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Energy to Serve Your World™

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Docket No.: 50-364

NEL-01-0170

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Joseph M. Farley Nuclear Plant – Unit 2
Licensee Event Report 2001-001-00
Reactor Trip Due to Main Generator Neutral Connecting Bolt Failure

Ladies and Gentlemen:

Joseph M. Farley Nuclear Plant – Licensee Event Report (LER) No. 2001-001-00 is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A).

There are no NRC commitments in this letter. If you have any questions, please advise.

Respectfully submitted,

Dave Morey

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Attachment

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U. S. Nuclear Regulatory Commission

cc: Southern Nuclear Operating Company
Mr. L. M. Stinson, General Manager – Farley

U. S. Nuclear Regulatory Commission, Washington, D. C.
Mr. F. Rinaldi, Licensing Project Manager – Farley

U. S. Nuclear Regulatory Commission, Region II
Mr. L. A. Reyes, Regional Administrator
Mr. T. P. Johnson, Senior Resident Inspector – Farley

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2) NUMBER	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Joseph M. Farley Nuclear Plant – Unit 2	05000364	2001	- 001	- 00	2 OF 4

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

Westinghouse -- Pressurized Water Reactor

Energy Industry Identification Codes are identified in the text as [XX]

Description of Event

The generator neutral transformer leads are disconnected and reconnected each unit refueling outage. This process is controlled by the main generator [EL] tagging and backfeed procedure. In 1998, torque values for the main generator neutral transformer connection bolt [EL] were added to the procedure. This guidance included a value of 20 ft-lbs for bronze connectors and a standard table of values for steel connectors including both English units (ft-lbs) and metric units (Newton-meters), typically 24-30 ft-lbs and 33-40 nt-m for the bolt size in question. The generator neutral transformer electrical connection was made up with a bolt made of coated silicon bronze material similar in appearance to steel. During three successive outages the coated bronze bolt was misidentified by the worker as steel. In the 1998 and 1999 outages, the bolt was torqued to 33-40 ft-lbs, based on reading the metric values in the procedure as English units. In each of these cases the worker realized his mistake and remade the connection using the correct value for a steel bolt (24-30 ft-lbs). On May 2, 2001, during the 2001 outage the bolt was misidentified as steel and overtorqued to 24-30 ft-lbs.

On June 23, 2001 at 0857, with the unit at 100% power, the generator neutral connecting bolt failed due to the repeated overtorquing. The loss of this electrical connection actuated the generator neutral overcurrent auxiliary relay, which per design resulted in a main generator trip, turbine trip, and reactor trip. All safety systems functioned as designed following the trip.

In order to determine the failure torque for the silicon bronze type bolt, two new bolts were slowly torqued to failure. The bolts failed at 41 and 42 ft-lbs. Two additional new bolts were torqued in increasing increments of 5 ft-lbs, detensioning after each increment, until failure. These bolts failed at 35 and 36 ft-lbs.

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Cause of Event

The failure of the bolted electrical connection on the generator neutral overcurrent transformer was due to a combination of personnel error and procedural inadequacy as follows: On three occasions over a four year period, workers reconnecting the generator neutral misidentified the bolt as steel, based on its coating, rather than silicon bronze. As a result, they overtorqued the bolt to 24-30 ft-lbs, appropriate for steel, but in excess of the recommended 20 ft-lbs for silicon bronze. The procedure did not provide guidance for distinguishing coated silicon bronze bolts from steel bolts which are visually very similar. This overtorquing was further aggravated by failure to follow procedure in the use of metric values with a wrench calibrated in English units. On two of the above three occasions, the procedure was initially misapplied in that the metric torque value given in the procedure (33-40 Newton meters is equivalent to 24-30 ft-lbs) for steel was used as 33-40 foot-pounds, resulting in additional overtorquing. Although on both these occasions the worker realized his mistake and retorqued the bolt to the correct value for steel, the initial overtorque contributed to eventual failure of the bronze bolt.

A contributing cause was inadequate procedure in that no guidance on evaluating overtorquing was established.

Safety Significance

All safety systems functioned as designed following the trip. There was no abnormal release of radioactive material during this event; therefore the health and safety of the public were unaffected by this event.

Since all safety systems functioned as designed, this event does not represent a Safety System Functional Failure.

Corrective Action

The main generator tagging and backfeed procedures will be revised by September 1, 2001 to specify the exclusive use of silicon bronze bolts in this application, to specify only a single torque value, and to require replacement of the generator neutral transformer connecting bolts every refueling outage.

Appropriate personnel will be made aware of this event and of the above procedure changes by October 1, 2001.

Appropriate training and procedure changes will be provided by October 1, 2001 to create a standard requiring that, if a bolt is ever overtorqued, it will be evaluated for suitability for continued service.

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Additional information

The following LERs have been submitted in the past two years on reactor trips due to personnel error or inadequate procedure:

LER 2000-006-00 Unit 1, Reactor Trip from 4% Power Due to Unexpected Turbine Electrohydraulic Control System Response

LER 1999-002-00 Unit 1, Unit 1 Reactor Trip Following Loss of the 1A Steam Generator Feedwater Pump