SAFETY EVALUATION
FIRE PROTECTION - INCOMPLETE ITEMS
TROJAN NUCLEAR PLANT
DOCKET NO. 50-344

The following provides our evaluation of the incomplete items. Numbers in parentheses preceding each heading refer to the sections of our previously issued SER which address these incomplete items.

(3.2.1) Cable Penetration Firestops

Our SER noted that electrical cable penetration firestop tests would be performed to demonstrate the adequacy of firestop designs used at the Trojan facility. By letter of August 22, 1979, the licensee provided details on modifications to be made to upgrade the electrical cable penetration firestops; and test reports to demonstrate the rating of the upgraded firestop designs. Although these tests were not performed with a significant pressure differential across the seal, we find that such conditions would not affect the ability of these firestops to withstand a severe fire. Based on our review of the details provided, we find that adequate designs and sufficient testing have been performed to demonstrate the ability of these designs to withstand an ASTM E-119 3-hour severity fire. Additionally, the licensee has proposed to upgrade penetration firestops to one of these tested designs. Subject to implementation of these modifications, we find that the electrical cable penetration firestops conform to the provisions of Appendix A to BTP 9.5-1 and are, therefore, acceptable.

(3.2.2) Cable Tray Tests

Our SER noted that the licensee had proposed to perform cable tray tests to demonstrate the ability of the Train B switchgear room coolers to remove the heat generated by a fire in this room and, thus, protect cables and equipment from the safety division not involved in the fire. Subsequently, the licensee decided not to perform the tests, but to provide an analysis based on cable tray tests that had been recently performed by other organizations. We have reviewed the results of this analysis and find it unacceptable. We will require that to provide adequate protection for redundant equipment and cabling in this switchgear room, one of the following should be provided:

(1) an alternate shutdown capability independent of this area; or

(2) a 3-hour fire-rated barrier to separate Train A and Train B equipment in the area; or

(3) an automatic total flooding gas suppression system.

Further details on the basis for our conclusion and the required modifications are contained in separate correspondence. This item will be further discussed in another supplement.

(3.2.3) Effects on Safe Shutdown Where Redundant Cables are in Proximity

Our SER noted that the licensee had performed on analysis of the effects on safe shutdown for fires that occur at locations where cabling from redundant safety divisions cross each other or are exposed by a common cable tray. As a result of this analysis the licensee had proposed to perform certain modifications as described in our SER. However, this analysis did not consider areas where redundant cables are in proximity to each other and could be damaged due to heat buildup, radiant energy effects, or fires in other combustibles in the area. The licensee performed a further evaluation to look at these potential effects for all areas of the plant, excluding areas where specific modifications were already being performed due to concerns over cable separation. Examples of areas not reviewed further are the cable spreading room where an alternate shutdown capability is being provided, or the diesel driven auxiliary feedwater pump room where a fire barrier is being installed to enclose safe shutdown cabling from the opposite safety division. As a result of this analysis the licensee identified only one additional area where further protection is required. At the electrical penetration area inside containment, a firestop will be installed in the non-safety related cable trays that provide a pathway between redundant safe shutdown cables.

We have reviewed the licensee's analysis and concur with his conclusion. We find that, subject to implementation of the various modifications identified in our SER and the additional modification described above, adequate protection will be provided in areas containing redundant safe shutdown cabling so that the objectives of Section 2.0 of our SER are satisfied. Accordingly we find this protection acceptable.

(3.2.4) Water Shielding

As noted in our SER the licensee had agreed to perform an evaluation of the effects on safe shutdown due to water damage resulting from cracks in fire suppression piping. The results of this analysis were provided in Appendix G to PGE-1012, Amendment 8, in July 1979. This analysis considered the effects of water spray in all areas containing fire suppression piping. Only one area was identified where a failure in suppression system piping resulting in water spray could damage redundant safe shutdown equipment. This area is elevation 93 feet of the control building, where failures in either of two locations could cause water spray to impact control room panels. To correct this situation, the licensee has proposed to provide a water shield or baffle in one location; in the other location the piping will be disconnected which supplies water to the sprinkler heads in the shift supervisor's office and corridor outside the control room. Because (1) fires in these areas would not affect safe shutdown capability, (2) manual hose stations are provided nearby, and (3) personnel are available in the adjacent control room, we find that disconnecting this pipe is acceptable. We have reviewed the licensee's analysis and agree with the conclusions. Subject to implementation of the above modifications, we find that protection against postulated water spray from suppression system piping satisfies the guidelines of Section 2.0 of our SER and is, therefore, acceptable.

(3.2.5) Administrative Controls

Our SER noted that the licensee's description of the administrative controls for fire protection was not adequate to permit a conclusion by our staff. By Amendments to the PGE-1012 report, "Trojan Nuclear Plant Fire Protection Review", Appendices E and F to this report provided information describing how the staff's guidelines are satisfied. This information also described various changes to procedures and development of new procedures and training programs that were being made to satisfy the staff's guidelines. The staff's guidelines are contained in "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance," dated June 14, 1977. We find that, subject to implementation of these changes, the licensee's administrative controls satisfy the staff guidelines and are therefore acceptable.

(3.2.6) Containment Fire Suppression

Our SER noted that fire protection in containment was still under staff review. The present fire protection for the containment building is fire detectors and portable dry chemical extinguishers. No hose stations and no protection against a major reactor coolant pump lube oil fire are provided.

The portable extinguishers would not provide an adequate means of suppressing fires in cable trays or small lube oil fires at the reactor coolant pumps. To provide such capability the licensee has proposed to provide hose stations inside containment. With this modification, the fire detectors already being installed, and the wide physical separation between cabling of redundant safety divisions, we find that adequate manual fire fighting capability is being provided for fires in cable trays.

The lack of protection for a reactor coolant pump lube oil leak could allow a large oil fire. The smoke and heat from such a fire would preclude access by the fire brigade, and would require that the fire be allowed to burn until all of the leakage has been consumed.

The licensee has performed an analysis of the effects of a reactor coolant pump oil fire using the CONTEMPT-PS computer code relying on the containment air coolers as well as heat sinks for heat rejection and also looked at radiant energy effects on nearby equipment. From this analysis the licensee concluded that a reactor coolant pump oil fire would not affect cabling or equipment required for safe shutdown.

Even with this analysis we concluded that with the severity of this hazard and with the location of vital safe shutdown equipment inside containment, it was not acceptable to allow such a fire to burn unsuppressed, possibly 25 minutes or longer. Accordingly the licensee has proposed to install a reactor coolant pump oil collection system to collect leakage and drain to a closed container. With this modification a reactor coolant pump oil fire would be limited to the small amount of residual oil that remains on pump or collection system surfaces, and could be easily extinguished manually.

The licensee's commitment on the oil collection system satisfied our guidelines with the exception of whether this sytem will be designed for leaks that could occur during a safe shutdown earthquake (SSE), and whether the potential for an SSE to cause the oil collection system to be dropped has been evaluated. However, this requirement is now included in Appendix R to 10 CFR Part 50 which will become effective in the near future. We, therefore, expect that the licensee will conform to this requirement. Subject to conformance to this requirement, this item is satisfactorily resolved.

With the above modifications we find that fire protection for containment satisfies the guidelines of Section 2.0 of our SER and is therefore acceptable.

(3.2.7) Cable Penetration Area Fire Protection

Our SER described an inadequacy of the existing closed head sprinkler system to detect fires in this area that is open to the outside, and also, if actuated, to suppress fires in lower trays due to shielding from higher level trays. To provide adequate protection in this area to suppress fires that may occur, the licensee has proposed to: convert this suppression system to an open head directed water spray system with heads located to provide direct coverage of the top and bottom surfaces of each tray and the tray supports; use both ionization and photoelectric-type detectors for alarm and actuation, with some located directly above the safety-related trays; and provide manual actuation capability from inside the nearby turbine building. Subject to implementation of these modifications, we find that fire protection for this area satisfies the guidelines of Section 2.0 of our SER and is therefore acceptable.