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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-001

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Additional Information Supporting License Amendment Regarding Automatic Operation of Transformer Load Tap Changers

References: (1) Letter from P. R. Simpson (Exelon Generation Company, LLC) to U. S. NRC, "Request for License Amendment Regarding Automatic Operation of Transformer Load Tap Changers," dated January 25, 2006

(2) Letter from U. S. NRC to C. M. Crane (Exelon Generation Company, LLC), "Quad Cities Nuclear Power Station, Units 1 and 2 – Request for Additional Information Related to Automatic Load Tap Changers Amendment Request," dated May 12, 2006

In Reference 1, Exelon Generation Company, LLC (EGC) requested a license amendment supporting a change to the Updated Final Safety Analysis Report. Specifically, the requested change implements the use of automatic load tap changers (LTCs) on transformers that provide offsite power to Quad Cities Nuclear Power Station, Units 1 and 2. The LTCs are subcomponents of new transformers that are being installed to compensate for potential offsite power voltage fluctuations in order to ensure that acceptable voltage is maintained for safety related equipment.

In Reference 2, the NRC requested additional information to support their review of Reference 1. The attachment to this letter provides the requested information.

EGC has reviewed the information supporting a finding of no significant hazards consideration that was previously provided in Attachment 1 of Reference 1. The supplemental information provided in this submittal does not affect the bases for concluding that the proposed license amendment does not involve a significant hazards consideration.

If you have any questions concerning this letter, please contact Mr. David Gullott at (630) 657-2819.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 17th day of May 2006.

Respectfully,

Patrick R Simpson

Patrick R. Simpson
Manager - Licensing

Attachment: Additional Information Supporting the Automatic Operation of Transformer Load Tap Changers

ATTACHMENT

Additional Information Supporting the Automatic Operation of Transformer Load Tap Changers

Request 1

Describe the periodic testing to be performed on the automatic load tap changer (LTC) to ensure proper operation, including its interval.

Response 1

On a two year frequency, the LTC will be verified both manually and electrically for proper timing and sequencing of operation. On a six year frequency, preventative maintenance consisting of inspection of contacts for damage and pitting, checks for loose or damaged components, and functional testing of the LTC (i.e., similar to the two year test) will be performed.

Request 2:

Will the control and indication of the LTC be available in the control room?

1. *If there is control and indication of the LTC in the control room, provide a discussion about the verification of the LTC transformer control circuits, controls and control switches for proper functionality.*
2. *If there is no control and indication of the LTC in the control room, provide a basis for not having control and indication of the LTC in the control room.*

Response 2:

The LTCs are subcomponents of new reserve auxiliary transformers (RATs) that are being installed at Quad Cities Nuclear Power Station. There will be no LTC control or tap position indication available in the control room. All manual tap changes will be performed locally at the transformers' LTC control cabinets. Control room operators, however, do have both high and low voltage alarms for the buses that are fed by the RATs. Actual bus voltages can be obtained from voltmeters on the control room panels or through computer points via the plant's process computer. In addition, the primary and backup LTC controllers initiate control room alarms should their microcontrollers or power supplies fail. The backup LTC controller also provides a control room alarm should the transformer secondary voltage move outside the limits of both the primary and backup LTC controllers for a period of three minutes. This would alert control room operators that a problem has occurred and that the LTC controllers or the LTC itself are not operating properly.

LTC control and indication in the control room was deemed unnecessary due to the consequences associated with a postulated failure of the LTC in its automatic mode of operation. In a scenario in which a LTC experiences a failure of both the primary and backup controllers, the secondary voltage on the RAT begins to rise. Depending on the grid voltage (transformer primary), the loads fed from the RAT could experience a high voltage condition which could lead to equipment damage. However, this is only a concern should the condition be sustained for an extended period of time. Upon receipt of a high voltage alarm, operators would have sufficient time to dispatch personnel to the LTC control cabinet and take manual control of the LTC. Control room operators in parallel with this action would be monitoring the 4 kV bus voltages from the control room voltmeters and would be in a position to manually trip the RAT should voltages continue to rise. A scenario in which the LTC fails in the opposite direction results in bus voltages being lowered. This scenario is mitigated by the existing degraded voltage relays which would separate the plant buses from their offsite sources (approximate 5-minute delay) and allow the plant loads to be powered from the emergency diesel generators.

Request 3:

Describe the design features of the LTC to identify failures and limit failure duration.

Response 3:

The primary LTC controller is designed to regulate the 4 kV bus voltages under both normal and accident conditions. In the event this controller fails and the voltage rises or falls outside its operating voltage band, the backup LTC controller will take over automatic operation of the LTC. The backup LTC controller also utilizes a redundant relaying scheme to ensure the LTC does not raise or lower the taps beyond the limits set within the backup LTC controller itself. With the use of this redundant relaying scheme, a single relay failure cannot cause the LTC to operate outside the operating range of the backup LTC controller.

Both the primary and backup LTC controllers initiate control room annunciator alarms should their microcontrollers or power supplies fail. The backup LTC controller also provides a control room alarm should the RAT secondary voltage move outside the limits of both the primary and backup LTC controllers for a period of three minutes. This would alert operators that a problem has occurred and that the LTC controllers or the LTC itself are not operating properly.

The LTC is also equipped with a vacuum interrupter monitoring system to ensure the vacuum interrupters are operating properly during the tap changing process. The monitoring system will abort a tap change operation should a vacuum interrupter fail to interrupt the current during a tap change or should the power supply to the monitoring system fail. The failure would be indicated on the local control panel and identified during operator rounds. The system must be verified to be operating correctly and manually reset prior to further tap changes.

Request 4:

Discuss whether a separate power supply will be used for main and backup controllers associated with the LTC.

Response 4:

Both the main and backup controllers, as well as the LTC motor and its associated controls, are fed from the same power source via an automatic transfer switch. The normal power supply is from an MCC on the opposite unit. Should that source fail, the transfer switch will automatically swap over power to the LTC and its controllers from an MCC on the affected unit (i.e., emergency supply). The use of the opposite unit MCC was necessary due to the large voltage drop that would occur during accident conditions due to ECCS pump starts, which might prevent the LTC motor from operating during the first few seconds of an accident.

The LTC will not be considered functional when powered by its emergency power supply. In the event the transfer switch operates, an annunciator alarm is received in the main control room. In response to this alarm, an operator will be dispatched to the transfer switch to verify proper transfer of the power supply and actions will be taken to restore power back from the normal supply.