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April 11, 1990  
5000-90-1910

U. S. Nuclear Regulatory Commission  
Mail Station P1-137  
Washington, DC 20555

Attention: Document Control Desk

Dear Sir:

SUBJECT: Oyster Creek Nuclear Generating Station  
Docket No. 50219, Licensing No. DPR-16  
Oyster Creek Drywell Containment

References: GPUN Letters 5000-88-1633 dated September 12,  
1988, 5000-89-1717 dated February 9, 1989, NRC  
Letter dated April 28, 1989, and GPUN Letter  
5000-89-1820, dated September 29, 1989

In our conference call on March 8, GPUN committed to provide the staff with information on our recent findings regarding the Oyster Creek drywell wall thickness and our plans to assess and maintain the structural integrity of that vessel. This letter satisfies that commitment.

It has been our practice for several years to monitor the drywell thickness at selected representative locations by periodic ultrasonic (UT) inspection during plant outages where a drywell entry is made. One such UT inspection was made during the brief Oyster Creek outage in February of this year. The wall thickness data obtained during that inspection suggested that corrosion rates in some locations were higher than previously projected. As a result of those findings, we prepared an update (Revision 4) to our safety evaluation, concluding that, based on present analyses and observed corrosion rates, the drywell's service life can be conservatively confirmed to extend beyond our current operation cycle, that is, mid-1991.

Because the February database was somewhat limited, we decided also to conduct a more extensive examination at the next opportunity. That examination was conducted during the 12UJ outage (March 26 through April 3, 1990), and the results are reported below. We chose also to expand significantly our other ongoing activities to abate the drywell corrosion, to analyze the drywell, and to develop methods for any needed drywell repair. Our plans in these areas are also discussed in this letter.

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#### 12UJ INSPECTION PROGRAM

For the 12UJ outage, GPUN conducted the following inspections:

1. We re-inspected areas in the sand bed and the sphere where the February 1990 data indicated apparent changes in corrosion rate. These additional confirmatory data were obtained from Bay 5 in the Sphere (El. 50'-2") and from Bay 13A in the sand bed region, the same locations where the February 1990 data was taken.
2. We inspected additional areas in the sand bed region and El. 50'-2" which previously had exhibited lower corrosion rates. This included eight locations in the sand bed region which had not been inspected since October 1988 and performance of an A-scan of the accessible portions of the drywell circumference at El. 50'-2". We also took grids of 7 x 7 UT readings at the three thinnest points found by A-scan of the 50'-2" circumference.
3. We re-inspected the three regions in the upper cylinder (El. 87'-5") where we had previously not observed ongoing corrosion. (Had this examination showed ongoing corrosion, the plan called for an A-scan of accessible segments of the drywell circumference at El. 87'-5" followed by taking grids of 7 x 7 UT readings at the three thinnest locations found by A-scan. This expanded examination at 87'-5" proved unnecessary.)

An evaluation of the data taken in 12UJ as described above indicates that the conclusions of the safety evaluation (SE 000243-002, R4) are unchanged. This is based upon the determination that corrosion rates in the sand bed and sphere are about the same as those rates calculated from the February 1990 data. The areas inspected in the sand bed which had shown low corrosion when last examined in October 1988 have not changed with the exception of one location in Bay 13D. We plan to redesignate this location as a Priority 1 location for frequent monitoring pending completion of our evaluation of the 12UJ data. Our evaluation of the three thinnest locations on El. 50'-2" found by the A-scan shows that the minimum thickness around the circumference is consistent with that at the Priority 1 location currently being monitored. Finally, our evaluation of the three regions in the upper cylinder showed no ongoing corrosion.

In addition to the UT inspections during 12UJ, we also extracted a 2" diameter sample (core plug) from drywell Bay 13A in the sand bed. Bay 13A is an area of apparent significant corrosion (based on February 1990 data) which is not cathodically protected. This core plug was removed and will be chemically and metallurgically examined to determine if significant corrosion is occurring and to identify the corrosion mechanism. Removal of the plug also permitted removal of a sample of sand for chemical analysis to assess the condition of the sand bed.



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While the lab results of the core plug and surrounding sand are not yet in hand, by visual inspection the core plug looked similar to those removed in 1986, and the surrounding sand appeared relatively dry.

#### ONGOING WORK

Based on our conclusions from the drywell inspection activities in February and March of this year, we are proceeding with several parallel work paths on a very high priority. Our ultimate objective is to ensure that the drywell is, and remains, structurally adequate to meet its intended safety function. Our workplan includes several main elements, as follows:

- o Augmented data acquisition
- o Corrosion mitigation tasks
- o Structural analysis
- o Drywell modification/repair

Our plan of attack in each of these areas is outlined in the following sections.

#### Augmented Data Acquisition

Our approach here is to build on the existing database of UT wall thickness measurements and other examinations already conducted, and to continue on an aggressive data acquisition program. We are considering an augmented effort to include measurements at locations not yet interrogated in order to provide high statistical confidence that our program does in fact characterize the entire drywell vessel. Our feasibility study of the expanded plan will take into account both accessibility and radiation exposure implications. Our target is to complete our evaluations by September 1990. Until implementation of any augmented program, we will continue the current program.

#### Corrosion Mitigation

This involves several activities. The primary one is to evaluate the effectiveness of the existing cathodic protection (CP) system and to consider design and/or operational changes to enhance its performance. The system installed at Oyster Creek is quite extensive and was the result of a major engineering effort. We have been monitoring the effectiveness of this system since placed in operation in 1988. So far it appears to be less effective than we had hoped. A system performance test has recently been concluded, and the results are currently being evaluated by GPUN and Corrosion Services Co., Ltd. (the consultant who designed the system). The results of this evaluation should indicate the level of protection being afforded the drywell and potential enhancements to the operating system.

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Also, actions will continue to prevent or retard intrusion of water into the gap and the sand bed. During the 12R outage, a strippable coating was applied to the refueling cavity prior to refueling in order to eliminate this source of water into the sand bed. For the 13R outage, the application of this type of coating will be expanded to include both the refueling cavity and the equipment storage pool, which is another presumed source of water.

In parallel with the above evaluation of CP and because of the uncertainties in its effectiveness, we are reconsidering other mitigation methods we previously evaluated, including the use of drying systems, addition of chemical corrosion inhibitors, and chemical inhibitors in combination with CP.

Our target in corrosion mitigation is to develop a course of action by October 1990 with implementation as soon as possible thereafter. Over the long term, the effectiveness of the installed CP system or any other selected methods will be monitored by ongoing UT measurements.

#### Structural Analysis

Our objective is to develop a more comprehensive understanding of the dynamic structural performance of the drywell vessel under varying conditions in order to ensure that the drywell is structurally adequate for continued use. This will include application of state-of-the-art techniques for modelling and analyzing the vessel, review of the design basis loading conditions, and consideration of the actual material properties of the Oyster Creek vessel. Our target in this activity is to conclude our structural analysis work by September 1990.

#### Drywell Modification/Repair

Our approach here is to build on previous evaluations of potential structural repair of corrosion damaged areas of the drywell. This will include review of the previous study performed by CB&I Services to define conceptually various options for structural repair in the sand bed region. This study evaluated selected plate replacement, doubler plates, weld overlay, and stiffener structures as potential repair methods. This study will be expanded to consider Oyster Creek plant-specific constructability requirements, radiation dose estimates, decontamination and contamination control requirements, radwaste disposal requirements, schedule development, cost estimates, and locations in the drywell most likely to require repair. Options for repair of elevations above the sand bed will also be evaluated.

Our target is to select a preferred repair option before the 13R outage, and then take steps to be ready to implement that option if and when it is required. During the 13R outage, drywell walkdowns will be performed to assess physical aspects of the job and to compile the information required to complete selection of and planning for a repair option.



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In summary, GPUN's Safety Evaluation 000243-002 (Rev. 4) has conservatively confirmed safe operation of Oyster Creek through the 13R outage until August 1991. Our current actions, including continued inspections, structural analysis, and corrosion mitigation will establish the basis for continued operation until the 14R outage. Over the longer term, the repair contingency plan will be developed to the extent that it is available to support a timely decision by GPUN regarding steps necessary to ensure drywell serviceability.

We will continue to keep you informed of our progress in this area. If you have any questions or you wish to schedule a meeting for further discussion, please contact M. W. Laggart, Manager, BWR Licensing at (201) 316-7968.

Sincerely,



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Vice President, Technical Functions

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