



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

TEPA

OCT 20 1980

MEMORANDUM FOR: Those on Attached List
FROM: Ronald Feit, Chairman
Fire Protection Review Group
SUBJECT: FIRE PROTECTION REVIEW GROUP MEETING REPORT

Enclosed for your information is a copy of my report on the
Fire Protection Review Group meeting held October 3, 1980.

Ronald Feit

Ronald Feit, Chairman
Fire Protection Review Group

Enclosure: As stated

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Addressees for Memorandum Dated: OCT 20 1980

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FIRE PROTECTION REVIEW GROUP MEETING REPORT

Name of Author: Ronald Feit

Place and Date: Bethesda, Maryland, October 3, 1980

Purpose: To discuss the preliminary replication fire test plan

Discussion:

A draft test plan for the fire replication tests prepared by Sandia Laboratories was sent to the review group members prior to the meeting. The following reflects the conclusions reached during the meeting:

1. The prime objective of the replication fire test is to prove the adequacy of existing plant configurations and fire protection systems reviewed and approved by NRC using existing fire protection guidelines. It was agreed that as a secondary objective, and on a non-interfering basis, the test could be used to provide experimental data for analytical evaluations.
2. The test plan should describe in more detail the test configuration. Dick Silver (NRR) distributed a set of drawings and specifications covering the TVA equipment to be included in the test. After review of this material, a more detailed test plan will be written for the Browns Ferry test.
3. NRR indicated that they may not accept the TVA fire brigade response time obtained from the test TVA conducted. They are reviewing the test and their current licensing position and will provide a response time as soon as possible. The chairman indicated that if a fire brigade response time is recommended by NRR that is considerably higher than the time obtained by TVA, it will have to be substantiated either by a definitive NRR licensing position or a specific deficiency in the way the TVA test was conducted.
4. NRR indicated that they are still considering the issue of the amount of fuel used for the test fire. Their considerations are in the range of two and five gallons as previously proposed. Based on discussions with TVA personnel and an inspection of the plant area, Sandia and the chairman recommend a value of two gallons.
5. On page (3), item #3 should be referred to as Phase I test to coincide with the bimonthly status letter to the Commission.
6. The failure criteria for the Phase I test (page 3, item #3) should be clarified to reflect the following:

- A. If during the Phase I test there is a failure of cable in a redundant safety division cable tray, then the complete (Phase II) test will not be run and it will be concluded that the fire protection system is not adequate to protect redundant safety systems in the area tested.

As in previous NRC tests, cable failure will be based on resistance measurement to adjacent cables and from each cable to ground. Specific degradation values that will constitute a failure will be included in the revised test plan.

- B. If during the Phase I test there is either evidence of propagation up any of the vertical cable trays or temperatures measured in the vicinity of the horizontal cable trays that are close to the cable ignition temperature of the cable in these trays, then the Phase II test will be run.

7. The Phase I and Phase II test sequence will be as follows:

The first test will include the entire fire protection system with the suppression system response time predetermined by separate effects testing. If the automatic suppression system response time is shown to be longer than the brigade response time or if the fire suppression system is not actuated with the test fire, then only the second test will be conducted. The second test will assume a single failure that disables the fire suppression system in which case only the simulated fire brigade (using a predetermined response time) will be utilized to suppress the fire.

8. The next bimonthly report to the Commission should include a schedule based on the actual time required to procure equipment and construct the test mock-up. RES will prepare a revised schedule. Also, the letter should include a summary of the conservatism in the test and the degree to which the results can be utilized for other plants. NRR will prepare this portion of the letter.
9. The Brunswick test will follow the general guidelines agreed to for the Browns Ferry test. The chairman indicated that he was informed by utility personnel that the detailed information requested during the plant visit would be sent before November 1, 1980. Revised test plans will be written separately for the Browns Ferry and Brunswick tests.

DRAFTREPLICATION TESTS FOR FIRE
PROTECTION SYSTEMSTest Outline1. Overview

In December 1978, the NRC staff decided that full-scale replication testing of actual plant configurations and fire protection systems should be implemented. These plans were reported to the Commission on August 8, 1979, SECY-79-478. The recent Commission Order (CLI-80-21, May 27, 1980) emphasizes the importance that the Commission places on tests and requests that they be expedited and that a firm schedule be established.

Planning for these tests was initiated in early 1979, culminating in a user request memorandum to the Division of Reactor Safety Research in July 1979. Detailed plans were made for a full-scale replication test of the fire protection system for the Rancho Seco Make-up Pump Room. Prior to a final inspection and meeting with the utility in September 1979, it was learned that the fire protection system had been modified and that the planned test was no longer relevant. Accordingly, it was decided to alter the test plan (Schroeder and Eisenhut to Murley, September 21, 1979) and to begin planning for a full-scale replication test of the fire protection system for the Arkansas Auxiliary Building Corridor. A plant visit was conducted in November 1979, but final plans were delayed by problems in obtaining information, from the utility, needed to replicate the test configuration.

As a result of the recent Commission Order (May 27, 1980), which requested the staff to test first the configurations of greatest concern to the staff, it was decided to test the Browns Ferry Reactor Building first, and the Brunswick intake structure basement next (Vollmer to Murley, June 26, 1980).

2. Scope

Full-scale replication testing will be done to provide information on margins to safety and defense in depth, with the parameters of each test being determined in advance. Separate effects tests will be performed to determine detector and sprinkler head response variability to the source fire. Another test which may be considered separate is a test of the vertical cable trays only (from Browns Ferry Reactor Building) to assess temperature and plume height in the vicinity of the upper horizontal cable tray. The results of this test may eliminate the need for the full scale test of the entire configuration.

3. Test Objectives

To test fire protection configurations designed in accordance with NRC fire protection guidelines and found acceptable by the staff. The tests should confirm whether these configurations are valid for actual operating plant conditions. In addition, without interfering with the primary objective above, provide experimental data for analytical evaluation of fire suppression phenomenology.

4. Test Conditions and Requirements

Browns Ferry Reactor Building, North Wall-El. 593.0

- 1) The test configuration consists of four vertical cable trays and adjacent conduits leading into a stack of horizontal trays that are at least 20 feet from the ground. Only 12 feet of horizontal cable trays either side of center will be considered in the configuration.
- 2) The exact placement of cable trays, conduits, sprinklers, line detection and smoke detectors will be made from plant drawings.
- 3) A separate effects test will be run with only the vertical trays and conduits. Appropriate barriers will simulate the horizontal trays. The Design Basis Fire (DBF) (2-5 gallons of fuel) will be used at the base of the vertical trays within the curbing of the floor penetration. Smoke detectors will be used but no fire suppression system will be employed. The DBF will be allowed to burn for the time that is agreed to be a reasonable fire brigade response time, plus detector response time, plus time to account for variability of results. Failure criteria for this separate effects test would be either fire propagation of the vertical tray or conduits, or failure in a redundant division in the conduit, or temperature in the vicinity of the horizontal stack approaching the cable ignition temperature. If a failure does occur here, the full scale test will be conducted.
- 4) It was observed that several cables in the vertical trays were not coated. Subsequent discussions showed a working

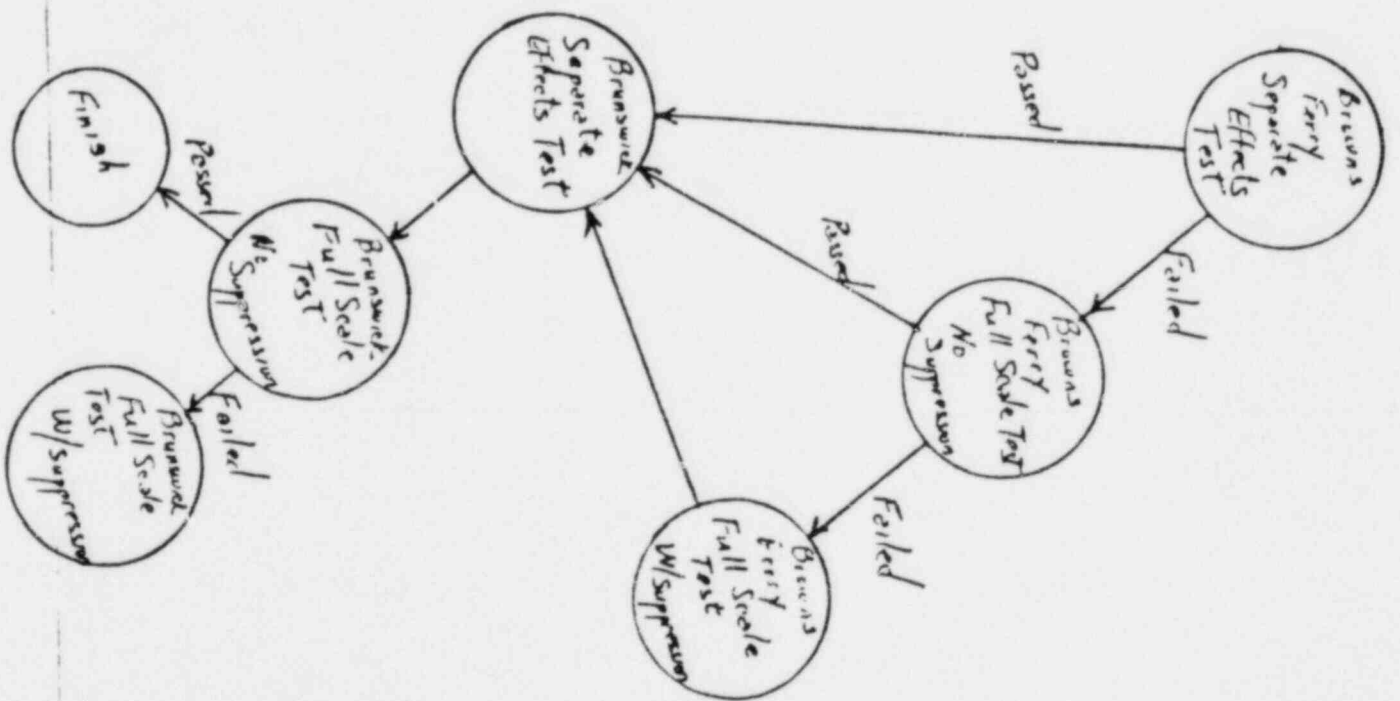
procedure allowed up to 10 cables to be inserted before additional coating was applied. Therefore, ten uncoated cables will be used in each of the four trays.

5) Cable will be used which duplicates the general mix of actual tray fill and cable materials will be obtained which meet the plant specifications.

6) The ventilation rate used is that measured by TVA personnel in the vicinity of the vertical trays.

Brunswick Intake Structure Basement

- 1) The area designated is in a corner of the basement (14 feet long, 14 feet wide, and 14 feet high) and includes numerous horizontal cable trays and conduits as well as two pumps that supply bearing service water for redundant make-up pumps.
- 2) The DBF will be the burning of 2-5 gallons of flammable liquid placed in a 25-foot dyke beneath the pumps. The length of burn will be determined as explained for the Browns Ferry Test.
- 3) Ventilation will be used as determined by plant personnel.
- 4) Fire Suppression is provided by a ceiling level pre-action sprinkler system actuated by smoke detectors and fusible links.
- 5) Ceramic fiber blanket insulation is provided around some redundant cables in close proximity.
- 6) A separate effects test will be performed first to obtain the response time of the smoke detectors and fusible links. No cable will be loaded into the trays during this test.
- 7) Failure criteria is only applicable to the full scale tests and consists of failure (short or open) in a redundant division.



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