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 AUTH. NAME: LEWIS, S. R. AUTHOR AFFILIATION: Duke Power Co.
 RECIP. NAME: RECIPIENT AFFILIATION: Region 2, Atlanta, Office of the Director

DOCKET #
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SUBJECT: LER 80-003/03L-0: on 800205, during routine tour, main feeder bus 1 was isolated when smoking bus connection was discovered. Apparently caused by differing secondary voltages resulting in transformer 3T carrying excessive load.

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DUKE POWER COMPANY
OCONEE UNIT 3

Report Number: RO-287/80-3

Report Date: March 6, 1980

Occurrence Date: February 5, 1980

Facility: Oconee 3, Seneca, South Carolina

Identification of Occurrence: Main Feeder Bus Isolated

Conditions Prior to Occurrence: 99% Full Power

Description of Occurrence:

On February 4, 1980, breaker 3B2T-1, the 4160 volt normal feeder breaker to Oconee 3 Main Feeder Bus (MFB) 2, failed to close during performance of the monthly breaker operability test. Breaker 3B2T-5 was then closed, energizing MFB 2 from startup transformer CT-3. At 0620 on February 5, 1980, smoke was observed to be coming from a connection in cabinet 3B1T-3 during a routine tour of the Oconee 3 Blockhouse. MFB 1 was isolated, and the connection stopped smoking. An hourly firewatch was established since the smoke detectors had not alarmed. At 0010 on February 6, 1980, breaker 3B1T-5 was closed, energizing MFB 1 from transformer 3T. The breaker from MFB 1 to switchgear group 3TC was then closed, but tripped on overcurrent approximately 5 seconds later. Breaker 3B1T-5 was reopened, and the breakers energizing switchgear groups 3TC, 3TD, and 3TE from MFB 1 were closed. Breaker 3B1T-5 was then reclosed, and no problems were observed. However, a review of hourly megawatt readings indicated that during the period that MFB 1 was energized by transformer 3T and MFB 2 was energized by transformer CT3, transformer 3T was reading approximately 15 megawatts higher than normal, and transformer CT3 was supplying no power. Breaker 3B1T-1 was closed and breaker 3B2T-1 was opened, so that MFB 1 was energized by transformer CT3. On February 7, 1980 investigation of the problems with breaker 3B2T-1 was completed, and it was returned to service. A simplified schematic of the power distribution system is attached.

Apparent Cause of Occurrence:

During the period that MFB 1 was energized by the normal transformer and MFB 2 was energized by the startup transformer, both transformers were feeding the same loads in parallel. This should only be done if both transformers have the same characteristics. It appears that approximately 15 megawatts was flowing from transformer 3T through transformer CT3 back into the 230 KV switchyard, possibly due to differing secondary voltages for the two transformers. The resultant excessive current caused the bus connection in cabinet 3B1T-3 to overheat and burn off the adjacent epoxy insulation. With no flame present, the smoke produced was of very low thermal energy and would tend to stratify, so that it did not reach a smoke detector located on the ceiling. In addition, the detector in the area had a somewhat lower sensitivity than others in use.

Analysis of Occurrence:

MFB 1 was out of service for approximately 19 hours while the smoking bus connection was investigated and repaired. Oconee Nuclear Station Technical Specification 3.7.2(d) 1 permits one main feeder bus to be out of service for up to 24 hours. In addition, MFB 2 was operable and capable of supplying auxiliary power. However, since this incident constituted operation in a degraded mode permitted by a limiting condition for operation, it must be reported pursuant to Technical Specification 6.6.2.1.b(2), although it was of no significance with respect to safe operation, and the health and safety of the public were not affected.

Corrective Action:

Investigation of the problem with breaker 3B2T-1 revealed a ground on the DC system. When the ground was cleared, the breaker operated properly. The overheated bus connection was inspected and cleaned thoroughly after it was determined that no damage had occurred. The overcurrent trip protective relaying, which should have prevented the overheating, are being investigated. The possibility of welding all aluminum-to-aluminum connections in the 4160 volt switchgear is also under review. In addition, consideration is being given to installing an electrical interlock to prevent the main feeder buses from being energized by the normal and startup transformers in parallel. The 4160 volt breaker operability test may be revised to avoid placing the transformers in parallel. The existing smoke detector will be replaced, and an ionization detector will be installed above each switchgear cabinet to identify overheating problems.

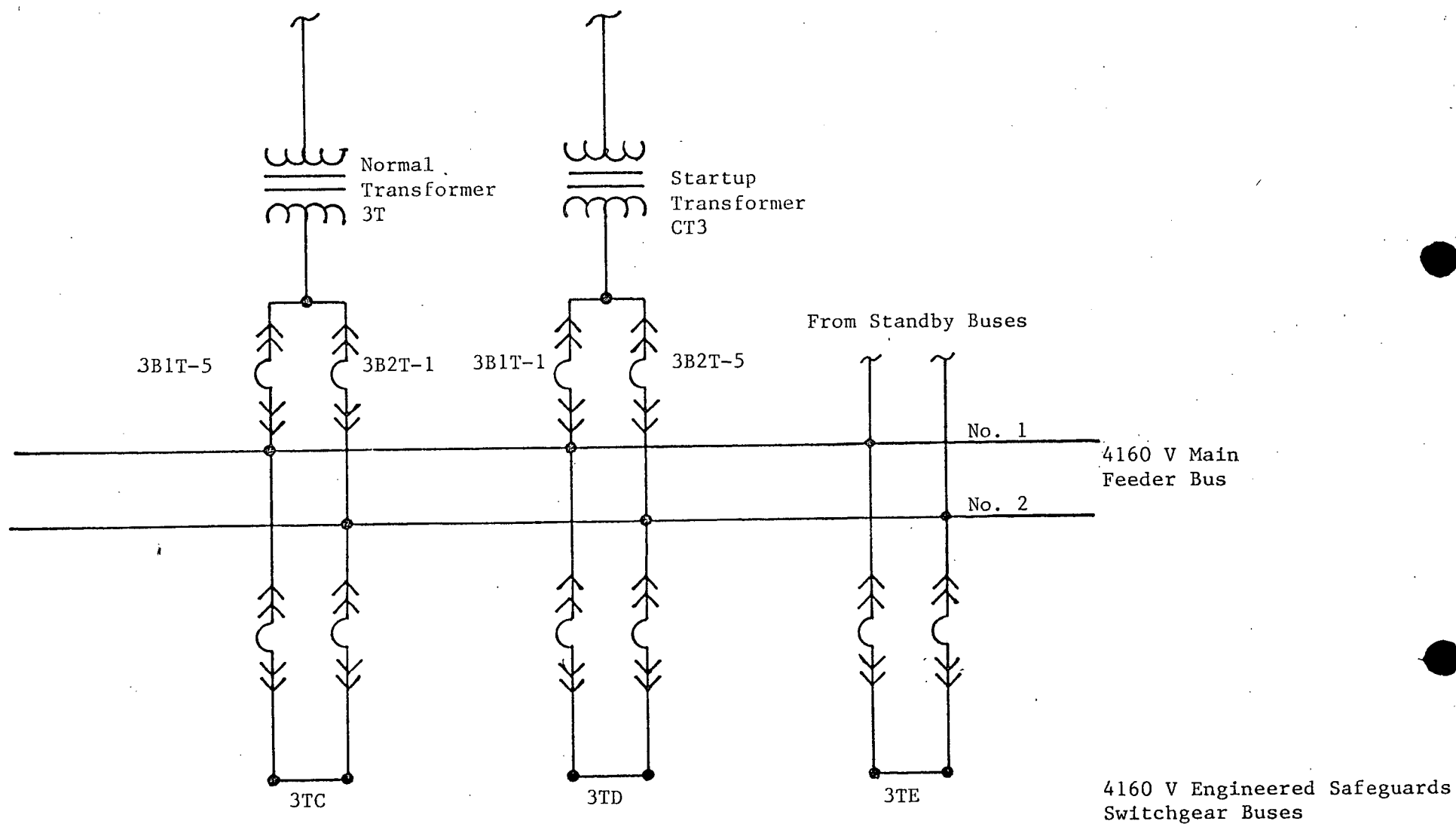


Figure 1

Simplified Schematic of Power Distribution System

LICENSEE EVENT REPORT

EXHIBIT A

CONTROL BLOCK: 1 (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 S C N E E 3 2 0 0 - 0 0 0 0 0 0 - 0 0 3 4 1 1 1 1 4 5

LICENSEE CODE 14 15 LICENSE NUMBER 25 26 LICENSE TYPE 30 37 CAT 58

CON'T

01 L 6 0 5 0 0 0 2 8 7 7 0 2 0 5 8 0 8 0 3 0 6 8 0 9

REPORT SOURCE 60 61 DOCKET NUMBER 68 69 EVENT DATE 74 75 REPORT DATE 80

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES 10

02 Main feeder bus 1 was isolated when a smoking bus connection was discovered

03 during a routine tour of the Oconee 3 Blockhouse. The bus was out of service

04 for approximately 19 hours, less than the limit allowed by Oconee Nuclear

05 Station Technical Specification 3.7.2(d) 1. Also, MFB 2 was operable and

06 capable of supplying auxiliary loads. Therefore, this incident did not affect

07 safe operation of the unit or the health and safety of the public.

08

09

SYSTEM CODE E B 11 CAUSE CODE X 12 CAUSE SUBCODE Z 13 COMPONENT CODE T R A N S F 14 COMP. SUBCODE Z 15 VALVE SUBCODE Z 16

LER/RO REPORT NUMBER 17 EVENT YEAR 8 0 SEQUENTIAL REPORT NO. 0 9 3 OCCURRENCE CODE 0 3 REPORT TYPE L REVISION NO. 0

ACTION TAKEN B 18 FUTURE ACTION X 19 EFFECT ON PLANT Z 20 SHUTDOWN METHOD Z 21 HOURS 0 0 0 0 ATTACHMENT SUBMITTED Y 23 NRC-4 FORM SUB. Y 24 PRIME COMP. SUPPLIER L 25 COMPONENT MANUFACTURER W 1 2 0 26

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS 27

110 At the time the smoking connection was discovered, MFB 1 was energized by

111 normal transformer 3T and MFB2 was energized by startup transformer CT3.

112 Apparently, differing secondary voltages when the two transformers were used

113 in parallel caused 3T to carry an excessive load. Various means for assuring

114 that the transformers are not used in parallel are under investigation.

15 E 28 % POWER 0 9 9 29 OTHER STATUS NA 30 METHOD OF DISCOVERY B 31 DISCOVERY DESCRIPTION Routine Tour of Blockhouse 32

ACTIVITY CONTENT 7 33 7 34 AMOUNT OF ACTIVITY NA 35 LOCATION OF RELEASE NA 36

PERSONNEL EXPOSURES NUMBER 0 0 0 37 TYPE Z 38 DESCRIPTION NA 39

PERSONNEL INJURIES NUMBER 0 0 0 40 DESCRIPTION NA 41

LOSS OF OR DAMAGE TO FACILITY TYPE Z 42 DESCRIPTION NA 43

PUBLICITY ISSUED N 44 DESCRIPTION NA 45

NAME OF PREPARER S. R. Lewis PHONE: (704) 373-8285

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