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BWR OWNERS' GROUP

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Chief, Rules and Directives Review Branch
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: **COMMENTS ON PROPOSED GENERIC COMMUNICATION, "AUGMENTED INSERVICE INSPECTION REQUIREMENTS FOR MARK I AND MARK II STEEL CONTAINMENTS, REFUELING CAVITIES, AND ASSOCIATED DRAINAGE SYSTEMS" (57 Federal Register 54860, November 20, 1992)**

References:
1) R. W. Bishop (NUMARC) to Chief, Rules and Directives Review Branch (NRC), same subject, December 17, 1992
2) G. J. Beck (BWROG) to G. Bagchi (NRC), "BWR Owners' Group Recommendations on Containment Inspections; Summary of Survey of Utilities," June 7, 1991
3) S. D. Floyd (BWROG) to G. Bagchi (NRC), "BWROG Recommendations on Drywell Inspections," December 22, 1989
4) R. D. Binz (BWROG) to G. Bagchi (NRC), "Additional Information Pertaining to Containment Inspections," September 3, 1991

The BWR Owners' Group (BWROG) appreciates the opportunity to provide comments on the proposed generic communication referenced above.

BWROG Position

In their letter on this subject (Reference 1), NUMARC provides comments demonstrating that the proposed generic communication should not be issued. We concur with NUMARC's letter and believe that the fundamental issues raised by NUMARC need to be addressed. In addition, the BWROG does not believe that the program reflected in the proposed Generic Letter (GL) is technically justified or cost-effective. Accordingly, the BWROG recommends against issuance of the GL as proposed.

Nevertheless, the BWROG is willing to work with the Staff to develop an approach to address the technical concerns. At the NRC's initiative, the BWROG and NRC have established an ongoing dialogue on the topic of augmented inservice inspections of BWR Mark I and Mark II steel containments. The BWROG recognizes the NRC concerns with demonstrating containment integrity and that augmented inspections may be justified for some plants. It is the goal of the BWROG to establish an approach which is technically sound and reasonable, considering the importance of the containment to public health and safety, and which recognizes plant-specific differences regarding containment design and actions already taken. In this regard, and to advance the continuing dialogue on this subject, we are providing comments on the proposed GL. Attachment 1 to this letter provides specific comments on particular provisions of the Staff's proposed GL. Attachment 2 outlines the components of a program recommended by the BWROG.

The recommendations contained in the proposed GL are new Staff positions that, if implemented, would require a variety of actions to be taken by licensees. Accordingly, the proposed GL is a backfit within the context of 10CFR50.109, and should be supported with a backfitting analysis prior to issuance in final form. One potentially significant aspect of the proposed GL is the increased occupational radiation exposure that would result from the implementation of specific recommendations. Therefore, the Staff should ensure any backfitting analysis specifically addresses such an impact [see Section 50.109 (c)(4)]. Furthermore, as the increased occupational radiation exposure could be significant, an additional evaluation of its environmental impact may be necessary under Part 51.

Assuring that the containment satisfies its design and safety functions is a continuous effort performed by licensees whether or not the proposed GL is issued. In Reference 2, the BWROG provided results of a survey of its members demonstrating that most had taken steps to follow the BWROG approach. Plants also routinely demonstrate that the containment conforms to its design and licensing bases through testing under Appendix J of 10CFR50. These actions, along with the information obtained by the NRC from licensee responses to GL 87-05 as well as voluntary licensee actions triggered by GL 87-05, illustrate the proactive steps already taken by the BWR industry on this topic. Moreover, the available information indicates that the instances of containment corrosion already reported are isolated cases.

Overview of BWROG Comments and Recommendations

In response to previous NRC requests, the BWROG provided recommended inspections in References 2, 3 and 4. The BWROG and NRC also met to discuss this topic in October 1989 and December 1990. At the latter meeting, the NRC provided a table presenting its recommendations and comparing them to the BWROG recommendations. Since that meeting, there has been no further interaction on this topic. In addition, since that time, there have been no instances where a BWR licensee has identified a containment corrosion concern other than the two already well known. Yet, the inspections described in the Federal Register notice go well beyond those expected by the BWROG based on past discussions and on the positive BWR experience regarding containment integrity.

The BWROG is concerned that the inspections proposed by the NRC are not justifiable from a safety perspective, and that the cost of the NRC recommendations, including the increase in occupational exposure, is not commensurate with potential benefits. The BWROG believes that the NRC concerns can be properly addressed in a more cost-efficient manner. For example, the drywell inspections recommended in the proposed GL would apply to all Mark I and Mark II plants, even though drywell corrosion has not been shown to be a concern for plants without a drywell air gap (plants with an air gap include all Mark Is except for Brunswick Units 1 and 2, and one Mark II plant, WNP-2). In addition, the BWROG is concerned that the NRC recommendations do not provide adequate flexibility to allow exceptions for those plants with mitigating design features or that can demonstrate that a corrosion concern does not exist. Instead, the NRC recommendations would impose on all Mark I and Mark II plants an inspection program that may be unwarranted.

The NRC is well aware of industry concerns with rising operating and maintenance costs, and the impact this can have on plant performance and overall safety. The NRC has estimated that the cost of implementing the recommended inspection program is approximately $250,000 per unit. Based on a preliminary review, the BWROG believes that initial inspections could cost [illegible] to $1,000,000 per unit depending on individual plant circumstances, and continue at approximately $250,000 per outage per unit thereafter. In addition, some of inspections recommended by the NRC would be on the outage critical path, and would therefore extend the outage by the amount of time needed to complete those inspections. This time that the plant is not operating will also significantly contribute to the cost of implementing the NRC program. The BWROG believes that its recommendations can address the technical concern at much less cost.

The detailed BWROG comments provided in Attachment 1 were developed by utility representatives following an in-depth review of the proposed GL. The BWROG comments demonstrate that in some cases the NRC recommendations will not accomplish the intended purpose. In other cases, the intent of the NRC recommendations can be achieved in a more cost-efficient manner. The comments suggest alternatives that should be considered by the NRC.

The BWROG recommended approach outlined in Attachment 2 of this letter is similar to that provided previously in References 2, 3 and 4, but contains enhancements based on insight gained through the review of the proposed GL and further review of the preceding BWROG recommendations. The BWROG recommendations for the drywell are focused on first, assuring that if leakage exists it is detected and corrective actions are taken; second, evaluating the possible consequences of the leakage; and third, performing thickness measurements if indicated by the evaluation. For the torus, the recommendations are focused on performing a visual examination and, if so indicated, taking appropriate measurements to assure that the design thickness is present.

Conclusion

We would be happy to meet with the Staff to discuss our comments and work towards development of an appropriate program. Please contact the undersigned if you have any questions or if I can be of any other assistance. The BWROG also suggests that further dialogue on this subject can also be accomplished through established forums where both the NRC and industry are represented, such as ASME.

The comments/positions provided in this letter and its attachments have been endorsed by a substantial number of the members of the BWROG; however, it should not be interpreted as a commitment of any individual member to a specific course of action. Each member must formally endorse the BWROG position for that position to become that member's position.

Very truly yours,

Cynthia L. Tully

Cynthia L. Tully, Chairperson
BWR Owners' Group

WAZ14/CLT/waz

Attachments

cc: L. A. England, BWROG Vice Chairman
G. J. Beck, BWROG RRG Chairman
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BWROG Primary Representatives
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ATTACHMENT 1

Comments on Draft Generic Letter

Provided below are the BWR Owners' Group (BWROG) comments on the draft Generic Letter (GL) "Recommended Actions to be Taken by Addressees." The comments focus on specific provisions of the recommended actions in the proposed GL, as noted, and are provided should the NRC decide to issue the GL.

DRYWELL (External Surface)

Comment: The proposed GL fails to note that not all Mark I and Mark II plants have a drywell air gap. Accordingly, the GL should be revised to state that the recommended drywell inspections are applicable only to those plants with an air gap (all Mark I plants except Brunswick Units 1 and 2, and one Mark II plant, WNP-2).

(1) *- The proposed GL states that "Before [the] next refueling, plant personnel should perform inspections and tests for leakage of the joints and seals of the refueling cavity equipment pool and spent fuel pool that could leak water into the air gap."*

Comment: The GL should permit greater flexibility regarding whether these inspections need to be performed at the next refueling outage, by allowing credit for inspections or other actions previously performed by the licensee.

Comment: The BWROG believes the inspections stated above will not provide information that cannot be otherwise obtained at a lower cost. The proposed inspections are typically located on the critical path of outage activities, and thus will extend the outage by the amount of time needed to complete them. Refueling activities cannot begin until the inspections are completed and the pools then filled with water. In addition, the pools are located in a high radiation area, and the associated exposure should and can be avoided.

In its previous letters on this subject, the BWROG has maintained that the primary means of detecting leakage into the drywell air gap is by monitoring the drain lines in and above the sand cushion. The NRC, later in this same paragraph of the proposed GL, affirms the reliability of this method of detecting leakage by using it as the means of establishing inspection frequency. The GL should therefore state that the drains in and/or above the sand cushion should be monitored to detect leakage into the air gap. If leakage is indicated, the licensee should perform inspections and tests as needed to determine the source of the leakage.

Comment: Seal welded joints and the drywell bellows should perform their design function for the life of the plant. In addition, the drywell bellows is protected by a large guard plate that is not easily removed or, in some cases, permanently installed. Removal of this plate would unnecessarily increase outage time (because it would typically fall on the critical path, since refueling activities cannot begin until the inspection is completed and the pools filled with water)

and personnel radiation exposure. The bellows is also not a part of the plant's pressure boundary during operation. The GL should distinguish between seal welded joints and the drywell bellows, both of which do not require periodic inspection to perform their design function for the life of the plant, and gasketed (sealed) joints, which may be susceptible to leakage.

- The proposed GL states "Because the level switch, the flow indicators, and the flow switches cannot detect small leaks, they should not be relied on for leakage detection."

Comment: This sentence should be deleted. Generic conclusions regarding the accuracy of the level switch, flow indicators, and flow switches cannot be made because the accuracy will vary from plant-to-plant. In addition, inclusion of this sentence will preclude licensees from upgrading these components if needed, and thus inappropriately restricts licensees from implementing certain acceptable alternatives for leakage detection.

(2) *- The proposed GL states "Before the next refueling outage, drain lines that drain leakage from the pools should be checked to ensure that these lines do not contain restrictions that would inhibit the flow, and to ensure that the water is not directed into the drywell air gap."*

Comment: The GL should permit greater flexibility regarding whether these inspections need to be performed at the next refueling outage, by allowing credit for inspections or other actions previously performed by licensees.

Comment: The bellows seal rupture drain line is the only drain line from the pools that could result in leakage into the air gap, for the vast majority of BWRs. A functional test of the drywell bellows seal rupture drain line requires access to the drain in the cavity behind the bellows seal. As previously discussed, the drywell bellows is protected by a large guard plate which is difficult to remove or, in some cases, permanently installed, and removal of the plate would increase outage time (because it is a critical path item) and personnel exposure. Access to the drain through the bellows seal or in some other manner will also potentially increase the probability of leakage around or through the bellows in the future.

The BWROG believes the inspections stated in the proposed GL will not provide information that cannot be otherwise obtained at a lower cost. The proposed inspections are typically located on the critical path of outage activities, and thus will extend the outage by the amount of time needed to complete them. Refueling activities cannot begin until the inspections are completed and the pools then filled with water. In addition, the pools are located in a high radiation area, and the associated exposure should and can be avoided.

In its previous letters on this subject, the BWROG has maintained that the primary means of detecting leakage into the drywell air gap is by monitoring the drain lines in and above the sand cushion. The NRC, later in this same paragraph of the proposed GL, affirms the reliability of this method of detecting leakage by using it as the means of establishing inspection frequency. The GL should therefore state that the drains in and/or above the sand cushion should be monitored to detect leakage into the air gap. If leakage is indicated, the licensee should then perform an evaluation and inspections as needed to determine the source of the leakage.

(3) *- The proposed GL states "The sand-filled drains leading from the sand cushion should be checked for functionality by testing with compressed air or other means before each refueling and by collecting sand samples to test for the presence of moisture before and after each refueling."*

Comment: The intent of this GL recommendation is apparently to verify the functionality of the drain lines in and/or above the sand cushion. The BWROG wishes to emphasize that more than one acceptable method exists to accomplish this intent, and concurs with the wording in the proposed GL that permits the licensee to select the appropriate method. The BWROG notes that drawing a sand sample twice per outage may eventually result in difficulty in extracting sand in the future, as the sand in the vicinity of the drain lines is removed. The BWROG also notes that sampling the sand will not verify that a free path exists from a potential leakage source to the drain lines; if the sand is dry, a free path may or may not exist. Thus other methods, such as compressed air or a boroscope, may be more appropriate for determining ***both*** the existence of a free flow path and the functionality of the drain lines. To determine whether moisture is present, some type of moisture detection device may be more appropriate.

The GL should be revised to state that to determine if a free flow path is present, appropriate methods such as compressed air should be used, and to determine if moisture is present, appropriate methods such as a moisture detection device should be used.

- *The proposed GL states "To determine the effect of the moisture on drywell corrosion, carbon steel specimens should be inserted into the sand cushion through the drains and withdrawn every six months to check for any indication of corrosion."*

Comment: In its December 22, 1989 letter to the NRC on the subject of drywell inspections, the BWROG suggested that a carbon-steel specimen be inserted into the sand cushion and periodically withdrawn to look for signs of corrosion. The intent of the BWROG suggestion was to provide a ready means of determining whether moisture was present in the sand cushion, thus indicating the possibility of leakage into the drywell air gap. However, it is important to recognize that corrosion of a carbon-steel specimen does not necessarily indicate the existence of corrosion of the drywell shell. The implication in the proposed GL is the opposite.

Corrosion of the carbon-steel specimen is not an indication of drywell steel corrosion because:

a) the specimen is located in a portion of the sand cushion away from the drywell wall, and thus may be exposed to a very different environment than the drywell wall;

b) the EMF potential of the specimen can be much different than that of the drywell wall;

c) the specimen's material properties can be much different than that of the drywell wall (for example, the fabrication technique, grain size, and other material properties affecting corrosion behavior will be different); and

d) the drywell wall may be coated with a corrosion resistant primer.

The preceding sentence of the proposed GL states that licensees should verify the functionality of the drains in and/or above the sand cushion using acceptable means. The use of a carbon-steel specimen may be a method of detecting moisture. However, the BWROG notes that, like sand sampling, if the carbon-steel specimen shows no corrosion, a free flow path from a potential leakage source to the drain lines may or may not exist. Thus other methods, such as compressed air or a boroscope, may be more appropriate for determining the existence of a free flow path and the functionality of the drain lines.

The GL should be revised to state that to determine if a free flow path is present, appropriate methods such as compressed air should be used, and to determine if moisture is present,

appropriate methods such as a moisture detection device (which could include a carbon-steel specimen) should be used.

(4) - *The proposed GL states "Plant personnel should perform UT thickness measurements of the drywell shell if water is detected in the sand cushion or if the steel specimen is corroded."*

Comment: Per the discussion in the preceding paragraph, corrosion of the carbon-steel specimen is not necessarily an indication of corrosion of the drywell shell.

Comment: The presence of water provides a basis for suspecting that corrosion *may* exist, but is not necessarily an indication that corrosion *does* exist.

UT measurements of the drywell are costly and difficult, particularly measurements of the region adjacent to the sand cushion since this area is typically surrounded by concrete. UT measurements should therefore only be performed if corrosion is believed to be of concern after completion of an engineering evaluation. The purpose of the engineering evaluation is to determine if corrosion is present and, if so, its impact on the capability of the containment to perform its design and safety functions. The engineering evaluation should consider at least the following:

a) the source of the leakage and the chemistry of the water;

b) material properties;

c) coatings and their effectiveness;

d) the length of time the drywell shell was exposed to the water, the functionality of the drains, and the drains' leakage history;

e) any potentially mitigating factors (such as use of dehumidifiers or cathodic protection); and

f) any potentially contributing factors (such as location of gap-forming materials).

The proposed GL should be revised to state that if water is present, an engineering evaluation considering at least all of the above should be performed to determine if a corrosion concern exists and, if so, whether the corrosion may impact the functionality of the containment. UT measurements may then be deemed appropriate depending on the results of the evaluation.

- *The proposed GL states "At facilities in which the sand cushion is sealed with a plate and has no drains, these inspections should be performed if the sealing joint of the cover plate has evidence of degradation."*

Comment: Evidence of degradation of the sealing joint of the cover plate does not provide sufficient justification for performing costly and difficult UT measurements. The cover plate performs no safety function and is not part of the primary containment boundary. Degradation of the sealing joint does not have any safety implications and may be due to mechanisms other than the presence of water or corrosion. Inspections of the cover plate can only be performed visually through the drain lines, and therefore only a small portion of the cover plate can be inspected.

The proposed GL should be revised to state that if water is present at the air gap drains above the sand cushion, an engineering evaluation considering all of the above should be performed to

determine if a corrosion concern exists and, if so, whether the corrosion may impact the functionality of the containment. UT measurements may then be deemed appropriate depending on the results of the evaluation. The above sentence should therefore be deleted.

- The proposed GL states "The measurements should include not only the sand cushion region, but also that portion of the drywell shell from which the gap-forming material was not removed."

Comment: The gap-forming material was used during construction to form the gap between the steel sheii and the surrounding concrete structure, and otherwise has no design or safety function. Parts of the gap-forming material may have been left in place after construction, but the exact location of the material may not have been accurately recorded by the contractor or the material may have shifted since construction.

The above sentence should be deleted from the GL as it inappropriately limits UT measurements to only the sand cushion region or areas of the drywell shell at which the gap-forming material may still be present. In actuality these may not be the areas where corrosion is present or where the margins to the required wall thickness are the least. As discussed above, licensees will perform an engineering evaluation considering all pertinent information, and based on the results of the evaluation determine the potential for corrosion and its impact if it is present. The results of the evaluation will determine whether UT measurements are needed and, if so, what locations may be of the most concern.

- The proposed GL states "The frequency of the UT thickness measurements would be established from the results of the UT thickness measurements performed during the first two refueling outages and from the extent and nature of the corrosion."

Comment: Although UT measurements can provide useful information, inaccuracies in such measurements may not permit a meaningful comparison for determining approximate corrosion rates when the measurements are performed over two consecutive outages. In its December 22 1989, letter on the subject of drywell inspections, the BWROG suggested performing UT measurements two outages apart to determine approximate corrosion rates. The proposed GL should be revised to incorporate the BWROG suggestion. The proposed GL should also be revised to permit licensees to establish an alternative inspection schedule based on an engineering evaluation of plant-specific circumstances.

TORUS/SUPPRESSION POOL (Inside Surface)

Comment: The GL should allow plants to take exception to the proposed inspections depending on plant-specific design features intended to mitigate or prevent corrosion.

- The proposed GL states "During the next refueling outage, plant personnel should inspect the inside face of the torus (suppression pool) which is coated and forms the boundary of the containment..."

Comment: The GL should permit greater flexibility regarding whether these inspections need to be performed at the next refueling outage, by allowing credit for inspections or other actions performed previously by the licensee.

In its letter of June 7, 1991 on this subject, the BWROG provided to the NRC results of a survey of its members. The survey results indicated that a significant number of licensees have already conducted torus inspections. Based on the results of those inspections, the licensee has typically

developed a schedule for subsequent inspections justified by the condition of the torus or corrective actions taken.

Comment: It should be noted that the inspections proposed in the draft GL resulted from corrosion occurring at a single facility that did not have a coated torus. All other plants addressed by the proposed GL have a corrosion-resistant coating applied to the wetted surfaces of the torus. In each case the coating is a quality-class coating which required Design Basis Accident testing or qualification consistent with 10CFR50 Appendix B.

(1) - *The proposed GL states "The use of underwater examination methods and techniques may be required."*

Comment: The BWROG recommends that individual licensees be allowed to evaluate the advantages and disadvantages of draining the torus to facilitate inspection of areas normally below the waterline. De-sludging, decontamination, installation of scaffolding and lighting, walking on the coated surface, and drying of the normally wetted surface may damage the coating and therefore promote coating failure. Draining the torus is also a critical path outage activity since plants may be required to off-load fuel.

(2) - *The proposed GL states "UT measurements should be performed on areas identified for potential corrosion due to degradation of coating and deposits on the surface."*

Comment: Corrosion of the torus, if it were to occur, would be in the form of pitting (not broad generalized thinning). The pitting corrosion mechanism of the coated, submerged-service carbon-steel walls has been confirmed by inspections at BWRs over the last fifteen years.

UT measurements to determine wall thickness may be acceptable, but licensees can more readily use gauges or micrometers to determine the pit depth (which in turn can be used to calculate the nominal wall thickness at each pit location measured) for a statistically significant number of pits. The pit depth measurements can then also be used to trend corrosion rates.

Many current coatings are asbestos-based or have asbestos additives, so quantities of these coatings can no longer be obtained to prepare calibration blocks to properly quantify the effect of the coating on UT measurements, and thus accurately calibrate UT instruments. Additionally, removal of such coatings results in extensive and expensive measures for personnel protection (e.g., special protective clothing, personnel showers, tenting, special personnel monitoring, special breathing apparatus, etc.) due to the health hazards associated with asbestos materials.

UT measurements from inside the torus would require that the pit be cleaned. If the pit does not have a flat bottom the straight beam technique cannot be used, and if the shear wave technique is required it is also likely that the coating would have to be removed adjacent to the surface to obtain a pit depth measurement that is accurate enough to be of use. In summary, UT measurements would generally require that the coating be removed. However, removal of the coating to perform UT measurements would expose the underlying surface, thus possibly promoting corrosion.

The GL should thus be revised to permit licensees to utilize alternate methods besides UT to properly characterize pit depth.

(3) - *The proposed GL states "The same visual examination and the associated UT measurements should be performed during subsequent refueling outages."*

Comment: As discussed above, UT measurements may be an acceptable method of characterizing wall thickness, but alternative acceptable methods (such as measuring pit depth using gauges or micrometers) should also be permitted.

Comment: The BWROG recommends that the schedule for performing subsequent visual examinations and pit depth measurements be established by each licensee based on evaluation of the conditions associated with each particular plant, including:

a) an evaluation of the pit depths and the margin to the torus or suppression pool wall design thickness;

b) the growth rate of the pits measured and the measurement accuracy; and

c) repair, replacement, or mitigation plans.

Some BWRs have implemented trending programs to measure, at regular intervals, the growth rate of a number of pit evaluation areas. The results indicate that the pitting mechanism and expected growth rates do not justify performing the proposed inspections every refueling outage.

(4) - *The proposed GL states "If the same areas of corrosion are identified in consecutive inspections, the frequency of inspection should be revised on the basis of the rate of corrosion determined from the consecutive UT measurements..., and on the past experience considered by the licensee to be relevant to the degradation of the coating."*

Comment: As discussed above, UT measurements may be an acceptable method of characterizing wall thickness, but alternative acceptable methods (such as measuring pit depth using gauges or micrometers) should also be permitted.

Comment: The BWROG recommends that the schedule for performing visual examinations and pit depth measurements be established by each licensee based on:

a) an evaluation of the pit depths and the margin to the torus or suppression pool wall design thickness;

b) the growth rate of the pits measured and the measurement accuracy; and

c) repair, replacement, or mitigation plans.

(5) - *The proposed GL states "To correlate the extent of degradation of the coating and the rate of corrosion of the shell base metal, representative sample coupons which are of the same materials (coating and steel base metal) as those of the shell should be placed at the waterline at least one in each bay (between two successive saddle supports) or in each 20-degree sector of the pool."*

Comment: The type of coating degradation typical of BWR torus and suppression pool surfaces cannot be represented by corrosion coupon testing. Meaningful results regarding coating degradation that could be used to determine the remaining life and an inspection frequency cannot be obtained due to the many independent variables that would significantly impact the results. The variables include surface preparation, cure time, operating temperatures,

temperature differentials, radiation exposure, wear, random scratches, sludge piles, water quality, coating thickness, and the total exposed life. The growth rate of a pit depends on various location-specific conditions such as anode to cathode area effects, oxygen, pit depth, temperature, tubercle characteristics, sludge level, water chemistry, flow, and coating quality.

The BWROG therefore recommends that the proposed GL be revised to delete this section.

(6) - *The proposed GL states "Should the rates of corrosion obtained from items 4 and 5 above be different, the frequency of inspection should be determined on the basis of the highest rate of corrosion. The frequency of inspection thus determined should not be less than that of refueling outages."*

Comment: The BWROG recommends that the schedule for performing visual examinations and pit depth measurements be established by each licensee based on:

a) an evaluation of the pit depths and the margin to the torus or suppression pool wall design thickness;

b) the growth rate of the pits measured and the measurement accuracy; and

c) repair, replacement, or mitigation plans.

(7) - *The proposed GL states "...the UT measurement should be qualified by including the coating and surface deposit. A statistically significant number of data points should be used to establish the accuracy of the UT measurements..."*

Comment: As discussed above, UT measurements may be an acceptable method of characterizing wall thickness, but alternative acceptable methods (such as measuring pit depth using gauges or micrometers) should also be permitted.

ATTACHMENT 2

BWROG Recommendations Regarding Drywell and Torus Inspections

The BWR Owners' Group (BWROG) comments on the proposed Generic Letter provided in Attachment 1 suggest an alternate inspection program that should resolve NRC concerns with demonstrating containment functionality. Provided below is an outline of the components of the BWROG recommendations. This outline is intended to assist the Staff in revising the proposed GL should it be issued, and can serve as a basis for continuing interaction with the BWROG on this issue. The approach outline below is similar to that provided previously by the BWROG, but contains enhancements based on insight gained through the review of the proposed GL and further review of the preceding BWROG recommendations.

The drywell inspections described below are applicable only to those plants with a drywell air gap (Mark I plants except Brunswick Units 1 and 2, and one Mark II plant, WNP-2). The torus inspections are applicable to Mark I and II plants. Licensees may justify alternatives to what is described below or may not need to implement all steps depending on plant-specific circumstances.

<u>DRYWELL</u>

1) Validate containment design bases.

2) Perform Appendix J test program.

   <u>At the appropriate frequency determined by plant-specific considerations</u>:

3) Evaluate the necessity to verify functionality of the bellows seal rupture drains.

   If indicated by the results of the evaluation, verify functionality of the bellows seal rupture drain.

   If not functional, evaluate repair options and take appropriate corrective actions.

4) Verify the functionality of the drain lines in and/or above the sand cushion.

   If not functional, evaluate repair options and take appropriate corrective actions.

5) Monitor the drain lines in and/or above the sand cushion to determine if leakage exists. This may include methods to determine if excessive levels of moisture are present in the sand cushion.

6) If leakage is detected (per step 5), perform inspections and tests as needed to identify the source of the leakage. Perform appropriate corrective actions to stop further leakage.

7) If leakage is detected (per step 5), perform an engineering evaluation to determine the potential for corrosion and the impact of such corrosion on the containment's design and safety functions.

8) Depending on the results of the engineering evaluation (step 7), evaluate and determine appropriate repair and/or inspection options, and implement.

9) Evaluate the results of the inspections and/or repairs to determine the frequency of subsequent examinations.

TORUS/SUPPRESSION POOL

1) Validate containment design bases.

2) Perform Appendix J test program.

At the appropriate frequency determined by plant-specific considerations:

3) Perform a visual examination of the inside surface above and below the water line of the torus (suppression pool).

4) Where degradation of the torus coating is identified, look for signs of corrosion (pitting).

5) If corrosion (pitting) is observed, quantify the depth of the pitting corrosion using acceptable methods and determine the remaining nominal wall thickness (or perform UT measurements to determine the remaining wall thickness). Evaluate the degree of corrosion against the design basis and determine if repairs are necessary.

6) Subsequent visual examinations and/or depth measurements should be established by each licensee.