

1 All changes on this page,
except as noted

LOP DG Start Instrumentation
B 3.3.5

B 3.3 INSTRUMENTATION

B 3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

BASES

BACKGROUND

The DGs provide a source of emergency power when offsite power is either unavailable or is insufficiently stable to allow safe unit operation. Undervoltage protection will generate an LOP start if a loss of voltage or degraded voltage condition occurs in the switchyard. There are two LOP start signals, one for each 16 kV vital bus.

Three undervoltage relays with inverse time characteristics are provided on each 16 kV Class 4 instrument bus for detecting a sustained degraded voltage condition or a loss of bus voltage. The relays are combined in a two-out-of-three logic to generate an LOP signal if the voltage is below 75% for a short time, or below 90% for a long time. The LOP start actuation is described in FSAR, Section 8.0 (Ref. 1).

The Allowable Value in conjunction with the trip setpoint and LCO establishes the threshold for Engineered Safety Features Actuation System (ESFAS) action to prevent exceeding acceptable limits such that the consequences of Design Basis Accidents (DBAs) will be acceptable. The Allowable Value is considered a limiting value such that a channel is OPERABLE if the setpoint is found not to exceed the Allowable Value during the CHANNEL CALIBRATION. Note that although a channel is OPERABLE under these circumstances, the setpoint must be left adjusted to within the established calibration tolerance band of the setpoint in accordance with uncertainty assumptions stated in the referenced setpoint methodology, (as-left-criteria) and confirmed to be operating within the statistical allowances of the uncertainty terms assigned.

Allowable Values and LOP DG Start Instrumentation Setpoints

REVIEWER'S NOTE

Alternatively, a TS format incorporating an Allowable Value only may be proposed by a licensee. In this case the Nominal Trip Setpoint value is located in the TS Bases or in a licensee controlled document outside the TS. Changes to the trip setpoint value would be controlled by 10 CFR 50.59 or administratively as appropriate, and adjusted per the setpoint methodology and applicable surveillance requirements. At their option, the licensee may include the trip setpoint in the surveillance requirement as shown, or suggested by the licensee's setpoint methodology.

WOG STS

B 3.3.5 - 1

Rev. 2, 04/30/01

1

All changes on this page,
except as notedLOP DG Start Instrumentation
B 3.3.5

APPLICABLE SAFETY ANALYSES (continued)

Instrumentation," include the appropriate DG loading and sequencing delay.

The LOP DG start instrumentation channels satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO for LOP DG start instrumentation requires that ~~three~~ channels per bus of ~~both~~ the loss of voltage and degraded voltage Functions shall be OPERABLE in MODES 1, 2, 3, and 4 ~~when~~ the LOP DG start instrumentation supports safety systems associated with the ESFAS. In MODES 5 and 6, the ~~three~~ channels must be OPERABLE whenever the associated DG is required to be OPERABLE to ensure that the automatic start of the DG is available when needed. A channel is OPERABLE with a trip setpoint value outside its calibration tolerance band provided the trip setpoint "as-found" value does not exceed its associated Allowable Value and provided the trip setpoint "as-left" value is adjusted to a value within the "as-left" calibration tolerance band of the Nominal Trip Setpoint. A trip setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions. Loss of the LOP DG Start Instrumentation Function could result in the delay of safety systems initiation when required. This could lead to unacceptable consequences during accidents. During the loss of offsite power the DG powers the motor driven auxiliary feedwater pumps. Failure of these pumps to start would leave only one turbine driven pump, as well as an increased potential for a loss of decay heat removal through the secondary system.

"when" is a
handshake to
Applicability
statement

LOP DG start
instrumentation
for the loss of
Voltage Function

see
LCO Appl.
Comments

three channels
per trip
of the

APPLICABILITY

The LOP DG Start Instrumentation Functions are required in MODES 1, 2, 3, and 4 because ESF Functions are designed to provide protection in these MODES. Actuation in MODES 5 or 6 is required whenever the required DG must be OPERABLE so that it can perform its function on a LOP or degraded power to the ~~fuel~~ bus. ~~associated Emergency~~

Loss of voltage

INSERT 2A

TST-418 Rev. 2
Reviewer's Note
Not Shown

ACTIONS

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the channel is found inoperable, then the function that channel provides must be declared inoperable and the LCO Condition entered for the particular protection function affected.

set, but also
include per
train basis

Because the required channels are specified on a per bus basis, the Condition may be entered separately for each bus as appropriate.

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be

WOG STS

B 3.3.5 - 3

Rev. 2, 04/30/01

5

INSERT 2A

or other specified conditions other than MODES 1, 2, 3, and 4

Insert Page B 3.3.5-3

LOP DG Start Instrumentation
B 3.3.5

ACTIONS (continued)

entered independently for each Function listed in the LCO. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies to the LOP DG start Functions with one loss of voltage or one degraded voltage channel per bus inoperable.

If one channel is inoperable, Required Action A.1 requires that channel to be placed in trip within 4 hours. With a channel in trip, the LOP DG start instrumentation channels are configured to provide a one-out-of-two logic to initiate a trip of the incoming offsite power.

A Note is added to allow bypassing an inoperable channel for up to 4 hours for surveillance testing of other channels. This allowance is made where bypassing the channel does not cause an actuation and where at least two other channels are monitoring that parameter.

The specified Completion Time ~~and time allowed for bypassing one channel are~~ reasonable considering the Function remains fully OPERABLE on every bus and the low probability of an event occurring during these intervals.

B.1

Condition B applies when more than one loss of voltage or more than one degraded voltage channel per bus are inoperable.

Required Action B.1 requires restoring all but one channel per bus to OPERABLE status. The 1 hour Completion Time should allow ample time to repair most failures and takes into account the low probability of an event requiring an LOP start occurring during this interval.

C.1

Condition C applies to each of the LOP DG start Functions when the Required Action and associated Completion Time for Condition A or B are not met.

In these circumstances the Conditions specified in LCO 3.8.1, "AC Sources - Operating," or LCO 3.8.2, "AC Sources - Shutdown," for the

WOG STS

B 3.3.5 - 4

Rev. 2, 04/30/01

LOP DG Start Instrumentation
B 3.3.5

ACTIONS (continued)

DG made inoperable by failure of the LOP DG start instrumentation are required to be entered immediately. The actions of those LCOs provide for adequate compensatory actions to assure unit safety.

SURVEILLANCE REQUIREMENTS

SR 3.3.5.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

The Frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

SR 3.3.5.2 *and SR 3.3.5.4*

SR 3.3.5.2 *are* the performance of a TADOT. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. This test is performed every 184 days. The test checks trip devices that provide actuation signals directly, bypassing the analog process control equipment. For these tests, the relay trip setpoints are verified and *adjusted as necessary*. The Frequency is based on the known reliability

WOG STS

B 3.3.5 - 5

Rev. 2, 04/30/01

1 All changes on this page

LOP DG Start Instrumentation
B 3.3.5

SURVEILLANCE REQUIREMENTS (continued)

of the relays and controls and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

SR 3.3.5.3 (and SR 3.3.5.5)

and SR 3.3.5.5 are

SR 3.3.5.3 the performance of a CHANNEL CALIBRATION.

The setpoints, as well as the response to a loss of voltage and a degraded voltage test, shall include a single point verification that the trip occurs within the required time delay as shown in Reference 1.

A CHANNEL CALIBRATION is performed every 18 months approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The Frequency of 18 months is based on operating experience and consistency with the typical industry refueling cycle and is justified by the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

31 day or 184 day (as applicable)

REFERENCES

1. FSAR, Section 8.3
2. FSAR, Chapter 15
3. Plant specific setpoint methodology study

INSERT 21

WOG STS

B 3.3.5 - 6

Rev. 2, 04/30/01