December 8, 2004

LICENSEE: Exelon Generation Company, LLC

FACILITIES: Dresden Nuclear Power Station

SUBJECT: SUMMARY OF THE DECEMBER 2, 2004, MEETING WITH EXELON GENERATION COMPANY, LLC, TO DISCUSS CRACKING ON THE STEAM DRYERS AND MAIN GENERATOR ROTORS ON UNITS 2 & 3 AT THE DRESDEN NUCLEAR POWER STATION

On December 2, 2004, a Category 1 public meeting was held between the U. S. Nuclear Regulatory Commission and representatives of the Exelon Generation Company, LLC, (Exelon), the licensee for Dresden, at the Dresden Nuclear Power Station Training Center, 6500 N. Dresden Road, Morris, Illinois. The purpose of the meeting was to discuss the return to power operation of Dresden Units 2 and 3 at full extended power uprate (EPU) levels and to discuss issues identified during the on-going dual unit outage at Dresden, including the cracking observed on the steam dryers on Units 2 & 3 and the cracking on the main generator rotors for both Units 2 & 3. The meeting notice can be found in ADAMS as ML043290428. A list of meeting attendees is provided as Enclosure 1. The licensee's handout is provided as Enclosure 2.

Generator Rotors

During the fall 2004 refueling outage on Dresden Unit 3, the licensee identified a 13-inch crack in the main generator rotor. As a result, the licensee shut down Dresden Unit 2 for inspection and also identified a 10-inch crack in the main generator rotor on Unit 2. During the meeting, the licensee presented an overview of the cracking issues on the main generator rotors, including a timeline, inspection results, and causal factors resulting in the cracks. The licensee concluded that intermittent oscillating torsional loads above the material fatigue endurance limit combined with fretting in the keyway joining the coupling and the rotor produced the cracks on the rotor shaft. The specific sources of the intermittent oscillating loads were not known, but the licensee stated that possible causes of the oscillatory loads included switchyard events, breaker reclosures, line faults, and cycling of large loads. The licensee concluded that operations at EPU did not cause the cracking. The licensee presented the corrective actions taken for the cracking, including removal of the cracked end of the rotor, welding of a new stub shaft, re-design of the keyway to eliminate stress risers, and increasing the shaft torsional capacity through an improved coupling shrink fit. Because the exact sources of the intermittent oscillating torsional loads were not known, the licensee described monitoring plans for detecting and locating the sources of the intermittent loads.

In the discussions during and following the presentation on the rotors, NRC representatives expressed satisfaction with the efforts taken by Exelon on the Dresden units, but were concerned with other units that might be susceptible to a similar condition. Exelon representatives stated they would submit a voluntary Licensee Event Report (LER) on the rotor experience in order to support potential generic issue communications by NRC.

Steam Dryer

During the fall 2004 refueling outage at Dresden Unit 3, the licensee identified about 16 cracks in the steam dryer as a result of a detailed inspection. The most significant of the Dresden Unit 3 inspection findings was a 12-inch crack in the weld for the cover plate to the dryer support ring. As a result of the Dresden Unit 3 steam dryer inspection findings, the licensee performed a focused inspection of the Dresden Unit 2 steam dryer during its mid-cycle outage in November 2004. The Dresden Unit 2 steam dryer inspection only identified one small crack in a weld on the cover plate near a gusset.

During the meeting, the licensee also presented an overview of the steam dryer cracking issues, including a timeline of EPU operation at the Dresden units, a description of the modifications made to the Dresden units as a result of steam dryer cracking at Quad Cities, and the cracking and inspection results on the Dresden units since initial operation at EPU. Included in the licensee's presentation were the specific results of inspections since Unit 3 shut down for a refueling outage in October 2004, including over 1100 dryer inspection points on Unit 3 and high stress areas on Unit 2. Root cause and contributing factors for the identified cracks were discussed. On Unit 3, the licensee concluded that the causes of the most significant crack, involving the cover plate to support ring weld, were inadequate margin for load uncertainty, undersized fillet weld with small lack of fusion, and higher than nominal residual stresses. Most of the other Dresden Unit 3 steam dryer indications were determined to be small fatigue cracks. On Unit 2, the licensee concluded that the preliminary cause of the one identified crack (also on the cover plate to support ring weld) was lack of fusion at the crack initiation site. The licensee discussed the on-going analytical efforts for resolving the steam dryer issues at both Dresden and Quad Cities, including scale model testing, acoustic circuit analysis, and finite element analysis, and also detailed the modification and monitoring efforts implemented on the Dresden units. The licensee concluded that the steam dryer loading at Dresden Units 2 & 3 is less than the Quad Cities units, the causes of the cracks are understood and resolved, and monitoring will provide the capability to identify any future problems in time to take appropriate actions.

In the discussions during and following the presentation on the steam dryers, NRC representatives encouraged the use of scale model testing specifically for Dresden versus extrapolating from a Quad Cities model. The licensee stated that the dryer inspection results from the Dresden Unit 2 fall 2005 outage would be used to determine the potential impact on Dresden Unit 3. The licensee also committed to update their May 12, 2004 submittal to the NRC regarding EPU operation for Dresden and Quad Cities to include the basis for continued EPU operation at Dresden as discussed in the meeting.

The NRC and licensee representatives agreed that the meeting was beneficial in promptly addressing the generator rotor and steam dryer inspection issues for Dresden Units 2 and 3. The licensee representatives stated that they would consider the comments provided by the NRC staff in the actions to address these issues.

/RA/

Mark A. Ring, Chief
Branch 1
Division of Reactor Projects

Docket Nos. 50-237; 50-249
License Nos. DPR-19; DPR-25

Attachments: 1. List of attendees
2. Licensee Handout

cc w/encls: Site Vice President - Dresden Nuclear Power Station
Dresden Nuclear Power Station Plant Manager
Regulatory Assurance Manager - Dresden
Chief Operating Officer
Senior Vice President - Nuclear Services
Senior Vice President - Mid-West Regional Operating Group
Vice President - Mid-West Operations Support
Vice President - Licensing and Regulatory Affairs
Director Licensing - Mid-West Regional Operating Group
Manager Licensing - Dresden and Quad Cities
Senior Counsel, Nuclear, Mid-West Regional Operating Group
Document Control Desk - Licensing
Assistant Attorney General
Illinois Department of Nuclear Safety
State Liaison Officer
Chairman, Illinois Commerce Commission

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Enclosure 1

Meeting Participants

Exelon Generation Company, LLC.
K. Nicely
T. Roddey
P. Simpson
K. Jury
J. Benjamin
J. Meister
R. Lopriore
D. Bost
M. Kanavos
J. Sipek
P. Salas
G. Boershig
A. Shahkarami
A. Khanifar
D. Galanis
E. Flick
R. Osgood
R. Testin
A. McMartin
R. Rybak
J. Griffin
D. Leggett

Illinois Emergency Management Agency
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A. Settles

General Electric
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NRC
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