



### Information Security Reminder

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Page: 1

**Joseph Giantelli** (10/2/2008 2:53:36 pm)

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### River Bend - Wind Forces Exceed Turbine Building Siding Construction

At 1802 on September 1, 2008, River Bend Station completed a planned manual shutdown of the unit. The licensee determined a shutdown was necessary based on the conditions of the grid due to Hurricane Gustav. Evaluation by the licensee of grid conditions determined that a shutdown would improve the reliability of the grid. In addition, the licensee reported damage to turbine building siding. It turns out that more than 70% of the siding blew off the turbine building. See pictures of turbine building and transformer area. [Picture 1](#), [Picture 2](#) and [Picture 3](#)

See [EN 44457 - RIVER BEND "Planned Manual Plant Shutdown Due To Grid Conditions"](#) for details.

During the high winds a piece of the siding landed on the main transformer. Notice siding and insulation lying in the area. A piece of siding is laying on a transformer bushing. Potentially this could have led to an electrical fault if the licensee continued power generation. The insulation in the pictures can be seen spread out in several locations.

On September 2, 2008, a Preliminary Notification of Event or Unusual Occurrence was issued to the public. See [PNO-IV-2008-008: Entergy Operations, Inc., Waterford-3 & River Bend Station NRC Response to Hurricane Gustav ML082460622](#)

On Monday September 08, 2008, Entergy provided a telephone briefing on the turbine building damage at River Bend. The licensee discussed fastener design and installation, wind speed measures and probable gust wind speeds, and specifications for siding load capacity. [See attach wind speed data](#). The licensee performed a root cause and risk analyses. The licensee's conclusions indicated that:

- 1) The panels were not installed according to specifications - large variance in fastener spacing and angle
- 2) The wind consultants brought in by Entergy to review the turbine building failure identified an error in their calculations related to the attachment points of the outer skin. As such, they have revised their estimates to conclude the siding failed at a wind pressure of approximately 31 psf, which is less than the design criteria.
- 3) Higher localized wind gusts capable of achieving detachment pressure appear to have occurred, as evidenced by collateral damage to plant facilities and environs (e.g., cooling tower, building canopy, signage, pine trees, etc.).

The field investigation and repairs by the licensee is expected to reinforce the turbine building corners for higher wind pressures, reevaluate the fastener design and angle, reduce fastener spacing, install missing girt supports, conduct metallurgical testing, and laboratory analysis.

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The replacement siding installed by River Bend meets design criteria, and River Bend has taken actions to raise the strength of the remaining originally installed siding to meet design criteria, so this does not represent an ongoing concern.

See Licensees presentation on siding failure

### **Past operating experience of turbine building siding damage**

River Bend - The licensee had previous operating experience with lost siding during an incident in 1992.

On September 14, 1999, Hurricane force winds from Floyd at Brunswick, resulted in unusual event declaration and both units going to cold shutdown. Some siding panels from the turbine building were lost. Wind speed recorded at 75-95 mph. See EN 36163

Calvert Cliffs Individual Plant Examination of External Events Technical Evaluation Report for High Winds, Floods, and Other External Events Analysis identified that the air conditioning condenser units and air intake for the switchgear rooms for both units are vulnerable to potential missiles consisting of the collapsed sheet metal siding of the turbine building during hurricanes and tornadoes.

On May 10, 1996, a tornado at Quad Cities caused structural damage to the metal siding that forms the secondary containment barrier for the refueling floors on both Units. Subsequent documented inspections revealed approximately 270 (out of 1496) damaged explosion bolts. It was observed that not all of the damaged bolts were a result of this tornado. On August 23, 1996, it was concluded, through calculations, that not all of the design requirements for the siding would have been met and this would have placed secondary containment in an inoperable condition. The previously damaged explosion bolts were damaged either by a pressure load or by ineffective work practices. See Information Notice 96-64 for more details.

Quad Cities - EA 96-530 - Failure to maintain secondary containment as safety related.

### EN 42888 -SURRY - Manual Scram Due to Unusual Noise in Turbine Building

October 7, 2006, Surry experience detachment of the siding on the turbine building. The siding detached from all 12 safety valves opening at the same time, creating a high differential pressure across the turbine building siding. The design of the siding was to withstand wind speeds in excess of 150 mph. See INPO SEE-IN document SEN 266 for more details.

### Generic Letter 88-20 INDIVIDUAL PLANT EXAMINATION OF EXTERNAL EVENTS (IPEEE) FOR SEVERE ACCIDENT VULNERABILITIES

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