



Entergy
Operations

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Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Response to Inspection Report
50-313/92-09; 50-368/92-09

Gentlemen:

Pursuant to the provisions of 10CFR2.201, attached is the response to violation 50-368/9209-01.

Should you have questions or comments, please call me at 501-964-8601.

Very truly yours,

for James J. Fisicaro
Director, Licensing

JJF/SWB/mmg
attachments

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NOTICE OF VIOLATION

During the NRC inspection conducted during the period May 10 through June 20, 1992, a violation of NRC requirements was identified by your staff. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C, the violation is listed below:

10 CFR Part 50.62(c)(1) requires in part that "each pressurized water reactor must have equipment from sensor output to final actuation device, that is diverse from the reactor trip system, to automatically initiate the . . . emergency . . . feedwater system . . . under conditions indicative of an ATWS." ATWS is an acronym for Anticipated Transient Without Scram.

Contrary to the above, the licensee identified on June 5, 1992, as documented on Condition Report CR-2-92-0140, that the diverse emergency feedwater actuation system (DEFAS) was not likely to actuate under conditions indicative of an ATWS. When the motor generator output diverse scram system contactors open, the power supply to the motor generator excitation field will be lost and, as a result, control power to Auxiliary Relays 29X-5 and 29X-6 will be lost. Since these relays were intended to be energized to enable the DEFAS to actuate, DEFAS will likely not actuate during an ATWS. This condition has existed since installation during Refueling Outage 2R8.

This is a Severity Level IV violation. (Supplement I) (368/9209-01)

Response to violation 368/9209-01

(1) Reason for the violation:

Arkansas Nuclear One (ANO) agrees that a violation occurred regarding the inoperability of the Diverse Emergency Feedwater Actuation System (DEFAS) since installation. The purpose of DEFAS is to mitigate Anticipated Transient Without Scram (ATWS) event consequences by providing a diverse means to initiate emergency feedwater. The primary means of emergency feedwater actuation, the Emergency Feedwater Actuation System (EFAS), satisfied the Technical Specification requirements during this time.

The Diverse Scram System (DSS) was installed during the Unit Two refueling outage #7 (2R7). The design development of DEFAS began after the design of the DSS was completed.

The design engineer utilized a spare auxiliary relay contact (installed per the DSS design) from each contactor control circuit to enable the DEFAS. He did not realize that power would be lost to the DSS contactor control circuits upon DSS trip. The design engineer thought that power would be available to the control circuit after a DSS trip since the control circuit power was derived from the motor generator (MG) output upstream of the contactors.

However, he did not realize that the DSS contactor was upstream of the excitation circuitry power source on the MG output. In reality, control power would not be available for the contactor control circuits upon a DSS trip due to a loss of generator excitation. This is an obscure error that was not detected during the Design Change Package (DCP) development, review or post-modification testing. In addition, several reviews of Unit Two's implementation of the Anticipated Transient Without Scram (ATWS) rule have been conducted in the past and did not identify this subtle design error. The root cause of this condition is considered a personnel error in the design of Design Change Package (DCP) 89-2053.

Two contributing causes have been identified.

1. The only drawing that showed the excitation circuitry power source downstream of the DSS contactors was vendor print 6600-E2014-4. Since the DEFAS DCP did not result in a revision to this drawing, it was not included in the DEFAS DCP and probably was not reviewed during the review process. Design engineering personnel have determined that if a design drawing such as the MG set schematic (E-2192 Sh. 1) or the DSS schematic (E-2192 Sh. 2) had indicated that the excitation circuitry power was derived from the MG set output downstream of the DSS contactor, then the design error likely would not have occurred.
2. This design error was not identified during the start-up testing for the DEFAS DCP. It is our belief that the only way this error could have been detected during testing was to simulate actual plant conditions during full power operation. Although a very detailed test plan was developed for post-modification testing of this DCP, no testing was conducted at actual power operation conditions (i.e., MG sets operating).

It was originally the intent of start-up engineering personnel to test the DSS trip with the MG sets in operation; however, the MG sets were found to be de-energized and hold-carded due to the outage. Likewise, DSS contactor control power handswitches 2HS-9901 (2C407) and 2HS-9902 (2C408) were found to be in the OFF position. Realizing that the DSS or DEFAS would not be operable without power to the MG sets, start-up engineering personnel stopped testing (as noted in the test log of test procedure 2409.284) and consulted with personnel from modifications engineering.

It was decided that with no power to the MG sets, the DSS and DEFAS were not required to be operable since a loss of power would result in a reactor trip, and therefore would not result in an ATWS condition. However, it was not realized that this situation was equivalent to that resulting from a DSS contactor trip with the DSS bypass breakers open ("not in bypass"). Subsequently, the control power handswitch on each DSS

contactor cabinet was placed in the TEST position to provide control power from 2Y3 for 2C407 and from 2Y4 for 2C408. This allowed testing to continue since power could now be applied to the contactor trip coil. Although the MG set status and DSS contactor control power handswitch status were not identified as initial conditions in the DSS testing portion of DEFAS Work Plan 2409.284, it is considered to be a weakness that the handswitch position was altered without a change to the test procedure or an entry in the test log.

(2) Corrective steps taken and the results achieved

Temporary Modification 92-2-013 was installed on June 19, 1992, making DEFAS operable. This temporary modification bypassed the auxiliary relay contact of each DSS contactor used for the DEFAS enable signal. Additionally, bypassing these contacts allows the DEFAS to be operable during a loss of offsite power.

DCP 92-2017 has been developed to permanently correct the DEFAS problems. The plant installation of this DCP is expected prior to the end of 2R9.

The necessary design drawings have been revised to distinctively indicate that the excitation circuitry power source is located on the MG set output downstream of the DSS contactor.

(3) Corrective steps which will be taken to avoid further violations

A meeting was held on August 7, 1992, with startup and modification engineers to review this incident and the lessons learned. The meeting stressed the need to accurately assess the functional requirements and proper lineup of systems involved in a post modification test and to incorporate these into the test. It also emphasized that all significant post modification test evolutions, discrepancies and corresponding resolutions be completely documented.

A review for generic applicability of this condition was conducted for both units. No other applications were identified where this condition occurred. Entergy Operations, Inc. considers this condition to be a unique design error and not indicative of a generic programmatic concern with the design or post modification testing processes.

(4) Date of full compliance

Full compliance was achieved on June 19, 1992, as a result of the installation of Temporary Modification 92-2-013 making the system operable.