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A. Giambusso	1 signed			SENT AEC PDR X SENT LOCAL PDR X

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DESCRIPTION:
Ltr trans the following:

ENCLOSURES:
Report describing an incident on 1-4-74 which resulted in the isolation of the 230 KV switchyard.....

ACKNOWLEDGED

DO NOT REMOVE

PLANT NAME: Oconee Units 1 & 2

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FOR ACTION/INFORMATION 1-18-74 fod

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DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28201

Regulatory File Cy.

A. C. THIES
SENIOR VICE PRESIDENT
PRODUCTION AND TRANSMISSION

P. O. BOX 2178

January 14, 1974

Mr. Angelo Giambusso
Deputy Director for Reactor Projects
Directorate of Licensing
Office of Regulation
U. S. Atomic Energy Commission
Washington, D. C. 20545

Re: Oconee Nuclear Station
Docket Nos. 50-269 and 50-270

Dear Mr. Giambusso:

Transmitted herewith for your information is a report describing an incident which resulted in the isolation of the 230 KV switchyard at Oconee Nuclear Station on January 4, 1974.

Very truly yours,

A. C. Thies

A. C. Thies

ACT:vr

Attachment

DUKE POWER COMPANY
OCONEE NUCLEAR STATION
230 KV SWITCHYARD ISOLATION
JANUARY 4, 1974

Introduction

A spurious signal in a multi-conductor cable between the Oconee Nuclear Station and the 230 KV switchyard actuated solid-state breaker failure relays located in the switchyard. This actuation resulted in the isolation of the 230 KV switchyard. The affected cable circuits were disconnected at the relays on an interim basis, and isolating interposing relays and individual shielded cables will be installed for each circuit as a permanent corrective action.

Breaker Failure Protective Circuitry

The 230 KV switching station is composed of 230 KV power circuit breakers arranged in a breaker and a half scheme, as shown in the Oconee FSAR, Figure 8-2. Each transmission line is protected by redundant, diverse, protective relaying logic. The primary channel relaying is solid-state; the secondary channel is electro-mechanical. In addition to these two channels, a solid-state breaker failure relay is provided on each breaker to isolate that breaker should it fail to operate properly by tripping the breakers on each side. All relays are located in the switchyard relay house. The breaker failure relay monitors current flow through the breaker. If the protective relay logic initiates a trip signal to a breaker, and if fault current is still flowing through the breaker after an eight cycle delay, the breaker failure relay will initiate an output signal to isolate that breaker. The eight-cycle time delay allows the breaker adequate time to clear before initiating an isolating signal.

Additionally, the breaker failure relays associated with transformer circuit breakers have redundant actuating circuits from the individual transformer differential lock-out relays. These provide additional equipment protection in the event of a fault on the low side of a transformer. The transformer differential relay would sense this fault condition and trip the circuit breakers; furthermore, it would arm the breaker failure relays, which in turn would actuate if the breakers did not open within the eight-cycle time delay. This additional equipment protection was provided to minimize the damage from a transformer low-side fault condition by detecting it at an early stage. The breaker failure relay wiring for this additional circuit consists of a pair of #16 wires run in a 61 conductor interlocked armor cable with an internal corrugated copper shield. The connecting circuitry runs from the breaker failure relay in the relay house to the transformer lockout relay contacts within the station.

Description of the Incident

On the afternoon of January 4, 1974, Oconee Unit 1 was shut down, Oconee Unit 2 was at 75 percent power, Keowee Unit 1 was supplying 80 megawatts to the system grid, and Keowee Unit 2 was not running. The 13.8 KV underground feeder connected Keowee Unit 1 and transformer CT-4 at Oconee and was energized.

In the 230 KW switchyard, breakers 20 and 21 associated with Oconee Unit 1 were open, and all other breakers closed.

At 3:06 p.m., a spurious signal was induced into multiple circuits within a multi-conductor cable connecting the station and the switchyard. This spurious signal was probably generated by a transient current which flowed through ground circuits within the cable. The cable consisted of 61 circuits and had an overall corrugated shield plus an interlocked armor covering. The induced voltages caused the actuation of several solid-state breaker failure relays within the switchyard. Since these breaker failure relays were associated with breakers connected to both the yellow and red buses, these buses were tripped to isolate the breakers. Upon loss of voltage on both buses, the switchyard isolation logic correctly isolated the switchyard, initiating an emergency startup signal to both Keowee units, and separating them from the system grid. The isolation logic functioned as designed; Keowee Unit 1 separated from the system and continued to energize the 13.8 KV underground feeder to Oconee. Keowee Unit 2 started and was available as required. The Oconee transfer logic performed properly and connected vital auxiliary loadssto the standby bus supplied by the underground feeder from Keowee.

Corrective Action

As an interim measure, the breaker failure relay circuits from the transformer lockout relays have been disconnected, thereby preventing spurious signals from actuating these relays. As a permanent corrective measure, interposing relays will be installed to provide isolation from spurious induced voltages, and individual shielded cables will be run for each circuit. The interim and permanent measures provide greater switching station reliability without reduction of off-site power availability to the station.