

AEOD TECHNICAL REVIEW REPORT\*

UNITS: Cooper Nuclear Station  
DOCKET NO.: 50-298  
LICENSEES: Nebraska Public Power District  
NSSS/AE: General Electric/Burns & Roe

EE REPORT NO. AEOD/T414  
DATE: July 12, 1984  
EVALUATOR/CONTACT: F. Ashe

SUBJECT: STATION OPERATING RESTRICTIONS FOR LOST OR OUT OF SERVICE POWER TRANSFORMERS THROUGH WHICH ELECTRICAL POWER IS SUPPLIED TO THE EMERGENCY BUSES

EVENT DATE: January 29, 1984

REFERENCE: Nebraska Public Power District, LER 84-002  
Docket No. 50-298, dated February 24, 1984.

SUMMARY

This Technical Review Report provides information concerning operating restrictions for nuclear stations in the event that a power transformer, which forms a part of the two required electrical circuits from the offsite power network to the onsite distribution system, is lost or removed from service. The initial concern was that if such an event occurred at some stations, operating restrictions for these stations may not be specified in their technical specifications. If this was the case, then this could increase the chances that the associated power circuit may not be available when needed.

The referenced licensee event report (LER) and the abstracts for forty-five related LERs along with discussions with NRR staff members were used as the sources of information for this report.

This report concludes that in general the stated concern is not applicable to nuclear stations, although the specific operating restrictions do not appear to be consistent for all stations. Also, the stated concern does apply to the Turkey Point Station, however, it is our understanding that this station along with others are presently converting to standard technical specifications. These specifications uniformly address the stated concern. This being the case, the report further concludes that no additional AEOD actions are warranted for this issue at this time.

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

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## DISCUSSION

The referenced licensee event report provides a description of an event which occurred at the Cooper Nuclear Station on January 29, 1984. As described, the plant was operating at seventy-nine percent power with the normal station service transformer out of service. The startup station service transformer was supplying the normal in-house power. With the station operating in this manner, high winds detached a piece of Reactor Building siding (aluminum) which then blew onto the 161KV line creating a phase-to-phase and/or phase-to-ground electrical short. This short caused air circuit breakers 3306 and 3312 to open. It also caused oil circuit breakers 1604 and 1606 to open. The opening of these circuit breakers resulted in deenergizing the startup station service transformer. This action resulted in the loss of all non-critical 4160 volt buses and the loss of these buses caused the reactor recirculation pumps as well as other normally operating equipment to trip. As reactor power decreased, the pressure fell to below the 825 psig Group 1 isolation setpoint and a Group 1 isolation occurred. When the main steam isolation valves reached the ten percent valve closure scram setpoint, the reactor protection system initiated a reactor scram. After load shedding had taken place, the emergency transformer energized the critical buses. Both diesel generators started normally but did not connect to the critical buses since the emergency transformer was already supplying the necessary loads. Reactor pressure increased after the main steamline isolation valves shut and one relief valve lifted which armed the pressure control system. This system functioned as required to control pressure. The reactor core isolation coolant system was operated manually as required to maintain reactor water level and the reactor was cooled down at a normal cooldown rate.

The emergency station service transformer and diesel generators were all operable and capable of supplying power for a safe shutdown. No component failures were observed and all safety systems responded as required. To prevent recurrence of this event the damaged portion of the aluminum siding was securely fastened to the reactor building.

Followup activities conducted for the above event clearly established that there are no operating restrictions for this station if the normal station service transformer is out of service. The reason for this is that at this particular station the minimum two required circuits (as required by General Design Criterion 17) from the offsite transmission network to the onsite distribution system are provided by way of the startup station service transformer and the emergency transformer. One of these two transformers is associated with one circuit and the other with the remaining circuit. It is clear in this case why there are no such operating restrictions if the normal station service transformer is out of service. However, with some other design arrangements where there may be normal station service or other power transformers which form a part of the two required circuits there could be no operating restrictions for the associated station if one of these transformers is lost or removed from service. The concern for such a condition is that offsite power may not be available to the emergency buses when needed due to such transformers being out of service.

Using the above as a bases for further actions, searches were obtained from the SCSS and RECON data base systems for events involving loss or improper operations of power transformers through which electrical power is supplied to the emergency buses. These searches resulted in the identification of forty-five licensee event reports which described events involving loss or improper operation of power transformers. These events occurred during the period from February 1977 to March 1983 with thirty-five of them occurring since January 1980. A review of the abstracts for these reports did not result in the identification of a single event in which a power transformer that forms a part of the two required circuits (from the offsite network to the onsite distribution system) was lost or removed from service without some operating restrictions being applicable to the associated station. However, based on informal discussions with NRR staff members, it appears that this concern is applicable to the Turkey Point Station in that there are no operating restrictions applicable to this station in the event that a startup power transformer is lost or removed from service during power operation. The standard technical specifications do include items which address the stated concern and it is our understanding that the Turkey Point Station is presently converting to these specifications. In addition, we have verified that the stated concern does not apply to the Salem or Surry Stations. However, there appears to be inconsistencies in the amount of time permitted before actions restricting operations of a station are required in that the technical specifications for some stations permit a power transformer to be out of service for a longer period of time (before actions restricting station operation are required) than is permitted by the specifications for other stations. Collectively, the above information indicates that the identified concern is not a generic one, although it may be applicable to certain stations.

#### FINDINGS

In view of the information presented in the discussion above, the following findings are provided:

1. The result of the review of the data set of operating experience events and other related information is that in general operating restrictions are presently applicable to an associated station when a power transformer which forms a part of the two required circuits from the offsite transmission network to the onsite distribution system is lost or removed from service. However, in the event that a power transformer is lost or removed from service the amount of time permitted by technical specifications before actions restricting operations of the station are required does not appear to be consistent for all operating stations. In general, the stations which operate in accordance with standard technical specifications permit seventy-two (72) hours whereas others which operate in accordance with custom specifications permit seven days. It is our understanding that many of these other stations are or will be converting to the standard technical specifications.
2. The identified concern does apply to the Turkey Point Nuclear Station during power operations. However, it is our understanding that this station is presently converting to the standard technical specifications and that this concern will be adequately addressed during this process.

CONCLUSION

Based on the above information we believe that the concerns identified in this report will be adequately addressed by implementation of the standard technical specifications. In view of this, we believe that further AEOD actions relating to these concerns are not warranted at this time.