

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555

February 14, 1991

NRC INFORMATION NOTICE NO. 86-99, SUPPLEMENT 1: DEGRADATION OF STEEL  
CONTAINMENTS

Addressees:

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

This supplement to Information Notice (IN) 86-99 is intended to alert addressees to additional information about a potential degradation problem regarding corrosion in steel containments. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this supplement to the information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Discussion:

IN 86-99 was issued on December 8, 1986, in response to the discovery of significant corrosion on the external surface of the carbon steel drywell in the sand bed region of the Oyster Creek plant. This supplement updates the status of Oyster Creek containment corrosion and the licensee's mitigation program.

Since drywell corrosion was detected in 1986, the licensee instituted periodic wall thickness measurements by the ultrasonic testing (UT) technique to determine corrosion rates. The most severe corrosion was found in the sand bed region at a nominal elevation of 11'-3". The highest corrosion rate determined was 35.2±6.8 mils per year. To mitigate the corrosion in the sand bed region, water was drained from the sand bed and cathodic protection (CP) was installed in the bays with the greatest wall thinning in early 1989. Subsequent UT thickness measurements in these bays indicated that CP was ineffective. The licensee's consultants indicated that it would be necessary to flood the sand bed and to install CP in all the bays to make the CP system effective. The licensee decided that large amounts of water in the sand bed would be counterproductive.

In the spherical portion of the drywell above the sand bed region, the highest corrosion rate determined was  $4.6 \pm 1.6$  mils per year at a nominal elevation of 51'. In the cylindrical portion of the drywell above the spherical portion, where minor corrosion was discovered and was thought to have originated mostly during construction, no significant wall thinning was detected (at a nominal elevation of 87'). However, this is the region in which the nominal thickness of the wall has the least margin, thus requiring periodic monitoring of actual thickness.

The licensee has instituted a drywell program to arrest corrosion and to ensure containment integrity for the full licensed term of the plant. The licensee has taken action to investigate, identify, and correct leak paths into the drywell gap and plans to take more action to survey leakage and prevent it. The stainless steel liners in the refueling cavity and the equipment pool developed cracks along the perimeter of the liner plates where they were welded to embedded channels. For the refueling cavity, all potential leakage pathways have been thoroughly checked and liner cracks are sealed with adhesive stainless steel tape before a strippable coating is applied. Since the refueling cavity is flooded only during refueling, no leakage concerns exist at other times. At the end of an outage, the refueling cavity is drained, and the tape and strippable coating are removed. The licensee found leaks related to the equipment pool and stopped them with liner weld repairs. The equipment pool also will be protected with a strippable coating during flooded periods of operation.

The licensee believes that a thorough program has been established for managing leakage that could affect drywell integrity due to corrosion from moisture ingress into the drywell gap. Recent surveillance of the sand bed drains indicates that the sand bed is free of water. To further mitigate drywell corrosion, the licensee is considering removing the sand, insulation, gap filler material, and corrosion film and applying a protective coating to the exterior drywell surface. The licensee is proceeding with the analysis, engineering and planning to support removing the sand from the drywell sand bed region in the near future. Removal of the insulation and gap filler material from the drywell gap is being evaluated for future consideration.

The BWR Owners Group is surveying its members to determine whether other plants are experiencing water leakage into the drywell gap and possible corrosion of the exterior surfaces in the sand bed region as well as in the spherical and cylindrical parts of the drywell.

This supplement requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate NRR project manager.

*Charles E. Rossi*  
Charles E. Rossi, Director  
Division of Operational Events Assessment  
Office of Nuclear Reactor Regulation

Technical Contacts: Frank J. Witt, NRR  
(301) 492-0767

C.P. Tan, NRR  
(301) 492-3315

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED  
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
89-32, Supp. 1	Surveillance Testing of Low-Temperature Overpressure-Protection Systems	02/12/91	All holders of OLs or CPs for nuclear power reactors.
91-10	Summary of Semiannual Program Performance Reports on Fitness-for-Duty (FFD) in the Nuclear Industry	02/12/91	All holders of OLs or CPs for nuclear power reactors.
91-09	Counterfeiting of Crane Valves	02/05/91	All holders of OLs or CPs for nuclear power reactors.
91-08	Medical Examinations for Licensed Operators	02/05/91	All holders of OLs or CPs for nuclear power, test and research reactors.
90-77, Supp. 1	Inadvertent Removal of Fuel Assemblies from the Reactor Core	02/04/91	All holders of OLs or CPs for pressurized-water reactors (PWRs).
91-07	Maintenance Deficiency Associated with General Electric Horizontal Custom 8000 Induction Motors	02/04/91	All holders of OLs or CPs for nuclear power reactors.
91-06	Lock-up of Emergency Diesel Generator and Load Sequencer Control Circuits Preventing Restart of Tripped Emergency Diesel Generator	01/31/91	All holders of OLs or CPs for nuclear power reactors.
91-05	Intergranular Stress Corrosion Cracking in Pressurized Water Reactor Safety Injection Accumulator Nozzles	01/30/91	All holders of OLs or CPs for pressurized water reactors (PWRs).
91-04	Reactor Scram Following Control Rod Withdrawal Associated with Low Power Turbine Testing	01/28/91	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License  
 CP = Construction Permit