AEOD TECHNICAL REVIEW REPORT*

Unit: Oconee 3 TR Report No.: AEOD/T404

Docket No.: 50-287 Date: April 13, 1984

Licensee: Duke Power Company Evaluator/Contact: M. Chiramal

NSSS: B&W

SUBJECT: CABLE FIRE AND LOSS OF CONTROL POWER TO ENGINEERED SAFEGUARDS (ES) VALVES

LER NO. & EVENT DATE: 83-007/03L-1; May 25, 1983

SUMMARY

At Oconee 3 on May 25, 1983, while welding a hanger, a nearby flex conduit caught on fire. The welding was stopped, but the control cable in the conduit burned through before the fire was extinguished. The burnt cable supplied control power to SV-90 which controls letdown valve 3HP-5, and the valve failed to its closed position. Oconee 3 was operating at 100% power at the time of the event. To continue letdown, the closed valve had to be reopened quickly. To repair the damaged cable the supply breaker of the cable was opened. This caused the loss of control power to four other containment isolation valves. These Engineered Safeguards (ES) valves failed to their non-ES position (i.e., failed open) as designed. However, this caused the plant to be in a degraded mode of operation per the plant technical specifications. The cable was repaired and letdown was re-established in 13 minutes.

Investigation by the licensee did not find any problems associated with the welding procedures and activities. It was hypothesized that the apparent cause of the fire was by grounding circuit feedback.

*This document supports ongoing AEOD and NRC activities and does not represent the position or requirements of the responsible NRC program office.

DISCUSSION

At Oconee 3 on May 25, 1983, while welding activity involved in the installation of a hanger was in progress, a flex conduit nearby caught on fire. The welding was stopped and the fire extinguished, however, the control cable in the conduit was burned through. This cable provided control power to valve SV-90 which in turn controls letdown valve 3HP-5, which consequently failed to its closed position. Since Oconee 3 was operating at 100% power at the time of this incident, there was an urgent need to reopen 3HP-5 in order to re-establish letdown flow. In preparation for repairing the damaged cable, power supply to it was de-energized by opening circuit breaker 3DIB-25. This action also caused the loss of control power to four other Engineered Safeguards (ES) containment isolation valves. These valves (3HP-21, 3PR-8, 3PR-10, and 3CC-8) failed to their non-ES open position as designed. However, this situation constituted operation in a degraded mode per the plant technical specifications. The damaged cable was repaired in 13 minutes and power to all the valves was restored. During this period redundant containment isolation valves for the five affected valves were operable, but letdown capability was not available. After repairing the cable, letdown was re-established and plant operation continued.

The licensee investigated the event to find the cause of the fire. The welding procedures used at the time of the incident were the approved procedures. The welding crew's actions were reviewed; welding equipment was checked. No problems with the procedures, the actions of the crew or the equipment were found. The portion of the conduit that caught on fire was located approximately 4 to 6 feet from where welding was performed. The welding ground hook-up was made at a penetration approximately 2 feet from the welding location and 6 to 9 feet from the fire.

Based on the investigation the licensee was unable to determine the cause of the fire, but has hypothesized that electrical current feedback in the grounding path may have been the cause of the fire. The licensee has also concluded that the circumstance in which the fire occurred was an unusual service condition, and other than repairing the damaged conduit and cable no further corrective actions are required.

AEOD conducted a search of the SCSS data base to find out if there have been any similar events in the recent years (1981 - 1983). No other events were found. Our review of the event at Oconee 3 lead us to believe that the fire was probably caused due to the unique circumstance. This together with the search result cause us to conclude that the event has no generic implications.

During our review of the event we discovered a discrepancy in the Oconee 3 FSAR. FSAR Table 6.2.3 shows that the five containment isolation valves that were involved in the event go to the non-ES position upon loss of power. However, during the event 3HP-5, the letdown isolation valve, failed to its closed position, which is contrary to the FSAR. The Resident Inspector at Oconee 3 has talked to the licensee about this discrepancy and the licensee has stated that the FSAR will be modified to reflect the as-existing operation of this letdown valve.

FINDINGS

1. The fire in cable and conduit occurred during welding activity near the location of the activity, but there appears to be no direct relationship between the fire and the welding.

2. The licensee has been unable to identify the root cause of the fire. No problems with welding procedures, personnel actions or equipment were found. The licensee has hypothesized that the fire was due to electrical current feedback in the grounding path during welding.

3. In our search for similar events in the SCSS, we did not find any other similar event.

CONCLUSION

The event appears to be unique, possibly involving the grounding method used during the welding activity. Since no other similar events were found by us, we believe that this event has no generic implications. We also conclude that no further action is necessary as a consequence of this event.