



February 28, 1991 3F0291-14

U. S. Nuclear Regulatory Commission Attention: Document Control Desk Washington, D. C. 20555

Subject: Licensee Event Report (LER) 91-002

Dear Sir:

Enclosed is Licensee Event Report (LER) 91-002 which is submitted in accordance with 10 CFR 50.73.

Sincerely,

Muy Boldt

G. L. Boldt Vice President Nuclear Production

WLR:mag

Enclosure

xc: Regional Administrator, Region II Project Manager, Region II Senior Resident Inspector

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# EVENT DESCRIPTION

On January 29, 1991, Crystal River Unit 3 was operating in MODE I (POWER OPERATIONS) at 99% rated power. The continuing Design Basis review program identified to plant management that the UNIT 3 STARTUP TRANSFORMER (SUX) [EB,XFMR] was not capable of maintaining its voltage output above the setpoint of the Second Level Undervoltage Relays (SLURS) [EB,PR] under certain Engineered Safeguards (ES) [EB,BU] actuation conditions. The SUX is the alternate offsite power source for the ES busses. A specific combination of conditions is necessary before this problem exists. The necessary combination is for the SUX to be carrying both of the 4160V Unit Busses [EA,BU] and either of the ES 4160V busses, and for an ES actuation to occur, and for the ES busses to be supplying those loads required by an intermediate or large break Loss of Coolant Accident (LOCA).

The function of the SLURs is to protect the ES 4160V busses from sustained periods of low voltage. Continued operation of safety-related equipment in a degraded voltage condition could cause damage and loss of function for vital safety-related end devices. The potential for degradation of the ES 4160V bus voltage below the SLUR setpoint results in the SUX (the alternate offsite power source) not meeting its design criteria. Calculations also indicate that the steady state loading on the 4160V winding of the SUX will exceed the Forced Oil and Air (FOA) 65 degree Centigrade rating of the winding during the LOCA situations mentioned above.

## CAUSE OF EVENT

The cause of this inability to meet performance requirements is a failure to anticipate a specific combination of events and conditions in the initial design and subsequent plant modifications. Neither the initial loading calculations nor those performed for the addition of the SLURs considered the magnitude of the voltage drop experienced with fully loaded ES and unit busses.

### SAFETY CONSEQUENCES

If the SUX were loaded with both Unit 4160V busses carrying normal loads and either ES 4160V busses carrying normal operating loads, and an ES actuation due to an intermediate or large break LOCA were to occur, the following would be the sequence of events:

- Engineered Safeguards equipment would be loaded onto the ES 4160V bus.
- The SUX would not be able to keep the voltage of the ES 4160V bus above the setpoint of the SLURs.

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- - 3. The SLURs, which are time delay devices, would separate the ES loads from the ES 4160V and de-energize the 4160V bus.
  - 4. When the ES busses experienced an undervoltage condition, the Emergency Diesel Generator (EDG) [EK,DG] would start.
  - 5. ES loads would be picked up by the EDG and the plant would be protected as designed.

These actions would fully comply with the design objective of protecting the nuclear core and preventing the release of radioactive material. Therefore, the health and safety of the public would not be compromised by the inability of the Unit 3 Startup Transformer to meet it: design objective.

#### CORRECTIVE ACTION

- 1. Guidance concerning acceptable electrical lineups for the Unit and ES 4160V busses was immediately provided to the licensed operators. The acceptable electrical lineups proclude the SUX from carrying the loads described above.
- 2. Immediate notification was made to the Nuclear Regulatory Commission by means of a one hour report.
- 3. Procedure changes to Operating procedures are being implemented to guide the operators in electrical lineups for the Unit and ES 4160V busses.
- 4 .... Florida Power Corporation (FPC) will install an additional transformer to be used as the alternate offsite power source for the ES 4160V busses.
- The Design Basis review program, which led to identification of this 5. inadequacy on the part of the SUX, will continue.

## PREVIOUS SIMILAR EVENTS

Several previous Licensee Event Report (LER) events caused by design or system inadequacies were discovered by the use of more stringent analysis methods than the original methods employed. Among the more recent LERs are 90-002 and 90-005. Neither of these LERs dealt with the SUX or the electrical system.