

CERTIFIED

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JUL 6 1982

MINUTES OF THE ACRS SUBCOMMITTEE MEETING ON
QUALIFICATION PROGRAM FOR SAFETY RELATED EQUIPMENT
MAY 19-20, 1982 - ALBUQUERQUE, NM

The ACRS Subcommittee on the Qualification Program for Safety Related Equipment met on May 19-20, 1982, at the AMFAC Hotel, Albuquerque, NM. The purpose of this meeting was to discuss four programs underway at the Sandia National Laboratory concerning equipment qualification. These include: the Qualification Test Evaluation Program, the Independent Verification of Reactor Safety Program, the Equipment Qualification Research Testing Program, and the Hydrogen Burn Survival Program. Also, to continue the review of equipment qualification requirements.

A copy of the notice for this meeting is included as Attachment A. A list of attendees is included as Attachment B. The schedule for this meeting is included as Attachment C, and the handouts for this meeting are included in the ACRS Files. Selected portions of the handouts are included as Attachment D. The meeting was begun at 8:30 a.m. on May 19, 1982, with a short executive session in which Mr. Ray, the Subcommittee Chairman, summarized the objectives of the meeting. The meeting was recessed at 12:38 p.m. and reconvened at 8:30 a.m. on May 20, 1982. The meeting was adjourned on May 20, 1982 at 11:30 a.m. All portions of this discussion were held in open session.

The ACRS Members present were J. J. Ray (Chairman), and D. Ward. The principal Sandia Staff present were W. Snyder, L. Bonzon, D. Jeppesen, W. McCulloch, L. Croppe, and B. Bader. A member of Industry who expressed his view was L. Gradin of EBASCO. The NRC Designated Federal Employee was Dr. R. Savio, ACRS. Another members of the ACRS Staff included A. Cappucci.

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INTRODUCTORY STATEMENT

Mr. Jeremiah J. Ray, Subcommittee Chairman, introduced the members and stated the purpose of the meeting. He pointed out that the meeting was being conducted in accordance with the provisions of the Federal Advisory Committee Act and the Government in the Sunshine Act.

Mr. Ray stated that the ACRS had not received written statements or requests for oral statements from members of the public. He also stated that the meeting would recess at noon on May 19, 1982 and resume the following morning at 8:30 a.m.

INTRODUCTORY REMARKS - W. SNYDER, SANDIA

Mr. Snyder briefly outlined the programs underway at Sandia. He stated that approximately 2/3 of the NRC programs at Sandia concerned reactor safety. He made the comment that only emphasizing the containment of severe accidents was a mistake. In order to achieve a balance of safety, emphasis should be on the quality of components. No one would be comfortable with contained severe accidents. Mr. Ray likened this philosophy to the "Defense in Depth" approach. Mr. Snyder agreed, he went on to say that one cannot anticipate every accident, there are practical problems with building the last component to take the worst accident, and that system reliability should be distributed to all components. He went on to endorse the ACRS' and the NRC Staff's interest in the quality of components, their assured performance under adverse conditions, and the adequacy of their design.

Mr. Ward questioned Mr. Snyder as to his comments concerning the NRC stressing reliability of the "nth" component (i.e., containment) and industry emphasizing the reliability of the first component for economic reasons. Mr. Snyder indicated that the point was that a large amount of funding was for severe accident phenomenology research to make explicit changes in regulations and design in the absence of the complete story on the phenomenology of total containment.

Mr. Snyder also stated that he was a proponent of the NRC Safety Goal. He indicated that the goal should be fractionated to avoid localization of emphasis on a particular system or component. He expressed concern that the safety goal would be implemented exclusively through PRA. He stated there were too many uncertainties involved with this type of analysis. He endorsed the use of PRA as a base upon which a decision would be made, but indicated that it would be a mistake to substitute it for the broader judgement decision.

QUALIFICATION TESTING EVALUATION PROGRAM - LLOYD BONZON

Mr. Bonzon outlined the program objectives. These included obtaining data to verify and/or change the current regulations concerning class 1E equipment, establishing standardized testing methodologies, and support the NRC licensing process. Mr. Bonzon also stated that the French and Japanese were involved in a much larger research effort than the U.S. He indicated that Sandia was actively involved with coordination and contact with these research groups. One interesting aspect was the capability of the French to vary pressure with temperature in their test chamber by inserting an overgas. This gave them the capability for either a superheated (short duration) or saturated profile to be used in conjunction with LOCA type tests.

Mr. Bonzon indicated that the main thrust of this program is to evaluate materials such as elastomerics. Focus seems to be on cables, however, work is planned on component piece parts including seals, electronics, etc., to determine aging effects.

It was shown that for Ethylene Propylene Rubber (EPR), the most widely used insulation material, that the tensile properties (elongation) changes significantly with the testing methodology applied. That is, whether sequential or simultaneous aging was applied (Radiation and thermal). Mr. Ward indicated that this could be bad news for component testing. Mr. Bonzon disagreed, he stated the industry need only to take this finding into account when they perform their testing. Mr. Bonzon also emphasized the fact that their charter was to develop test methodology guidance for industry and not verification of industry testing programs.

Mr. Bonzon discussed the work performed on the P.G. O'Brien/Duke Power penetration connector from Catawba requested by the Commissioners. He indicated that the tests were performed actually on the connectors and not the penetration and consisted of thermal aging, radiation, and accident simulation in sequence. The results demonstrated grommet extrusion and insulation removal with a subsequent electrical short. Because of this, Duke was asked to perform more testing which is still in progress. The apparatus and selected preliminary results are presented in Appendix D.

Mr. Ward questioned Mr. Bonzon concerning sequence testing between radiation and thermal, which one first? Mr. Bonzon indicated that a general rule of thumb would be radiation followed by thermal. More damage and more degradation will result. He went on to discuss more details concerning the source term and synergetic effects of radiation and thermal environment.

Comments were made concerning the fire retardent aging of certain polymers, i.e., EPR, and Hypalon. It was indicated that the flammability characteristics of these materials do not change overtime, that is, they do not age even though the retardent (antimony chloride) boils off with heat applied. The reason for this is that the material is normally overloaded with antimony chloride.

Mr. Ray requested that Mr. Bonzon discuss TMI related activities at Sandia concerning equipment qualification. Mr. Bonzon discussed the breakdown of terminal blocks using the TMI-2 Containment environments as the starting basis for evaluations. Sandia determined that the probability of terminal block breakdown was sensitive to terminal block protection and cleanliness. Mr. Bonzon indicated that there is some controversy over the terminal block testing performed at Sandia. It stems from the ability of the terminal blocks to be qualified and the statistical nature of the results. For example, 3 out of 10 terminal blocks will most likely fail environmental testing, therefore, the number of blocks tested becomes significant. He also stated that it was very difficult to obtain equipment for evaluation and testing from TMI.

Mr. Ward expressed general concern that loss of function was the only parameter measured. Mr. Bonzon explained that they didn't study absolute values of parameters, but only looked at changes as a function of the methodologies involved. Mr. Ward also expressed concern for the emphasis on cables and the lack of emphasis on equipment testing. Mr. Ray indicated that more work on components was required.

INDEPENDENT VERIFICATION OF REACTOR SAFETY (IVRS) AND EQUIPMENT QUALIFICATION
(EQ) RESEARCH TESTING - DAVID JEPPESEN

Mr. Jeppesen explained that the primary elements of these programs are to observe and review the industry's component qualification programs, to perform independent qualification related component testing, and to participate in the accreditation of industry testing laboratories. He further explained that to date, no work had been performed concerning accreditation. He indicated that the objectives of these programs were to increase confidence in testing methodology and to refine state of the art qualification technology. The programs do not intend to verify industry's qualification testing methodology. The IVRS Program is sponsored by I&E whereby Sandia acts as a consultant in the evaluation of industry qualification test programs. The EQRT programs is sponsored by the Electrical Branch of Research and is made up of two basic elements, (1) qualification technology/methodology research and (2) qualification of industry components. It was emphasized that both of these programs include component testing and not basic material research.

Mr. Ward questioned whether equipment qualification was a National Laboratory enterprise because of complex testing apparatus and methodologies. Mr. Bonzon

indicated that this was not the case. He stated the facilities required for this testing were relatively simple. Mr. Ray asked if functionability was a requirement. Mr. Jeppesen replied that it was.

Comparison of aging techniques; thermal followed by high radiation dose rate, high dose rate followed by thermal, and low dose rate followed by thermal, indicated that the material properties, such as elasticity are sequence sensitive. It was also stated that because of healing effects (return of insulation resistance) on cable insulation, aging parameters should be measured during the test and not just at the beginning and end of the test.

Mr. Jeppesen outlined some of the future work planned by Sandia. He stated that they would be looking at failure mechanisms for pressure switches and RTDs. Other test candidates would include fan motors, level switches/sensors, valve actuators, and pressure transmitters.

HYDROGEN BURN SURVIVAL PROGRAM - BILL McCULLOCH

Mr. McCulloch explained that the Hydrogen Burn Survival Program was established to assess equipment survivability. The purposes of the program are to determine the significance of the problem and to develop an analytical capability to evaluate the licensee/applicant's response to the NRC Staff questions on survivability. This program also draws support from other hydrogen burn research underway at Sandia such as studies concerning the characterization of the hydrogen burn environment. He also indicated that the scope is limited by assuming deflagrations only, i.e., igniters will work, and limiting the scope to ice condenser PWRs, i.e., Sequoyah.

Mr. Ray questioned Mr. McCulloch whether qualification of the igniters were included in this program. He replied they were not in the present scope. The Sandia representatives also replied that the igniters were highly reliable. They based this conclusion on the long service history of these igniters in diesel engines (GM Diesel Glow Plugs). They also stated that they have used these Plugs at voltages up to 70 volts for faster response, when in normal service they are used at 14 volts.

Mr. McCulloch discussed the scaling problems associated with obtaining results from the hydrogen burn facilities and extrapolating to a containment. He displayed two curves, one produced by experiment for a 15% hydrogen burn on the Sandia VGES (Variable Geometry Experimental System) facility and another produced by analysis for the Sequoyah Plant at 10% hydrogen. The VGES facility is an underground tank approximately 16 ft. high and 4 ft. in diameter. The 10% predicted Sequoyah H_2 burn indicated maximum temperatures in excess of 820°F while the VGES experiment demonstrated maximum temperatures at 200°F. Another area of concern expressed was the positioning of the igniters. It seems that they are placed at the top of containment assuming flame propagation down. Sandia personnel indicate that downward flame propagation occurs only at hydrogen concentrations greater than 10% by volume.

Mr. McCulloch indicated that it might be easier for a licensee to protect equipment (barriers) from hydrogen burn, than to qualify for that environment.

MEETING MINUTES ON QPSRE

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COMMENTS BY INDUSTRY - LARRY GRADIN, EBASCO.

Mr. Gradin requested that he be given time to speak to the Subcommittee. The Chairman agreed. Mr. Gradin stated that he did not believe the Sandia data was properly utilized by the NRC Staff. He pointed out that EBASCO has helped both the industry and Sandia in defining source terms and realistic accident scenarios. However, these remain unaccepted by the NRC Staff. He also questioned why the NRC Staff has never endorsed any IEEE 323-1974 test.

Other significant comments made by Mr. Gradin were:

- Concern over the lack of synchronyzation between issuance of the final rule 10CFR50.49 and Regulatory Guide 1.89, Revision 1.
- Clarification by the NRC Staff concerning their position on mild environments as covered by the final rule and the regulatory guide cited above.

GENERAL COMMENTS AND QUESTIONS

At the final session held on May 20, 1982, significant comments and questions were presented and discussed. These questions and comments are presented below.

Sandia stated that the Hydrogen burn problem was neither trivial or insurmountable. They indicated that the utilities were not taking this issue seriously. Mr. Ray noted the difference between Sandia and Industry. He also asked if the NRC Staff agreed with their suggestion to protect instead of wholesale replacement of components for hydrogen burn. Sandia replied in the affirmative.

Mr. Ward questioned what the algorithm (analytical capability) would be, a complicated computer code or some simple criteria. Bill Snyder of Sandia indicated that it would be simple and not require a large analytical support staff. The algorithm would most likely be in the form of nomograms and address parameters individually, i.e., evaluation of maximum temperature. Mr. Ray asked if there was agreement between Sandia and the NRC Staff as to this approach. He stated there was.

Mr. Ward questioned Sandia as to the qualification of the glow plugs and their circuitry. Bill Snyder indicated that this was the responsibility of the Licensee and was really a question for the NRC Staff. This issue is not addressed by Sandia.

The Chairman asked if information generated by the materials qualification is available to the industry. Sandia replied yes, except in cases where the information is proprietary. In these cases, the distribution is limited.

Bill Snyder indicated that it was very difficult to obtain test components from industry. He indicated that the component manufacturers were reluctant to have their components tested. As an example, he stated that if a component does not pass a preliminary test, then the manufacturer's market position could be compromised. He stated that the manufacturer needs a vehicle for protection. The Subcommittee pointed out that there was no reason why components could not be made available from industry. It should be up to the NRC Staff and Commission to develop procedures to make test specimens available. Lou Croppe, Sandia indicated that the laboratory was trying to develop an atmosphere where these test specimens would be made available.

Mr. Ray asked about sequential testing for environmental and seismic. Mr. Bonzon stated that Sandia would eventually consider this issue but was not pursuing it at this time. Mr. Ward asked Sandia if the exposure scenarios, i.e., 40-years aging + LOCA + Hydrogen Burn, were defined by NRC. Mr. Bonzon indicated that they were defined only on a case by case basis. He also added that foreign countries do write prescriptions in this area. The Subcommittee raised some concerns about this matter. They indicated that sequential testing was promulgated by the NRC Staff, but the individual reviewer would be making prescriptions for individual plants. They pointed out that this was a flaw in the regulatory process.

At the request of the Chairman, Sandia indicated future areas of equipment qualification which could be pursued by the NRC Staff. An example of such a program would be an assessment of the design adequacy of certain components. They indicated it would be possible to demonstrate by guidelines methods for designing in qualification.

NOTE: Additional meeting details can be obtained from a transcript of this meeting available in the NRC Public Document Room, 1717-H Street, N.W., Washington, D.C., or can be purchased from Alderson Reporting company, Inc., 400-Virginia Avenue, S.W., Washington, D.C. 20024, (202) 554-2345.

any of its consultants who may be present, will exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions with representatives of the Consumers Power Company, the NRC Staff, their consultants, and other interested persons regarding this review.

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by a prepaid telephone call to the cognizant Designated Federal Employee, Mr. David Fischer (telephone 202/634-1413) between 8:15 a.m. and 5:00 p.m., e.s.t.

I have determined, in accordance with subsection 10(d) of the Federal Advisory Committee Act, that it may be necessary to close portions of this meeting to public attendance to protect proprietary information. The authority for such closure is Exemption (4) to the Sunshine Act, 5 U.S.C. 552b(c)(4).

Dated: April 27, 1982.

John C. Hoyle,

Advisory Committee Management Officer.

(FR Doc. 82-12119 Filed 5-3-82; 8:45 am)

BILLING CODE 7590-01-01

Advisory Committee on Reactor Safeguards, Subcommittee on Qualification Program for Safety Related Equipment; Meeting

The ACRS Subcommittee on Qualification Program for Safety Related Equipment will hold a meeting on May 19 and 20, 1982, at the AMFAC Hotel, Valle Grande Room, 2910 Yale Blvd., Albuquerque, NM. The Subcommittee will discuss three major program areas conducted by Sandia Laboratory and continue its review of equipment qualification requirements. Notice of this meeting was published April 13.

In accordance with the procedures outlined in the Federal Register on September 30, 1981 (46 FR 47903), oral or written statements may be presented by members of the public; recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify the Designated Federal Employee as far in advance as practicable so that appropriate arrangements can be made to allow the necessary time during the meeting for such statements.

The entire meeting will be open to public attendance except for those sessions which will be closed to protect proprietary information (Sunshine Act Exemption 4). One or more closed sessions may be necessary to discuss such information. To the extent practicable, these closed sessions will be held so as to minimize inconvenience to members of the public in attendance.

The agenda for subject meeting shall be as follows:

Wednesday, May 19, 1982—8:30 a.m. until 12 NOON

Thursday, May 20, 1982—8:30 a.m. until the conclusion of business

During the initial portion of the meeting, the Subcommittee, along with any of its consultants who may be present, may exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions with representatives of the NRC Staff, their consultants, and other interested persons regarding this review.

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by a prepaid telephone call to the cognizant Designated Federal Employee, Dr. Richard Savio or Staff Engineer, Mr. Anthony Cappucci (telephone 202/634-3267) between 8:15 a.m. and 5:00 p.m., d.s.t.

I have determined, in accordance with subsection 10(d) of the Federal Advisory Committee Act, that it may be necessary to close portions of this meeting to public attendance to protect proprietary information. The authority for such closure is Exemption (4) to the Sunshine Act, 5 U.S.C. 552b(c)(4).

Dated: April 28, 1982.

John C. Hoyle,

Advisory Committee, Management Officer.

(FR Doc. 82-12119 Filed 5-3-82; 8:45 am)

BILLING CODE 7590-01-01

(Docket No. 80-317)

Baltimore Gas & Electric Co.; Consideration of Issuance of Amendment to Facility Operating License

The United States Nuclear Regulatory Commission (the Commission) is considering issuance of an amendment to Facility Operating License No. DPR-53 issued to Baltimore Gas and Electric Company (the licensee), for operation of the Calvert Cliffs Nuclear Power Plant,

Unit No. 1 located in Calvert County, Maryland.

The amendment would revise the Safety Limits and Limiting Conditions for Operation, contained in the Appendix A Technical Specifications, for Calvert Cliffs Unit No. 1 in accordance with the licensee's application dated February 17, 1982. These changes are primarily the result of new safety analysis methods applied to the analysis for Cycle 6 operation of Calvert Cliffs Unit 1. The analysis presented provides for an increased operating period between refuelings.

Prior to issuance of the proposed license amendment, the Commission will have made findings required by the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations.

By June 3, 1982, the licensee may file a request for a hearing with respect to issuance of the amendment to the subject facility operating license and any person whose interest may be affected by this proceeding and who wishes to participate as a party in the proceeding must file a written petition for leave to intervene. Requests for a hearing and petitions for leave to intervene shall be filed in accordance with the Commission's "Rules of Practice for Domestic Licensing Proceedings" in 10 CFR Part 2. If a request for a hearing or petition for leave to intervene is filed by the above date, the Commission or an Atomic Safety and Licensing Board, designated by the Commission or by the Chairman of the Atomic Safety and Licensing Board Panel, will rule on the request and/or petition and the Secretary or the designated Atomic Safety and Licensing Board will issue a notice of hearing or an appropriate order.

As required by 10 CFR 2.714, a petition for leave to intervene shall set forth with particularity the interest of the petitioner in the proceeding, and how that interest may be affected by the results of the proceeding. The petition should specifically explain the reasons why intervention should be permitted with particular reference to the following factors: (1) The nature of the petitioner's right under the Act to be made a party to the proceeding; (2) the nature and extent of the petitioner's property, financial, or other interest in the proceeding; and (3) the possible effect of any order which may be entered in the proceeding on the petitioner's interest. The petition should also identify the specific aspect(s) of the subject matter of the proceeding as to which petitioner wishes to intervene. Any person who has filed a petition for

ATTACHMENT A

5/7/82

PROPOSED SCHEDULE FOR THE
ACRS SUBCOMMITTEE MEETING ON THE
QUALIFICATION PROGRAM FOR SAFETY RELATED EQUIPMENT
ALBUQUERQUE, NEW MEXICO
MAY 19-20, 1982

<u>MAY 19, 1982</u>	<u>ESTIMATED TIME</u>	<u>PRESENTATION TIME</u>
I. Executive Session	15 min	8:30 - 8:45 am
II. Presentation by the Sandia Staff		
A. Introduction - Bill Snyder	15 min	8:45 - 9:00 am
B. Sandia Qualification Test Evaluation Program - L. Bonzon	60 min	9:00 - 10:00 am
*** BREAK ***	15 min	10:00 - 10:15 am
C. Independent Verification Research Test Program / D. J. JENSEN	60 min	10:15 - 11:15 am
D. Hydrogen Burn Equipment Survivability / W. McCulloch	60 min	11:15 - 12:15 pm
III. Recess		12:15 pm
*** LUNCH ***	60 min	12:15 - 1:15 pm
Meet in Hotel Lobby	15 min	1:15 - 1:30 pm
Tour of Sandia Facilities	3-1/2 hrs	1:30 - 5:00 pm

MAY 20, 1982

I. Resume Meeting/Executive Session	15 min	9:00 - 9:15 am
II. ACRS Questions and Comments	105 min 120 min	9:15 - 11:15 am
III. Sandia Personnel Closing Comments	15 min	11:15 - 11:30 am
*** ADJOURN ***		
II. Industry Comments / L. GARDIN, EBASCO	15 min	9:15 - 9:30 am

ATTACHMENT B

TIME 8:30 A.M.
DATE 5-19-82

MEETING ROOM _____

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

MEETING

Qualification Program for Safety Related Equipment

ATTENDEES PLEASE SIGN BELOW

(PLEASE PRINT)
NAME

AFFILIATION

1	BENJAMIN E. BADER	SANDIA NAT'L LABS
2	LOUIS D. CROPP	SANDIA NAT'L LABS
3	LLOYD L. BONZON	" " "
4	DAVID M. JEPPESEN	" " "
5	W. H. McCULLOCH	" " "
6	Charles R. Pierce	Southern Company Services
7	Ralph Trujillo	Southern Nat'l. Labs.
8	Larry Gradin	Ebasco Services
9	JOHN FRANKLIN	FLORIDA POWER & LIGHT CO.
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18		ATTACHMENT C
19		
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TIME 9:00 A.M.
DATE 5-20-82

MEETING ROOM _____

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

MEETING

Qualification Program for Safety Related Equipment

ATTENDEES PLEASE SIGN BELOW

(PLEASE PRINT)
NAME

TABLE NO.

AFFILIATION

1	LLOYD POWSON		SANDIA NATIONAL LABORATORIES
2	BENJAMIN E. BADER		SANDIA NAT'L LABS
3	Larry Gradin		Elvasco Services
4	JOHN FRANKLIN		FLORIDA POWER AND LIGHT CO
5	DAVID M. JENSEN		SANDIA NAT'L LAB
6	BILL McCulloch		
7	LOU CROPP		SANDIA NAT'L LABS
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CATAWBA PENETRATION TEST TEST CHAMBER INTERNAL TEMPERATURE JUNE 15 1981

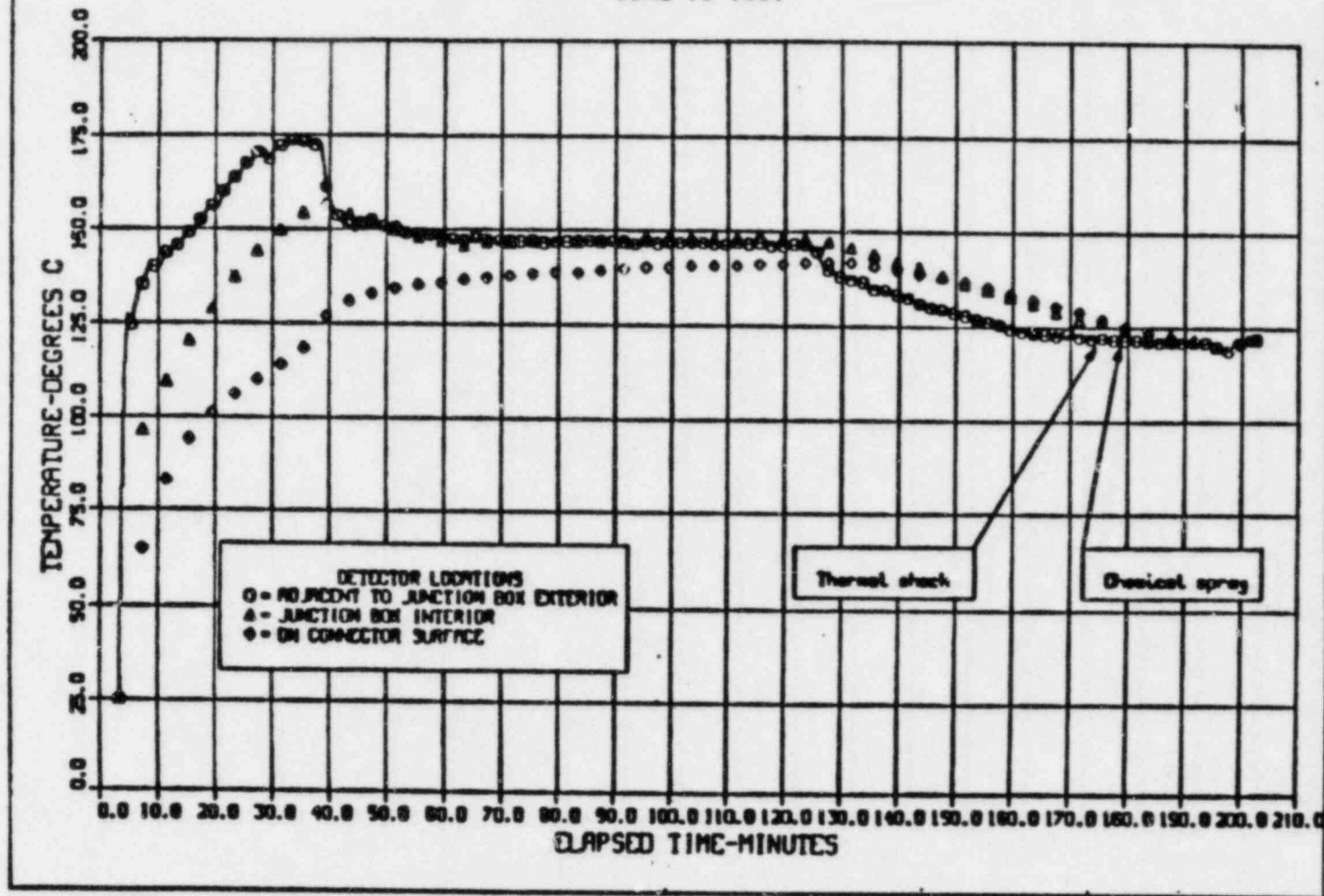


Figure 5-12a. Actual Temperature Profile

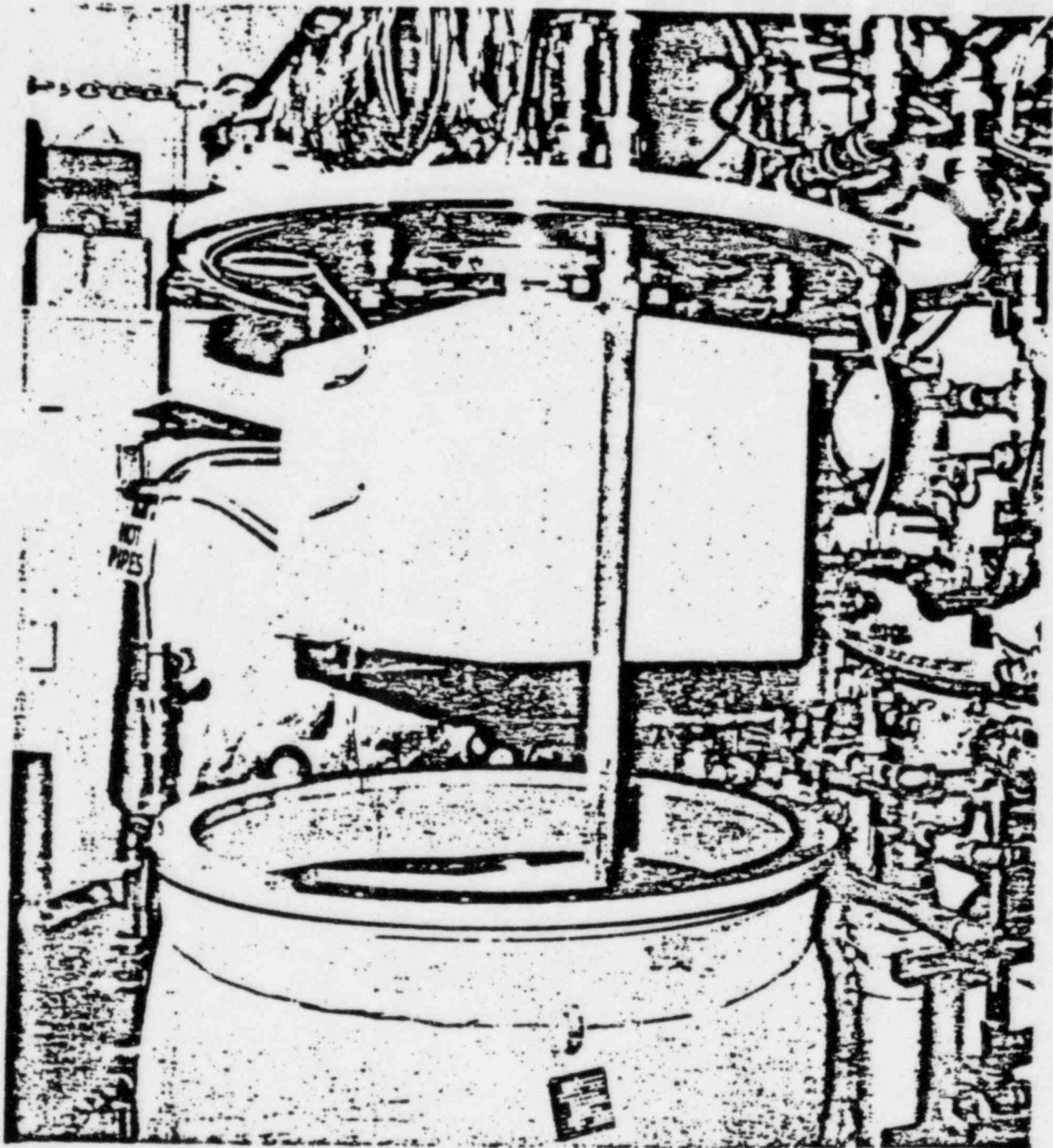


Figure 5-9. Penetration Assembly Being Positioned in Steam Test Chamber