

2.0 LIMITING CONDITIONS FOR OPERATION

2.7 Electrical Systems

Applicability

Applies to the availability of electrical power for the operation of plant components.

Objective

To define those conditions of electrical power availability necessary to provide for safe reactor operation and the continuing availability of engineered safety features.

Specifications

(1) Minimum Requirements

The reactor shall not be heated up or maintained at temperatures above 300°F unless the following electrical systems are operable:

- a. Unit auxiliary power transformers TIA-1 or -2 (4,160 V).
- b. House service transformers TIA-3 and 4 (4,160 V).
- c. 4,160 V engineered safety feature buses 1A3 and 1A4.
- d. 4,160 V/480 V Transformers TIB-3A, TIB-3B, TIB-3C, TIB-4A, TIB-4B, TIB-4C.
- e. 480 V distribution buses 1B3A, 1B3A-4A, 1B4A, 1B3B, 1B3B-4B, 1B4B, 1B3C, 1B3C-4C, 1B4C.
- f. MCC No. 3A1, 3B1, 3A2, 3C1, 3C2, 4A1, 4A2, 4C1 and 4C2.
- g. 125 V d-c buses No. 1 and 2 (Panels EE-8F and EE-8G).
- h. 125 V d-c distribution panels AI-41A and AI-41B.
- i. 120V a-c instrument buses A, B, C, and D (Panels AI-40-A, B, C and D).
- j. ~~120V a-c instrument panels AI-42A and AI-42B.~~ Inverters A, B, C, and D.
- k. Station batteries No. 1 and 2 (EE-8A and EE-8B) including one battery charger on each 125V d-c bus No. 1 and 2 (EE-8F and EE-8G).
- l. Two emergency diesel generators (DG-1 and DG-2).
- m. One diesel fuel storage system containing a minimum volume of 16,000 gallons of diesel fuel in FO-1, and an additional 8,000 gallons of diesel fuel in FO-10.

2.0 LIMITING CONDITIONS FOR OPERATION

2.7 Electrical Systems (Continued)

- l. Island buses 1B3A-4A, 1B3B-4B, and 1B3C-4C may be inoperable for up to 8 hours provided there are no inoperable required safeguards components which are redundant to components on the inoperable bus(es).
- m. Either one of the 125V d-c buses No. 1 or 2 (Panels EE-8F or EE-8G) may be inoperable for up to 8 hours.
- n. Either one of the 125V d-c distribution panels AI-41A or AI-41B may be inoperable for up to 8 hours.
- o. ~~Either one of the 120V a-c instrument panels AI-42A or AI-42B may be inoperable for up to 8 hours.~~ One inverter (A, B, C, or D) may be inoperable for up to 24 hours provided the reactor protective and engineered safeguards systems instrument channels supplied by the remaining three inverters are all operable and the 120V a-c instrument bus associated with the inoperable inverter is powered from its bypass source.

Basis

The electrical system equipment is arranged so that no single failure can inactivate enough engineered safeguards to jeopardize the plant safety. The 480 V safeguards are arranged on nine bus sections. The 4.16 kV safeguards are supplied from two buses.

The normal source of auxiliary power with the plant at power for the safeguards buses is from the house service power transformers being fed from the 161 Kv incoming line with on-site emergency power from either one of two diesel generators and off-site standby power via the unit auxiliary transformers.⁽¹⁾ The loss of the 161kV incoming line renders the house service transformers (T1A-3 and T1A-4) inoperable in that the transformers cannot supply power to the 4.16kV safeguards buses 1A3 and 1A4. Inoperability of the house service transformer(s) or loss of the 161kV incoming line is not reportable pursuant to 10 CFR 50.72 criteria; however, the NRC will be promptly notified of these events via the NRC Operations Center.

The two emergency diesel generators on site do not require outside power for start up or operation.

Upon loss of normal and standby power sources, the 4.16 Kv buses 1A3 and 1A4 are energized from the diesel generators. Bus load shedding, transfer to the diesel generator and pickup of critical loads are carried out automatically.⁽²⁾

When the turbine generator is out of service for an extended period, the generator can be isolated by opening motor operated disconnect switch DS-T1 in the bus between the generator and the main transformer, allowing the main transformer and the unit auxiliary power transformers (T1A-1 and T1A-2) to be returned to service.⁽³⁾ The auxiliary power transformers are not considered inoperable during these normal plant startup/shutdown realignments.

The time allowed to repair an inoperable inverter is based upon engineering judgement, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability. In the event of inverter failure, the load on the inverter is automatically transferred to its safety related bypass source. The associated 120 V a-c instrument bus is considered OPERABLE when it is being powered from its bypass source and during the short time it takes to manually or automatically transfer between sources.

2-35

Amendment No. 76,147,150,162

3.0 SURVEILLANCE REQUIREMENTS

3.7 Emergency Power System Periodic Tests (Continued)

- d. During refueling shutdowns the correct function of all D.C. emergency transfer switches shall be demonstrated by manual transfer of normal D.C. supply breakers at the 125 volt D.C. distribution panels.

(3) Emergency Lighting

The correct functioning of the emergency lighting system required for plant safe shutdown shall be verified at least once each year.

(4) 13.8 Kv Transmission Line

The 13.8 Kv transmission line will be energized and loaded to minimum shutdown requirements at each refueling outage following installation.

(5) Inverters A, B, C, and D

The correct inverter output (voltage, frequency, and alignment to required 120 V a-c instrument buses) shall be verified weekly.

Basis

The emergency power system provides power requirements for the engineered safety features in the event of a DBA. Each of the two diesel generators is capable of supplying minimum required safety feature equipment from independent buses. This redundancy is a factor in establishing testing intervals. The monthly tests specified will demonstrate operability and load capacity of each diesel generator. These tests are conducted to meet the objectives of NRC Generic Letter 84-15 regarding the issue of reductions in cold fast starts. For this reason, the test verifying a 10 second start will be conducted from ambient conditions once per 184 days for each diesel. Other monthly tests will allow for manufacturer's recommended warm-up to reduce the mechanical stress and wear on the diesel engines. The fuel supply and various controls are continuously monitored and alarmed for off-normal conditions. Automatic starting on loss of off-site power and automatic load shedding, diesel connection, and loading will be verified on a refueling frequency. At the same intervals, capability will be verified for manual emergency control of these functions from the diesel and switch-gear rooms.

Considering system redundancy, the specified testing intervals for the station batteries should be adequate to detect and correct any malfunction before it can result in system malfunction. Batteries will deteriorate with time, but precipitous failure is extremely unlikely. The surveillance specified is that which has been demonstrated over the years to provide an indication of a cell becoming unserviceable long before it fails.

References

- (1) USAR, Section 7.3.4.2
- (2) USAR, Section 8.4.1
- (3) USAR, Section 8.3.4
- (4) USAR, Section 8.4.2

U.S. Nuclear Regulatory Commission
LIC-95-0218

ATTACHMENT B

DISCUSSION, JUSTIFICATION AND NO SIGNIFICANT HAZARDS CONSIDERATION

DISCUSSION AND JUSTIFICATION:

The Omaha Public Power District (OPPD) proposes to revise the Fort Calhoun Station (FCS) Unit No. 1 Technical Specifications (TS) electrical requirements to delete the requirements for non-safety related 120 Volt a-c instrument panels and to incorporate a separate requirement for safety related inverters.

Currently TS 2.7, "Electrical Systems," requires that 120 Volt a-c instrument panels (buses) AI-42A and AI-42B be operable whenever the reactor coolant temperature is above 300°F. Either of these instrument panels may be inoperable for up to 8 hours or a plant shutdown is required. These instrument panels are non-safety related and do not receive or actuate any Engineered Safety Features (ESF) or Reactor Protection System (RPS) signals. In January 1995, FCS experienced problems with nonsafety related inverter No. 2 which provides power to AI-42B. The inverter could not be repaired within the 8 hours allowed by the Limiting Condition for Operation (LCO) and a Notification of Unusual Event was declared. The inverter was repaired shortly thereafter. As these panels do not serve a nuclear safety function, it is proposed that the TS requirements for these components be deleted.

Instrument Panels AI-42A and AI-42B are not required for accident mitigation of a design basis event, these instrument panels are not in any ESF, RPS, or Emergency Core Cooling System circuits, and the panels are not required for containment integrity. The FCS plant specific Probabilistic Risk Assessment (PRA) model was reviewed to determine the effect of unavailability of these instrument panels on the core damage frequency. The results of the review show that the unavailability of these panels is not a contributor to risk. Therefore these instrument panels do not meet any of the four criteria contained in 10 CFR 50.36 for inclusion into TS. The operation of these panels is controlled by plant procedures that may be revised following 10 CFR 50.59.

It is also proposed to incorporate new requirements for the safety-related 125 Volt d-c to 120 Volt a-c inverters similar to the Standard Technical Specification for Combustion Engineering plants as contained in NUREG-1432. Currently, there are no TS requirements for inoperability of the safety related inverters. If an inverter is inoperable and its associated 120 Volt a-c instrument bus is powered by its safety related bypass transformer, the a-c instrument bus is declared inoperable and an 8 hour LCO is entered. The bus is declared inoperable even though it is being powered from a safety related source because this source is not an uninterruptible power supply.

DISCUSSION AND JUSTIFICATION (Continued):

Operating experience has shown that, in many instances, 8 hours is insufficient time to troubleshoot and conduct repairs on an inverter. FCS initiated a TS required plant shutdown in November 1994 due to an inoperable inverter that could not be repaired in the 8 hours allowed by TS. Power was reduced from 100% to 94% before the inverter could be repaired. If FCS had 24 hours to conduct repairs, a power reduction, and the potential to challenge plant systems, would not have been necessary.

The FCS plant specific PRA model was reviewed to determine the effect of unavailability of any one of the safety-related instrument buses on the core damage frequency. The results of the review show that the unavailability of one instrument bus is not a significant contributor to risk. Therefore, the proposed change to allow one instrument bus to be powered from its safety related bypass transformer for 24 hours versus the 8 hours currently allowed is not a significant contributor to risk.

Comparison of Proposed Changes to Standard TS

The note contained in Standard TS 3.8.7 concerning disconnecting inverters during times when an equalizing charge is being supplied to its associated battery is not applicable. Equalizing charges are applied when the inverter is in operation.

The note contained in Standard TS 3.8.7 concerning entry into the LCO for de-energized vital buses is not applicable. TS 2.7(2) only allows one of the listed components to be inoperable, therefore an inverter and vital bus may not be inoperable at the same time. Due to this requirement a note is being added to the basis stating that a bus is considered operable when powered from its bypass source or during the short time required to transfer between sources.

BASIS FOR NO SIGNIFICANT HAZARDS CONSIDERATION:

The proposed changes do not involve significant hazards consideration because operation of Fort Calhoun Station (FCS) Unit No. 1 in accordance with these changes would not:

- (1) Involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed changes will delete requirements from the Technical Specifications (TS) for non-safety related 120 Volt a-c instrument panels AI-42A and AI-42B, and incorporate new requirements for the safety-related 125 Volt d-c to 120 Volt a-c inverters (A, B, C, and D) similar to the Standard Technical Specification for Combustion Engineering plants as contained in NUREG-1432.

TS 2.7 requires that 120 Volt instrument panels AI-42A and AI-42B be operable whenever the reactor coolant temperature is above 300 °F. Either of these instrument panels may be inoperable for up to 8 hours or a plant shutdown is required. These instrument panels are non-safety related and do not receive or actuate any Engineered Safeguards Features (ESF) or Reactor Protection System (RPS) and the panels are not required for, nor do they indicate the status of, containment integrity. The FCS plant specific Probabilistic Risk Assessment (PRA) model was reviewed to determine the effect of unavailability of these instrument panels on the core damage frequency. The results of the review show that the unavailability of these panels is not a contributor to risk. Therefore these instrument panels do not meet any of the four criteria contained in 10 CFR 50.36 for inclusion into TS. The operation of these panels are controlled by plant procedures that are governed by 10 CFR 50.59.

Therefore, deletion of the requirements for AI-42A and AI-42B from the TS would not significantly increase the probability or consequences of an accident previously evaluated.

It is also proposed to incorporate new requirements for the safety-related 125 Volt d-c to 120 Volt a-c inverters (A, B, C, and D). Currently, there are no TS requirements for inoperability of the safety-related inverters. However, if an inverter is inoperable and its associated 120 Volt a-c instrument bus is powered by its safety-related bypass transformer, the a-c instrument bus is considered inoperable and an 8 hour Limiting Condition for Operation is applied. The bus is declared inoperable even though it is being powered from a safety related power source because this source is not an uninterruptible power supply. Operating experience has shown that, in many instances, 8 hours is insufficient time to troubleshoot and conduct repairs on an inverter. FCS initiated a TS required plant shutdown in November 1994, and again in January 1995, due to inoperable inverters that could not be repaired in the 8 hours allowed by TS. If FCS had 24 hours to conduct repairs, a power reduction, and the potential to challenge plant systems, would not have been necessary.

BASIS FOR NO SIGNIFICANT HAZARDS CONSIDERATION (Continued):

The proposed change does not increase the probability of an accident since loss of power to a vital bus is not an initiator of any analyzed accident. The proposed change does not increase the consequences of any accident since the TS currently allow one 120 V instrument bus to be inoperable and de-energized. The proposed change would only allow one 120 V instrument bus to be energized from a safety related bypass source. The proposed changes do not reduce the number of RPS or ESF actuation channels that are required to be operable. Should a loss of offsite power event occur, power to the instrument bus would only be interrupted during the time required for the emergency diesel generator to start and load.

The FCS plant specific PRA model was reviewed to determine the effect of unavailability of the 120 V instrument panels supplied by inverters A, B, C, and D on the core damage frequency. The results of the review show that the loss of one of the panels has an insignificant effect on the PRA model. Therefore, the proposed change of allowing a 24 hour period with one instrument panel powered from an interruptible power supply has an insignificant effect on the PRA results.

Therefore, the proposed change to include specific operability requirements for safety related inverters does not significantly increase the probability or consequences of an accident previously evaluated.

- (2) Create the possibility of a new or different kind of accident from any accident previously evaluated.

There will be no physical alterations to the plant configuration, changes to setpoint values, or changes to the implementation of setpoints or limits as a result of these proposed changes. The proposed changes do not reduce the number of RPS or ESF actuation channels that are required to be operable. Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

- (3) Involve a significant reduction in a margin of safety.

The proposed changes delete TS requirements for nonsafety related instrument panels and incorporate additional operability requirements for safety related inverters. The proposed changes do not revise any setpoints or limits monitored by the instrument panels or buses. In addition, a review of the FCS plant specific PRA shows that these proposed changes are insignificant to core damage frequency. Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

BASIS FOR NO SIGNIFICANT HAZARDS CONSIDERATION (Continued):

Therefore based on the above considerations, it is OPPD's position that this proposed amendment does not involve significant hazards considerations as defined by 10 CFR 50.92 and the proposed changes will not result in a condition which significantly alters the impact of the Station on the environment. Thus, the proposed changes meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and pursuant to 10 CFR 51.22(b) no environmental assessment need be prepared.