NRR Nuclear Reactor Regulation

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**Stephen Pannier** *(10/6/2010 9:29:29 am)*

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**San Onofre 2 & 3: EDG Ventilation Fan Nose Cone Corrosion Results in Fan Damage.**

The licensee at San Onofre Nuclear Generating Station (SONGS) submitted a voluntary Licensee Event Report (**LER 3612010004R0**) identifying a potentially new and unanticipated degradation mode for Emergency Diesel Generator (EDG) ventilation fans. During an EDG surveillance run, a ventilation fan hub 'nose cone' was ingested by one of the two Emergency Fans which ventilate the EDG building. The licensee voluntarily reported this occurrence because the findings may be of generic interest in that the potential exists for inspections to overlook the extent of corrosion that has occurred on components installed in inaccessible areas exposed to salt air environments. The licensee considered the safety significance of this condition to be minor.

The EDG Emergency fans at SONGS are Joy Manufacturing Company vane axial fans model 48-21-177. These fans draw in outside air and are located in the EDG buildings near the ocean shore line. An aluminum 'nose cone' bolted to the fan hub directs air over the fan blades. The nose cone is relatively light in weight and is secured to the carbon steel fan shaft sleeve with four carbon steel bolts. The failure of the nose cone in this Emergency Fan was due to pitting corrosion of the hub section caused by galvanic corrosion between the aluminum nose cone and carbon steel fan shaft sleeve, accelerated by the salt air in the marine environment. Other sections of the nose cone did not exhibit significant pitting corrosion. The corrosion was most severe on the back side of the nose cone where it contacts the carbon steel and retains moisture, making it difficult to detect visually. The failed nose cone was installed at time of original plant construction, approximately thirty years prior to the event. The licensee also found that the corrosion of the nose cones for fans on the west side (ocean side) of the EDG buildings was more pronounced than the corrosion found on the nose cones for the fans on the east side of the buildings.

The licensee replaced the remaining five nose cones on the EDG Emergency Fans. As a conservative measure, similarly designed nose cones on fans serving the Auxiliary Feedwater Building were inspected and replaced, although the corrosion found was not significant. The nose cone on one intake structure fan was also replaced; the other intake structure fans had previously had nose cones replaced as preventative maintenance.
The licensee will also revise the Preventative Maintenance program to ensure the nose cones on the EDG Emergency Fans are inspected and replaced more frequently.

**Related Inspection Procedure** (guidance only): **IP 50100** "Heating, Ventilating, and Air Conditioning Systems"

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