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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Dresden Nuclear Power Station, Units 2 and 3
Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

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

Subject: Commitments for Resolution of Steam Dryer Degradation Issue

On June 10, 2003, Exelon Generation Company, LLC (EGC) commenced a shutdown of Quad Cities Nuclear Power Station (QCNPS), Unit 2, as a result of suspected steam dryer degradation. The degradation was suspected due to noted increases in reactor coolant moisture carryover and corresponding changes, albeit small, in main steam flow and reactor water level. A decision was made to shut down Unit 2 based upon the combined changes in these parameters. The shutdown was completed on June 11, 2003. Following reactor vessel disassembly, EGC and General Electric (GE) completed detailed inspections of 100% of the accessible areas of the QCNPS Unit 2 steam dryer. These inspections identified damage in the outer hood cover plates, internal bracing, and tie bars of the steam dryer.

Details of the damage, cause evaluation, and planned repairs were discussed with the NRC during conference calls on June 17, June 18, and June 20, 2003. During the June 20, 2003, conference call, EGC discussed the actions that had been taken and those planned, to provide a basis for the return to power operations following completion of the repairs and associated testing. Specific commitments were discussed with the NRC to address the efficacy of the repairs and to address generic implications to other boiling water reactors in the EGC/AmerGen fleet. Additional discussions were held on June 25, June 26, and June 27, 2003, in which additional commitments were discussed with the NRC. The specific actions and commitments are discussed in the Attachment, and represent our commitments in their entirety.

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If you have any questions or require additional information, please contact Mr. Kenneth M. Nicely at (630) 657-2803.

Respectfully,

Keith R. Jury

Keith R. Jury
Director – Licensing
Mid-West Regional Operating Group

Attachment:
Actions for Resolution of Steam Dryer Degradation Issue

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

ATTACHMENT
Actions for Resolution of Steam Dryer Degradation Issue

Background

On June 10, 2003, Exelon Generation Company, LLC (EGC) commenced a shutdown of Quad Cities Nuclear Power Station (QCNPS), Unit 2, as a result of suspected steam dryer degradation. The degradation was suspected due to noted increases in reactor coolant moisture carryover and corresponding changes, albeit small, in main steam flow and reactor water level. A decision was made to shut down Unit 2 based upon the combined changes in these parameters. The shutdown was completed on June 11, 2003. Following reactor vessel disassembly, EGC and General Electric (GE) completed detailed inspections of 100% of the accessible areas of the QCNPS Unit 2 steam dryer. These inspections identified damage in the outer hood cover plates, internal bracing, and tie bars of the steam dryer.

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Steam Dryer Licensing Basis

The function of the steam dryer is to remove moisture from the steam in order to minimize erosion of the piping and turbine and to improve the turbine efficiency. Moisture is removed by impinging on the dryer vanes, and flows down through collecting troughs and tubes to the water trays above the downcomer annulus. The steam dryer at QCNPS Unit 2 does not have a safety-related function other than to maintain its structural integrity. In addition, steam moisture content is a factor in design inputs such as transport of particulate radioactive material from the reactor.

The Boiling Water Reactor Vessel and Internals Project (BWRVIP) document BWRVIP-06 (i.e., Reference) states that the dryer is non-safety related and that failure of a dryer component may cause an operational concern but has no safety impact. BWRVIP-06 also states that cracking in the dryer would have to be very significant to cause structural integrity concerns. Because dryers are visually inspected during removal in outages, significant cracking and associated loose parts due to cracking during the subsequent cycle are unlikely. In addition, the Updated Final Safety Analysis Report for QCNPS does not describe any type of dryer failure or postulate a dryer failure.

EGC has evaluated the QCNPS Unit 2 dryer in light of the licensing basis described above. Although the dryer's structural integrity was compromised (i.e., damage was identified), there was no impact to the safety-related function of any components. Analyses conclude that there is no impact to the safety function of components due to loose parts in the annulus and separator regions. Partial blockage of the main steam lines due to loose parts would be detected through routine monitoring of main steam line flow. Full blockage of the main steam lines would result in an automatic reactor scram, with a pressure transient less severe than the

limiting overpressurization transient. Finally, loose parts would not result in the loss of the main steam line isolation valves' function to isolate the line due to the high velocity of steam flow and the redundant valve arrangement.

The accidents and transients described in the Updated Final Safety Analysis Report Section 15.0 remained bounding and there were no effects on the Technical Specifications due to the actual event. Based on the identified dryer damage and the actual migration of its broken parts, it can be concluded that all of the QCNPS Unit 2 safety systems would have responded as designed, had a design basis event occurred.

In summary, as discussed in QCNPS licensing basis documents and further supported by the BWRVIP, failure of a dryer component may cause an operational concern but has no safety impact.

Unit 2 Startup and Power Ascension Monitoring Plan

During QCNPS Unit 2 startup following the dryer repairs, a Startup and Power Ascension Monitoring Plan will be implemented. The purpose of the plan is to ensure that the dryer repairs were effective in restoring the material condition of the dryer, and to establish a baseline of pertinent data for future analysis. Elements of the plan include monitoring moisture carryover, key reactor parameters, main steam line vibration data, and Loose Parts Monitor indications for anomalies. Specific elements of the Startup and Power Ascension Monitoring Plan are described below.

- Main steam line vibration levels and key reactor and plant parameters (e.g., reactor pressure, reactor water level, feedwater flow, and main steam line flow) will be monitored during the startup following the dryer repair. Unexpected changes in reactor parameters or main steam line vibration levels will be evaluated, documented in the Corrective Action Program, and actions will be taken as appropriate.

- The power ascension plan during the startup following the dryer repair will include a documented assessment of overall dryer performance, including moisture carryover measurements, once a power level of approximately 2511 megawatts thermal (Mwt) is reached. This power level is the maximum original licensed power level prior to NRC approval of extended power uprate (EPU). The moisture carryover results will be evaluated to ensure that the value is within the expected range for the plant conditions. In addition, the QCNPS Plant Operation Review Committee (PORC) will review the monitoring plan data and evaluation results.

- Any anomalous moisture carryover results will be evaluated. Specific moisture carryover thresholds have been established based on previous operating experience. If moisture carryover is greater than or equal to 0.1%, Engineering personnel will perform a formal evaluation through use of the EGC Corrective Action Program. Actions will be developed and implemented as appropriate.

  The EGC Operability Evaluation (OE) process will be used to perform this assessment. The OE process establishes a formal mechanism for reviewing non-conformances. Furthermore, the OE process ensures the appropriate level of technical rigor and management review.

- Moisture carryover samples will be taken on a daily basis. This is important because moisture carryover is the primary indicator of dryer degradation.

- Loose Parts Monitors, installed on each main steam line during the maintenance outage supporting the dryer repair, continuously monitor vibrational data and record any events. EGC will evaluate the loose parts monitors on a shiftly basis for the remainder of the cycle in an attempt to identify indications of potential loose parts. However, the data may not provide meaningful insights until a complete baseline of reliable data is obtained.

Regulatory Commitments

In addition to the Unit 2 Startup and Power Ascension Monitoring Plan, the following table identifies commitments made by EGC. EGC discussed these commitments with the NRC during a conference call on June 20, 2003, and additional discussions on June 25, June 26, and June 27, 2003. Any other actions discussed in the submittal represent intended or planned actions by EGC. They are described for the NRC's information and are not regulatory commitments.

Commitment	Committed Date or Outage
EGC will complete repairs to the QCNPS Unit 2 steam dryer and perform an evaluation to determine if the dryer is acceptable for operating up to pre-EPU 100% power levels (i.e., 2511 Mwt).	Complete
EGC will implement daily monitoring of moisture carryover and other key reactor and plant parameters while operating at full power at Dresden Nuclear Power Station (DNPS) Units 2 and 3, and QCNPS Units 1 and 2, to provide an early indication of potential dryer structural integrity issues. The QCNPS Unit 2 power level will be limited as delineated in this letter. If indications of steam dryer damage or structural integrity concerns are identified, EGC will reduce power to pre-EPU levels on the affected unit and continue to evaluate the issue in accordance with the corrective action process. The monitored parameters and monitoring frequency will be re-evaluated after completion of the QCNPS Unit 2 dryer root cause analysis.	Complete

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Commitment	Committed Date or Outage
EGC will restrict operation of QCNPS Unit 2 to the pre-EPU 100% power level until it is confirmed that the dryer degradation was unrelated to EPU. If the degradation is determined to be related to EPU operations, the effects of EPU operations on the reactor pressure vessel internal components and main steam line piping will be evaluated. The schedule for completing this evaluation will be communicated to the NRC. If supplemental information related to previous EPU licensing correspondence is required, this information will be sent under separate cover once this evaluation is complete. These effects and the root cause (discussed below) will be presented in a meeting with the NRC prior to increasing power above the pre-EPU power level.	Communicate the schedule by July 11, 2003
EGC will determine the root cause of the QCNPS Unit 2 steam dryer degradation and cracking; the metallurgical analysis of the dryer failure mechanism will be factored into the root cause analysis as appropriate. The schedule for completing this root cause determination will be communicated to the NRC.	Communicate the schedule by July 11, 2003
EGC will perform detailed finite element modeling of the steam dryers at DNPS Units 2 and 3, and QCNPS Units 1 and 2. Based on the results of the modeling, EGC will inspect susceptible areas of the four dryers during the next refueling outage for each unit.	DNPS Unit 2 (D2R18, scheduled to start on October 14, 2003) DNPS Unit 3 (D3R18 scheduled to start on November 2, 2004) QCNPS Unit 1 (Q1R18 scheduled to start on March 1, 2005) QCNPS Unit 2 (Q2R17 scheduled to start on February 24, 2004)
EGC will evaluate the insights gained from the QCNPS Unit 2 dryer root cause evaluation for impact to QCNPS Unit 1 and DNPS Units 2 and 3 based on the design similarities of these units. Any generic insights gained from the root cause evaluation will be shared with the Boiling Water Reactor Owners' Group in a timely manner for an evaluation of generic implications.	September 5, 2003
EGC will evaluate and disposition the extent of condition on the reactor pressure vessel internal components and main steam line piping relative to the degradation mechanisms that occurred on the QCNPS Unit 2 steam dryer, including the impact of operation at extended power levels. The schedule for completing this evaluation will be communicated to the NRC.	Communicate the schedule by July 11, 2003
EGC will submit a voluntary Licensee Event Report (LER) to the	August 22, 2003

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Commitment	Committed Date or Outage
NRC describing the event, failure mechanism, root cause, corrective actions, and safety significance. This will be submitted in accordance with NUREG-1022, Section 2.7, as an event or condition that might be of generic interest or concern.	

Reference

EPRI TR-105707, BWR Vessel and Internals Project, "Safety Assessment of BWR Reactor Internals (BWRVIP-06)," dated October 1995