LBS ORIGINAL

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IN 86-99

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

December 8, 1986

IE INFORMATION NOTICE NO. 86-99: DEGRADATION OF STEEL CONTAINMENTS

Addressees:

All nuclear power reactor facilities holding an operating license or a construction permit.

Purpose:

This notice is to provide recipients with current information of a potentially significant safety problem regarding the degradation of a steel containment resulting from corrosion. It is expected that recipients will review this information for applicability to their facilities and consider actions, as appropriate, to promptly recognize or prevent a similar problem from occurring. However, suggestions contained in this notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

The Oyster Creek Nuclear Generating Station first discovered water in the gap between the boiling-water-reactor drywell and the concrete shield in 1980 and began investigation of the cause in 1983. It appeared that the collection of water varied from a few drops to 2 gallons per minute, depending on whether the unit was in operation or an outage for refueling. During the spring and summer of 1986, the licensee planned work to identify and eliminate this water problem. The bellows at the drywell to cavity seal was repaired and a gasket was replaced, thus stopping the leakage. Since the bellows is located at the top of the drywell and the region above the bellows is flooded during refueling, it would explain why leakage was high during refueling and low during operation.

To determine if the water in the gap had caused damaged to the steel containment, the licensee measured the wall thickness, using an ultrasonic testing (UT) technique at two elevations. The 51-ft level near the drywell seal was sound, but there appeared to be loss of metal on the gap side at the 11-ft 3-in. level immediately above the concrete floor. In this area, the gap is packed with sand and contains five equally spaced drain pipes (see attached Figure 1). A total of 143 measurements were made at this level and 60 indicated a reduction in thickness of more than 1/4 in. from the drawing thickness of 1.154 in. These readings were found throughout seven of the ten downcomer bays. The licensee plans to cut the steel containment and remove about 12 samples to confirm and evaluate the corrosion damage.

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The licensee plans to remove a section of the drain pipe to perform a visual examination of the outside of the drywell. Wipe samples will be taken from several areas and a chemical analysis will be performed. Sand samples will be taken adjacent to the core holes and will be analyzed for chemicals, bacteria, and water composition. Some channels are being cut in the concrete floor that is inside the drywell to provide access for further UT examination of the containment-sand interface.

Discussion:

The purpose of the sand is to act as a cushion and allow expansion of the drywell during operation. The steel containment is in contact with sand in those areas where corrosion has been detected. The containment material is ASTM A-212 Grade B carbon steel plate. The licensee stated that the outside surface was protected with a red lead coating from above the drywell down to about the 10-ft. level, which means that the interface between the lead paint and the unprotected steel was in contact with wet sand. Red lead protects steel by providing a stable and impenetrable surface, but the steel is sacrificial with respect to the lead in dilute, acidic water conditions.

It is possible that condensation during initial construction, moisture pickup through the drain line during operation, and the leaking bellows wetted the sand, thereby causing corrosion of the containment steel plates. During construction, water was seen running down the outside of containment into the sand. The five drain lines, as well as other penetrations in the concrete shield, are open during operation and would allow moist air to enter and rise up the gap and later cool and condense as water. Water also was able to enter the gap through the holes in the bellows during refueling until repairs were made.

A related matter is discussed in IE Information Notice 86-35, "Fire in Compressible Material at Dresden Unit 3," where a large amount of water was used to extinguish the slowly burning fire between the drywell and the concrete shield. Oyster Creek uses different filler material.

The NRC is continuing to obtain and evaluate pertinent information. If specific actions are required, an additional notification will be made.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contact: Paul Cortland, IE
(301) 492-4175

Attachments:
1. Figure 1, Sketch of Possible Degraded Area
2. List of Recently Issued IE Information Notices

Sketch of Possible Degraded Areas

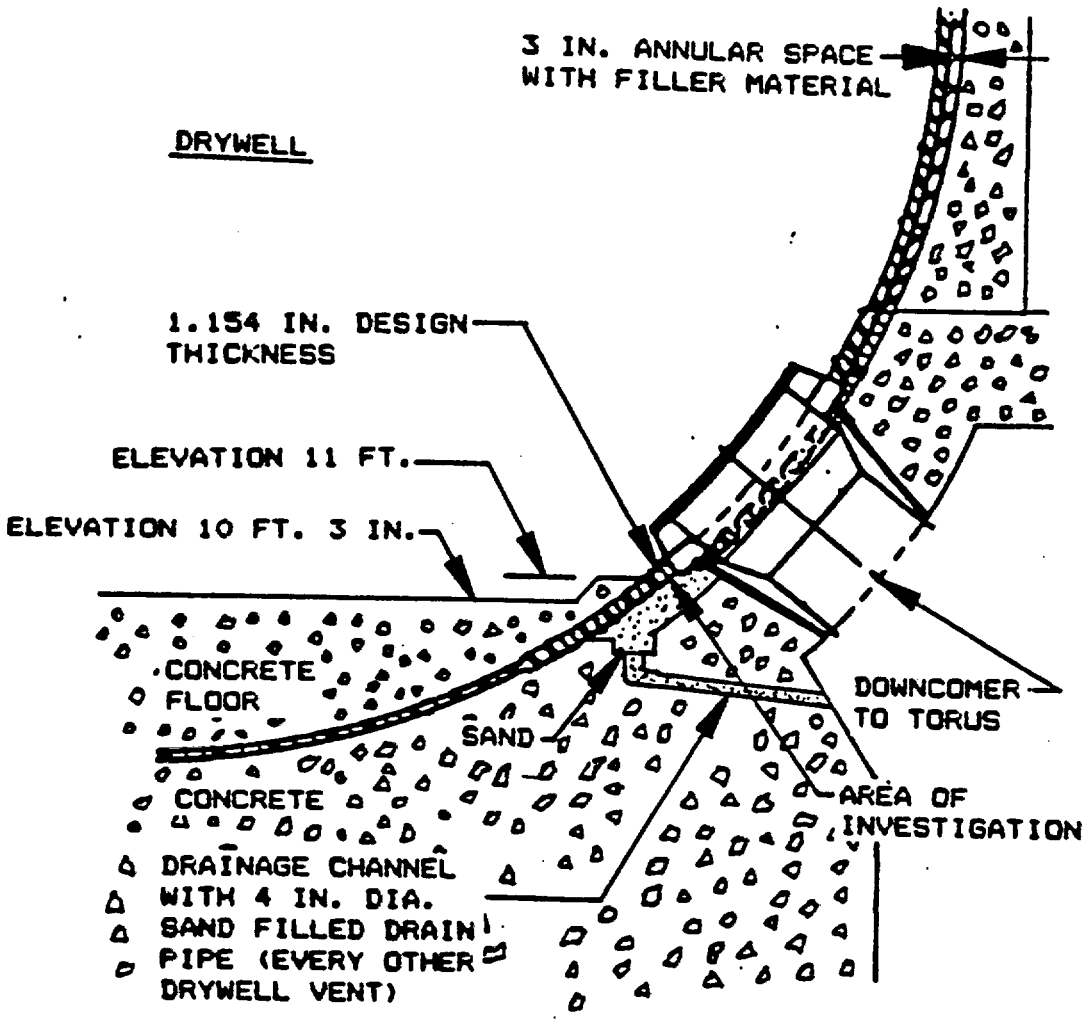

Figure 1

Attachment 2
IN 86-99
December 8, 1986

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-21 Sup. 1	Recognition Of American Society Of Mechanical Engineers Accreditation Program For N Stamp Holders	12/4/86	All power reactor facilities holding an OL or CP
86-98	Offsite Medical Services	12/2/86	All power reactor facilities holding an OL or CP
86-97	Emergency Communications System	11/28/86	All power reactor facilities holding an OL or CP and fuel facilities
86-96	Heat Exchanger Fouling Can Cause Inadequate Operability Of Service Water Systems	11/20/86	All power reactor facilities holding an OL or CP
86-95	Leak Testing Iodine-125 Sealed Sources In Lixi, Inc. Imaging Devices and Bone Mineral Analyzers	11/14/86	All NRC licensees authorized to use Lixi, Inc. imaging devices
86-94	Hilti Contrete Expansion Anchor Bolts	11/6/86	All power reactor facilities holding an OL or CP
86-93	IEB 85-03 Evaluation Of Motor-Operators Identifies Improper Torque Switch Settings	11/3/86	All power reactor facilities holding an OL or CP
86-82 Rev. 1	Failures Of Scram Discharge Volume Vent And Drain Valves	11/4/86	All power reactor facilities holding an OL or CP
86-92	Pressurizer Safety Valve Reliability	11/4/86	All PWR facilities holding an OL or CP

OL = Operating License
CP = Construction Permit

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