupturing where it's under stress against the galvanized steel.

Q Somehow or other, the moisture has to get through the boot by rupture or bonding or whatever?

A [Witness Wilson]" That's true, yes.

Q Then it's got to get through the cement.

A [Witness Wilson] It doesn't have to get through the boot if it comes in under the end of the boot.

Q I see.

A [Witness Wilson] All right?

Q And then is the next moisture barrier the cement?

A [Witness Wilson] Wait a minute; I'm not done with the boot and the sealant yet.

Q You have more concerns than we've already talked about?

A [Witness Wilson] You haven't begun to let me answer your question.

Q Well, I want you to answer.

A [Witness Wilson] I've got several more, and you've given several answers. I'd like to provide my answer, if I may.

Q All right. Let's make sure that the record is

such that we can read it. Have you given us some, but not all of your concerns about how moisture can evade the Raychem boot?

A [Witness Wilson] At what time? In my testimony right now?

Q Yes.

A [Witness Wilson] In the inspection report or where?

Q In your testimony so far.

A [Witness Wilson] I've given some but not all; that is correct.

Q All right, how many others are there, just so we'll know?

A [Witness Wilson] I haven't counted them. I'm looking at the seal and as I go along, pointing out weaknesses where I am concerned.

Q I see.

A [Witness Wilson] I haven't made a list of so many possible entrance points. I'll look for a test and analysis to show integrity.

Q Okay.

A [Witness Wilson] In the absence of them, I'm speculating along with you as best I can.

Q Okay, maybe that's a shorthand way of describing this conversation; is that we're engaged on speculation on

how the moisture can get in?

A [Witness Wilson] Exactly; I agree.

Q All right, as long it's under the heading of speculation, keep speculating for us.

A [Witness Wilson] Okay, at the other end of the boot, the red Raychem adhesive must bond the Raychem material to the galvanized steel pipe nipple. I am concerned about that bonding, particularly in view of the sentence I read from the Wylie test report of the boot on the galvanized nipple. It said all of the galvanized nipple is corroded, even under the Raychem material.

Q This is the same one where they reported no failures?

A [Witness Wilson] No, it's the one where 6 of 12 failed.

Q Well, we read into that. Go ahead; I didn't mean to interrupt. Go right ahead.

A [Witness Wilson] So, there is a concern, not only with the moisture entrance path here, but there's another one that I'll get to in a minute, after I talk about the part of the seal that's not here.

There is a Raychem keeper sleeve with the conduit clamp over it in the complete non-section specimen that the licensee provided.

Q Would it help if you saw that?

A [Witness Wilson] The Judge may wish to refer to that at this point. I don't need it over here, but what I wanted to point out is the concern about the conduit clamp and the Raychem material.

Q Yes. We are looking at Alabama Power Company Exhibit 103.

A [Witness Wilson] There's never been a test by Raychem of Raychem material that has a conduit clamp over it. There's never been a test by Raychem of Raychem material that is clamped between two pieces of steel. I am not at all convinced that this metal conduit fitting designed for use with metal, steel conduits, is appropriate for use with the Raychem polyolefin.

I'm concerned that where this clamp attaches to the Raychem boot, it may damage the boot. If that happens, the design reverts back to a problem that Raychem had with their boot used with a cable where during LOCA testing, the boot did not remain attached to the cable. The adhesive softened and the boot tended to work its way off the end of the cable.

Now, without the support of the keeper sleeve, I'd be concerned about that same deficiency on this specimen. If this adhesive were not able to hold the boot onto the pipe nipple -- now, if the clamp does defeat the function of the keeper sleeve, then I would have that concern.

There is always a concern as to whether the adhesive will remain bonded to the steel pipe nipple. Raychem hasn't marketed such a device. For whatever reason, they have chosen not to market it. In m, mind, that plants a bit of a seed of doubt. For some reason, they appear not to have confidence --

Q Whoa, wait a minute, Mr. Wilson. You cannot tell us what was in Raychem's mind when it decided to market or not market any of its products.

A [Witness Wilson] I just said I don't know the reason for not doing it.

Q All right. Let's leave it at that and not speculate about --

A [Witness Wilson] Fine.

Q -- their mental state of mind.

A [Witness Wilson] Fine.

Q We're trying to see if we can get all of your concerns, and I don't want you to be shy. Let's say every one you have. And we're going to try and reduce them to the real world.

A [Witness Wilson] All right.

Q Go ahead.

A [Witness Wilson] I appreciate that assistance.

If the adhesive does not remain bonded to the galvanized steel, there is the concern of moisture intrusion

through that path, there's the concern of the sleeve of the boot moving.

Now, the adhesive itself, I'm not concerned about it. It takes radiation; it takes LOCA conditions when the boot is on a cable jacket. It is the bond between the adhesive and the galvanized steel that, to my knowledge, has never been LOCA tested. We don't know what it would do in a LOCAL test. We don't have any tests on it with LOCA chemicals present.

So I don't consider material qualification in this case to be relevant. I think the test is needed to show that the adhesive can bond to the galvanized steel.

In summary, the concerns I have with this design is that we don't have the good LOCA qualification testing with the Raychem materials used with steel. We only have it where it's used with cable, and the cable jackets are all plastic and elastomers.

So that is the guts of the real nucleus of my concern there. We're using Raychem materials differently than we have the good qualification tests for.

Q Okay. Is it fair to say that you reject the analysis in the Wyle test report as providing justification for maintaining bonding on Exhibit 103?

A [Witness Wilson] Not at all. Six of their twelve specimens failed.

Q All right.

A [Witness Wilson] To me, that's not demonstrating qualification.

Q Okay. But you recognized that the failure was unrelated to the lack of bonding of the Raychem boot to the galvanized steel nipple?

A [Witness Wilson] Not at all.

Q You can't say that?

A [Witness Wilson] I don't know what their failure modes were.

Q Okay.

A [Witness Wilson] They go to post-test investigation, and they've speculated as to failure causes. There may have been others.

Q Okay. I'm not trying to find the failure cause, but we can say, and if you can't, say so, that one thing that didn't cause the failure was the lack of bonding between the Raychem boot and the galvanized nipple.

A [Witness Wilson] I don't know that.

Q Okay. Well, we'll work on that.

Have you told us all your concerns and illustrated to the Board how, in your view, moisture is going to get into this limit switch?

A [Witness Wilson] I think I have speculated on possible intrusion paths.

Q Okay.

A [Witness Wilson] I think I have --

Q All right.

A [Witness Wilson] -- stated my concern that this is an untested configuration.

Q Okay.

JUDGE CARPENTER: Mr. Miller, if I may, while you have the witness looking at those so I don't have to come back to it --

MR. MILLER: Please do.

JUDGE CARPENTER: Mr. Wilson, if you could help me, I think you said that you would expect that this boot, if the adhesive failed, would slide down the cables. Are you saying that the pressure inside the limit switch during a LOCA is greater than the outside pressure?

WITNESS WILSON: No. I can see why it may sound confusing there. On the end of the cable, there simply isn't any void such as it's filled with Chico cement in this case. The boot comes right down over the end of the cable jacket, so there really isn't an cavity inside, and the pressure, the internal pressure with the cable just is not a factor.

The problem is that the Raychem polyolefin material is a heat shrinkable material. The boot as fabricated by Raychem is expanded to roughly twice its

normal diameter, and when you make the seal, you heat shrink the Raychem material, and Raychem has very detailed instructions as to how you do that on a cable, but they don't have them for how you do it on a steel pipe nipple, to my knowledge.

My concern is that unless the boot is fully recovered to its original diameter, that upon heating, it will want to continue to shrink. So in effect, the boot then is over the end of the cable and the boot wants to shrink away off the end of the cable, and this is the difficulty that Raychem had with the initial testing of their boot. The concern then is the heat shrink material rather than pressure.

You don't look satisfied.

JUDGE CARPENTER: Well, the sample I'm looking at is of a pipe nipple with this Raychem boot over it.

WITNESS WILSON: Yes.

JUDGE CARPENTER: And the sample I have apparently has been heat shrunk so the Raychem plastic material has actually formed a thread that mates with the thread on the pipe nipple.

WITNESS WILSON: Yes.

JUDGE CARPENTER: Would you expect that to slide off?

WITNESS WILSON: I really don't know. I frankly

would expect it to rupture somewhere in that corner area.

JUDGE CARPENTER: From contractions?

WITNESS WILSON: Yes. Or differential expansion. I'm not sure what's going to happen with the Raychem material. Its differential thermal expansion coefficient is a lot larger than the galvanized steel, but it also has this tendency to shrink unless it's been fully recovered during the installation.

As another example, the way that Raychem recommends removing Raychem splices is to score the material with a knife and then heat it, and then it will shrink itself away from the scoring so that you can easily remove it from whatever you had it attached to. This is the type of material that it is because of the heat shrink properties.

JUDGE CARPENTER: Thank you very much. Thank you, Mr. Miller.

MR. MILLER: Yes, sir.

BY MR. MILLER:

Q Mr. Wilson, you have speculated on your concerns to us. Is it your position as an inspector that unless the licensee documents in some way a response to all of your speculative concerns, then his documentation, using the words of the NOV, is to be deemed inadequate?

A [Witness Wilson] Mr. Miller, I have tried to

separate speculation from regulatory concerns, and I'm going to continue to try to do that. Possible voids --

Q May I have an answer to the question?

A [Witness Wilson] -- to your entry paths, I put in the speculative category. I don't expect you to address them.

Q Yes, sir. May I have an answer to the question?

A [Witness Wilson] The failure to provide testing and analysis to demonstrate [illegible] remains.

Q I see.

But do you contend today as a Staff witness that documentation of some form is required to answer among other things the concerns that you have described on the record for us?

A [Witness Wilson] Yes.

Q Okay. Let's turn our attention to the Sandia Lab seminar in 1987 and you attended that, did you not?

A [Witness Wilson] Yes, I did.

Q I want you and I to read some of your deposition testimony into the record and I call attention to Volume 1 of your deposition, taken July 22nd, 1991, page 174, and we'll start on line 23 of page 174. I'll try and be precise:

"Okay, okay, well, let's go back to the '87 Sandia seminar, okay?"

You read the answer.

A [Witness Wilson] "Okay."

Q "I've got here with me Exhibit No. 3, which is the Equipment Qualification Seminar. That is what I am reading from. Tell me what you understood to be the reason for this seminar."

Would you mind reading your answer, please?

A [Witness Wilson] "In fact, I tried to do that just a few minutes ago. I'll start a little differently now. By this time I think that I ought to have the aspect of the counterparts meeting in this training session, meaning that we had inspection teams by that time, I think being led from two or three regions in addition to headquarters.

We had a situation where different team leaders would be out on the road and not able to communicate with each other a great deal.

We had a case where we had the temporary instruction for performing the inspections that I was responsible for and I don't know if even everybody had a copy of it. I'm being facetious there. We certainly had been able to get all of the players together and discuss EQ for a long time."

Should I continue?

Q Please do.

A [Witness Wilson] All right.

"So I believe that the primary purpose of that

session was simply to get the players together for a few days and talk about what was left to be done in the first round inspection program. It certainly had an element of comparing notes as part of it."

Q "Sort of update seminar, current event seminar?"

A [Witness Wilson] "Yeah. There were new people coming in and out of the program. A couple of the regions did not maintain continuity of personnel through this time period, for example, so we had a few people there who knew an awful lot about EQ and we had a lot of people that did not know an awful lot about it."

Q Thank you, sir.

We have heard previously that you taught at that seminar, isn't that the case?

A [Witness Wilson] Some, yes.

MR. MILLER: If we could take just a few minutes, please.

JUDGE BOLLWERK: Sure.

[Counsel for APCo conferring off the record.]

JUDGE BOLLWERK: Let's have a brief recess.

[Brief recess.]

JUDGE BOLLWERK: Everyone be seated. Let's go back into session.

Mr. Miller?

BY MR. MILLER:

Q Just a few final questions, Mr. Wilson.

With regard to moisture intrusion, is it correct to say that the bonding concern you had is the way that moisture will intrude through that Raychem/Chico A seal into the limit switch?

A [Witness Wilson] It is a possible way, yes.

Q And the other ways are splitting and cracking, I think you may have said?

A [Witness Wilson] Yes, attacking the integrity of the Raychem material itself.

Q Or slippage, I think you also said?

A [Witness Wilson] Possibly.

Q In the Bechtel test report and the Wyle test report that you have before you as Exhibits 33 -- Staff Exhibits 33 and 34, do you see any evidence that, during those tests, the Raychem boot on a galvanized pipe nipple split or cracked?

A [Witness Wilson] Not in these particular reports, except in the Bechtel test for Farley, of course, until the Chico -- until the Chico cement was introduced, boots with splitting and cracking.

Q Once that occurred, though, there is no such evidence with a Chico A/Raychem boot such as you have before you right now.

A [Witness Wilson] Not with the one test specimen

that was tested in the particular test conditions, which I find very short of LOCA conditions.

Q I understand that.

Same question for slippage: Any evidence in the two test reports we are discussing, illustrating that there was slippage of the Raychem boot on a galvanized pipe nipple in the case of the Bechtel report with Chico A?

A [Witness Wilson] Same answer with a clarification that should apply also to the last answer: When a test failure occurs, you may or may not find the cause by examining the specimen. You may or may not determine the cause at time of failure.

You may find one defect in the specimen. Others may have been present that you did not look for or did not report. Particularly in the case of the Wyle test report, which is even briefer than the other one we're talking about --

Q Excuse me, sir. The answer to the question was no, there is no such evidence in those test reports, correct?

A [Witness Wilson] The answer is there is no such evidence, but that does not mean that the thing did not happen.

Q I understand that, but you were not there and have no personal knowledge of what happened.

A [Witness Wilson] I can only go by the test reports.

Q All right. All of us are in that condition, and the test report, as you have told us, does not show the evidence of splitting or cracking or boot slippage that we have talked about today, true or false?

A [Witness Wilson] True.

MR. MILLER: Thank you very much, Mr. Wilson. No further questions.

JUDGE BOLLWERK: Redirect?

MR. HOLLER: Yes, sir, I have a few questions.

REDIRECT EXAMINATION

BY MR. HOLLER:

Q Mr. Wilson, with reference to what's been marked as Staff Exhibit No. 33, the Bechtel test report, you testified that that report did, in fact, have a time/temperature profile, and then, on cross, you also testified that there was no documentation of time/temperature profile. Can you explain that for me, please, sir?

A [Witness Wilson] Yes. I think the testimony referred to actual time/temperature profile. What -- what I am concerned with is the seal that's going to be exposed has to be capable of exposure to plant LOCA conditions.

During the plant LOCA test, the seal will be

exposed to an in-rush of steam, and there is one large driving force behind that steam, because we're talking a double-ended guillotine pipe rupture, of course, of a primary loop pipe.

The seal will be exposed to rapidly-moving steam which is going to transfer heat into the seal very quickly, and it's going to heat the seal quickly.

Now, in the December 1981 test that was run for the Farley seal, the room-temperature seal was put into stagnant air in an electrically-heated test chamber. There was no pressure at that particular point. The pressure was added a minute later.

But the point is, when the room-temperature specimen is placed into stagnant air at 310 degrees, it's not going to instantly reach that temperature.

I don't want to be facetious and talk about a one-pound roast in an oven in the kitchen, but that specimen is not going to instantly, in that stagnant air, reach anything like 310 degrees Fahrenheit.

The licensee has never addressed that point. In its testimony, it provided a time/temperature curve, and it started at 1/10th of a second at 310 Fahrenheit. This eliminates in the test, if you believe those numbers, the entire thermal shock of the LOCA. You got up to temperature and you're there.

Now, what apparently was measured in the test, based on a sketch of the test chamber that was in the report, was the output of the thermocouple that was mounted in the test chamber, and it appeared to me, as best I could determine -- and I have heard no clarification of this from the licensee -- that this thermocouple was probably measuring the air temperature in the chamber.

I suspect that the thermocouple would have a slow time response, because normally you don't get fast response temperature measurements on gases, including air. There is no indication the thermocouple had been specially selected or anything of the sort.

So, what I see in the test report is recorded temperatures from a thermocouple that I don't think was reflecting anything like the temperature that the seal, in a plant loss-of-coolant accident, would see.

I think that we were seeing artificially high temperature readings from the test thermocouple.

Q Mr. Wilson, if I remember correctly, you also testified that during the inspection you did not see the actual seals. Today is the first day that you've seen these examples of the seal. Could you explain for the Board how you could conduct an inspection if you didn't see the actual seal?

A [Witness Wilson] Yes. The purpose of the

inspection was to determine whether the licensee had documented a qualification basis for the seal.

What we looked for in that type of an inspection is description of how the seal was designed and built, assembled, installed, in terms of specifications, drawings, procedures.

We looked for records that that same design has been qualification tested. And there we're looking to see that the same drawings, procedures, instructions, whatever were used to build the test specimen.

If there are differences between the controlled design installed in the plant -- if there are variations within that design because the plant drawings do not adequately control the installation, we look for analyses to address these differences.

The analysis may simply point out that the difference is nothing but the color of the wire, and that's it. But we looked to see that an engineer -- an EQ engineer has determined for himself that there are differences, if they exist, and we looked to see evidence that he is satisfied with them.

I was concerned that Farley during the inspection, when I saw the test procedure, called for one set of drawings. But when I asked for the plant installation drawings I was given different numbers and routes. And

never has the licensee in its testimony or anything else addressed that discrepancy. This is the type of concern we can look for without seeing the hardwire.

Another thing that we look for in the EQ inspection is whether the testing was adequate to qualify the equipment. We looked to see does the testing duplicate plant loss of coolant accident conditions? And, if not, how does it depart? Where there are departures, we looked for evaluation of those departures.

In the DOR Guidelines, for example, and, again, they are most lenient EQ criteria. The DOR Guidelines says you should run a combined pressure, temperature, steam and fire test for equipment that you want to qualify for in-containment service. It then allows you to separately test or analyze for radiation effects, for aging the specimen. You don't have to look at testing the age of the specimen.

And we have not raised these issues at Farley because we were satisfied with what they did there. They didn't document the whole story, but the evidence was there and it was accepted by the NRC inspectors.

With regard to whether the testing adequately covered the plant LOCA conditions, again, we can look at that without seeing the hardwire.

Now, normally, on an EQ inspection, the inspector who did the file review would look at the hardwire. At

least in the ones I led, we almost always did it that way. That wasn't possible at Farley because they wanted to start up the plant prior to the date that was -- for which the inspection was scheduled. As a result of that, the walkdown inspection was conducted two weeks before the file review. And during the week of the walkdown inspection, I was leading our EQ inspection at a large three-unit plant and I couldn't leave that one to go to Farley.

We did look t the Chico seals during the Farley inspection. And, in fact, that was the first time that I ever heard of them from our inspectors who had conducted the walkdown. They didn't show them the EQ master list; they didn't show them the files for the in-containment limits, which is -- our inspectors during the inspection saw them and asked what they were. And this was how we learned of them.

But, again, as far as doing the review without seeing the specimens, our main interest in seeing the specimens during a plant walkdown is to see whether the equipment is installed within the constraints of the qualification basis. For example, if something is only qualified to be installed vertically, we look to see that it is installed vertically only.

The purpose of the walkdown inspection is not education in what a seal looks like or what a transmitter

looks like, and it's not to explain to people how seals or transmitters work. The walkdown inspection is primarily to verify that the installation and its interfaces are correct.

Now, I'd like to elaborate on another area of this, if I may, with regard to different design conditions and different design specifications I have seen for Chico seals. Is that appropriate here?

Q Mr. Wilson, perhaps -- let me --

A [Witness Wilson] If it's not, okay --

Q -- restrain this to the questions that were asked to you on cross.

A [Witness Wilson]" Fine.

Q And we'll have an opportunity to do that, I'm sure, as Mr. Miller is aware --

A [Witness Wilson] Fine.

Q -- on rebuttal to bring those through.

A [Witness Wilson] Okay.

Q Before we -- but going to the cross examination, before we lose track of what you've pointed out to us with regard to looking at hardware, Mr. Miller, today, has presented you with what he purports to be a represented sample of the seal and, in fact, a cut-away of the seal.

A [Witness Wilson] Okay.

Q And I would ask you, in view of what you just told us, is it your opinion that the cut-away is an accurate

representation of the seals that you would find in the plant? And if not, why not?

A [Witness Wilson] I really don't know. The reason relates to the manner in which the Chico cement is installed.

MR. MILLER: Pardon me, sir. But your answer was you don't know.

WITNESS WILSON: All right.

MR. MILLER: If you don't know, you don't know.

WITNESS WILSON: May I elaborate on that and clarify it?

BY MR. HOLLER:

Q Let me go to this question, and perhaps we can come back to it. I will ask you if you can explain to us your opinion as to whether or not the cut-away seal is an accurate representation of the seal that was tested? And I'm referring to that tested in the Bechtel test report that's been identified as Staff Exhibit No. 33.

MR. MILLER: May I ask the witness a question on voir dire?

JUDGE BOLLWERK: Go ahead.

VOIR DIRE

BY MR. MILLER:

Q Do you know the configuration of the seal that was tested by Bechtel?

A [Witness Wilson] I know the instruction for the preparation of that specimen.

Q All right. Can you look at what you see there and say whether that is or is not consistent with the instruction?

A [Witness Wilson] I believe this specimen is consistent with the instruction for the preparation of the test specimen, but not for the instruction of the plant equipment. And that's what I'd like to elaborate on to explain why.

MR. MILLER: You'll have your rebuttal testimony on that.

WITNESS WILSON: If I can expand on that, I don't think you tested much of what you put in the plant.

MR. MILLER: We understand your position, Mr. Wilson.

BY MR. HOLLER:

Q Mr. Wilson, let me move away from that. I'm sure the Board will ask if they are interested or, as Mr. Miller points out, we'll have our opportunity on rebuttal.

Putting that aside, you testified with regard to the Sandia training sessions, and I would ask you, was the Raychem/A Chico seal addressed at the Sandia training sessions?

A [Witness Wilson] We had never heard of it at that

point.

MR. HOLLER: Thank you, sir. I have no further questions.

RECROSS EXAMINATION

BY MR. MILLER:

Q You told us, Mr. Wilson, that the test chamber had stagnant air when the specimen was inserted, under your understanding?

A [Witness Wilson] That's my expectation. I saw no provisions for a fan or any other air circulation.

Q Isn't it true that the stagnant air was heated to a temperature of 310 degrees?

A [Witness Wilson] Yes, it was.

Q And you told us about what you looked for on the analysis and the testing for the seal such as we've been discussing this morning, haven't you?

A [Witness Wilson] What I had looked for?

Q Well, let me strike it and ask it to you this way: When you were describing the things that you looked for, isn't it true, when you were at Farley nuclear plant, you did that looking in a conference room?

A [Witness Wilson] I was highly portable. I went wherever I could get information and I asked for information.

Q I see. And the way it worked is you --

A [Witness Wilson] I looked at everything I was given.

Q And the way it worked is you would ask questions, and the licensee would provide answers to those questions.

A [Witness Wilson] This was the structure the licensee had set up initially, but my questions on the Chico seal started out: Where is the rest of this test report? Do you have any other test reports? Do you have a drawing of the design I could look at?

Those are the type of questions I was asking.

Q Won't you agree with me, Mr. Wilson, that on that occasion, a look at the configuration and the seal such as you have before you right now would have been at least helpful to you?

A [Witness Wilson] It probably would have.

Q And on that occasion --

A [Witness Wilson] I would have been happy to see one.

Q On that occasion, will you identify for me the person at Farley nuclear plant that you asked to take you to see a seal such as you have before you?

A [Witness Wilson] I don't recall if I asked that specific question.

Q Thank you.

A [Witness Wilson] As I explained earlier, this was

primarily a qualification review, not a design review.

Q I see.

A [Witness Wilson] And there was a great deal of other missing information, and the questions, I think, had to be prioritized.

Q Okay. Thank you very much, Mr. --

A [Witness Wilson] The qualification basis was the real issue.

Q You raised the concerns --

MR. MILLER: Well, strike that. Thank you very much, Mr. Wilson.

JUDGE BOLLWERK: Anything further, Mr. Holler?

MR. HOLLER: No further questions.

JUDGE BOLLWERK: All right. We will have questions from the Board. I think Judge Carpenter first.

BOARD EXAMINATION

JUDGE CARPENTER: Well, Mr. Wilson, I guess it's irresistible that I should ask out of curiosity the basis for your view that what we're looking at here today in terms of these samples of these seals doesn't accurately represent what's installed in the plant.

WITNESS WILSON: Thank you. I appreciate the opportunity to address that.

Using these two specimens, let me just --

JUDGE BOLLWERK: I'm sorry to interrupt you.

We're referring to APCo Exhibit 102. Is that correct?

WITNESS WILSON: 102 and 103.

JUDGE BOLLWERK: And 103, which is the full scale model.

WITNESS WILSON: Okay.

JUDGE BOLLWERK: All right.

WITNESS WILSON: Okay. On the cut-away, you will recall the concern with this design initially with no Chico cement as backing was that the Raychem boot imploded due to pressure.

The Chico cement was added in order to provide backing to prevent the Raychem boot from catastrophically failing, and that's what it did in tests by both Wyle for Raychem and also by Bechtel for Alabama Power. So the purpose of adding the Chico cement was to provide backing for the boot at that point.

Now, we were earlier referring to the December 1981 Wyle test report -- I'm sorry -- Bechtel test report or Wyle. We were talking about the page where the temperature versus time data for that pressure and temperature test began. It was in Exhibit -- I'm sorry -- Appendix B on the first page.

MR. HOLLER: It may help the Board, I believe Mr. Wilson is referring to Staff Exhibit Number 33.

WITNESS WILSON: I'm sorry, yes, I am.

MR. HOLLER: And the page is Bates number 005554.

WITNESS WILSON: Good. Now, not quite halfway down that page it says, "Chico A4 sealing compound, manufactured by Crouse-Hinds Company, was poured into nipple and allowed to cure."

Now, this morning, Mr. Miller handed me APCo Exhibit 104, which is Drawing Number A177541, Revision 0, and what this drawing describes is the way that, at least initially, the Chico cement was introduced into the plant test specimens, into the plant installed seals. It was done using a veterinary syringe with a piece of tygon tubing attached to it.

I think the reason that they did that is of interest, and the consequences of it cut to my concern about differences.

Using Exhibit 103, the licensee's testimony indicates that its seals were originally installed in the Farley plant without the Chico cement. Raychem then ran a test of a Raychem boot on a metal pipe nipple and it failed as I described a minute ago using the section specimen. They obtained the same result at Farley using their test chamber. As a result of that, they added the Chico cement to another test specimen at Farley by simply pouring it into the pipe nipple.

Now, what they had to do in the plant, with an

installed specimen, they had to take the side off the limit switch itself, which was not present in the test run for Farley. There was no limit switch at all in that test, only the wide open nipple. They had to come through the contacts with the tygon tubing, they had to insert that down into the pipe nipple. The instructions then specify using 1 and 1/2 ounces of Chico cement; however, it is important that no more than 1 and 1/2 ounces of Chico is applied to each switch.

In other words, the installation instructions gave a maximum quantity of Chico cement, but no minimum quantity. There are no instructions for a visual examination by the technician or anything of the sort. He was simply told to use a nominal amount of 1 and 1/2 ounces of Chico cement, but be sure and not to use too much, and there was no lower limit given.

Now, going back to Exhibit 102 and the section specimen, the Tygon turbine war coming down through the limit switch, passed along these contacts, through the conduit entrance hub of the limit switch, down here under this boot, which had four wires in it, and if they were like this, they had pretty heavy insulation on them -- this is up near an eighth-inch diameter -- and they were inserting the Chico cement down into this cavity with that Tygon tubing.

I am not at all convinced, in the absence of any

quality-control records, any inspection hold points, anything else on that installation, and given the lack of detail in the procedure, I am not sure that we are going to find in every single plant seal that the Chico cement provided such a nice backing for the Raychem boot at this one point of failure as what we'd see on the specimen or as what would have been seen in the plant test specimen.

If the backing were not available at this point, where the boot is coming over the end of the pipe nipple, if we did not get that backing, then we would expect the boot to fail exactly as it had in the Wyle and previous Bechtel Farley tests.

So, that is a large part of my concern about differences between plant equipment and test specimen.

There are others that are spelled out in the inspection report, such as the conduit compression adapter never being called out by a model number, a size, or different mentions of the supplier of it, for example.

But I am particularly concerned about the way in which the Chico cement was installed to provide backing to the boot right at the point where it was known to fail without backing.

JUDGE CARPENTER: If I may capsulate your answer, what you're saying is pouring the cement in is satisfactory but injecting it with a syringe is not?

WITNESS WILSON: Well, you're pouring it into the wide-open top of the pipe nipple. You're injecting essentially an uncontrolled quantity with respect to how little to be installed past the limit switch and down into the nipple.

JUDGE CARPENTER: But for the example with the pouring, there was pouring with the four wires present?

WITNESS WILSON: I don't recall if the wires penetrated the top of the nipple or not. They didn't make any electrical measurements. The wires would have been present at the bottom and, I would expect, part-way up, and I am not sure how far.

I don't believe I ever saw a drawing, and I didn't see the test specimen.

JUDGE CARPENTER: I just have one other question. What's the permissible leak rate for these seals? How fragile is this limit switch?

WITNESS WILSON: That's another question I'm glad you asked.

The purpose of the seal is to maintain the electrical integrity of the limit switch circuits coming through it.

When the limit switch manufacturer tested -- LOCA-tested the limit switch, he used solid-steel conduit from the limit switch to the wall of the test chamber to exclude

moisture and pressure, etcetera.

He had two criteria for the performance of the limit switch during that test. One was insulation resistance of the limit switch contact circuits. The other one was variation in the current through energized contacts.

In other words, the limit switch manufacturer forgot about helium leak rate; he forgot about moisture leak rate.

He said I want my limit switch to perform a safety-related function during a LOCA. So, he measured its ability to perform that safety-related function, which is electrical, instrumentation in fact.

So, he cut right to it. He said if I get the contact circuit insulation resistance and if it will carry the current that people run through contacts, then it has demonstrated its ability to work during and after a LOCA.

And this is another criticism raised in the inspection report, that the functional performance of the seal in its application was not addressed by the licensee.

He did address it during a submergence test, but we never heard of that until last month, and the submergence test specimen never saw LOCA conditions.

JUDGE CARPENTER: Do you tell me that the permissable leak rate is essentially zero?

WITNESS WILSON: I really don't know what it is.

I think you have to look at the electrical circuit and see what it is.

It's not a mechanical function. The function of the seal is to maintain the integrity of the limit switch circuit, and the limit switch is used as a position switch primarily for valves.

So, what you need is to have electrical integrity of that circuit such that the switch can perform its function. You can undoubtedly tolerate quite a bit of humidity in there, perhaps some moisture, but the question is do you get the electrical function or not?

JUDGE CARPENTER: That's what I'm asking you.

WITNESS WILSON: See, again, you're into the area of speculating. Well, if the helium leak rate is too much - -

JUDGE CARPENTER: No. I'm asking, if you know, did the manufacturer test the device to see how tolerant it was of humid environments?

WITNESS WILSON: No.

JUDGE CARPENTER: You said, first of all, he tested it in as little humidity as he could get by sealing it.

WITNESS WILSON: Well, the next thing he did then was tell his customers that they had to install it in the same manner, by providing a cable entrance seal that would

exclude the harsh environment. This was an installation condition made by NAMCO, the limit switch manufacturer.

JUDGE CARPENTER: I'm just trying to get some perspective when I look at these test results that say a certain leak rate was observed. On what basis is the investigator concluding that that leak rate is acceptable?

WITNESS WILSON: I don't know.

JUDGE CARPENTER: Thank you.

WITNESS WILSON: For Mr. Miller's benefit, I've speculated and things like that this morning.

JUDGE BOLLWERK: Judge Morris.

JUDGE MORRIS: Mr. Wilson, I think if you could summarize your position, the Staff's position, on the use of separate effects tests. If I understood you correctly, Staff will accept separate effects test provided one looks at the similarity of the device being tested, the test conditions and analyzes any differences and supports an argument that any such differences are not important for qualification purposes. Is that a correct summary?

WITNESS WILSON: The only quibble I'd have with that is per DOR guidelines -- I'd like to say pressure temperature and steam in the same test. With that quibble you have stated my position perfectly.

JUDGE MORRIS: I think I also understood that prior to your inspection at Farley, you made a number of --

some 20 odd EQ inspections at other plants. Over what period of time was that?

WITNESS WILSON: The very first one we did was at Calvert Cliffs in September of '84 on which I was not on. The next one was Zion of January of '85, which I attended. And by the time Farley came I had led about 15 and assisted in a few others.

JUDGE MORRIS: And then you testified that you were present at the Sandia seminar?

WITNESS WILSON: In '87. And also, an earlier one.

JUDGE MORRIS: If you had not gone to that Sandia seminar, that later one, how would your inspection procedures at Farley have differed?

WITNESS WILSON: Personally I wouldn't have done anything different within the areas that I reviewed. I was not the team leader at Farley, I was the assistant team leader. And the areas I looked at were instrument accuracy as an overall area and cable entrance sales along with solenoid valves, limit switches and a couple of other things. I would not have reviewed anything differently based on what happened or didn't happen at Sandia in those areas.

JUDGE MORRIS: Were the items that you inspected selected by a team leader or how did that come about?

WITNESS WILSON: It was really a joint effort between Norman Merriweather and me. After the walk-down inspection that took place two weeks prior to the file review, we had a list of about ten concerns that had been raised, primarily during the walk-down inspection and we discussed that at headquarters. And after going through the list, it appeared to me that what I wanted to review were the two areas that I just mentioned. I believe at that point I called Norman Merriweather and said, how would you like me to take these two? And he said something like, fine. So, it was definitely a joint thing that I had input on and the team leader approved. And they were intended to be difficult review areas.

JUDGE MORRIS: I will repeat a comment that I made the other day. It is a little difficult to ask Staff questions at this point because we don't have the rebuttal testimony. There is certainly differences of opinion, at least between what the Staff testifies to and what Alabama Power testifies to. I hope in the rebuttal testimony that those differences would be explicitly discussed.

JUDGE BOLLWERK: Any other questions?

JUDGE MORRIS: Nothing further.

JUDGE BOLLWERK: I have no questions. At this point if --

Yes, Mr. Miller?

MR. MILLER: I would just ask any member of the Board to give us an opportunity to respond to these same kind of questions. Mr. Wilson has criticized at great length a test that he did not attend, a component he has not seen until today. That test was performed under the supervision of Mr. Love who is here with us and who will take the stand. We urgently ask the Board to ask us the questions also.

Thank you, sir.

JUDGE BOLLWERK: Judge Carpenter has one more question for this panel.

JUDGE CARPENTER: Mr. Wilson, you seem to have substantial sensitivity to the fact that the detailed thermal history of the seals on a time scale of seconds, if not minutes, wasn't known. Can you just point to what causes that concern, what phenomena? What are you looking for? Why do you need to know? What is the deficiency?

WITNESS WILSON: I am motivated by what is different between this design and other designs that I have seen qualified. And also what is similar in this design, to test failures to that design. And in my view, the major difference here is that we are now using Raychem material with metal and I am sensitive to and conscious of any concerns that could be raised by that difference.

We've had a history in the nuclear industry of

moisture intrusion into electrical devices ever since I was designing neutron detector installations for submarines. And we have generally had leakage. And this is the type of device -- is the sort that has had leakage in the past. I am worried about possible sharp edges in the metal, I am worried about the Raychem --

JUDGE CARPENTER: Mr. Wilson, let me interrupt.

Let's stay focused on my question. You were concerned that in the one test where one of these seals was inserted into a test chamber and the temperature was monitored with a thermocouple, that the tie-in cost of the thermocouple wasn't short enough and there wasn't detail knowledge of the thermal history on a seconds to minutes scale in the test. And I am trying to find out why that is so important. And only that.

WITNESS WILSON: Well, we are having differential thermal expansions with very different coefficients. We have Raychem material that may or may not have been fully recovered during its shrinkage.

I don't believe it's going to take more than a few thousandths of an inch relative motion to initiate a cut in that Raychem boot, for example, where it wraps over the end of the pipe nipple, a split, and when that type of split initiates, it doesn't remain small in this material, it'll very quickly propagate into a gross failure.

But mostly, I'm simply taking the approach that we have consistently taken on EQ. We want a good test to show that something will perform its safety function so that we don't need to speculate as to whether we have a good probability.

Remember, we had a seal design that was acceptable to the licensee until Raychem ran a test on it and it catastrophically failed, and then they added the backing.

Now, if the judgment that the backing would solve all the problems is correct, then we're there. If it's not correct, we're not there. But we'd really like to know.

JUDGE CARPENTER: Well, are you speculating that the splitting that you're concerned with, has it been demonstrated to depend on the rate of heating?

WITNESS WILSON: I don't know. The only other tests that we have of the Raychem material with steel -- I simply don't know. There was the Raychem test, the Wyle test for Raychem where six of twelve didn't pass. I don't know if thermal shock was a contributor or not.

There was another test run for plant Hatch that also had epoxy resin, which probably by itself provided a seal as well as backing. So I don't know from that one.

The test that was run for Farley, I don't think it simulated the LOCA initial conditions enough to go by. So I just don't have a basis for saying.

JUDGE CARPENTER: I simply was asking if you knew of a test, of a study by somebody --

WITNESS WILSON: No, I don't.

JUDGE CARPENTER: -- that showed that the splitting depended on the rate of heating where you have a thermal plastic material that may be shrinking and you have a metal pipe that may be expanding. Does it depend on how fast it happens?

WITNESS WILSON: I don't know, but that --

JUDGE CARPENTER: In terms of the ultimate force that the material is subjected to.

WITNESS WILSON: I don't know, and the way that I address, very simply, is I think it is a safety concern. I think it's something the licensee should have addressed by analysis.

JUDGE CARPENTER: Fine. I just was trying to see if your concern --

WITNESS WILSON: Yes.

JUDGE CARPENTER: -- was based on a similarity analysis.

WITNESS WILSON: No. My concern is based on --

JUDGE CARPENTER: Thank you.

WITNESS WILSON: -- an ignorant approach from that direction.

JUDGE CARPENTER: Thank you very much.

JUDGE BOLLWERK: Can you envision test other than testing the exact device that APCo used in their plant that would have satisfied you?

WITNESS WILSON: Oh, sure. That would not be a problem. For example, we were talking about the other test that Wyle ran for Raychem. They ran it on a half-inch pipe nipple rather than a one-inch. That kind of difference wouldn't bother me at all.

I would have difficulty accepting this design in the absence of a pressure/temperature/steam test. I really would. I just don't think the simulation of what the LOCA does to the seal is there without the steam.

I'd certainly, and I'm again going back to concerns from the inspection report, I'd certainly like to see more control over the design of the plant specimens and evaluation of what the differences there might be and how they might compare with what was tested.

JUDGE BOLLWERK: All right. Thank you very much, sir. All right. If there's nothing else, we'll go ahead and excuse this panel, and I think both Mr. Wilson and Mr. Luehman have finished their testimony before the Board, and we thank both of you for your service to the Board.

[Panel excused.]

JUDGE BOLLWERK: At this point, I think we have a few exhibits to move into evidence.

MR. HOLLER: Yes, sir. If you will bear with me just a second, I'll get our list of exhibits.

[Pause.]

MR. HOLLER: At this point, the NRC staff would move to have admitted into evidence the following documents which have been marked for identification as Staff Exhibit No. 27, IE Bulletin 79-01A, dated June 6th, 1979.

Staff Exhibit Number 33, Qualification Testing of Raychem Environmental Seals for Alabama Power Company, Joseph M. Farley Nuclear Plant, Approved, J.E. Love, dated December 30th, 1981.

Staff Exhibit Number 34, Wyle Laboratories Test Report Number 58730, dated June 22nd, 1982.

Staff Exhibit Number 35, EQ Test Report of Raychem NEIS, Environmental Interface Seal Kits on Stainless Steel Pipe, EDR-6063; further identified as Raychem Energy Division, Bechtel Power Corp., Job Number 1506, dated November 20, 1985.

Staff Exhibit Number 36, EQ Package Number 29G, Raychem NCB with Chico A seal, table of contents, no date.

Staff Exhibit Number 37, System Component Evaluation Worksheet, SCEW No. 29G, Sheet 1 of 6, dated November 30th, 1987.

Staff Exhibit Number 38, EQ Report Evaluation Number 29G, Raychem/Chico Equipment Entrance Seal, dated

September 8th, 1987.

Staff Exhibit Number 39, EQ Test Report of Raychem Nuclear Cable Breakout and End Sealing Kits for Raychem Corporation, Menlo Park, California, Wyle Laboratories Number 58442-2, no date.

Staff Exhibit Number 40, Testing and Irradiation of Four-Inch EYS, E-Y-S, Conduit; further identified as a letter to Jean Pettit, P-e-t-t-i-t, from Jesse I. Ramon, R-a-m-o-n, with enclosures; further identified as SWRI Project Number 03-4974-001, dated February 1st, 1979.

Staff Exhibit Number 41, Analysis of Heat Aging Data on 52 Molding Material to Determine Pre-Aging Conditions for Nuclear Qualification Testing, Raychem Energy Division Report EDK-5040, dated October 15th, 1981.

Staff Exhibit Number 42, Chico-A Sealing Compound Environmental Qualification ES-86-769, Bechtel File A.88/E-91 AP-12696, Bechtel Job 7597-042, dated March 11th, 1987.

Staff Exhibit Number 43, Tray and Conduit General Details and Notes, Bechtel Drawing Number A-177541, Bechtel Corporation Job 7597-03, no date.

Staff Exhibit Number 44, Information Notice Number 84-57, dated July 24th, 1984.

Staff Exhibit Number 45, Case Study Report, Operating Experience Related to Moisture Intrusion in

Environmentally Qualified Electrical Equipment at Commercial Power Plants; further identified as AEOD-C402, dated September 15th, 1983.

Staff Exhibit Number 46, APCo three-page analysis dated November 25th, 1987.

Staff Exhibit Number 47, EQ of Raychem/Chico sealant and terminal blocks --

JUDGE BOLLWERK: That one has already come in.

MR. HOLLER: Oh. Thank you, sir.

JUDGE BOLLWERK: So you don't have to read that one.

MR. HOLLER: The exhibits I have identified at this point the staff would move to have admitted into evidence.

JUDGE BOLLWERK: Any objections?

MR. MILLER: No objection.

JUDGE BOLLWERK: Then Staff Exhibits 27 and 33 through 46 will be received in evidence.

[Staff Exhibits 27 and 33 through 46 were received in evidence.]

MR. MILLER: With respect to Alabama Power Company Exhibits 102 and 103, since there has been some discussion about whether or not they are accurate, we will defer moving their admission until the testimony of our witnesses.

With respect to Alabama Power Company Exhibit 104,

which we have identified as Drawing A177541, Rev. 0, under the date July 16th, 1982, we move the admission of that exhibit at this time.

JUDGE BOLLWERK: Any objection as to Alabama 104?

MR. HOLLER: No objection from the staff.

JUDGE BOLLWERK: Alabama Exhibit 104 will be received in evidence.

[APCo Exhibit 104 was received in evidence.]

JUDGE BOLLWERK: Anything else at this point from either party?

MR. BACHMANN: Yes, sir. Regarding the previous physical evidence -- I refer to the V tape splices and the five to one splices -- there was an indication by Your Honor this morning that these might be considered to be admitted into evidence.

I stated on the record just before we closed yesterday's session that our splice panel had dispersed. Well, we do have Mr. Paulk here. If it is the Board's intention to at some time mark the two splice examples and potentially admit them into evidence, the staff would request that we have an opportunity to put Mr. Paulk on the stand and have him explain his view of those particular splices vis a vis the ones that he had observed personally in the plant at the time of the inspection.

I say this, if it is the intention at some time to put them into evidence so we might have a complete record. Mr. Paulk will be available this afternoon. I do not anticipate that the cross-examination of the panel comprised of Mr. Jones and Mr. McKinney will last very long so at that point we could put him on.

I could give him a brief run-down. He could explain it. The Board could ask questions. He'd be obviously subject to cross examination by Mr. Miller and at that point we would then have no objection if at some future date the Board intended to use these as evidence.

JUDGE BOLLWERK: Mr. Miller.

MR. MILLER: May I propose that we get together with the Staff, have our experts talk with Mr. Paulk to determine if we have a genuine evidentiary problem. If there is, we just have to forward and ask the Board to resolve it and if there's not maybe we can work something out.

JUDGE BOLLWERK: Assuming that there is some problem, do you have any objection to Mr. Paulk being allowed to testify briefly on the exhibit? I think the Board would find that useful.

MR. MILLER: I agree and we -- let's put him on there and let him say what he think he feels he has to say.

JUDGE BOLLWERK: All right, then, why don't you

all go and get together.

Do you think you can do that during the lunch break?

MR. MILLER: Yes, sir. We'll do that. We'll get together.

JUDGE BOLLWERK: If you do need to look at what we have, these have not yet been marked for identification.

If you want to look at these at this point, you are certainly welcome to do so and let's go ahead and adjourn until -- do the parties think that you can get the, we can get together at about a quarter to 2:00? Is that enough time for lunch? That is about an hour and fifteen minutes.

MR. MILLER: Yes, sir.

MR. BACHMANN: Yes, [illegible].

JUDGE BOLLWERK: Why don't we say we'll get back together then at 1:45, so we are adjourned until then.

[Whereupon, at 12:30 p.m., the hearing was recessed for lunch, to reconvene at 1:45 p.m., this same day.]

AFTERNOON SESSION

[1:47 p.m.]

JUDGE BOLLWERK: Let's go back on the record. Is there anything the parties would like to discuss with the Board before we begin with the first APCo panel?

MR. MILLER: I'm going to try, if it please the Board, try and state accurately, the results of the discussion about the 5:1 splice and the V-splice. With respect to the V-splices, they are illustrative of V-type splices.

Within a reasonable degree of certainty, if you had gone to Farley Nuclear Plant back during this inspection, you would have seen one that looks like that. It is agreed that you would surely have seen one that looks like either Figure 8 or Figure 9, being unified Bates Number 0067351 and 0067352 of Staff Exhibit 25, the Qualification Test Program on Splices prepared by Wylie. Have I said it accurately, Mr. Paulk?

MR. PAULK: [Nods yes.]

MR. MILLER: Mr. Paulk signifies yes. With respect to the 5:1, this is a 5:1 splice. It is not like the one at Farley Nuclear Plant because of these five ends. At the plant, they were covered with a fabric that was over-coated with a shellac, correct?

MR. PAULK: Yes.

MR. MILLER: Other than that, the Board may look at that -- I'm sorry, I should have said it this way: taking that into consideration, that these ends don't have the fabric and the shellac, the Board may do with the 5:1 as it sees fit. These do not have numbers, but since we have come to terms on them, I would propose to mark them 105 and 106, but I may not have my numbers right.

105 will then be the V-type splices and we have two examples and just to make sure, we want one more.

JUDGE BOLLWERK: We are satisfied with two. Now, if there is something that the staff needs, that might be something different.

MR. MILLER: I'll work that out with them. We have two examples which we will mark each of them -- well, we'll mark one 105A, and one 105B. Then 106 will be the 5:1 splice and it will be 106A and 106B. We will undertake to get some type of tag or something that we can put on there, maybe this afternoon or tomorrow so that we can clarify that.

JUDGE BOLLWERK: All right, but wait to put them into evidence until we've got them tagged and everything, but for identification purposes, we'll work it that way.

MR. MILLER: Okay, good.

JUDGE BOLLWERK: What about also the T-drain? Is that something you also want to mark for identification?

MR. MILLER: Why don't we go ahead and mark the T-drain as 107. No one disputes that this is a T-drain. We have but one and we'll get another one and we'll mark it 107A, which we have in our possession and we will give you 107B.

JUDGE BOLLWERK: And the staff, I take it, has no problems with what Mr. Miller has represented to us?

MR. BACHMANN: No, sir. We have discussed this previously and we have no problems.

JUDGE BOLLWERK: All right then, APCo Exhibits 105 A and B, 106, A and B, and 107, A and B, are marked for identification.

[APCo Exhibits 105, 106, and 107 were marked for identification.]

JUDGE BOLLWERK: Anything else that the parties would like to discuss with the Board before we begin?

MR. BACHMANN: No, sir.

JUDGE BOLLWERK: All right, why don't we go ahead then and have the first APCo panel then?

MR. HANCOCK: Could you please state your names?

MR. McKINNEY: My name is Doug McKinney.

MR. JONES: David Huber Jones.

JUDGE BOLLWERK: All right, we'll need to swear in the witnesses first.

[Witnesses sworn.]

Whereupon,

DAVID HUBER JONES,

and

BERNARD DOUGLAS McKINNEY,

were called for examination as a panel by Alabama Power Company, and, having been first duly sworn, were examined and testified as follows:

DIRECT EXAMINATION

BY MR. HANCOCK:

Q Mr. Jones and Mr. McKinney, I'll ask both of you the same question and ask that you respond individually. Did you assist in the preparation of this testimony that you have before you entitled Testimony of David Huber Jones and Bernard Douglas McKinney, Jr., on Behalf of Alabama Power Company?

A [Witness McKinney] I did.

A [Witness Jones] Yes.

Q Do you have any corrections that you wish to make to this testimony at this time?

A [Witness McKinney] I do not.

A [Witness Jones] No.

Q If you were asked these same questions today, would your responses be the same as they are here?

A [Witness McKinney] Yes.

A [Witness Jones] Yes.

Q And do you adopt this testimony today as it's contained in this document?

A [Witness McKinney] I do.

A [Witness Jones] Yes.

MR. HANCOCK: Judge Bollwerk, I move that this testimony be bound into the record.

JUDGE BOLLWERK: Any objection from the staff?

MR. BACHMANN: No objections.

JUDGE BOLLWERK: Then the testimony of David Huber Jones and Bernard Douglas McKinney, on Behalf of Alabama Power Company will be bound into the record.

[Testimony of David Huber Jones and Bernard Douglas McKinney, Jr., on Behalf of Alabama Power Company follows:]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	Docket No. 50-348-CivP
ALABAMA POWER COMPANY	)	50-364-CivP
	)	
(Joseph M. Farley Nuclear Plant, Units 1 and 2)	)	ASLBP No. 91-626-02-CivP

TESTIMONY OF DAVID HUBER JONES AND
BERNARD DOUGLAS MCKINNEY, JR.
ON BEHALF OF ALABAMA POWER COMPANY

GENERAL BACKGROUND

Q1. Please state your name and provide the Board with your educational and employment background.[1]

A: (Jones) My name is David Huber Jones. I am currently Manager of Engineering Support, Farley Nuclear Plant, for Southern Nuclear Operating Company, Inc. I received a Bachelor of Science degree in Civil Engineering from Auburn University in 1979. Then, I joined Alabama Power Company as a Junior Engineer in the Eastern Division. After approximately one year, I was assigned to the nuclear support group for Farley Nuclear Plant and have held various engineering positions and responsibilities associated with supporting plant operations. In 1986, I was assigned my

[1] Unless noted otherwise, the responses to each question will be sponsored by both Mr. Jones and Mr. McKinney.

current responsibilities, which are to supervise the eight people in my group. We provide a full range of technical and engineering services to Farley Nuclear Plant.

A: (McKinney) My name is Bernard Douglas McKinney, Jr. I am employed by Southern Nuclear Operating Company, Inc., as the Manager of Nuclear Engineering and Licensing. I am a graduate of the University of Alabama where I earned a Bachelor of Science degree in Mechanical Engineering in 1973. I also have a Senior Reactor Operator's License for Farley Nuclear Plant Unit 1. After graduation, I joined Alabama Power Company as a Junior Engineer at Farley Nuclear Plant. In 1978, I was transferred to Birmingham as a project engineer for the Farley Engineering Services support group. I was designated as Supervisor in 1982, and in 1988 became Manager of Nuclear Engineering and Licensing.

Q2. What is Southern Nuclear Operating Company, Inc.?

A: Southern Nuclear Operating Company, Inc. (Southern Nuclear) is a wholly owned subsidiary of The Southern Company. On December 23, 1991, Southern Nuclear became the licensed operator of Farley Nuclear Plant, which is owned by Alabama Power Company, another wholly owned subsidiary of The Southern Company. During all times relevant to this case, however, the

licensed operator of Farley Nuclear Plant was Alabama Power Company.

Q3. What is the purpose of your testimony?

A: The purpose of our testimony is twofold: First, we will provide a general overview of Alabama Power Company's response to the Staff's Notice of Violation (NOV) and resulting Order imposing a $450,000 civil penalty for alleged EQ violations. Second, because of our personal involvement in Alabama Power Company's EQ compliance efforts, including the preparatory work for the EQ inspection in 1987, we will also provide more detailed testimony on the issues raised in this proceeding. In this way we hope to provide the Board with the proper framework to evaluate the testimony of other witnesses on the various technical issues.

Q4. Please summarize for the Board the general overview of Alabama Power Company's positions in this enforcement hearing.

A: Alabama Power Company's answer to this proposed civil penalty has two principal parts: legal issues and evidentiary or fact issues. The primary legal issues will be articulated and argued in detail by legal counsel. These issues have, however, been presented once in Alabama Power Company's response to the Notice of Violation and Proposed Imposition of

Civil Penalty. (Staff Ex. 15, Attachment 2 at pp. 2-12). Generally, though, we understand that the Company's contention is that the Modified Enforcement Policy, under which this enforcement action is proceeding, violates the Atomic Energy Act, section 234, by allowing escalated enforcement action for alleged violations that have no safety significance. The basis for this position is that the Modified Enforcement Policy specifically disclaims any attempt to determine actual operability of the affected equipment, assuming instead that "unqualified equipment" is equipment for which inadequate documentation exists, and that this in turn equates to equipment that will not perform its intended function. Because Alabama Power Company had reasonable assurance that each item of electrical equipment relevant here would perform its intended function, we feel that the civil penalty is disproportionate to any alleged violation of 10 CFR 50.49.

The evidentiary or fact issues have two components: The regulatory process and the enforcement process. We define the regulatory process as an evaluation of whether Alabama Power Company, as of November 30, 1985, was in compliance with 10 CFR 50.49. We think it was, and Alabama Power Company will present testimony of numerous experts on this point. Moreover, the evidence will show that Farley Nuclear Plant received no fewer than three Technical Evaluation Reports (TERs), six Safety Evaluation Reports (SERs), two EQ plant

audits and one operating license issued prior to the deadline. These important Staff and NRC communications and actions, when coupled with EQ compliance efforts, provided reasonable assurance that Alabama Power Company was in compliance with 10 CFR 50.49.

Moreover, it must be recognized that the inspectors at Farley Nuclear Plant in 1987 raised many questions regarding the qualification or qualifiability of the equipment items at issue here. Many of these questions were fundamentally at odds with the prior approvals on the Plant dockets. In addition, as our experts will show, the inspectors' questions often lacked technical merit or support. Alabama Power Company tried to explain the Company's position during and after the inspection. They will do so again in this forum.

The enforcement process is an additional analysis. Because of the unique nature of the Modified Enforcement Policy, Alabama Power Company contends that even if 10 CFR 50.49 violations occurred, then under the Modified Enforcement Policy, no civil penalty is justified. This is for two principal reasons: First, the Staff cannot meet its burden of proving that Alabama Power Company, prior to November 30, 1985, "clearly knew or should have known" of the lack of proper environmental qualification of the pertinent equipment. Second, the Staff has improperly refused to consider information available to

the inspectors showing that certain items of equipment were qualified for the application in question, in contravention of sound policy as well as Section III of the Modified Enforcement Policy. Their approach leads to the absurd result that any attempt by Alabama Power Company to refute a Staff question became an "after the fact" analysis that would not be considered.

Finally, if this Board is inclined to sustain a civil penalty at any level, Alabama Power Company contends that it exercised its best efforts to "complete EQ within the deadline," as evidenced by the two EQ audits, the TERs, the Unit 2 full power operating license, and the numerous SERs. Importantly, the last SERs, issued in December, 1984, said, "Based on our reviews, we conclude that the Alabama Power Company Environmental Qualification Program is in compliance with the requirements of 10 CFR 50.49 . . . ." Accordingly, at least 50% mitigation should be allowed (in addition to the mitigation already allowed by the Staff in the Order).

Q5. Can you be more specific about the evidentiary or fact issues in this escalated enforcement action?

A: Yes. The underlying basis for the NOV and the subsequent Order Imposing a Civil Monetary Penalty is that the level of documentation Alabama Power Company had in its qualification

file during the inspection was insufficient. Our evidence will be, however, that a reasonable engineer, knowledgeable in EQ requirements, would determine that our documentation provided reasonable assurance for qualification. Said another way, the current enforcement Staff has failed to consider Alabama Power Company's legitimate and necessary exercises of engineering judgment in making a determination of the qualification of electrical equipment or in assigning a satisfactory level of documentation demonstrating such qualification. The Staff inspectors were applying a new, heightened standard for documentation -- far exceeding the approach deemed sufficient in the regulatory process prior to November 30, 1985.

Prior to the deadline, both the Staff and Alabama Power Company routinely used undocumented engineering judgment to determine equipment qualification. This is evidenced by the Franklin Research Center TERs, the transcript of the hearing at which the Unit 2 operating license was issued, and other communications from the Staff. However, for enforcement purposes, that standard was changed. According to Messrs. Luehman, Potapovs and Walker, in their testimony concerning enforcement, at page 3, "[A] licensee's inability to present documented knowledge of whether [EQ] equipment is capable of operating" means that the equipment is unqualified and subject to escalated enforcement action. Alabama Power Company

witnesses, two of which were key NRC personnel in EQ in the early 1980's, will explain why Alabama Power Company's interpretation of EQ requirements before the deadline was proper.

Moreover, Alabama Power Company contends that another underlying basis for the Order is the Staff's reliance, for enforcement purposes, on an evolving level of knowledge obtained after the deadline. The evidence will establish that as the Staff, through their inspections of other plants and continuing research in the industry, learned more and more about the qualification of EQ equipment, it imputed this new knowledge to licensees by claiming that they "clearly knew or should have known" of this knowledge prior to the deadline. This also effectively raised the level of documentation expected to demonstrate qualification. Then, when Alabama Power Company failed to meet this new documentation level, the current enforcement staff imposed a civil penalty under the Modified Enforcement Policy as if the licensee "clearly knew or should have known" of the new knowledge. To prove this, Alabama Power Company will show that in August, 1987, one month before the start of Farley Nuclear Plant's EQ inspection, Sandia National Laboratories held an "Equipment Qualification Seminar" attended by many of the inspectors who later came to the Plant. The agenda from that seminar vividly demonstrates that the equipment qualification problems

discussed in August, 1987 were substantially similar to those raised in Alabama Power Company's EQ in November, 1987, inspection and this enforcement action. (APCo Exhibit 1).

In addition, Alabama Power Company contends that, without imputing its post-deadline knowledge to Alabama Power Company's pre-deadline state of mind, the Staff cannot meet its burden of proving that Alabama Power Company met the "clearly knew or should have known" standard required by the Modified Policy prior. As the Modified Policy states:

> If violations of the EQ rule identified at plants operating after November 30, 1985 existed before the deadline and the licensee "clearly knew or should have known" of the lack of proper environmental qualification, then enforcement action may be taken as described in Sections III and IV. If the licensee does not meet the "clearly knew or should have known" test, no enforcement action will be taken.

Modified Enforcement Policy for EQ Requirements, at page 1, emphasis added (APCo Exhibit 2).

As the testimony will make clear, the Staff's position on many of the issues is predicated on the adequacy, or alleged lack thereof, of documentation demonstrating qualification. The current enforcement Staff has improperly rejected Alabama Power Company's arguments and analyses presented or available at the inspection, at the enforcement conference, or included in other submittals, as irrelevant "after the fact" justifications. Our testimony will show that any alleged documentation "deficiencies" did not have safety significance

because the equipment at issue was indeed capable of performing its safety function during a design basis accident. More importantly, we dispute the Staff's characterization of our analyses as "after the fact." We believe that in most instances when the Staff questioned documentation (usually based on new, heightened documentation expectations), Alabama Power Company had reasonable assurance to believe that the equipment was qualified as of the deadline. Alabama Power Company provided further information to confirm that judgment or to rebut unfounded Staff arguments. Consistent with the Modified Enforcement Policy, Section III, alleged documentation "deficiencies" such as these can be remedied by file additions "developed during the inspection" and should not be treated as sufficiently significant to warrant a civil penalty. The Modified Enforcement Policy states:

> However, although not in the qualification file, if sufficient data exists or is developed during the inspection to demonstrate qualification of the equipment or, based on other information available to the inspector, the specific equipment is qualifiable for the application in question, the qualification deficiency is not considered sufficiently significant for assessment of civil penalties.

Modified Enforcement Policy for EQ Requirements, at page 2 (APCo Exhibit 2).

Finally, Alabama Power Company will establish that it exercised its best efforts to achieve compliance with 10 CFR 50.49 prior to the deadline and thus is entitled to a 50% mitigation of any base civil penalty which may be imposed.

While we believe that the current enforcement Staff cannot prove that the "clearly knew or should have known" test was met or that the "sufficiently significant" test described in Section III of the Modified Enforcement Policy was met (both of which must be satisfied to sustain any base civil penalty), the evidence will be that Norman Merriweather, the NRC EQ inspection team leader, thought Alabama Power Company's EQ efforts were significant. In his sworn deposition, he testified:

> Q: But can't you say, though, that by December 1984, substantial and significant effort had been put forth by Alabama Power Company to comply with the various EQ requirements promulgated by the staff?
>
> A: I would say significant effort, yes.
>
> . . .
>
> Q: Okay. Well, let me ask sort of a different -- the same question in a different way. Are you aware, as a result of your review of this SER and the NRC files, of any concerns, as of December 13th, 1984, any concerns that the NRC had about the effort put forth by Alabama Power Company to comply with EQ?
>
> A: No, I'm not aware of any concern.

Merriweather Deposition, Volume 3, at p. 82. Moreover, at frequent intervals throughout the pre-deadline period, Alabama Power Company's responsiveness and best efforts to comply were implicitly acknowledged by the Staff as Alabama Power Company received these favorable communications from the Staff about its compliance with EQ requirements.

DEVELOPMENT OF EQ RULE

Q6. Please explain, in general terms, your understanding of the historical background of the EQ rule.

A: In 1977, the Union of Concerned Scientists petitioned the NRC requesting various actions related to fire protection for electrical cables and environmental qualification of electrical components in nuclear power reactors. In response, on April 13, 1978, the Commission ordered, among other things, that the Staff concentrate on the "safety adequacy and environmental qualification of all Class 1E electrical equipment." 7 NRC 400, 420 (1978) (APCo Exhibit 3).

On May 31, 1978, in response to the Commission's order, the Staff issued IE Circular 78-08 entitled "Environmental Qualification of Safety Related Electrical Equipment at Nuclear Power Plants." (APCo Exhibit 4). This Circular recommended that all licensees (except a few included in a separate program) examine installed safety related electrical equipment and "ensure appropriate documentation of its qualification to function under postulated accident conditions." It also informed licensees that "NRC inspectors will review these matters with licensees in future inspections." Although no written response was required,

Alabama Power Company provided one which addressed certain issues raised by the Circular. (APCo Exhibit 5).

Then, on February 8, 1979, the Staff issued IE Bulletin 79-01. (APCo Exhibit 6). The purpose of this communication was to raise the threshold of Circular 78-08 to the level of a Bulletin, requiring a written response. The response required by the Bulletin was a re-review of the environmental qualification of safety related electrical equipment as described in Circular 78-08. Bulletin 79-01 also requested licensees to provide written evidence of qualification of electrical equipment required to function under accident conditions. As in the case of Circular 78-08, the Staff said that NRC inspectors would continue to monitor the licensees' progress in completing the requested action.

However, Bulletin 79-01 was revised twice: 79-01A and 79-01B. (APCo Exhibits 7 and 8). Because many of the licensees' responses to 79-01 indicated certain deficiencies, the Staff concluded that generic criteria were needed for evaluating the environmental qualification of electrical equipment at all plants. As a result, the Division of Operating Reactors (DOR) prepared a document entitled "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors." These "DOR Guidelines" were intended to be used by each licensee to evaluate its own qualification

documentation. In January, 1980, the Staff formally issued to the industry the DOR Guidelines as Attachment 4 to IE Bulletin 79-01B. The Staff had already employed Franklin Research Center to review environmental qualification documentation and to present to the Staff the results in the form of a Technical Evaluation Report (TER) for each licensed unit. Then, on February 5, 1980, the Staff issued NUREG-058 . which provided licensees with the Staff's technical positions on selected areas of environmental qualification. It, too, provided guidance on how to comply with the environmental qualification requirements.

In April, 1980, the Commission formed the Equipment Qualification Branch of the newly created Division of Engineering and named Philip A. DiBenedetto as its first Section Leader for Environmental Qualification. This branch was assigned responsibility for reviewing the status of equipment qualification for plants, including Farley Nuclear Plant.

Then, on May 23, 1980, the NRC issued Memorandum and Order CLI-80-21. (APCo Exhibit 9). It said:

> The Commission considers the staff's review of the 79-01B Bulletin responses to be of high priority, and the staff is requested to keep the Commission and the public apprised of any further findings of incomplete environmental qualification of safety-related electrical equipment, along with corrective actions taken

> or planned. The staff is requested to provide bimo.thly reports of progress on this review. The staff is directed to complete its review of environmental qualification, including the publication of Safety Evaluation Reports by February 1, 1981. By no later than June 30, 1982 all safety-related electrical equipment in all operating plants shall be qualified to the DOR Guidelines or NUREG-0588. These deadlines, however, do not excuse a licensee from the obligation to modify or replace inadequate equipment promptly.

11 NRC 714-15 (1980).

Q7. When did the Commission issue its final rule on environmental qualification and how does it apply to this proceeding?

A: The final rule on environmental qualification, codified at 10 CFR 50.49, was issued by the Commission on January 21, 1983. This rule required each holder of or applicant for a license to establish a program for qualifying certain electrical equipment important to safety. The rule imposed a qualification deadline of November 30, 1985. For Farley Nuclear Plant, 10 CFR 50.49(k) did not require re-qualification of existing electrical equipment since the NRC had previously required qualification of that equipment in accordance with DOR Guidelines (applicable to Unit 1) and NUREG-0588 (Category II) (applicable to Unit 2). Thus, for the electrical equipment relevant to this enforcement hearing, all of which was already installed at the plant, the promulgation of 10 CFR 50.49 did not require any re-

qualification; Alabama Power Company could take credit for its previous efforts to comply with the evolving EQ requirements and the Staff's evaluation of these efforts.

However, the current enforcement Staff has not given Alabama Power Company this credit. Instead, this enforcement action is based on post-deadline knowledge, interpretations, and expectations, not those existing prior to the compliance deadline. When Farley Nuclear Plant received its EQ inspection in late-1987, the Staff had conducted over thirty other inspections and applied to the Plant, retroactively, this acquired knowledge compiled over the two years after the compliance deadline. Not surprisingly, the Staff now contends that Farley Nuclear Plant no longer met 10 CFR 50.49 by the deadline. This explains, of course, why in this enforcement hearing the Staff attempts to ignore its December 13, 1984 conclusion that based on its many EQ reviews of Farley Nuclear Plant, "Alabama Power Company's Environmental Qualification Program is in compliance with the requirements of 10 CFR 50.49 . . . ."

ALABAMA POWER COMPANY'S EQ COMPLIANCE EFFORTS

Q8. Now that you have provided your understanding of the development of the EQ rule, will you please explain Alabama Power Company's compliance efforts?

A: Yes. Like the evolutionary process associated with the development of the EQ rule, Alabama Power Company's response to the various Staff and NRC communications was evolutionary and cumulative. We have previously testified about the response Alabama Power Company prepared for Circular 78-08, even though a response was not required. This early initiative was indicative of the seriousness with which the Company viewed environmental qualification and the resources which it was willing to devote to it. In response to Bulletin 79-01B, Alabama Power Company, in conjunction with Bechtel and Southern Company Services, Inc., developed a Master List for Unit 1 and submitted it to the Staff for approval. This list was subsequently revised as a result of Staff review and input. As for Unit 2, which was classified as a Near Term Operating License (NTOL) plant, it was the subject of an environmental qualification audit conducted by the Equipment Qualification Branch of the NRC. On September 22-24, 1980, Staff members from this branch, supervised by Mr. DiBenedetto, visited Unit 2, "for the purpose of auditing the applicant's environmental qualification documentation and/or test data for safety-related electrical equipment." The trip report from this visit, dated May 27, 1981, is APCo Exhibit 10. The conclusion of that EQ audit was that "the documentation supporting the environmental qualification of the audited items was found satisfactory except in two cases." Those two

cases are not associated with electrical equipment at issue in this enforcement hearing.

Then, on December 2-5, 1980, Farley Nuclear Plant was the subject of another environmental qualification inspection. (APCo Exhibit 11). That inspection involved a review of installed equipment of both units "with respect to IE Bulletin 79-01B and NUREG 580." (It is believed that the inspector meant to say NUREG 0588.) A page from this inspection report is illustrative of the work performed by the inspector and is shown for ease of reference. From this page, it is apparent that the inspector reviewed the Hydrogen Recombiner, and 5:1 splice that is at issue in this proceeding, and deemed it to be qualified.

HYDROGEN RECOMBINER

Q2E17G001A-A	H Recombiner	Westinghouse	APR-GHREEE-01
Q2E17G001B-B	H Recombiner	Westinghouse	APR-GHREEE-02

CHEMICAL AND VOLUME CONTROL

Q2E21V038A	Motor Operator	Limitorque	SMB-4
Q2E21V038B	Motor Operator	Limitorque	SMB-4
Q2E21V038C	Motor Operator	Limitorque	SMB-4
N2E21ZS8149A	Limit Switch	NAMCO	EA180/11302
N2E21ZS8149B	Limit Switch	NAMCO	EA180/11302
N2E21ZS8149C	Limit Switch	NAMCO	EA180/11302
Q2E21SV8149AB	Solenoid Valve	ASCO	NP831654E
Q2E21SV8149BB	Solenoid Valve	ASCO	NP831654E
Q2E21SV8149CB	Solenoid Valve	ASCO	NP831654E

CONTAINMENT COOLING AND PURGE

Q2E14V004	Motor Operator	Limitorque	SMB000

The equipment inspected was examined for proper installation, overall interface integrity and manufacturers nameplate date was obtained. The nameplate data obtained was compared to the information listed in the licensee's report. Several minor differences were identified and the licensee's report is being updated.

Within the areas examined there were no identified violations.

Furthermore, during this very active period, additional effort was undertaken by Alabama Power Company to respond to IE Bulletin 79-01B. As noted, a Master List was prepared and sent to the Staff for approval. On December 10, 1980, the Staff prepared a Technical Evaluation Report which evaluated both the submittal by Alabama Power Company and the results of the December EQ inspection. That TER is APCo Exhibit 12 and, coincidentally, was prepared by Mr. Norman Merriweather, who was subsequently named team leader for Alabama Power Company's 1987 EQ inspection. One of the objectives of this TER was to categorize equipment "that is considered to meet IEB 79-01B requirements ...." If it did, then the TER assigned a numerical category of "1," which meant that the equipment was qualified. For ease of reference, a sample sheet from that TER is included.

FACILITY FARLEY 1

ATTACHMENT 1
FOR IEB 79-01B
TER

SYSTEM Rx Coolant - Steam Generator (SG)

CES. Page No.	Equip. I. D. #	Generic Name	Accid. Profile	Qual. Profile	Radiation Expl. (Containment) In-Side	Radiation Expl. (Containment) Outside	Qual. Method	Chem. Spray	Accur.	Subm.	Licensee Action Replace	Licensee Action Relocate	Outstanding Items Identified by	Category of Items
2	N1B21 PT402	PT	✓	2	P	–	P	P	P	✓	–	–	R	2
3	N1B21 PT403	PT	✓	2	P	–	P	P	P	✓	–	–	R	2
4	N1B21 TE410	RTD	✓	P	P	–	P	P	P	✓	–	–	–	1
5	N1B21 TE413	RTD	✓	P	P	–	P	P	P	✓	–	–	–	1
6	N1B21 TE420	RTD	✓	P	P	–	P	P	P	✓	–	–	–	1
7	N1B21 TE423	RTD	✓	P	P	–	P	P	P	✓	–	–	–	1
8	N1B21 TE430	RTD	✓	P	P	–	P	P	P	✓	–	–	–	1
9	N1B21 TE433	RTD	✓	P	P	–	P	P	P	✓	–	–	–	1
10	11TB002	TB	✓	✓	✓	–	✓	✓	–	B	–	–	–	1
11	11TB003	TB	✓	✓	✓	–	✓	✓	–	B	–	–	–	1
12	11TB004	TB	✓	✓	✓	–	✓	✓	–	B	–	–	–	1
13	21TB001	TB	✓	✓	✓	–	✓	✓	–	B	–	–	–	1

KEY:

B = Indicates the item is below the flood level
✓ or S = Indicates the item is Satisfactory
– or N = Indicates the item is Not Applicable
UL = Indicates the item is Unresolved, Licensee Identified
P = Proprietary
L = Licensee identified
R = Reviewer identified
1 = Equipment to qualify
2 = [illegible] with licensee [illegible] replacement

3 = Equipment requires modification (resolution, shielding, etc.)
4 = Qualification of equipment unresolved
a) Testing schedule but not complete
b) Reviewer needs additional information
c) Qual. Record search still in process
5 = Equipment not qualified
6 = Item identified to IE for resolution

REVIEWER [signature] DATE 11/3/80

0053460

According to this sheet, the terminal blocks identified by Mr. Merriweather are categorized as "1," "Equipment is qualified." These same terminal blocks are also an issue in this proceeding.

In February, 1981, Alabama Power Company received a Unit 1 "Equipment Evaluation Report by the Office of Nuclear Reactor Regulation, Equipment Qualification Branch." This report assessed 703 items of equipment and identified certain deficiencies associated with their qualification. Not surprisingly, many of the same items of electrical equipment that are the subject of this enforcement hearing, such as terminal blocks, Limitorque MOVs, the hydrogen recombiner, Joy Manufacturing fan motors, and GEMS level transmitters, were the subject of this Staff assessment. (APCo Exhibit 13). Then, on May 21, 1981, the Staff sent a Safety Evaluation Report in which the Staff concluded that the Farley Unit 1 Master List was "complete and acceptable." (APCo Exhibit 14). Clearly, the Staff was actively evaluating our submittals and documenting their assessment of our equipment qualifications and Alabama Power Company continued to respond accordingly.

For Unit 2, which was about to get its full power operating license in March, 1981, the Staff issued a Safety Evaluation Report which, in part, discussed envir mental qualification

of safety related electrical equipment. (APCo Exhibit 15). This SER acknowledged that:

> The Staff evaluation of the licensee's response included an on site inspection of selected Class 1E equipment, an audit of environmental qualification documentation, and an examination of the licensee's report for completeness and acceptability. The criteria described in the DOR Guidelines and in NUREG-0588, in part, were used as a basis for the staff evaluation of the adequacy of the licensee's qualification program.

The SER discussed the on-site verification inspection of December 2-5, 1980, and concluded that in that inspection, "No deficiencies were noted."

Having assessed 661 items of equipment, the SER determined that Alabama Power Company's Master List was, "complete and acceptable" (except for certain items unrelated to this enforcement hearing). The Staff did determine that some items of safety related electrical equipment did not have adequate documentation to ensure that they were capable of withstanding the design basis accident but, nonetheless, concluded that, "There is reasonable assurance of continued safe operation of the facility pending completion of these corrective actions."

This SER is consistent with the oral report provided to the NRC at the March 11, 1981 discussion on the full power license

for Farley, Unit 2. There, Mr. Vollmer, an NRC employee, told the Commission:

> We have reviewed the licensee's submittal in accordance with the equipment qualification guidelines. Basically we performed the same type of review that we have done for preceding plants and operating reactors.
>
> For the Farley Plant, based on this review, and an in-plant audit, we have concluded there are no outstanding items which require immediate corrective action to ensure safe operation of the plant. There are a number of items which are identified in the SER with which we could not make a specific conclusion regarding their acceptability because of, for example, deficiency in paperwork or because items such as the testing interval may not have met the guideline interval but yet one could make the argument that the need for the equipment fell within the envelope of the testing.

(Transcript of Nuclear Regulatory Commission meeting of March 11, 1981, In the Matter of: Discussion and Possible Vote on Full Power License for Farley at p. 7-8.) Of course, the full power license for Unit 2 was issued by the Commission on March 31, 1981.

Thus, by the time Unit 2 received its full power license, a regulatory compliance pattern was being established: When the Staff issued a communication on equipment qualification, Alabama Power Company was quickly responsive. The Staff then evaluated the response, concluding that some equipment was qualified and identified deficiencies for others. The

challenge to Alabama Power Company, then, was to proceed to resolve the deficiencies.

Q9. Please continue with your discussion of the efforts undertaken by Alabama Power Company to comply with EQ requirements during 1981-1985.

A: (Jones) In our earlier testimony, we identified the Commission Order CLI-80-21 and its requirements. In late 1981, I was assigned to be the EQ Project Engineer for Farley Nuclear Plant, replacing another engineer who had been performing these responsibilities. Let me emphasize, however, that I was not the only Alabama Power Company engineer that worked on environmental qualification issues. I called upon the expertise of many Company engineers familiar with plant equipment and EQ requirements, as well as engineers at Bechtel, Southern Company Services, Inc. and Westinghouse. Moreover, in late 1981, Alabama Power Company hired an independent contractor to augment its staff and to assist in the EQ effort. This engineer, Mr. Mike Lalor of United Energy Services, had experience with environmental qualification while stationed at the Browns Ferry Nuclear Plant. He was selected for his ability to step in and assist us with our EQ compliance program.

Q10. Please describe the process you used to establish qualification for a particular item of electrical equipment.

A: (Jones) As a result of Alabama Power Company's compliance with Bulletin 79-01B, we had a Master List of electrical equipment subject to environmental qualification. Our typical qualification process involved reviewing the supporting documentation in the files for a given item. In many cases, this documentation was sent to us by the vendor, usually in the form of a test report. This information was then sent to either Bechtel or Southern Company Services, Inc. for technical analysis and review. Typically, numerous telephone conversations and, on frequent occasions, meetings, occurred with the reviewers to resolve any questions relating to its sufficiency. Then, a documentation package would be returned to us with the designer's documented approval. A typical documentation package would include the following: 1) any test reports or other documentation relied upon by Bechtel or Southern Company Services, Inc.; 2) a report evaluation checklist, which documented the complete evaluation of the test reports; and 3) a System Component Evaluation Worksheet (SCEW sheet), which summarized the evaluation contained in the checklist. Mr. Lalor and I would again review the package to satisfy ourselves that it was acceptable. We would then send the documentation package and a cover letter through my

management for concurrence before it was transmitted to the Plant.

Q11. Who at the Plant received the documentation packages?

A: These packages were sent to the Systems Performance Manager, Mr. Robert Berryhill, who will testify about his review process.

Q12. Mr. Jones, please continue with your description of Alabama Power Company's EQ compliance efforts after you were assigned the EQ project engineer responsibilities.

A: (Jones) In early 1982, the Staff requested Alabama Power Company to submit to Franklin Research Center certain test reports that we were using to establish qualification for the items of electrical equipment on the Master List. We understand that the NRC had contracted with Franklin to perform a review of many licensees' qualification documentation files to determine whether adequate test reports existed to support qualification of the identified equipment. As Mr. Shemanski explained in his deposition:

> However, Franklin Research Center did essentially the entire review. Again, the staff simply did not have the resources to review documentation submitted by, at that

> point in time, 52 licensees representing 71 operating reactors.
>
> . . .
>
> [T]he information was sent from the licensees to the staff, then to the staff -- from the staff to Franklin Research Center. Occasionally, we did look to see what type of information was being submitted by the licensees, but, again, the staff did not do an indepth review, that was left to Franklin. However, we did work very closely with Franklin and had constant contact with Franklin.

Shemanski Deposition, at p. 19.

At the conclusion of Franklin's review, it issued a Technical Evaluation Report (TER) for each operating unit, which categorized each item of electrical equipment on the Master List as being qualified, unqualified, or as having deficient qualification documentation. (APCo Exhibits 16 and 17). In the Farley Nuclear Plant TER for Unit 2, Franklin stated that it presented to the Staff a detailed evaluation of:

> (1) the Licensee's qualification methodology, (2) the equipment environmental qualification of each equipment item, and (3) the Licensee's response to the NRC SER . . . .

Franklin TER for Unit 2, at page 5-1.

The TERs were submitted to the Staff who, in turn, transmitted them in February, 1983, to Alabama Power Company as an attachment to a Safety Evaluation Report (SER) for each unit.

(APCo Exhibits 18 and 19). In each Alabama Power Company SER, the Staff stated: "We have reviewed the evaluation performed by our consultant contained in the enclosed Technical Evaluation Report (TER) and concur with its bases and findings."

After receiving the SERs and attached TERs, Alabama Power Company began a diligent effort to resolve each deficiency identified by Franklin. This effort began in February, 1983 and culminated in a January 11, 1984 meeting with the Staff. Also during this time, Alabama Power Company developed an EQ Administrative Program, ETP-4108, which will be described by Mr. Berryhill.

Q13. What is the significance of the January 11, 1984 meeting?

A: As earlier noted, using the Franklin TERs as guides, Alabama Power Company worked diligently to resolve the identified equipment deficiencies. In January, 1984, at an all-day meeting in Washington, D.C., Alabama Power Company presented to the Staff its resolution of each deficiency identified in the Franklin TERs. As part of this presentation, numerous test reports and other documentation supporting qualification was discussed. We also addressed generic environmental qualification issues raised by the Staff.

Q14. Were any items of electrical equipment relevant to this proceeding discussed at the January 11, 1984 meeting?

A: Yes, all of the Franklin-identified deficiencies were discussed. In fact, two items pertinent here, terminal blocks and Limitorque MOVs, were discussed at great length with the Staff at this meeting. The Staff expressed qualification concerns about these two items and Alabama Power Company explained its proposed resolution. This discussion and the Staff's acceptance of these resolutions were later documented in a letter sent to the Staff dated February 29, 1984. (APCo Exhibit 20).

Q15. Did the Staff agree with Alabama Power Company's resolution of deficiencies identified in the Franklin TERs?

A: Yes. It was our impression at the meeting that the Staff agreed that Alabama Power Company had either resolved each of the deficiencies or that the plan presented for resolving deficiencies was acceptable. As noted, and at the Staff's request, Alabama Power Company sent a letter dated February 29, 1984, which summarized and documented Alabama Power Company's presentation and resolutions. The letter states: "On January 11, 1984, a meeting was held with members of the NRC Staff to discuss [Alabama Power Company's] responses that resolved each identified deficiency." (emphasis added).

(APCo Exhibit 20). In that letter, Alabama Power Company also requested that the Staff issue a final Safety Evaluation Report documenting its agreement with Alabama Power Company to these resolutions and its compliance with 10 CFR 50.49.

Q16. Please describe the Staff's final SER discussing Alabama Power Company's compliance with 10 CFR 50.49.

A: By letter dated December 13, 1984, the Staff transmitted the SERs to Alabama Power Company for Farley Nuclear Plant, Unit 1 and Unit 2. (APCo Exhibit 21). That transmittal letter referenced many of the same documents we have been discussing in our testimony. For example, the letter referenced the earlier Safety Evaluation Reports issued on January 31, 1983, and the Franklin Research Center Technical Evaluation Reports, which identified the deficiencies that Alabama Power Company had resolved. The letter went on to discuss the January 11, 1984 meeting and our letter, dated February 29, 1984, which documented the discussions held at the earlier meeting. As for the SERs, they provided an historical perspective of the evolving equipment qualification process. Importantly, the Unit 1 SER acknowledged that "equipment for Farley Unit 1 may be qualified to the criteria specified in either the DOR Guidelines or NUREG-0588, except for replacement equipment." This, of course, is consistent with our earlier testimony and

our EQ efforts. The Unit 2 SER made a similar acknowledgement.

Like the transmittal letter, the SERs recognized that a meeting was held with Alabama Power Company "in order to discuss all remaining open issues regarding environmental qualification, including acceptability of the environmental conditions for equipment qualification purposes . . . ."

Under the evaluation section of the SERs, the Staff recognized that there had been an audit review performed by the Staff. Of course, the SERs also indicated that the regulatory process would continue since a "follow-up inspection" would later be performed even though, "a significant amount of documentation [had] already been reviewed by the staff and Franklin Research Center . . . ."

The SER then approved Alabama Power Company's approach for identifying equipment within the scope of 10 CFR 50.49.

The SER concluded:

> Alabama Power's electrical equipment environmental qualification program complies with the requirements of 10 CFR 50.49.
>
> The proposed resolutions for each of the environmental qualification deficiencies identified in the January 31, 1983 SER and FRC TER are acceptable.

Continued operation will not present undue risk to the public health and safety.

Q17. What was the significance of this SER to Alabama Power Company?

A: The Staff's conclusion that Alabama Power Company was in compliance with the EQ regulations meant that Alabama Power Company had met the November 30, 1985 deadline for achieving compliance with 10 CFR 50.49. Alabama Power Company did not read these SERs as having been issued in a vacuum and we knew that the work leading up to this issuance had encompassed many, many, engineering hours of study and review by both the Staff and the Company. Thus, the Company believed that the Staff reached this conclusion "based on [Staff] reviews" of our responses to the various EQ circulars, bulletins and other communications outlined previously in our testimony. The Company also believed that the Staff considered its 1980 physical inspection of the EQ equipment at the plant, its prior SERs approving Alabama Power Company's detailed Master List, the Franklin TERs, our resolution to each Franklin deficiency discussed at the January 11, 1984 meeting, the numerous other submittals made to the Staff, and the many responses to Staff inquiries. Since the Staff knew of the long history of Alabama Power Company's efforts to achieve compliance, the Company believed that the Staff relied on this

record in determining that Farley Nuclear Plant was in compliance with 10 CFR 50.49.

Prior to the issuance of these SERs, Alabama Power Company knew that it complied with the Staff EQ regulations and its goal was to convince the Staff of this compliance. This goal was clearly accomplished when the Staff issued the December 13, 1984 SERs.

Furthermore, achievement of this goal was not limited to a mere approval of a methodology for complying with 10 CFR 50.49. The conclusion at the end of each safety evaluation (at page 9) is that "Alabama Power Company's electrical equipment environmental qualification program complies with the requirements of 10 C.F.R. 50.49." Alabama Power Company understood this statement to mean that it complied with all of 10 CFR 50.49, which essentially has three requirements pertinent here: 1) identification of equipment required to be qualified; 2) qualification of this equipment; and 3) documentation of this qualification. By December 17 '984, each of these requirements had been accomplished to the satisfaction of the Staff as evidenced by 1) the Staff's 1981 SER stating that our Master List was "complete and acceptable," 2) the Franklin review of each item on the Master List, which identified certain documentation deficiencies, and 3) the Staff's January 11, 1984 acceptance of our resolution

of these identified deficiencies. Because of this record of Staff review and acceptance, Alabama Power Company knew the Staff had looked at much more than just its "methodology" for complying with EQ. The Staff had looked at and evaluated every aspect of our compliance. With this compliance history in mind, Alabama Power Company received the December 13, 1984 SERs as the formal acknowledgement that it complied with the EQ rule. As noted by Mr. Shemanski, the "focus of these SERs was to have the licensee show compliance with 50.49." Shemanski Deposition at 26. Our best efforts to achieve compliance had been evaluated, acknowledged and accepted by the Staff.

Q18. Notwithstanding the SERs, did Alabama Power Company understand that it would still be subject to a follow-up inspection for EQ compliance?

A: Of course it did; that is part of the normal regulatory process that every licensee must expect, and Alabama Power Company accepts this fact of life without complaint. However, this enforcement proceeding is governed by the Modified Enforcement Policy, which creates a "clearly knew or should have known" standard. We understand that this standard must be met before the Staff can assess any civil penalty against a licensee. The significance to Alabama Power Company of the December 13, 1984 SERs is that, as of that date, Alabama Power

Company had reasonable assurance to conclude that it complied with the EQ regulations and that there were no deficiencies that it "clearly should know" were still unresolved. As Mr. Shemanski acknowledged:

> Q: As of the day the licensee receives an SER and the SER references the TER and in the TER Franklin has reviewed a specific component and says the documentation is sufficient because the following key attributes required by 50.49 have been addressed . . . the licensee . . . has a basis to assume, subject to later new information or whatever, that it has documented and analyzed what it needs to do with respect to that piece of equipment to meet 50.49.
>
> A: Yes. The licensee can certainly make that assumption.
>
> Q: And it is fair to say that that's in good faith reliance in a sense?
>
> A: Yes.

Shemanski Deposition at p. 63-64.

Q19. After receiving the December 13, 1984 SER, did Alabama Power Company transmit to the Staff a letter certifying that Farley Nuclear Plant was in compliance with the EQ rule?

A: Yes. On December 27, 1984, the Staff issued Generic Letter 84-24, which required licensees to submit a letter certifying, among other things, that each licensee, 1) had in place and was implementing an EQ program that satisfied the requirements of 10 CFR 50.49, and 2) all other equipment requiring

qualification was either fully qualified or a justification for continued operation had been submitted to the Staff. Alabama Power Company submitted such a letter on January 28, 1985. (APCo Exhibit 22).

In this certification letter, Alabama Power Company said, "Alabama Power Company has an Environmental Qualification Program in place that satisfies the requirements of 10 CFR 50.49 as stated in the NRC Safety Evaluations dated December 13, 1984." Alabama Power Company also certified that "[a]ll of the equipment identified in the Master Lists have been environmentally qualified and, as a result, a justification for continued operation with unqualified equipment is not required."

Alabama Power Company had two primary bases for making this certification. First, it believed that it complied with the EQ rule. Second, and more importantly, the Staff, in the December 13, 1984 Safety Evaluation Reports, had ratified Alabama Power Company's belief. The certification letter referenced the SERs as authority for Alabama Power Company's position that it complied with 10 CFR 50.49. By not rejecting the certification letter, and its stated bases, the Staff, once again, albeit tacitly, reassured Alabama Power Company that it had met the EQ requirements by the November 30, 1985 deadline.

Q20. After the issuance of the December, 1984 SERs, what did Alabama Power Company do to ensure continued compliance with 10 CFR 50.49?

A: As Mr. Robert Berryhill will testify, Alabama Power Company developed an EQ Administrative Program in 1983 that established procedures for maintenance and procurement of qualified equipment. As Mr. Berryhill will testify, this program was integrated into our total plant operations so that each group was responsible to assure that EQ compliance was maintained.

EQ ACTIVITIES AT THE PLANT IN 1987

Q21. Before describing the activities surrounding the EQ inspection at the plant in 1987, please summarize the EQ efforts Alabama Power Company undertook after the SERs but before the inspection.

A: (Jones) As previously noted, Alabama Power Company prepared and promulgated an EQ Administrative Program to ensure that it would remain in compliance with EQ requirements. Moreover, I kept my responsibilities as EQ Project Engineer and addressed EQ issues as they arose. Alabama Power Company attended meetings of the Nuclear Utility Group for Equipment Qualification (we became a full member in January, 1987). As

will be more fully explained by Mr. Snipman, who was the Assistant Plant Manager in 1987, Alabama Power Company organized an EQ Task Team to review the various components of the Farley Nuclear Plant EQ program. I was a member of the Task Team and was responsible for the review of the EQ documentation files.

In the summer of 1987, Alabama Power Company employed Mr. Philip DiBenedetto to review the qualification packages and provide it with the benefit of his experience at other facilities and overall knowledge of the most current Staff expectations.

Q22. When did the Staff conduct an environmental qualification inspection at Farley Nuclear Plant?

A: (Jones) Alabama Power Company's position is that the Staff began its EQ inspection at Farley Nuclear Plant in September, 1987, and concluded it in November, 1987. This is particularly important to Alabama Power Company because, despite its belief that it complied with the EQ rule, during the inspection, Alabama Power Company was able to develop sufficient data which should have satisfied the inspectors that even the evolving standards had been met. Thus, it is the position of Alabama Power Company that for purposes of the enforcement process, credit should be given for all

documentation in the qualification files at the conclusion of the inspection in November, 1987.

During the inspection, I was actively involved at the Plant in providing the inspectors with whatever documentation they requested and responding to their questions. I developed the "EQ Inspection Tracking Sheet," which was used to document the inspectors' questions and generally assisted in an orderly process whereby an inspector's concern could be addressed and, hopefully, resolved. Nonetheless, due to the time constraints of the inspection, some of the questions raised by the inspectors were addressed through oral presentations. For example, on an instrument accuracy issue, Alabama Power Company had a team of Westinghouse engineers flown down from Pittsburgh to address an inspector's concerns. Moreover, on another occasion, Alabama Power Company made an oral presentation to certain inspectors on Chico A/Raychem seals. Though these presentations were not always documented on a Tracking Sheet, a considerable amount of time and effort was spent addressing these issues. In his testimony, Mr. Richard C. Wilson complains, at pages 25-26, that, "[i]nformation was very slow in coming from the licensee during this inspection in the areas of solenoid valve qualification and instrument accuracy." Based on my personal knowledge, I can assure the Board that this was not so. I know of no inspector concern that was not expeditiously investigated and addressed by the

responsible people at Farley Nuclear Plant during the EQ inspection.

Q23. Do you intend to sponsor additional testimony on the various technical issues raised in this proceeding?

A: (Jones) Yes; on occasion, I will provide testimony on various technical issues. This will appear in my panel testimony with Mr. Jesse Love and Mr. Jim Sundergill of Bechtel. I will also provide a few items of testimony in the topics covered by Mr. Berryhill and Mr. Shipman.

CONCLUDING REMARKS

Q24. Do you believe that the Staff's imposition of a $450,000 civil penalty for the alleged violations of the EQ rule at Farley Nuclear Plant is justified?

A: We believe that the civil penalty levied against Alabama Power Company by the Staff is completely unwarranted based upon our record of responsiveness to the Staff's EQ communications from 1978-1985 and the frequent acknowledgement by the Staff that it had evaluated and accepted Alabama Power Company's technical positions. Throughout the pre-deadline time frame, Alabama Power Company expended many manhours of engineering time, dollars, and associated resources to comply with the

evolving EQ requirements. At frequent milestones, it received acknowledgement by the Staff of its efforts in the form of Technical Evaluation Reports, Safety Evaluation Reports, an operating license and a final declaration that it was in compliance. We know of no evidence that would support the Staff's position that Alabama Power Company had a "programmatic breakdown" of its EQ compliance efforts or that it "clearly should have known about the EQ violations prior to November 30, 1985 ...." We believe that the only way the Staff reached such a conclusion was to impute to Alabama Power Company the Staff's post-deadline knowledge regarding equipment qualification and then simultaneously to ignore its own communications, evaluations and formally promulgated safety evaluation reports -- which, coincidentally, is a fact never dealt with in their pre-filed testimony. Because the Staff has failed to prove their case and because they created and, thus, should be bound by the Modified Enforcement Policy, we do not believe that a civil penalty can be sustained.

Q25. Does this conclude your testimony?

A: Yes it does.

MR. HANCOCK: Alabama Power Company tenders these witnesses for cross examination at this time.

CROSS-EXAMINATION

BY MR. BACHMANN:

Q Thank you. Good afternoon.

Mr. Jones, referring to your testimony, and basically question and answer 1, could you explain or tell me when you became actively involved in the EQ area at Farley?

[Witness Jones] 1981.

Q Could you pin that down a little bit?

A [Witness Jones] As I recall, in the Fall of 1981 I was assigned as the project engineer responsible Farley Nuclear Plant's compliance with environmental qualifications.

Q Setting aside the litigation we're going through now, did you finish or complete that assignment? Are you still involved in the EQ, other than what is involved with this hearing?

A [Witness Jones] Yes, I am, as Manager of Engineering Support at Farley Nuclear Plant, I am still involved in environmental qualification, in addition to other design issues.

Q Mr. McKinney, let me ask you the same question. When did you first become actively involved in the EQ

program at Farley?

A [Witness McKinney] It was the early 1980s. But I was aware of the program in the late '70s, in that I was the licensing engineer for the Farley Unit Two licensing process. So it was in the early 1980s -- '80, '81 time-frame.

Q And again, as I asked Mr. Jones, are you still involved in the program?

A [Witness McKinney] In that David Jones reports to me, that is one of the areas that my group is responsible for.

Q So you would consider yourself still actively involved at the plant?

A [Witness McKinney] Yes.

Q Going to page 4 of your testimony, you see the statement that begins: Generally though, we understand?

A [Witness McKinney] Yes.

Q That statement is not based on any of your personal knowledge, is that correct?

A [Witness McKinney] It's based on the fact that I've read the modified policy, and this is what I understand the issue to be. However, it also does say that -- let me find the exact words -- it also says on page 3 that the primary legal issues to be articulated and argued in detail by legal counsel.

This is my understanding of it.

Q Okay. So the statements made in that paragraph that goes down to the break -- about two-thirds of the way down -- this is just your understanding of the company's legal position, and not anything that you know yourself, is that correct?

A [Witness McKinney] I've read the modified policy. That is my understanding. But it's also my understanding of the company's legal position.

A [Witness Jones] And if I may add -- obviously from an environmental qualification standpoint, we had to evaluate our plant against the modified policy. So we had to read and understand the flow process of the modified policy, both from a compliance with environmental qualification when it was issued, and through the proceeding of this hearing. So, that is the basis for the paragraph.

Q Turn to page 7 of your testimony, please.

Do you -- would one of you read the sentence that begins: Our evidence?

A [Witness McKinney] Our evidence will be, however, that original engineer knowledgable of EQ requirements will determine that our documentation provided reasonable assurance for qualification.

Q Now when you speak about our evidence, you are not talking about the testimony that is in this particular piece

of testimony, is that correct?

A [Witness McKinney] What I mean by that is that you have to look at the overall history and documentation that we have had on environmental qualification. It starts back in 1978, when the circular was issued on EQ. And moves on into 1979 when the Bulletin 7901-B was issued. There were several things related to the NRC staff. In the 1981 time-frame we received SERs that documented reviews of the Franklin research, reviewed our environmental qualification equipment.

It talks about in 1984 we had a meeting with NRC where we discussed all of the deficiencies that Franklin research had identified, that was related in our letter in February of 1984 where all of the deficiencies that were identified by Franklin research over the past several years were discussed. This meeting was a very important meeting, in that we wanted to make sure that all the issues were identified and resolved.

In 1984 that was documented on our February 29th letter, in which we requested that the SERs be revised to reflect the fact that our equipment was qualified. So, following the February '84 letter that documented all the discussions of all the deficiencies that Franklin identified in their detailed review of the equipment, we received the SERs in 1984 that said we were in compliance and our

equipment was qualified.

So that's what I mean about documentation.

Q The question was: What did our evidence mean, but that's all right.

A [Witness Jones] I would also like to add that: When I came on as project engineer in 1981, the level of documentation, as I think you have seen here from the past week, is that through the TERs and the safety evaluations, inspections, there was typically a check list. I would check off yes, no type questions. That was the level of documentation that we were using at that time. And that was acceptable up through the Franklin review.

If you will look at the Franklin review, there is a list of questions. They either conclude that it is acceptable, or have a check mark that says: I need additional information, or something is unsatisfactory to them.

There was not a long dissertation of answering every question or every documented thought process that an engineer went through in concluding that something was qualified.

So up through this history, from '80 to '85, there was this consistent response back from the NRC that we were right in line. We were doing everything that was required to insure compliance. And then in '87, there was suddenly

another level of documentation that was required that was just not required in the early '80s, up through the deadline of '85.

Q Proceeding on to page 12 of your testimony, now you referred to IE Circular 78-08. Is that correct?

A [Witness Jones] Yes.

Q Now, neither one of you were involved in EQ at the time that circular came out. Is that correct?

A [Witness Jones] That's correct, but when I came onboard in 1981, as one of the requirements and obvious needs for me to become knowledgeable of the status of Farley Nuclear Plant and its compliance with EQ in 1981.

The obvious way to do that was to go back and review the historical records. So, while I wasn't actually the EQ engineer at this timeframe, I am familiar with the sequence of events and the historical events that went on prior to '81.

Q Well, I suppose this is just being redundant, but at the bottom of the page there is a statement, "Although no written response was required, Alabama Power Company provided one which addressed certain issues raised by this circular."

Neither one of you contributed any input to that response, did you?

A [Witness McKinney] No.

A [Witness Jones] No.

JUDGE BOLLWERK: It occurred to me we're creating an inconsistency with the way we marked these exhibits and the ones we marked this morning.

I am going to adopt the designations "A" and "B". We'll just mark each one of these as 105, 106, and 107. We'll have essentially two copies. One we will retain, and one will go up to White Flint. Is that all right?

Because what we marked this morning we did not designate them that way, and I don't want to create any confusion in the record. So, that's what we'll do, all right?

MR. MILLER: Fine.

JUDGE BOLLWERK: Mr. Bachmann, I'm sorry to interrupt your cross.

BY MR. BACHMANN:

Q On page 13, you referred to IE Bulletin 79-01, and again, neither one of you were involved in the EQ program at the time that bulletin came out. Is that correct?

A [Witness Jones] No. I believe that 79-01 actually came out before 1981.

Q Right.

So, it's fair to say that any of these bulletins or circulars that begin with "79" or even "80," neither one of you would have had been involved in EQ at the time they

were issued. Is that fair to say?

A [Witness McKinney] I was there in the -- in the office area. I was not the primary engineer working on this, but I was involved in various aspects of the licensing process. So, you know, I probably contributed some to the effort, although I was not the primary person responsible.

A [Witness Jones] And my same answer as before. While I wasn't there, it was a requirement of me to go back and review the historical documentation and become familiar with it.

So, while I may not have been there in 1981, I was familiar with the sequence of events and the status of our plant prior to that time.

Q When you say "familiar with the sequence of events and status of" the plant, in what -- can you explain that a little bit more?

A [Witness Jones] Yes, I'd be glad to.

There was a number of issues that were going in the 1981 timeframe. As you can see, it started out at Circular 78-08, but in '81 was about the timeframe where there was a number of submittals being required.

There was a lot of work going on at the plant, particularly replacement of equipment. Specifically, I recall, we were replacing limit switches and solenoid valves.

We were working both from a design standpoint to ensure that we were addressing all the concerns that the NRC had, plus we were addressing issues that we concluded -- or at the concern of NRC, we were replacing equipment.

In addition, I was familiar with the fact that we had had -- already had an EQ inspection at the plant in September of 1980, the fact that Mr. Gibbons had come down in December of 1980, looked at specifically plant interfaces of equipment, and had found no violations or no deviations.

So, there was this beginning of a history and a -- and a pattern here of NRC would have a concern, we would address it, work on that, and then we would be getting submittals or SERs from the NRC that said yes, you are right on target with compliance of EQ.

[Pause.]

MR. BACHMANN: May I have a second? I need to find an exhibit here.

JUDGE BOLLWERK: Fine.

MR. BACHMANN: I thought we had it, and evidently, we don't.

[Pause.]

MR. BACHMANN: I will go on to another line of questioning, and then I'll have to come back.

[Pause.]

BY MR. BACHMANN:

Q If we go on to page 26 of your testimony, Mr. Jones, you refer to the master list. You had no input to that master list submittal, did you?

A [Witness Jones] I believe the original master list was submitted prior to me becoming Project Engineer but subsequent to me becoming responsible for EQ. That master list was revised on several occasions and submitted to the NRC.

Q So, you -- you actually actively submitted revisions to the master list. Is that what you're telling me?

A [Witness Jones] Yes. Specifically, I believe, on -- in 1983, after the rule 50.49 came out -- 50.49, one of the submittals required was to resubmit the master list, and I believe we did that in the May '83 timeframe.

I would just point out that that was in addition to the fact that we had already received SER's on both units that said that our Master List was complete and acceptable.

Q Do you have a copy of APCo Exhibit No. 11? It is referred to on Page 18 of your testimony.

A [Witness Jones] Are you referring to the Gibbons' Inspection?

Q I think we've colloquially referred to it as the Gibbons' Inspection.

A [Witness Jones] I'm on Page 18.

Q Okay, the last sentence in that paragraph of Page 18 says, "from this page" -- referring to a previous reference -- "it is apparent that the Inspector reviewed the hydrogen recombiner 5-to-1 splices issue in this proceeding and deemed it to be qualified."

Can you show me anywhere in that report where the word "qualified" is used?

A [Witness Jones] I think the fact that he said there were no violations or no deviations I concluded that it was --

Q Would you please answer. Mr. Jones, before you explain, would you answer the question. Can you show me anywhere in that report where the word "qualified" is used?

A [Witness Jones] That is the basis for me using the word "qualified" in my direct testimony, the fact that he found no deviations or violations were identified.

Q What is the basis for your statement that he reviewed the 5-to-1 splice on the hydrogen recombiner?

A [Witness Jones] Could you repeat that question, please?

Q What is the basis for your statement that the Inspector reviewed the 5-to-1 splice on the hydrogen recombiner?

A [Witness Jones] Page 4 of his Inspection Report at the top of the page it identifies hydrogen recombiner.

There is a TPNS No. Q2E17G001A-A and B-B. And at the bottom of the paragraph it says, as you read there, "the equipment examined was inspected for proper installation, overall interface integrity and manufacturer's namenlate date was obtained". And the last sentence, "within the areas examined there were no identified violations".

Q Now, Mr. Jones, that particular splice is in a junction box; is it not?

A [Witness Jones] I believe it is in a NEMA-4 type enclosure.

Q And that is closed; is that correct?

A [Witness Jones]" Well, if you will recall, this inspection is in December of 1980 and this is a Unit 2 TPNS number, and that was prior to us going commercial on Unit 2. In other words, Unit 2 was still under construction, so it could have very well had covers off, been very visible for inspection at that timeframe that he was there at our plant site.

Q But its normal configuration is with the cover closed; is that correct?

A [Witness Jones] That is the normal operating mode; that is correct.

Q Okay, now, you were not present at the time he did this inspection; were you?

A [Witness Jones] No, I was not.

Q Mr. McKinney?

A [Witness McKinney] I was on site, but I don't recall being at that inspection; no.

Q Do you know whether or not there was a cover on that box at the time?

A [Witness Jones] I do not know that. The only basis that I can go on is the written word of the inspection reports and the written word of the Safety Evaluation Report. And when he says he examined for proper installation and overall interface integrity, I've got to assume that he looked at the splice configuration.

Q So, it is only an assumption. You really have no idea.

A [Witness Jones] It is based on the written word in the documentation.

Q But it doesn't say "splice" there; does it?

A [Witness Jones] Well, overall interface integrity, that in my mind he had to look at the splice configuration because that is where the field cable joins the heater leads as we have seen by the exhibit that is before the Board now.

Q Well, let me ask you something then, if you are so convinced that "interface" means "splice", and NUREG 0588 suggested that interfaces should be listed on the Master List, and it has been APCo's testimony that that is not

something that you put on the Master List. Why wasn't it on the Master List in Unit 2?

A [Witness Jones] As I previously testified, our Master List was submitted and approved by the NRC as complete and acceptable in 1981. We resubmitted it in 1983 under the requirements of 50.49. The fact that splices were not on the list did not mean that we thought they were not important interfaces. In fact, we thought they were important, important enough for us to develop approved electrical modes and details of how to install a qualified splice.

In addition -- and I think that this is a very important point to make to the Board -- is in addition we had a test report in our file that qualified the materials for making up a V-type splice and we felt like that that was qualified and sufficient documentation to ensure qualification at that time and even today as borne out by our subsequent V-type test report that we developed in October of 1987.

Q Well, I think we went a little afield from my question, but in your mind the word "interface" equals "splice"; is that correct?

A [Witness Jones] I didn't say that. I think interface in the electrical sense -- if you are joining the field cable to the piece of equipment, you can call it

termination, you can call it splice, you can call it rat tail joints. Construction and electricians call it a lot of different things, but when you join two cables together you have to make a connection there.

Q So, in your mind as head of the EQ program, a termination and a splice can be used interchangeably; is that correct?

A [Witness Jones] That was not originally our intent or our thought process. We were trying to segregate the two in that a splice would be joining two cables in the middle of a run where you didn't have a piece of cable that was long enough to make it from one termination point to another, and then segregate that from termination. That is when you have a piece of equipment with a pigtail on it and you need to join the field cable to that pigtail that is attached to the end device. There is a segregation there.

Q Maybe I am not hearing correctly, and the record will bear me out, but I could have sworn you said that terminations -- you could call them terminations, you could call them splices, it really didn't make any difference; is that correct? Didn't you make that statement?

A [Witness Jones] Okay, I will accept that I made that statement and I think that if you look at the qualification from an EQ standpoint, it really makes no difference.

Q Whether you call it a termination or a splice?

A [Witness Jones] That is correct.

[Witness McKinney] I would like to add my perspective to the question you asked me.

If you look the letter, Exhibit No. 11, the areas inspected was in the areas of installed equipment review, respective bulletins 79-01B and NUREG-0588.

I was not at the particular inspection when the gentleman was there. However, from my knowledge of the hydrogen recombiner, which is basically a heater that's connected to the floor, it has power cables coming out of it.

When I made the statement that it was apparent in my mind it says here that he inspected for proper installation, which means it was connected to the floor. The only other interface that I can think of is power cables coming out, so I don't know what the gentleman looked at.

However, it was sufficient for him to say there were no identified violations.

Q Nowhere in that report does it say he looked at the qualification files, does it?

A [Witness McKinney] No but like I just said, the purpose of the areas inspected was of installed equipment with respect to IE Bulletin 79-01B and 05 -- it says here 0580. I think it means 0588, but that was the purpose of

the inspection.

My point is he looked at whatever he needed to, to draw the conclusion that there was no violations.

Q Now is it either of your position that someone could come in, look at a piece of electrical equipment, and without looking at the EQ file determine that equipment was qualified?

Is that what you are trying to tell me?

A [Witness Jones] Excuse me, repeat that question, please.

Q Well, we've established that he didn't look at the EQ files.

A [Witness McKinney] I don't know what he looked at.

Q All right. It doesn't say it in the report and you're basing it on the words of the report because nobody knows what he actually physically looked at but you are relying on the words of the report to say that he probably looked at the splice. All right, well, let's accept that as an assumption. Is it possible to determine if his equipment is qualified, and I am using your words, without looking at the EQ files?

MR. HANCOCK: I am going to object to that question. There is no basis for that hypothetical. If staff counsel will look at the first page of that document, it

does say that in certain cases there were records that were examined.

His conclusion that no records were examined there is no evidentiary foundation for making that statement.

MR. BACHMANN: Well, I think that counsel has testifying.

I asked if it said anywhere that they had looked at the EQ files. I think it is a perfectly legitimate question because Mr. Jones said he based his belief that they looked at the splice on the words of the document.

I am trying to get from him --

MR. HANCOCK: No, he said that he did not know what Mr. Gibbons looked at. Obviously he looked at the equipment but it does say here on page 1 that the inspection consisted of selective examinations of procedures and representative records. It does say that.

JUDGE BOLLWERK: I think at this point the testimony is that these two witnesses are not aware that he looked at any files. Am I --

MR. BACHMANN: That is what I was trying to elicit and then I was following on, since the witnesses say that the inspector deemed the equipment to be qualified, on page 18, and I asked them where does it say qualified, that they were not able to find it in the report, and I was just trying to see whether or not since it doesn't say that he

looked at the EQ files whether it is their position that someone could physically examine a piece of equipment and deem it qualified.

That was the question; is that your position.

JUDGE BOLLWERK: I'll allow that question.

WITNESS JONES: Let me try to answer it this way.

As I understand, Mr. Gibbons came down to the plant in December of 1980 as an NRC EQ inspector to ensure that we were in compliance with IEB 79-01B and NUREG-0588 I believe is the way we concluded that he looked at it, so I've got to assume that based on those words that he was knowledgeable enough to do whatever he had to do to satisfy himself that we had no violations, so if he felt like it was necessary for him to go look at the files, I would assume that he did that.

If he felt like it was not necessary for him to do that, I would assume that he didn't do that, but I would conclude that he was knowledgeable enough to do whatever it took to satisfy himself that we were okay.

BY MR. BACHMANN:

Q Let me ask you a question and it may require a bit of a stretch for this case but are you aware of how a licensee could violate a NUREG or a Bulletin?

Can you tell me any way how they could do that?

A [Witness Jones] An inspector even today can come

on site and he can write up a violation as he deems necessary.

Q Don't you generally require a regulation before you violate something?

A [Witness Jones] Here again I don't want to claim to be an NRC inspector and very familiar with the enforcement policy but I would assume that he had within his capability to be able to write a violation if he found something that he didn't concur with or feel comfortable with accepting it.

Q But isn't for instance a NUREG a suggested way of doing things and you can show the NRC you have an equally satisfactory way, that's okay?

A [Witness McKinney] In theory, sometimes that's true.

Q So you really can't "violate" a NUREG, isn't that correct?

A [Witness McKinney] Also, you have to look at the entire sentence here under Results.

I guess it's the first page under -- it doesn't have a page number but under Results it says "Of the two areas inspected, no violations or deviations were identified" so you are talking about violations in the area of a Bulletin or a NUREG and it also says there were no deviations as well.

A [Witness Jones] Here again, we accept the written word. He determined that there were no violations so I assumed that he was familiar with the regulation as written and could write a violation if he so desired.

Q But of course you are aware of that 5049, the regulation, EQ regulation did not, was not published until 1983.

A [Witness McKinney] That's true. Iet me answer the question this way.

I believe that if the gentleman had seen something that he wanted to write a violation, he would have written the violation. However, I agree with you it would probably not have tied to Bulletin 79-01B. It would have probably been tied to one of the general design criteria to cite the violation but it would have been based on guidance in the Bulletin 0588. That's my opinion.

Q Okay, I'm going to go on to another topic. I just have one or two more questions on this.

Neither one of you can state that you observed Mr. Gibbons during the inspection, that's correct?

A [Witness Jones] Correct.

A [Witness McKinney] Correct.

Q Therefore neither one of you know whether or not he looked at the 5-to-1 splices? Is that correct?

A [Witness McKinney] That's correct.

A [Witness Jones] That's correct.

Q Neither one of you know for a fact whether he looked at the EQ files on the splices, is that correct?

A [Witness McKinney] I don't know what he looked at.

A [Witness Jones] Here again, I go back to the fact that all I could assume was he was a knowledgeable EQ engineer and did whatever was necessary at that time frame to satisfy himself.

A [Witness McKinney] The point I would like to make as far as this particular document is that the gentleman came on-site for the purpose of auditing Alabama Power Company to the provisions of 7901B and 0588.

He did whatever he deemed necessary at that point in time in the EQ evolution to draw the conclusion there were no deviations or violations.

That's my point.

Q Are either one of you aware of anybody in your witness pool who might have been onsite when Mr. Gibbons was there?

A [Witness Jones] In our witness pool, I think, Mr. Phil DiBenedetto is involved, and of course his group did an inspection in September of 1980.

Other than that, I can't recall from memory anyone that worked specifically for Alabama Power Company at the

time from this witness pool to shed any light on that.

A [Witness McKinney] By "witness pool", do you mean David or I? Or do you mean --

Q Well, the people that are testifying for Alabama Power in this area in this proceeding.

A [Witness McKinney] Bill Shipman was on site. Whether he has knowledge about this, I don't know, but he was on the site.

Q Well, maybe we can ask Mr. Shipman about that. You used the word -- Mr. McKinney, I believe it was you who used the word "audit" in respect to this inspection. I would like -- I do not see that word used in the inspection report.

A [Witness McKinney] Well, that's my term for a group of inspectors coming on site and -- I call it an audit. That's my terminology.

I think the exact words on the cover sheet was the "scope of the inspection".

Q Assuming that the -- I use the words "junction box". I think Mr. Jones used a different word -- the "enclosure" -- had been as it would normally be, and that is closed, would it not have required a -- some sort of documentation, a work request, to have it opened?

I mean, the inspector could not do it himself, isn't that correct?

A [Witness Jones] If the cover was on. But I go back again to the fact that the time frame we were here, unit 2 was not licensed for full power operation. That occurred in the summer of 1981.

So with this time frame, unit 2 was still in construction.

Q but how did Ben close -- the inspector could not have opened it on his own, he would have had to request Alabama Power --

A [Witness Jones] I'm not sure exactly what time frame you go from construction to operation mode. You are correct in the fact that if we had been operating, we would require a work request to go in and inspect things.

I am not sure that at this specific time frame, while we were still in construction, what the plant requirements were.

Q In view of later testimony given by Alabama Power Company on these 5 to 1 splices -- I am sure this is within the realm of your knowledge -- one of the points Alabama Power Company has made was that Westinghouse tested the hydrogen recombiner using a 5 to 1 splice, and using number 70 scotch tape.

Is that correct?

A [Witness Jones] That is based on a letter we have received from him. That's correct.

Q Now, if an inspector looked at that splice and then -- let's make this hypothetical -- saw something in the EQ files that said, number 70 scotch tape. We know that wasn't number 70 scotch tape. Isn't that correct? On the 5 to 1 splice?

A [Witness Jones] For the nuclear plant, that's correct. We used our qualified tape that we had already had -- or that Okonite had tested and qualified that was in our files.

Q Could the inspector tell by looking that that was not number 70 scotch tape?

A [Witness Jones] I'm not sure what the inspector could conclude.

Q Could you tell by looking?

A [Witness Jones] I'm not familiar with scotch 70 tape. I'm familiar with the tape that we used -- the T-95 and number 35. So, I would know what that looks like, which is what we have used to develop the exhibits here.

Q Okay. Passing on to page 39 of your testimony. That's 39. All right. Mr. Jones, would you read the sentence that starts with -- it's the second sentence in answer 22. It begins with, "This is particularly important. . . ."

A [Witness Jones] "This is particularly important to Alabama Power Company because, despite its belief that it

complied with the EQ rule during the inspection, Alabama Power Company was able to develop sufficient data which should have satisfied the inspectors that even the evolving standard had been met."

Q All right. The "sufficient data that was developed" -- can you be more specific as to what you were referring to?

A [Witness Jones] Well, here again, you need to go back in the history of time, and as I tried to explain earlier, back in the 1981 time frame, up through the Franklin TER, typically the level of documentation, in addition to a SCEW sheet, was a typical checklist. A list of questions with a series of yes/no answers or a series of check marks which the inspector or Franklin would go through in concluding whether or not something was qualified.

I refer to the evolving standard in that in the 1987 inspection --

Q I'm going to have to cut you off, Mr. Jones. The simple question was, what is this data that was developed that you are talking about? In your testimony, what data are we talking about?

A [Witness Jones] It depends on the specific issue that you are talking about. An example is, we developed the V tape splice test report.

Q All right. Let's stop at that one. Are you

talking about the Wyle Report?

A [Witness Jones] Yes, I am.

Q Then this is the October '87 Wyle Report?

A [Witness Jones] Yes, that's correct.

Q Do you -- could you get a copy of APCO Exhibit 39?

A [Witness Jones] Okay.

JUDGE BOLLWERK: That is Staff Exhibit 25.

WITNESS McKINNEY: APCO Exhibit 39; is that what you're saying?

WITNESS JONES: All right, I think we have that report.

BY MR. BACHMANN:

Q Now, if you go to the page that has the unified or Bates Number 001962 --

A [Witness Jones] Okay.

Q Now, is this the report -- let me see if I get this right. Is this the report that supports or would like to support APCo's position that the staff should have looked at this when they came by in November of 1987 on the V-type splices?

A [Witness Jones] If they were not satisfied with the level of documentation that we had in our file at the time, then, yes, I feel like that they should have looked at this to satisfy themselves that we had verified through testing, our original assumptions and conclusions.

Q Okay, now, I want you to look carefully at this exhibit. Is this the report, as it is in front of you -- and this is an APCo exhibit -- is this the exact report that you say that they should have looked at? I mean, this is complete.

This is it. This is what you allege would have supported qualification.

MR. HANCOCK: This is a pretty big document. They need to look through it and make sure and hope this isn't leading to any trick question of whether or not a page is missing, but --

MR. BACHMANN: No. I just want to ensure that this is all, this is what they wanted us to look at, at that time. We can stipulate to it, or you can have them look at it.

MR. HANCOCK: I think you've asked him to look at it, and I think that's what he's doing right now.

JUDGE BOLLWERK: If there is no difference between the parties, it appears that Staff 25 is a part of APCo 39.

MR. BACHMANN: It probably is, sir. That's why I used their's.

MR. HANCOCK: Then perhaps Alabama Exhibit 39 is the complete document and what staff counsel is looking at is an incomplete copy of their exhibit.

MR. BACHMANN: No, I'm using APCo 39. I wanted to

be absolutely certain that I had what you supplied us. Your Honor, maybe we should take a five or ten minute break while they're looking at that and confer with counsel?

JUDGE BOLLWERK: All right. One thing that I want to do when we come back is, I'll go ahead and mark APCo 39 as identified for the record, because these documents are not the same. My assumption in looking -- when I look at these, I go through and check the titles, but if there's a difference and it's substantial, we ought to go ahead and admit both documents. We'll do that when we get back.

MR. BACHMANN: I am not representing that Staff 25 is the document we're talking about, and that's why I wanted to use their exhibit.

JUDGE BOLLWERK: Then we need to identify it separately and we can do that. We'll take a five-minute break and come back.

[Brief recess.]

JUDGE BOLLWERK: If you will be seated, we'll go back into session. Let's go ahead and get APCo Exhibit Number 39 marked for identification, if we could. Could you just identify it briefly for the record, Mr. Bachmann.

MR. BACHMANN: Just before the break, I asked you to look at a document which has been identified as APCo Exhibit Number 39. In fact, for purposes of further identifying it, on Bates Page 001962, there's a title called

Qualification Test Program on Splices Fabricated with 3M Scotch Super 33+ Vinyl Plastic Electrical Tape and Okonite Splicing Tapes Number 35 and T-95 --

MR. HANCOCK: Can I get a clarification? Are you reading from the staff exhibit, because we've got a different set of Bates numbers.

MR. BACHMANN: No. This is yours.

MR. HANCOCK: You probably have the staff exhibit.

JUDGE BOLLWERK: Let's take a second and make sure we're all using the same document. That's very important.

[Discussion off the record.]

JUDGE BOLLWERK: Let's go ahead and put it on the record just so we make sure that it's clear as to what we're looking at.

MR. MILLER: It's not material to the record. Apparently, there are two copies of this identical test report that picked up Bates stamp numbers, and the witness and counsel are reading from the same numbers, and that's what's important.

JUDGE BOLLWERK: Okay. Let's go ahead and, just for the record, identify as APCo Exhibit Number 39. It's a report from Wyle Laboratories dated 6-1-88, number U265603A. That's APCo Exhibit 39 we have marked for identification.

[APCo Exhibit Number 39 was marked for identification.]

MR. BACHMANN: I will repeat the title, which I think was some sort of control sheet. To help someone reading this transcript, the title that I think we are all considering on this Bates Number 001962, which Mr. Kinney has in front of him, is Qualification Test Program on Splices Fabricated with 3M Scotch Super 33+ Vinyl Plastic Electrical Tape and Okonite Splicing Tapes No. 35 and T-95 for the Alabama Power Company for use in the Farley Nuclear Generating Station, and the date on this document is October 1987.

BY MR. BACHMANN:

Q Now, you gentlemen have had a chance to look at this document. It was supplied to the staff and the Board as an exhibit by APCo. Is this the document that you allege was not looked at by the staff when they were at the plant in November '87 -- well, answer that question first.

A [Witness Jones] Yes, that's correct.

Q And is the document you have before you, APCo Exhibit Number 39, a complete document?

A [Witness Jones] I would hate to contend that that's complete because there are a lot of pages here, but it looks like a reasonable thickness to be complete.

Q Okay. And is it your position that had the staff analyzed this document, the staff would have concluded that the V-type tape splices were indeed qualified?

MR. HANCOCK: Could you repeat that question? Did you say "would have"? I think his testimony says "should have".

BY MR. BACHMANN:

Q Had the staff looked at it, is it your position that the staff should have concluded that they are -- that those tape splices were qualified?

A [Witness Jones] Had they not already been convinced before this time, I think they would have or should have.

Q Now, let me ask you a hypothetical. If it were determined, and I'm using this in the passive voice, if it were determined that this document does not support the qualification of the V splices, wouldn't you concur that the V splices are not qualified, or were not qualified?

A [Witness Jones] I wouldn't conclude that in that we've provided earlier documentation based on our engineering judgment that they were qualified. The configuration was not the significant issue; it was the materials used. However, based upon the fact that the NRC wanted additional data and were not satisfied with our argument based upon analysis and engineering judgment, then we went out and tested to verify our position.

MR. BACHMANN: The staff has no further questions of this panel.

JUDGE BOLLWERK: Any redirect?

MR. HANCOCK: Can you give us about two minutes?

JUDGE BOLLWERK: Sure.

[Counsel for APCo conferring off the record.]

MR. HANCOCK: I think I'm ready. I have, actually, one or two questions.

REDIRECT EXAMINATION

BY MR. HANCOCK:

Q Mr. Jones, you said, on cross, just a minute ago, that Alabama Power Company Exhibit 39, or Staff Exhibit 25, the Wyle test report, was the only data that was relied upon, or should I say it this way: If this test report did not prove a qualification, was there other data available?

I am going to hand you what has been marked for identification purposes Alabama Power Company Exhibit 108 and just ask you this question: Is that some of the additional data or analysis that you were referring to?

A [Witness Jones] Yes, it is.

JUDGE BOLLWERK: Could you identify that for the record, please?

MR. HANCOCK: It is a letter from R.P. McDonald, Senior Vice President of Alabama Power Company, dated September 30, 1987, to Dr. J.N. Grace, U.S. Nuclear Regulatory Commission.

JUDGE BOLLWERK: Let the record reflect that APCo

Exhibit 108 has been marked for identification.

[APCo Exhibit No. 108 was marked for identification.]

BY MR. HANCOCK:

Q You said that this does show additional analysis or data. Can you just very briefly explain what that is, what this letter indicates?

A [Witness Jones] I think this documents the meeting that we had on September 24, 1987, with the NRC, and it provides, based on other testing done by other utilities and the fact of additional analysis, that APCo concluded that the V-type splices would have performed their intended function.

MR. HANCOCK: All right. Thank you.

MR. BACHMANN: Could we have a more specific reference in that document to what Counsel is talking about?

[Pause.]

WITNESS JONES: I guess one of the references would be at the bottom of page two and the top of page three.

"Concurrently, consideration of available information relating to V splices led Alabama Power Company to conclude that splices in question would perform their intended function."

In addition, following along on page three, the --

I guess it's the second full paragraph, beginning with "The technical justifications for Alabama Power Company's decision that V-type splices in question would perform their intended function were based upon (1) qualification test data, (2) protection afforded to preclude exposure of the splices to direct spray, (3) the use of materials which were qualified for in-line splice configurations, and (4) engineering judgement."

BY MR. HANCOCK:

Q So, this document that is Alabama Power Company Exhibit 108 would serve as additional analysis tc show qualification of the V splices.

A [Witness Jones] That's correct.

MR. HANCOCK: No further questions.

MR. BACHMANN: I have one follow-up question on the redirect.

RECROSS EXAMINATION

BY MR. BACHMANN:

Q That paragraph that you just read from the letter, that only applies to the justification for continued operation, doesn't it, not to qualification.

A [Witness Jones] I can't distinguish between the two. We claimed that, based upon the -- the data, that they would perform their intended function, and I conclude that that is a qualification argument.

Q But isn't -- doesn't the preceding paragraph refer to the JCO and then that paragraph follow-on to that -- the JCO paragraph?

A [Witness Jones] Well, let me just back up a minute. It says here, "Upon the review of the situation, Alabama Power Company determined that the following two approaches could be taken with this potential issue."

Number one would be a JCO or, number two, have evaluated the capability of the subject splices to perform their intended function. We chose option two, which is we believe the V-type splices will perform their intended function.

MR. BACHMANN: I don't believe that's what the letter says, but I think the letter speaks for itself.

I have no further questions.

JUDGE BOLLWERK: All right. Just one second.

[Pause.]

JUDGE BOLLWERK: All right. Questions from the Board. Judge Carpenter?

JUDGE CARPENTER: No questions.

JUDGE BOLLWERK: Nothing?

Judge Morris.

[Pause.]

EXAMINATION BY THE BOARD

JUDGE MORRIS: Gentlemen, if you will turn to page

seven of your testimony, at the bottom of the page you quote Messrs Luehman, Potapovs, and Walker.

[Pause.]

JUDGE MORRIS: Have you had a chance to read that quotation?

WITNESS JONES: Yes, sir.

JUDGE MORRIS: Isn't that a direct quotation from the escalated policy statement?

WITNESS JONES: I am not sure.

JUDGE MORRIS: We can determine that ourselves, I guess. On page 38, the last full sentence on that page states Alabama Power Company attended meetings of the Nuclear Utility Group for Equipment Qualification (we became a full member in January '87)." Can you give me the dates of the prior meetings you may have attended or someone from Alabama may have attended?

WITNESS JONES: In the prior to 1987 timeframe?

JUDGE MORRIS: Prior to January 1987.

WITNESS JONES: No, sir, I can't give you any date.

JUDGE MORRIS: Can you make an estimate of whether there were some in '86?

WITNESS JONES: I would be speculating and I would say that we at least had the meeting minutes from meetings prior to '87. As far as specifically being at the meetings,

I did not attend. I'm not sure if someone from my group attended or not.

JUDGE MORRIS: So, even if you weren't there, you had some knowledge of what transpired at those meetings?

WITNESS JONES: Typically, there was -- in the industry meeting --

JUDGE MORRIS: When was that group formed; do you know that?

WITNESS JONES: I don't know.

WITNESS McKINNEY: I don't know.

JUDGE MORRIS: I raised the question with the staff of to what extent they, themselves, exercised engineering judgment and to what extent they accept engineering judgment on the part of licensees. I believe Mr. Luehman gave an answer to that question.

Have you had a chance to look at the transcript to see his answer?

WITNESS JONES: No, I have not.

WITNESS McKINNEY: No, sir, I haven't.

JUDGE MORRIS: In my mind, there seems to be some concern about what constitutes documentation in an auditable form and to what extent engineering judgment can be a part of what can be audited. I'd just like you to explain your perception of this concept.

WITNESS JONES: My concept would be that -- as I

said earlier, back in the early 1980 timeframe, qualification was reviewed through typically a series of checklists and it evolved to more detailed requirement of documentation needed to prove qualification. I feel like there is room to have engineering judgment available to knowledgeable engineers and come to the conclusion that something is qualified without having a piece of paper documenting that thought process.

JUDGE MORRIS: And do you believe that to still be acceptable after 50.49 was published?

WITNESS JONES: Yes, sir, I do.

WITNESS McKINNEY: My answer would be along the lines that in this early timeframe -- this is an evolving issue. Engineering judgment or documentation of engineering judgment is still an evolving issue in 1992 in other areas of design.

However, as far as what I thought was adequate, it was adequate in that we were developing the submittals to the NRC. Franklin Research was reviewing these submittals. We were having meetings. We were getting feedback on areas that were acceptable and areas that needed more clarification.

So, from the timeframe of the early 80's, we had SERs in '81 that basically documented back to Alabama Power Company that what we were submitting and what we were

documenting was adequate in that the SERs were saying this is qualified, you need some additional work over here. It would go off in an '81, '82, '83 timeframe. We were submitting more information to the Commission to document the SCEW sheets and that type of thing.

The NRC and Franklin would review that, Franklin, being the detailed review of the equipment. We would get these SERs back in '83 and '84 that said we were qualified.

We had a meeting in January of 1984 where we set down and we discussed each of these deficiencies that Franklin had identified, and our documentation that we had provided in our February '84 letter, in my mind, was sufficient to address the issues satisfactorily to the NRC staff and ourselves. And that was reflected in the '84 SER, so it was in the evolving timeframe that we were submitting information, getting feedback in the form of the SERs. We had a couple of onsite inspections in 1980.

It was this continuing submittal of information and getting feedback of SERs and the final SER in December of '84 was very significant in that it said that we had addressed all of the issues that we discussed in our January '84 meeting which basically resolved all the issues that Franklin had identified. So, it was that level of judgment, that level of review that, in my mind, where we concluded that it was sufficient, the big point being the December '84

SER.

JUDGE MORRIS: In your discussion in January '84, was there any discussion of the adequacy of documentation?

WITNESS McKINNEY: What I remember of the January '84 meeting was that there were several issues that the NRC wanted documented as a result of the meeting, and we included that in our February '84 letter, so, from that perspective, yes, sir.

JUDGE MORRIS: Did you get feedback after the February letter?

WITNESS McKINNEY: Yes, sir, in December of '84, we received the SER that said that Alabama Power Company equipment was qualified, so, yes, sir, in the December of '84 SER.

JUDGE BOLLWERK: I just want to follow up on what Judge Morris was asking about. Well, let me state this and you can clarify it or qualify it in any way you want:

Your position then is that engineering judgment, as a general rule, does or does not have to be documented?

WITNESS JONES: As a general rule, it does not have to be documented, in my mind, in that in the '84 timeframe, the issues were identified, reasonable conclusions acceptable resolution was agreed to between Alabama Power Company and the NRC. But the licensee then becomes at risk subsequent to that timeframe in that you're

at the inspector's discretion as to what level of documentation satisfies him and what level of engineering judgment satisfies him.

So, I felt in '87 that what was agreed to as adequate resolutions of the issues prior to the deadline was not adequate documentation to satisfy the inspectors in the '87 timeframe. Obviously, engineering judgment was used in '84. A limited amount of that, if any, was accepted in the '87 timeframe by the inspectors.

JUDGE BOLLWERK: Why, in your view, if it is, do you believe it's unreasonable for the staff to want engineering judgment documented so they will know what the thought processes are, and so that future utility employees who look at the file will know what the thought processes are, in case they have to go in and make some changes to the equipment?

WITNESS JONES: It becomes a matter of how much documentation is enough. And that what one engineer may conclude, and a utility conclude is enough information, may not be enough information for the inspector.

So it's a very judgmental call there on how much engineering documentation is enough.

JUDGE BOLLWERK: Do you have any concern, from the perspective of a utility employee, that you may not know what the engineering judgment was that someone else arrived

at in preparing a file, if you are going to go in and change the equipment in some way?

WITNESS JONES: Well, here again, we reviewed the documentation and the level of documentation that we were receiving from Bechtel or some vendor, and satisfied ourselves that that was sufficient information to justify qualification

WITNESS MCKINNEY: I felt that the level of documentation of engineering judgment was adequate at the time. Like I said earlier, this is 1992. And even today, it's evolving. So at the time, '81 to '84 time-frame, I felt like the level of documentation was adequate. And it's changed over time. But I felt that it was adequate.

JUDGE BOLLWERK: I have nothing further. Any other Board members?

JUDGE CARPENTER: Yes. With reference to generalizations about changes over time, how many items are on the Farley EQ list, in round numbers?

WITNESS JONES: Today?

JUDGE CARPENTER: Yes. Ten, a hundred or a thousand -- roughly.

WITNESS JONES: 1,500. And that's both units.

JUDGE CARPENTER: Against these evolving standards, do you think that in addition to the seven that are before us, there are others that might be questioned

sometime?

WITNESS JONES: Yes. We're always willing to accept the regulatory and evolving nature from that standpoint. And we accept that. I mean, standards are going to change over time. And we want to keep up with those. We feel that's important to satisfy anyone that comes in.

However, to take the regulatory standard and then apply it in the enforcement arena, under clearly should have known prior to the deadline, to me is not fair.

JUDGE CARPENTER: Well, I was curious. This sounds a little bit like a ratchet -- whether you are having to rework all the files to see if they meet the new standards.

WITNESS JONES: We did rework all of the files again in 1988 to make sure that they were at the level that was acceptable to the NRC. And they subsequently reviewed those files, and deemed them acceptable in the '88 time-frame.

JUDGE CARPENTER: Thank you for satisfying my curiosity.

JUDGE BOLLWERK: Does anyone else have anything further?

Okay, I think we can excuse this panel at this time. I think we will see Mr. Jones again. Mr. McKinney, I

thank you for your testimony, and your service to the Board, and you are both subject to being recalled if it becomes necessary.

(Whereupon, the panel was excused.)

MR. HANCOCK: Judge Bollwerk, we have a number of exhibits that I would like to move into the record. I believe -- and I'm looking at a list of Alabama Power Company exhibits, and from my quick review I think that three of these have already been identified and introduced as staff exhibits.

Just one second. I correct that. There are only two that this panel introduced. They introduced Alabama Power Company Exhibits 1 through 23. Excuse me.

JUDGE BOLLWERK: I have 1 through 22.

MR. HANCOCK: One through 22 is correct. I'm going to get my act here. One through 22 -- Alabama Power Company Exhibit 2 correlates to Staff Exhibit 4, which is already in evidence. And Alabama Power Company Exhibit 7 correlates to Staff Exhibit 27 which has already been admitted into evidence.

JUDGE BOLLWERK: Let me ask you about APCO 8, which I had marked as being similar to Staff 24. Maybe --

MR. HANCOCK: Julie tells me that they have different dates on them. So they are, in fact, --

JUDGE BOLLWERK: All right.

MR. HANCOCK: Yes. Our exhibit is the Alabama Power Company Exhibit 8, dated 1-17; and the Staff's Exhibit 24 is dated 1-14-80. So they are different dates.

JUDGE BOLLWERK: Okay. Well, go ahead --

MR. BACHMANN: Your Honor, ours is also dated 1-17. We may have misidentified it at some time.

MR. HANCOCK: Okay. If it's been misidentified, then I go back to my original statement that Alabama Power Company Exhibit 8 correlates to previously identified and admitted Staff Exhibit 24.

So at this time I would move that Alabama Power Company Exhibit 1, Alabama Power Company Exhibit 3 through 6, and Alabama Power Company Exhibit 9 through 22 be admitted into evidence.

I would further move that Alabama Power Company Exhibit 39, which is the Wiley test report referred to a few minutes ago, be admitted into evidence.

And Alabama Power Company Exhibit 108, which is the December 30, 1987 letter from Mr. McDonald to Dr. J.N. Grace, that it also be admitted into evidence.

JUDGE BOLLWERK: Okay. Let's stop one second here. In terms of -- we spoke earlier at the break about some kind of list that identifies these. Do we have one that we can put into the record?

MR. HANCOCK: I've got one here. We're going to

work on it, and make sure that the Staff exhibit numbers correlate, that we have a matching number. And this only goes through Alabama Power Company Exhibit 82. Of course, since we began this trial, we've picked up on 83, and I think we're up to 108. So we'll bring it current, and introduce it.

JUDGE BOLLWERK: All right. My concern is that when we either identify or receive into evidence a particular exhibit, that at that point we have something that identifies the document and the exhibit number in the record. We can take a piece of paper that lists all these and put them in the record at that point. Or we can do what Mr. Holler has done, and identify each one.

MR. HANCOCK: I would be happy to read this into the record. If you would like the brief description, it's about two pages, single spaced. And I would be happy to read that into the record.

JUDGE BOLLWERK: I hate to have to ask you to do that. But absent a list, I really want the record to reflect, when we either identify them or receive them, what the document is.

MR. HANCOCK: Okay.

JUDGE BOLLWERK: I'll know for the record that APCO 1, APCO 10, APCO 11, 12, 14, 16, 18, 19, 20 and 21 have already been identified.

MR. HANCOCK: All right. Then I will identify the evidence, if you would like. And you said 1 has been identified?

JUDGE BOLLWERK: That's correct.

MR. HANCOCK: Two has already been identified as Staff Exhibit 4.

Alabama Power Company Exhibit 3 is a 4-13-78 petition for emergency and remedial action, it's CLI-78-6.

Exhibit 4 is IE Circular 78.08.

Exhibit 5 is a 10-11-78 letter to James P. O'Reilly, transmitting the Farley response to IE Circular 78.08.

APCO Exhibit 6 is a letter to Mr. F.L. Clayton from James P. O'Reilly, dated February 8, 1979, regarding IEB 79-01.

Exhibits 7 and 8 have already been admitted into evidence.

APCO Exhibit 9 is CLI-80-21, dated 5-27-80.

APCO Exhibit 10 is memo to Z.R. Rosztoczy -- I'll spell that --

JUDGE BOLLWERK: That's already been identified.

MR. HANCOCK: That has been identified.

APCO Exhibit 13 is a letter to Mr. F.L. Clayton from Thomas M. Novak, dated February 13, 1981 --

Exhibit 15 is March 1981 Safety Evaluation Report

for Unit 2.

APCO Exhibit 17 is a January 17, 1983 Technical Evaluation Report.

And APCO Exhibit 22 is a letter to Mr. S.A. Varga from Mr. R.P. McDonald, dated January 28, 1985.

JUDGE BOLLWERK: Let the record reflect that APCO Exhibits 3 through 6, 9, 13, 15, 17 and 22 have been marked for identification.

[Alabama Power Company Exhibits 3 through 6, 9, 13, 15, 17 and 22 were identified for the record.]

JUDGE BOLLWERK: Okay. Now, we need

Now we need to move them into evidence.

MR. HANCOCK: I move APCo that those be admitted into evidence, along with Alabama Power Exhibit 39, which was the Wyle test report, and APCo Exhibit 108, which is the September 30, 1987, letter to Dr. J.N. Grace from Mr. R.P. McDonald.

JUDGE BOLLWERK: And I take it along with Exhibits 1, 10, 11, 12, 14, 16, 18, 19, 20, and 21 which you have previously identified.

MR. HANCOCK: Yes. I move that all of the above be admitted into evidence.

JUDGE BOLLWERK: Any objection from the staff if you followed all that?

MR. BACHMANN: The staff has no objection.

JUDGE BOLLWERK: Then APCo Exhibits 1, 3 through 6, 9 through 22, 39, and 108 are received into evidence.

[APCo Exhibit Nos. 1, 3 through 6, inclusive, 9 through 22, inclusive, 39, and 108 were received in evidence.]

JUDGE BOLLWERK: Did I get everything?

MR. HANCOCK: I think we got everything.

JUDGE BOLLWERK: All right. We're all in sync then.

MR. HANCOCK: Yes.

If the Board is anticipating a break before the next panel, we can either do this before the break or after the break, and that is introduce the testimony of Mr. Berryhill, who as you will recall, is still in California.

We agreed with the staff and with the Board's concurrence that we would file an affidavit swearing his testimony in, and I believe he offers one exhibit, and we can do that now or do that right after the break.

JUDGE BOLLWERK: Why don't we do it very quickly, and then we'll take a break?

MR. HANCOCK: I believe that staff counsel has a

copy of the affidavit that was faxed to Alabama Power Company last night. We have the original, the hard copy, which is en route by Fed Ex.

In fact, I hope it's at the hotel waiting for us when we get back, and we can supplement the record with the original, but at this time I would move that the testimony of Robert Berryhill on behalf of Alabama Power Company be admitted into evidence and be bound into the record, along with this affidavit.

JUDGE BOLLWERK: I'm sorry. You said there's something missing? I was looking at my sheet, and I missed that.

MR. HANCOCK: No. The only thing that's missing is the original of the affidavit, which is in en route, and we can supplement the record, but we have a faxed copy of a notarized affidavit, in which he says that he will adopt this testimony.

JUDGE BOLLWERK: Let me speak with the reporter just one second.

[Discussion held off the record.]

JUDGE BOLLWERK: When do you expect the affidavit to be here?

MR. HANCOCK: The original, we hope, is at the hotel right now. We asked him to Fed Ex it last night from Palo Alto, California. So, hopefully, it's at the hotel,

and we can produce it first thing in the morning.

JUDGE BOLLWERK: Okay. The only problem I'm having -- and this is a logistical problem -- to prepare the transcript and have the original transcript, we would put the original affidavit in the original transcript. We don't have it.

MR. HANCOCK: We can -- [illegible] 's acceptable to you, we can wait until we ha[illegible] orig[illegible]l before we move his testimony into the record.

JUDGE BOLLWERK: All right. Why don't we do that, then? I would feel -- I don't want to have to have the transcript bound together and then taken apart again to put it in. I think that's not a good idea.

MR. HANCOCK: I understand.

JUDGE BOLLWERK: So, I guess we'll hold up on Mr. Berryhill, then. All right?

Anything else at this point?

[Board members conferring off the record.]

JUDGE CARPENTER: I would like to ask either Alabama Power or staff if, by any chance, they could provide the Board with an information copy at the moment of the Sandia National Laboratory report, SAND 83-1617.

It's referred to in the testimony from both licensee and staff, and I have a hard time having any opinion about that report without looking at it. Is that

fair? I can go to the library this evening and read it, but if somebody has a copy handy --

MR. HANCOCK: If we have a copy, we will certainly make it available.

JUDGE CARPENTER: During the break, if you can look -- otherwise, I'll go to the library.

MR. HANCOCK: That was SAND 83-1317?

JUDGE CARPENTER: No, no, 1617.

MR. HANCOCK: 1617. We will check during the break.

JUDGE BOLLWERK: Can you point out where it's in the testimony at some point?

JUDGE CARPENTER: Yes.

[Pause.]

MR. HANCOCK: I'm informed that we have a copy of that back at the hotel. We can make it available first thing in the morning.

JUDGE CARPENTER: It's referred to in Alabama Power Company's Exhibit 59, and it's referred to in the staff testimony, also.

MR. BACHMANN: Judge Carpenter, can you tell me which staff testimony refers to that?

[Pause.]

JUDGE CARPENTER: On page 13 of Jacobus, Merriweather, Luehman, and Shemanski, I take it, when they

say the Sandia report, this is the same report they're referring to, because they refer to the same figure that Alabama Power refers to.

I'm getting the reference from the Alabama Power testimony.

MR. BACHMANN: Judge Carpenter, I see a nod from our Sandia representative that you're correct, that is the report.

JUDGE BOLLWERK: That isn't a nod that you have it, though, I take it.

MR. BACHMANN: Right.

JUDGE BOLLWERK: All right. Anything else? Anything further?

[No response.]

JUDGE BOLLWERK: Why don't we take a 10-minute break, then? We'll come back at 3:30, and I'll hear the next panel, the next individual.

[Recess.]

JUDGE BOLLWERK: Why don't we go back on the record and into our afternoon session.

I think we have another APCo witness now to be sworn in.

MR. HANCOCK: Yes. Would you please state your name?

MR. SHIPMAN: William B. Shipman.

MR. HANCOCK: Mr. Shipman, could you stand and raise your right hand?

Whereupon,

WILLIAM B. SHIPMAN,

a witness, was called for examination by counsel on behalf of APCo, and, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. HANCOCK:

Q Mr. Shipman, do you have before you the document entitled Testimony of William B. Shipman on Behalf of Alabama Power Company?

A [Witness Shipman] I do.

Q Did you assist in the preparation of this testimony?

A [Witness Shipman] I did.

Q Do you have any corrections to this testimony at this time?

A [Witness Shipman] I do not.

Q If you were asked these same questions today, would you respond in a similar manner to these questions?

A [Witness Shipman] I would.

Q And do you adopt this testimony as it is contained in this document?

A [Witness Shipman] I do.

MR. HANCOCK: At this time I move that this testimony, entitled Testimony of William B. Shipman on Behalf of Alabama Power Company be admitted and be bound into the record.

JUDGE BOLLWERK: Any objection?

MR. BACHMANN: No objection.

JUDGE BOLLWERK: The testimony of Mr. William B. Shipman will be bound into the record.

[The direct testimony of William B. Shipman on behalf of Alabama Power Company follows:]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	Docket Nos. 50-348-CivP
ALABAMA POWER COMPANY	)	50-364-CivP
	)	
(Joseph M. Farley Nuclear Plant, Units 1 and 2)	)	ASLBP No. 91-626-02-CivP

TESTIMONY OF WILLIAM B. SHIPMAN
ON BEHALF OF ALABAMA POWER COMPANY

Q1. Please state your name and your current employment position.

A: My name is William B. Shipman. I am currently employed by Georgia Power Company as General Plant Manager for the Vogtle Electric Generating Plant, a two-unit Westinghouse PWR located near Waynesboro, Georgia.

Q2. Please describe your educational background.

A: I have a Bachelor of Science degree in Electrical Engineering from Auburn University. From January, 1988 until spring, 1989, I held a Senior Reactor Operator's License for Units 1 and 2 of the Joseph M. Farley Nuclear Plant.

Q3. Please describe your employment history prior to joining Georgia Power Company.

A: After graduating from Auburn University in 1959, I worked in the aerospace industry for various companies including Boeing and McDonnell-Douglas. I also worked for Vitro Services, Inc. as a technical support contractor at the Marshall Space Flight Center in Huntsville, Alabama. In 1971, I joined Alabama Power Company as an Instrument Foreman at Farley Nuclear Plant. As part of my training I was temporarily assigned to be a Start-up Engineer at the Gorgas Steam Plant. I was then sent by the Company to the Westinghouse Instrument and Control training facility in Baltimore, Maryland and from there to the Nuclear Operations training facility at Zion, Illinois. I then returned to Farley Nuclear Plant to become the Start-up Supervisor for the Plant. I was later promoted to Start-up Manager for Farley Units 1 and 2, a position I had until 1978. In 1978, I became the Maintenance Manager in the Operating Department at the Plant and remained in that job until 1985 when I became the Assistant-Plant Manager for Support. Then in early-summer 1988, I became Assistant-Plant Manager for Plant Operations. In October, 1988, I transferred to Georgia Power Company to be the General Manager for Plant Support for Plant Vogtle and remained in that position until October, 1990. Since October, 1990, I have been General Plant Manager at Plant Vogtle.

Q4. What is the purpose of your testimony?

A: The purpose of my testimony is to describe for the Board the EQ Task Team which was created by Alabama Power Company in 1987 to confirm that the Company had maintained compliance with the NRC's EQ requirements. I will also describe the discovery by Alabama Power Company of the V-type taped splice concern of the Staff and the resolution of that issue.

Q5. From 1978 through 1985 while you were the Maintenance Manager at Farley Nuclear Plant, did you have any responsibilities related to the environmental qualification of electrical equipment?

A: Yes. As the Maintenance Manager at Farley Nuclear Plant, I was responsible for maintaining the qualified electrical equipment in its proper configuration. I did not participate, however, in the determination of whether a particular item of electrical equipment was qualified to the Commission's regulations.

Q6. During summer, 1987, were you asked to participate in an effort to review Farley Nuclear Plant's EQ program?

A: Yes. In summer, 1987, the Plant Manager, Jack Woodard, asked that I assemble and lead a task team to conduct a thorough

review of the EQ program at Farley Nuclear Plant. This effort was undertaken because, during a routine Vendor Technical Interface Program Inspection (VETIP) in the spring of 1987, NRC inspectors at the Plant made several comments indicating that Farley Nuclear Plant would have difficulty passing its upcoming first-round EQ inspection. Alabama Power Company knew that the Staff was in the process of conducting these first-round EQ inspections and it wanted to be prepared when the inspectors came to the Plant.

Q7. How did Alabama Power Company learn of the Staff's concern regarding V-type taped splices?

A: Shortly after the VETIP inspection, Alabama Power Company learned that what it considered to be a "termination," was considered by the current NRC inspectors and enforcement Staff to be a "splice." Alabama Power Company previously had considered a "splice" to be a joining of multiple lengths of field cables to form a continuous length. This is the definition used in The Lineman's and Cableman's Handbook, Sixth Edition. (APCo Exhibit 24). Splices are useful if cable has been damaged, broken, or if a cable is too short. At Farley Nuclear Plant, Alabama Power Company policy prohibited the use of splices to join two ends of field cable together, except in specific designer-approved circumstances. Instead, the Plant policy required that the entire electrical

cable be re-pulled so there would be a continuous and uninterrupted line of cable. In fact, I recall the splice log at the Plant only recorded one splice, and it was not subject to the design basis harsh environment. Hence, Alabama Power Company believed that the only "splices" at Farley Nuclear Plant were not within the scope of EQ. Farley Nuclear Plant did, however, have many "terminations" which Alabama Power Company considered to be the connection of a field cable to an electrical component.

Alabama Power Company is a member of the Institute of Nuclear Power Operators and from it, received various Staff inspection reports to review for general applicability to Farley Nuclear Plant. In the early summer of 1987, through a review of the EQ inspection report at Calvert Cliffs Nuclear Power Station, Alabama Power Company learned of the Staff concern about the qualification of V-type taped splice/terminations. The review of the Calvert Cliffs inspection report revealed that the Staff now considered "a wrap-around tape splice" in a pig-tail lead termination, to be subject to EQ qualification. This was new information to Alabama Power Company. The Staff had never informed the Company that concerns existed about these kinds of taped slices/terminations despite many opportunities to do so. For example, in late fall of 1980, the Staff conducted an inspection at the Plant of certain equipment subject to IEB 79-01B and NUREG-0588 (APCo Exhibit 11). During this

inspection, the inspector looked at several installed electrical components such as fan motors inside containment, and the hydrogen recombiner, as well as their interfaces. These interfaces included V-type taped terminations. No concern about these V-type tape splices/terminations was raised by the inspector; all his report says is, "No deficiencies were noted."

Q8. Why did Alabama Power Company consider its V-type taped slices/terminations to be environmentally qualified prior to the review of the Calvert Cliffs report?

A: Alabama Power Company had specific Electrical Notes and Details for the Plant describing how to terminate field cable to electrical components. Prior to 1987, we did not focus on minor configuration deviations. We considered installed electrical terminations to be consistent with the Electrical Notes and Details, which contained a termination detail that would provide insulation resistance sufficient to prevent the electrical cable from grounding or shorting. During construction, these terminations were made by trained, qualified workers, who used the skill of the craft. The terminations were reviewed by the QC department pursuant to an NRC-approved QC program. Any change-outs after commercial operation were performed by the trained, qualified maintenance department electricians. By this process, Alabama Power

Company had reasonable assurance that installed taped terminations would provide the required insulation function identified in the Electrical Notes and Details. The Company also had an Okonite test report (APCo Exhibit 25) that qualified the materials used to make these terminations. Accordingly, Alabama Power Company reasonably believed that these terminations were qualified to the EQ requirements.

Q9. After learning of the Staff's concern, what did Alabama Power Company do?

A: When Alabama Power Company learned in 1987 of the Staff's concern about V-type taped splices, it immediately performed an inspection to determine the degree to which the splices were being used at Farley Nuclear Plant. This inspection determined that if these terminations were indeed "splices," then a documentation problem might exist. Let me stress, however, that at no time did Alabama Power Company consider that the public health and safety was jeopardized, or even that the terminations were not operable or qualifiable.

Alabama Power Company notified the Staff of this finding through a voluntary Licensee Event Report (LER) (APCo Exhibit 26). The Company then sought to confirm the qualification of these V-type taped splices by sending a variety of them which had been removed from the plant to Wyle Laboratories. Wyle

was to dissect these splices, determine their make-up (e.g., type of tape and number of wraps), and with this knowledge, fabricate representative test specimens. Some plant personnel were also made available to Wyle to ensure that the tested specimens duplicated those found at the Plant. The Wyle test report was issued on October 8, 1987 and it concluded that these splice/terminations were environmentally qualified. (APCo Exhibit 27). Thus, prior to the November, 1987 EQ inspection, Alabama Power Company had the results of this testing in its qualification files, establishing that the V-type taped splice configurations would perform their intended function in the environment created by a design basis accident at Farley Nuclear Plant.

The technical details of this issue will be further explained by Mr. Love in his testimony.

Q10. The Staff has alleged that Alabama Power Company "took the less conservative approach" in resolving the V-type splice concern, because for fan motors, it did not issue a justification for continued operation and immediately declare all remaining fan motors inoperable. Do you agree with this statement?

A: No. Contrary to the Staff's contention, Alabama Power Company's actions were consistent with the guidance set forth in the Staff's Generic Letter 86-15. This guidance states:

> When a licensee discovers a potential deficiency in the environmental qualification of equipment (i.e., a licensee does not have an adequate basis to establish qualification), the licensee shall make a prompt determination of operability, shall take immediate steps to establish a plan with a reasonable schedule to correct the deficiency, and shall have written justification for continued operation. This justification does not require NRC review and approval.

(APCo Exhibit 28). As Mr. Love will explain, upon identification of this issue, we had made a prompt determination of operability. Subsequently, on August 4, 1987, Alabama Power Company initiated an evaluation of ten fan motors inside containment for each unit. Alabama Power Company began to develop a justification for continued operation (JCO), and, at the same time, began an inspection of each fan motor. Any splice configuration that was determined to be a deviation from the design was replaced with a Raychem splice. Alabama Power Company considered its prompt inspection and replacement decision to be a more conservative approach than waiting for the completion of a JCO, which would have taken longer. The Company utilized multiple inspection/replacement teams on each shift to expedite the schedule and to minimize personnel radiation exposure and heat stress. Additionally, only one component was taken out of service at a time to minimize the collective number of safety

systems simultaneously out of service. All ten fan motors on each unit were placed in a conservative and appropriate design configuration by August 22, 1987, thereby going beyond the Generic Letter recommendation that licensees "take immediate steps to establish a plan with a reasonable schedule to correct the deficiency." Through this effort, Alabama Power Company determined that the replacement work could be completed prior to the completion of the JCO and, accordingly, efforts on the JCO were stopped. Region II Staff questioned Alabama Power Company about this approach but never issued a directive to do otherwise.

Q11. In their written testimony on general enforcement issues, at page 16, the Staff now takes the new position that Alabama Power Company did not comply with the Unit 2 Technical Specifications regarding V-type taped splices in containment fan motors. Do you agree with this?

A. No. This new allegation is completely unfounded. The Technical Specifications surveillance requirements for those fan motors were satisfied in each case, and at no time was there was a violation of the Technical Specifications' operability requirements for these motors. (Importantly, at no time has the Staff previously cited a Technical Specification violation related to this matter.) As noted, Alabama Power Company's decision was based on three factors:

(1) engineering judgment that the tape splice would perform its intended function, (2) knowledge that leakage current was not an issue since this was a power circuit, and not an instrument circuit, and (3) knowledge that the Technical Specification surveillance requirements had been satisfied. This meant that the required prompt operability determination had been made.

Q12. You have testified that as a result of the Staff inspectors' comments during the VETIP inspection and as a result of the Calvert Cliffs report, Alabama Power Company established an EQ Task Team to review the EQ program at Farley Nuclear Plant. Please describe the various components of this EQ Task Team.

A: This Task Team was comprised of nine discrete sub-groups. Each sub-group leader was assigned a staff of engineers. These sub-groups were to re-evaluate the various aspects of Alabama Power Company's EQ program and were to perform certain action items including: 1) re-review of the auditability of the EQ files, 2) re-review of the maintenance activities, including preventive and corrective measures of the maintenance program, 3) perform any necessary EQ electrical equipment walkdowns in the containment area, the auxiliary building and in the main steam valve room, 4) re-review program document development, 5) re-review the correlation of purchase orders, the Master List and the installed equipment,

6) review past maintenance activities for effect on EQ certification, 7) review procurement, dedication and storage activities, 8) review storeroom spare parts to assure that they were properly procured, and 9) review EQ training practices. The Task Team began its efforts in the latter part of the summer of 1987 and continued to work throughout that fall completing the last inspections during the Unit 2 outage in the spring of 1988.

Q13. What did the EQ Task Team do during the Staff's EQ inspection of Farley Nuclear Plant?

A: While the inspectors were on-site, some Task Team engineers were asked to participate in the Plant's efforts to cooperate with the Staff. For example, Task Team members were asked to escort inspection team members during their walkdown of the Plant since these engineers were very familiar with the Plant and the location of items of electrical equipment of interest to the inspectors. Moreover, many engineers on the Task Team helped respond to questions that the inspectors asked during the course of the inspection. To facilitate this effort, a practice was established in which the inspector would write down the question he wished answered. In some instances, an inspector would refuse to write down his question. If so, then we would write the question down and ask the inspector to confirm its accuracy. The form on which each question was

written also had a space for the answer so that the response would be documented.

Q14. Did you have a specific responsibility during the EQ inspection?

A: I was responsible for communicating with the inspection team leader, Mr. Norman Merriweather, to make sure that he and his inspection team had all the information that they needed.

Q15. Does this conclude your testimony?

A: Yes it does.

MR. HANCOCK: At this time I would tender Mr. Shipman for cross examination.

JUDGE BOLLWERK: Mr. Bachmann.

CROSS EXAMINATION

BY MR. BACHMANN:

Q Mr. Shipman, I had not originally intended on doing much in the way of cross examination but you were identified by the previous panel as perhaps being at the Farley site when Mr. Gibbons made his inspection of Unit 2 on December 2nd through the 5th of 1980.

My question to you is did you accompany Mr. Gibbons on those dates when he inspected Unit 2?

MR. HANCOCK: If I could clarify that. That was an inspection of Unit 1 and 2, not just Unit 2.

BY MR. BACHMANN:

Q I am asking about Unit 2.

A [Witness Shipman] I did not.

MR. BACHMANN: I have no further questions.

MR. HANCOCK: I have no redirect.

[Laughter.]

MR. HANCOCK: I need ten or so minutes to confer with co-counsel but I don't anticipate any.

JUDGE BOLLWERK: Judge Carpenter, do you have any questions?

JUDGE CARPENTER: No.

JUDGE BOLLWERK: Judge Morris?

BOARD EXAMINATION

JUDGE MORRIS: I do, but I am trying to find the reference in your testimony.

On page 4, Mr. Shipman, at the top of the page, the first full sentence, have you had a chance to --

WITNESS SHIPMAN: Yes, sir.

JUDGE MORRIS: -- read that?

Could you give us some background information as to what kind of comments the inspectors made?

WITNESS SHIPMAN: No, sir. As I have testified before in the deposition, all I recall now from that time period was that some comments were made by the inspectors doing the V-type inspection that left me with a feeling that they were telling us if we came to do your EQ inspection today we don't believe your documentation would stand up under our scrutiny.

JUDGE MORRIS: So they did specifically refer to documentation?

WITNESS SHIPMAN: I believe that to be so, yes, sir. That is my recollection.

JUDGE MORRIS: Do you recall anything that would have cast doubt on qualification of any specific equipment or components?

WITNESS SHIPMAN: No, sir.

JUDGE MORRIS: I believe you also testified that, or perhaps it was the previous panel that written questions were provided or were requested of the inspector.

Is that your understanding?

WITNESS SHIPMAN: Yes, sir. That is during the EQ inspection.

JUDGE MORRIS: During the EQ inspection. Is that a normal practice for inspectors to provide their questions in writing?

WITNESS SHIPMAN: That is not a normal practice at the Farley Nuclear Plant.

JUDGE MORRIS: Was there some particular reason that took place during this EQ inspection?

WITNESS SHIPMAN: The reason was an attempt by Alabama Power to clearly understand what the question was so we could document a clear answer to the question as opposed to having an oral question that we may spend hours working and discover that we were working on the wrong question, that we did not understand what was being asked. That was the only reason to my knowledge that we developed that technique.

JUDGE MORRIS: Did you find that successful?

WITNESS SHIPMAN: Mixed results, sir.

JUDGE MORRIS: Did it make the relationship awkward?

WITNESS SHIPMAN: In some cases. Some inspectors were not really enthusiastic about that process of doing business.

JUDGE MORRIS: Is it your opinion that Alabama Power was able to provide adequate answers to the questions under this scheme?

WITNESS SHIPMAN: Yes, sir.

JUDGE MORRIS: I have no further questions.

JUDGE BOLLWERK: Is that practice of asking inspectors questions something you've tried since those inspections, having them write down their questions?

WITNESS SHIPMAN: I do not know if that practice has been continued since that time at the Farley site. I left in October of '80, shortly after this inspection.

JUDGE BOLLWERK: You have some testimony in your direct testimony about splices and terminations on page four. How would you interpret the word "interface"? Is that a splice or a termination, or is it something different?

WITNESS SHIPMAN: In the sense of a cable, the word "interface," I would -- I would think, normally, would refer to where we terminate to a component. That's the interface between the field wiring and the component.

JUDGE BOLLWERK: And is that different from a termination or a splice?

WITNESS SHIPMAN: It -- it is a termination.

[Pause.]

JUDGE BOLLWERK: I have no other questions.

Anyone else on the panel? Judge Carpenter.

JUDGE CARPENTER: Mr. Shipman, just to follow up on Dr. Morris' question with respect to the comments by -- I take it they are the resident NRC inspectors?

WITNESS SHIPMAN: I'm sorry, sir?

JUDGE CARPENTER: On page four, you made the reference to comments by NRC inspectors at the plant. Are you referring to the resident inspectors?

WITNESS SHIPMAN: No, sir. Those were the inspectors from the vendor interface and technical inspection.

JUDGE CARPENTER: They just happened to be at the plant when they made the comments.

WITNESS SHIPMAN: Yes. They were there doing the --

JUDGE CARPENTER: They are not the ones that are "at the plant," in quotes.

WITNESS SHIPMAN: They were the inspectors who were there doing the V-type program inspection, looking at documentation.

JUDGE CARPENTER: I just want to ask one more question. When you heard those comments, did you ask those

inspectors what basis they had for their doubts?

WITNESS SHIPMAN: No, sir.

JUDGE CARPENTER: That's unfortunate.

WITNESS SHIPMAN: The point, sir, is that I don't recall a specific question or a specific comment.

The sense I recall now is this was in the sense of innuendos, not a direct -- if we came and looked at your file on motor-operated valves from an EQ inspection today, we would find it inadequate. That's not the sense that the thing was couched.

JUDGE CARPENTER: Turning to -- I apologize for this at the end of the day, but I also have the same curiosity about nomenclature about connecting electrical leads, and "splice" is a term that seemed to be unfamiliar to Alabama Power.

My dictionary defines a splice as a braiding or interweaving, and ever since I have been a sea scout and as a professional oceanographer, a good many years, I made splices of lines, ropes, watched people do wire cable.

I don't know whether your line splices are actually interweaved and some way connect the individual wires. You know, it just wraps them together.

But what confuses me is there seems to be this big reluctance to call a connection a connection. Is that verboten in electrical engineering?

WITNESS SHIPMAN: No, sir. I think what you have is a description of a mindset in the industry, I think, as well as at Alabama Power Company, is that we splice lengths of cable together.

JUDGE CARPENTER: All right.

WITNESS SHIPMAN: We terminate to the components. That was my mindset. That was our electricians' mindset, the construction craft's mindset, is -- is we terminate to components, and we splice, if we splice, in -- in the length of cable.

JUDGE CARPENTER: I think your testimony on that is clear. I was just curious as to why. For example, this 5-to-1 splice -- what I see is a connector inside with insulation wrapped around it, but it's not called a connector, and apparently that's just jargon of the trade.

WITNESS SHIPMAN: I think, in the trade, we would -- we would normally refer to a connector as a -- as a device that's separatable, that you could unscrew it or unclasp it and separate the two halves of a connector, such as you have in aircraft or submarines or we have in the plant, connectors on the back of panels.

JUDGE MORRIS: Like a jack on your telephone.

WITNESS SHIPMAN: Yes.

JUDGE CARPENTER: Thank you very much.

JUDGE BOLLWERK: Anything else, Judge Morris?

JUDGE MORRIS: No.

JUDGE BOLLWERK: I have no further questions.

At this point, Mr. Shipman, you're excused. We thank you for your testimony before the Board and your service before the Board, and you're subject to recall for any reason that might be necessary.

[Witness excused.]

MR. HANCOCK: Judge Bollwerk, in Mr. Shipman's testimony, he references, I believe, five exhibits, three of which have been previously identified as staff exhibits and admitted into evidence.

That would be Alabama Power Company Exhibit 25; it correlates to Staff Exhibit 21. APCo 26 correlates to Staff Exhibit 16, and APCo Exhibit 28 correlates to Staff Exhibit 9.

At this time, I would move that APCo Exhibit 24, which is an excerpt from the Lineman's and Cableman's Handbook, Section 33, entitled "Splicing Cable," be admitted into evidence, and APCo Exhibit 27, which is an NEQ test report, number 17859-02B, performed by Wyle Labs, that it be admitted into evidence as well.

JUDGE BOLLWERK: Any objection from the staff?

MR. BACHMANN: No objection.

JUDGE BOLLWERK: The record should reflect that APCo Exhibit 24 and APCo Exhibit 27 are identified and are

received into evidence.

[APCo Exhibit Nos. 24 and 27 were received in evidence.]

JUDGE BOLLWERK: Anything further?

MR. HANCOCK: No, sir.

[Board members conferring off the record.]

JUDGE BOLLWERK: Judge Carpenter still has a question about the Sandia report. You said in the morning. Does the staff have it any earlier than that. I'll put it that way.

MR. HANCOCK: We have it back at the hotel. We can get it first thing in the morning, or the staff can put it together this afternoon.

MR. HOLLER: The staff would have search for that. We currently do not have a copy here. We would have to search for it on the document control system.

MR. HANCOCK: Yes. I might add, if Judge Carpenter is interested, we can go back to the hotel, make the requisite number of copies, and send a messenger back up this afternoon and have it back within an hour, hour-and-a-half.

JUDGE CARPENTER: That won't be necessary. First thing in the morning?

MR. HANCOCK: We'll bring copies first thing in the morning, yes, sir.

JUDGE CARPENTER: Thank you so much.

JUDGE BOLLWERK: Anything further either of the parties have at this point?

MR. BACHMANN: No, sir.

MR. HANCOCK: No, sir.

JUDGE BOLLWERK: We will then adjourn. One thing, Mr. Berryhill's testimony, we'll go ahead and move that in in the morning, first thing.

We stand adjourned, and we will be back in session tomorrow morning at 9 o'clock.

[Whereupon, at 3:46 o'clock p.m., the hearing recessed, to reconvene Thursday, February 20, 1992, at 9:00 o'clock a.m.]

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission
in the matter of:

NAME OF PROCEEDING: Alabama Power Company

DOCKET NUMBER: 50-348-CivP

PLACE OF PROCEEDING: Bethesda, Maryland

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.

Lynn Estep

Official Reporter
Ann Riley & Associates, Ltd.