FPL Energy
Seabrook Station

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December 20, 2002

NYN-02116

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Seabrook Station
Disposition of Pending NRC Actions and Revised Response to NRC Bulletin 2002-02
"Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs"

Reference: North Atlantic Letter NYN-02086, Response to NRC Bulletin 2002-02 "Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs" dated September 6, 2002

The Nuclear Regulatory Commission (NRC) issued an order on October 25, 2002 approving the transfer of the Seabrook Station Operating License (NPF-86) from North Atlantic Energy Service Corporation (NAESCO) to FPL Energy Seabrook, LLC (FPLE Seabrook). The closing for the subject transfer took place on November 1, 2002. A number of issues and requests associated with the operating license were under review with the NRC at the time of the license transfer. As a result of the completion of this transaction, FPLE Seabrook requests that the NRC transfer any outstanding applications and other initiatives submitted by NAESCO for Seabrook Station to FPLE Seabrook. Accordingly, FPLE Seabrook hereby adopts and endorses the pending requests made by NAESCO for Seabrook Station prior to the license transfer.

In letter NYN-02086 North Atlantic Energy Service Corporation (North Atlantic) provided requested information stated in NRC Bulletin 2002-02, "Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs." Review of North Atlantic's response by current owner, FPLE Seabrook, determined that North Atlantic did not follow the prescribed industry program in which North Atlantic was a participant. This revised response endorses the Electric Power Research Institute (EPRI) Material Reliability Program (MRP) Inspection Plan and provides justification for continued reliance on visual examinations as the primary method to detect degradation.

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In addition, FPLE Seabrook expects that non-visual examination methods, vendor specific inspection techniques, as well as inspection frequency will likely change over the next several operating cycles based on additional inspection results. FPLE Seabrook will continue to work closely with the NRC, EPRI and the ASME to establish a meaningful examination plan for the future. Should our inspection plans change beyond refueling outage OR10, as a result of additional or revised industry guidance, FPLE Seabrook will provide details on examination methods, inspection techniques, and scope of non-visual RPV head penetration examinations to the NRC within 6 months prior to the start of the applicable refueling outage.

NRC Bulletin 2002-02 requested Pressurized Water Reactor (PWR) licensees to provide information pertaining to their reactor pressure vessel (RPV) head and vessel head penetration (VHP) nozzle inspection programs to ensure compliance with applicable regulatory requirements. The NRC required that addressees provide written responses to the requested information in accordance with the provisions of 10 CFR 50.54(f) within 30 days of the date of the bulletin.

The FPLE Seabrook revised responses to the requested information are provided in Enclosure 1. Revised commitments made by FPLE Seabrook in response to this bulletin are provided in Enclosure 2.

Should you have any questions concerning this response, please contact Mr. James M. Peschel, Manager - Regulatory Programs, at (603) 773-7194.

Very truly yours,

FPL Energy Seabrook, LLC.

Mark E. Warner

Mark E. Warner
Site Vice President
Seabrook Station

cc: H. J. Miller, NRC Region I Administrator
R. D. Starkey, NRC Project Manager, Project Directorate I-2
G.T. Dentel, NRC Senior Resident Inspector

STATE OF NEW HAMPSHIRE

Rockingham, ss. DATE 12/23/02

Then personally appeared before me, the above-named Mark E. Warner, being duly sworn, did state that he is the Site Vice President of FPLE Seabrook, that he is duly authorized to execute and file the foregoing information in the name and on the behalf of FPLE Seabrook and that the statements therein are true to the best of his knowledge and belief.

James W. Connolly

James W. Connolly, Notary Public
My Commission Expires: September 4, 2007

JAMES W. CONNOLLY
MY COMMISSION EXPIRES SEPT. 4, 2007
NOTARY PUBLIC
NEW HAMPSHIRE

ENCLOSURE 1 TO NYN-02116

FPL Energy Seabrook Revised Response to NRC Bulletin 2002-02

BACKGROUND INFORMATION

On August 9, 2002, the Nuclear Regulatory Commission (NRC) issued Bulletin 2002-02, "Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs." This bulletin was issued to advise pressurized water reactor (PWR) licensees that visual examination, as a primary inspection method for the reactor pressure vessel (RPV) head and vessel head penetration (VHP) nozzles, may need to be supplemented with additional measures (e.g., volumetric and surface examinations) to demonstrate compliance with the applicable regulations. This bulletin requests PWR licensees to provide information concerning their RPV head and VHP nozzle inspection programs to ensure compliance with applicable regulatory requirements. The NRC required that addressees provide written responses to the requested information in accordance with the provisions of 10 CFR 50.54(f). Seabrook Station completed a 100% bare metal visual examination of the reactor pressure vessel (RPV) head in May 2002 during refueling outage OR08. No indications of primary coolant leakage through the penetrations and no indications of head degradation were identified.

REQUESTED INFORMATION

(1) Within 30 days of the date of this bulletin:

A. PWR addressees who plan to supplement their inspection programs with non-visual NDE methods are requested to provide a summary discussion of the supplemental inspections to be implemented. The summary description should included EDY, methods, scope, coverage, frequencies, qualification requirements, and acceptance criteria.

B. PWR addressees who do not plan to supplement their inspection programs with non-visual NDE methods are requested to provide a justification for continued reliance on visual examinations as the primary method to detect degradation (i.e., cracking, leakage, or wastage). In your justification, include a discussion that addresses the reliability and effectiveness of the inspections to ensure that all regulatory and technical specification requirements are met during the operating cycle, and that addresses the six concerns identified in the Discussion Section of this bulletin. Also include in your justification a discussion of your basis for concluding that unacceptable vessel head wastage will not occur between inspection cycles that rely on qualified visual inspections. You should provide all applicable data to support your understanding of the wastage phenomenon and wastage rates.

RESPONSE TO ITEM (1) B:

Seabrook Station is categorized as having low susceptibility to primary water stress corrosion cracking (PWSCC) using the industry model developed by EPRI MRP. FPLE Seabrook has determined the accrued Effective Degradation Years (EDY) for Seabrook Station in accordance with EPRI MRP report MRP-48 (Ref. 4) (Equation 2.2). As of August 9, 2002 Seabrook Station's accrued EDY is 1.8. The EDY value was based upon 9.85 effective full power years (EFPY) of operation at a reactor vessel head temperature of 559.6 °F.

EPRI MRP (Ref. 1) has developed an industry inspection plan for PWR power plants. FPLE Seabrook will begin implementing the MRP Inspection Plan recommendations for low susceptibility plants by conducting an MRP Inspection Plan "supplemental visual examination" in refueling outage OR10, currently scheduled for Spring 2005. Implementation of the MRP Inspection Plan is also consistent with the inspection commitments made in North Atlantic's response to Bulletin 2002-01 (Ref. 3).

EPRI MRP Inspection Plan and supporting technical basis documents (Ref. 1) have been developed by owners and operators of PWR units and have been transmitted to the NRC (Ref. 2). The MRP Inspection Plan presents a technically sound inspection regimen that assures to a high degree of certainty that leaks will be detected at an early stage long before wastage or circumferential cracking can challenge the structural integrity of the RCS pressure boundary. Furthermore, implementation of the MRP Inspection Plan will assure continued compliance with the regulatory requirements cited within NRC Bulletin 2002-02, since the MRP Inspection Plan addresses the safety aspects of the six concerns identified in the Bulletin.

FPLE Seabrook has reviewed North Atlantic's response to NRC Bulletin 2002-01 relative to the applicable regulatory requirements discussed in Bulletin 2002-02. The response to Bulletin 2002-01 remains valid relative to continued conformance to applicable regulatory requirements.

FPLE Seabrook is aware of recent EPRI MRP recommendations to perform baseline non-visual examinations of RPV head penetrations. The recommended baseline examination for low susceptibility plants such as Seabrook is within 3 RFO or 5 years (12/31/2007) whichever is greater. This time frame is beyond our planned "supplemental visual examination" in OR10. It is anticipated that inspection methods, techniques, and frequencies will likely change requiring consideration and planning. As such, and as stated in the cover letter, if inspection plans change beyond refueling outage OR10, FPLE Seabrook will provide to the NRC, the examination methods, techniques, and scope of non-visual RPV head penetration examinations within 6 months prior to the start of the applicable refueling outage.

FPLE Seabrook provides the following additional information as justification for continued reliance on visual examinations as the primary method to detect degradation in the RPV head. Included are discussions on the reliability and effectiveness of visual examinations as they relate to the six concerns cited in Bulletin 2002-02 and the basis for concluding that unacceptable wastage will not occur between examination cycles.

Concern 1: *Circumferential cracking of CRDM nozzles was identified by the presence of relatively small amounts of boric acid deposits. This finding increases the need for more effective visual and non-visual NDE inspection methods to detect the presence of degradation in CRDM nozzles before nozzle integrity is compromised.*

Response: Since the initial industry discovery of circumferential cracks above the J-groove weld in 2001, visual inspection techniques and approaches employed have been dramatically improved and a heightened sense of awareness exists for the range in size and appearance of visual indications that must be further investigated. Non-visual techniques similarly have and continue to evolve to more effectively examine the penetration tube and associated welds for evidence of cracks. Recent events at Davis-Besse have not invalidated the fundamental inspection capability requirements previously established as necessary to identify the presence of PWSCC and subsequent associated wastage. The effectiveness of inspection techniques continues to be evaluated and improved.

EPRI MRP has published detailed guidance for performing visual examinations of RPV heads (Ref 5). A utility workshop (Ref. 8) was recently conducted to discuss this guidance and lessons learned from recent field experience (including Davis-Besse). RPV head bare metal visual examination completed at Seabrook in May 2002 was performed and documented in accordance with written procedures and acceptance criteria consistent with the guidance of the MRP Inspection Plan. No RPV head nozzle degradation (leakage) or RPV head degradation (wastage) was identified.

In order for outside diameter (OD) circumferential cracks above the J-groove weld to initiate and grow, a leak path must first be established to the CRDM annulus region from the inner wetted surface of the reactor vessel head. If primary water does not leak to the annulus, the environment does not exist to cause circumferential OD cracking. Axial cracks in the CRDM nozzles or cracks in J-groove welds must first initiate and grow through-wall. Experience has shown that through-wall axial cracks will result in observable leakage at the base of the penetration on the outer surface of the RPV head, even with penetration nozzle interference fits. Alloy 600 steam generator drain pipes at Shearon Harris (1988) and pressurizer instrument nozzles at Nogent 1 and Cattenom 2 (1989) were all roll expanded but still developed leaks during operation (Ref. 1, Appendix B). Plant specific top head gap analyses have been performed for a large number of plants, with nozzle initial interference fits ranging from 0 to 0.0034 inches. These analyses have confirmed the presence of a physical leak path in essentially all nozzles under normal operating pressure and temperature conditions (Ref. 1, Appendix B).

The probability of detecting small CRDM leaks by visual inspections alone is high. Visual inspections of the reactor coolant system pressure boundary have been proven to be an effective method for identifying leakage from primary water stress corrosion cracking (PWSCC) cracks in Alloy 600 base metal and Alloy 82/182 weld metal. Specifically, visual inspections have detected leaks in RPV head CRDM nozzles, RPV head thermocouple nozzles, pressurizer heater sleeves, pressurizer instrument nozzles, hot leg instrument nozzles, steam generator drain lines, a RPV hot leg nozzle weld, a power operated relief valve (PORV) safe end, and a pressurizer manway diaphragm plate (Ref. 9). To date, no leaking (CRDM) nozzles have been discovered by non-visual NDE examinations except for the three nozzles at Davis-Besse where leakage would have been detected visually had there been good access for visual inspections and the head cleaned of pre-existing boric acid deposits from other sources (Ref. 1, Appendix B).

Finally, as described under Concern 3, detailed probabilistic fracture mechanics (PFM) analyses have been performed to demonstrate the effectiveness of visual inspections in protecting the CRDM nozzles against failure due to circumferential cracking (Ref. 1, Appendix A). Even though the above discussion illustrates that visual inspections performed in accordance with MRP recommendations have a high probability of detecting through-wall leakage, a very low probability of detection was assumed in the PFM analyses. The PFM analyses assume only a 60% probability that leakage will be detected if a CRDM nozzle is leaking at the time a visual inspection is performed. Furthermore, if a nozzle has been inspected previously, and leakage was missed, subsequent visual inspections are assumed to have only a 12% probability of detecting the leak that was previously missed. Even with these conservative probability of detection assumptions, the PFM analyses show that visual inspection every outage reduces the probability of a nozzle ejection to an acceptable level for plants with 18 or more EDY. Visual inspections of plants with fewer than 18 EDY in accordance with the MRP Inspection Plan will maintain the probability of nozzle ejection for these plants more than an order of magnitude lower than that for the greater than 18 EDY plants.

In summary, the industry has responded to the need to detect small amounts of leakage by increased visual inspection sensitivity, increased inspection frequencies, and improved inspection capabilities. Small amounts of leakage can be detected visually and it has been shown that timely detection by visual examination will ensure structural integrity of RPV head penetrations with respect to circumferential cracking.

Concern 2: *Cracking of Alloy* 82/182 *weld metal has been identified in CRDM nozzle J- groove welds for the first time and can precede cracking of the base metal. This finding raises concerns because examination of weld metal material is more difficult than base material.*

Response: Cracks in the J-groove weld do not pose an increased risk regarding nozzle ejection as compared to penetration base metal cracks. Cracking that is completely within the weld metal, even if 360° around the nozzle, will not lead to ejection since the portion of the weld that remains attached to the outside surface of the nozzle will not be able to pass through the tight annular fit. J-groove weld cracks that initiate and grow through-wall will leak the same as cracks in the penetration base metal. Therefore, weld cracks pose a similar risk as cracks in the base material and subsequent leakage is equally detectable by visual examination. Although higher crack growth rates have been observed in laboratory testing of weld metal, the industry model of time-to-leakage includes plants that have had weld metal cracking as well as base metal cracking. The visual examination frequencies from the MRP Inspection Plan have been conservatively established based on the risk informed analyses considering leakage due to both weld metal and base metal cracking.

Concern 3: *Through-wall circumferential cracking from the outside diameter of the CRDM nozzle has been identified for the first time. This raises concerns about the potential for failure of CRDM nozzles and control rod ejection, causing* a *LOCA.*

Response: Probabilistic fracture mechanics (PFM) analyses using a Monte-Carlo simulation algorithm were performed to estimate the probability of nozzle failure and control rod ejection due to through-wall circumferential cracking (Ref. 1, Appendix A). The PFM analyses conservatively assume that, once a leak path has extended to the annulus region, an OD circumferential crack develops instantaneously, with a length encompassing 30° of the nozzle circumference. Fracture mechanics crack growth calculations are then performed for this initially assumed crack, using material crack growth rate data from EPRI Report MRP-55 (Ref. 6). The parameters used in the PFM model were bench marked against the most severe cracking found to date in the industry (B&W Plants) and produced results that are in agreement with experience to date. The analyses were used to determine probability of nozzle failure versus effective full power years (EFPY) for various head operating temperatures. Analyses were then performed to estimate the effect of visual and non-visual (NDE) inspections of the plants in the highest susceptibility category, using the conservative assumption discussed above (see Concern #1 response) for probability of leakage detection by visual inspection. These analyses demonstrate that performing visual inspections significantly reduces the probability of nozzle ejection, and that performing such examinations on a regular basis (in accordance with the inspection schedule prescribed in the MRP Inspection Plan) effectively maintains the probability of nozzle ejection at an acceptably low level indefinitely.

In the extremely unlikely event that nozzle failure and rod ejection were to occur due to an undetected circumferential crack, an acceptable margin of safety to the public would still be maintained (Ref, 10). The consequences of such an event are similar to that of a small-break LOCA, which is a design-basis event. The probability of core damage given a nozzle failure (assuming that failure leads to ejection of the nozzle from the head) has been estimated by the industry to be 1 x 10^{-3}. The PFM analyses demonstrate that periodic visual inspections are capable of maintaining the probability of nozzle failure due to circumferential cracking well below 1 x 10^{-3}. Therefore, the PFM analyses demonstrate that the resulting incremental change in core damage frequency due to CRDM nozzle cracking can be maintained at less than 1 x 10^{-6} (i.e., 1 x 10^{-3} times 1 x 10^{-3} equals 1 x 10^{-6}) per plant year, through a program of periodic visual examinations performed in accordance with the MRP Inspection Plan. This result is consistent with NRC Regulatory Guide 1.174 that defines an acceptable change in core damage frequency (1 x 10^{-6} per plant year) for changes in plant design parameters, technical specifications, etc.

Concern 4: *The environment in the CRDM housing/RPV head annulus will likely be more aggressive after any through-wall leakage because potentially highly concentrated borated primary water may become oxygenated. This raises concerns about the technical basis for current crack growth rate models.*

Response: The MRP panel of international experts on stress corrosion cracking (SCC) (including representatives from ANL/NRC Research), prior to the Davis-Besse incident, gave extensive consideration to the likely environment in the annulus between a leaking CRDM nozzle and the RPV head and subsequently revisited the issue (Ref. 6). When revisited, the relevant arguments remain valid for leak rates that are less than 1 liter/hour or 0.004 gallons/minute (gpm), which plant experience has shown to be the usual case. The conclusions were:

1. An oxygenated crevice environment is highly unlikely because:

   - Back diffusion of oxygen is too low compared to counterflow of escaping steam (two independent assessments based on molecular diffusion models were examined).
   - Oxygen consumption by the metal walls would further reduce its concentration.
   - Presence of hydrogen from leaking water and diffusion through the upper head results in a reducing environment.
   - Even if the concentration of hydrogen was depleted by local boiling, coupling between low alloy steel and Alloy 600 would keep the electrochemical potential low.
   - Corrosion potential will be close to the Ni/NiO equilibrium, resulting in PWSCC susceptibility similar to normal primary water.

2. The most likely crevice environments are either hydrogenated steam or PWR primary water within normal specifications and both would result in similar (i.e. non-accelerated) susceptibility of the Alloy 600 penetration material to PWSCC.

3. If the boiling interface happens to be close to the topside of the J-groove weld, itself a low probability occurrence, concentration of PWR primary water solutes, lithium hydroxide and boric acid can in principle occur. Of most concern here would be the accelerating effect of elevated pH on SCC, but calculations and experiments show that any changes are expected to be small, in part because of the buffering effects of precipitates. A factor of 2x on the crack growth rate (CGR) conservatively covers possible acceleration of PWSCC, even up to a high- temperature pH of around 9.

For larger leakage rates, which could lead to local cooling of the head, concentration of boric acid, and development of a sizeable wastage cavity adjacent to the penetration, the above arguments no longer directly apply. However, limited data (Berge et. al., 1997) on SCC in concentrated boric acid solutions indicate that:

- Alloy 600 is very resistant to transgranular SCC (material design basis).
- High levels of oxygen <u>and</u> chloride are necessary for intergranular cracking to occur at all.
- The effects are then worse at intermediate temperatures, suggesting that the mechanism is different from PWSCC.

The above considerations show that there is no basis for assuming that any post-leakage, crevice environment in the CRDM housing/RPV head annulus would be significantly more aggressive with regard to SCC of the Alloy 600 penetration material than normal PWR primary water, irrespective of the assumed leakage rate and/or annulus geometry. The current industry model (Ref. 6), which includes a factor of 2x on CGR to cover residual uncertainty in the composition of the annulus environment, remains valid.

Concern 5: *The presence of boron deposits or residue on the RPV head, due to leakage from mechanical joints, could mask pressure boundary leakage. This raises concerns that a through-wall crack may go undetected for years.*

Response: The experience at Davis-Besse has clearly demonstrated that effective visual inspection for leakage from CRDM nozzle and weld PWSCC requires unobstructed inspection access and that the head surface be free of pre-existing boric acid deposits. Accumulations of debris and boric acid deposits from other sources can interfere with a determination as to the presence or absence of boric acid deposits extruding from the tube-to-head annulus. Therefore, to effectively perform a visual examination of the RPV head outer surface for penetration leakage, such deposits and debris accumulations must be carefully inspected, removed, and the area re-inspected for corrosion.

Each inspection at Seabrook Station will be rigorously conducted and any boric acid deposit on the vessel head will be evaluated to determine its source in accordance with existing industry guidance, supplemented by the most recent industry experience at the time of the inspection. These requirements are incorporated in the visual inspection guidance contained in the MRP Inspection Plan. Implementation of these requirements will preclude the cited condition of a through-wall crack remaining undetected for years.

Concern 6: *The causative conditions surrounding the degradation of the RPV head at Davis-Besse have not been definitively determined. The staff is unaware of any data applicable to the geometries of interest that support accurate predictions of corrosion mechanisms and rates.*

Response: The causes of the Davis-Besse degradation are sufficiently well known to avoid significant wastage. The root cause evaluation performed by the utility (Ref. 11) clearly identifies the root cause as PWSCC of CRDM nozzles followed by boric acid corrosion. The large extent of degradation has been attributed to failure of the utility to address evidence that had been accumulating over a five-year period of time (Figure 26 of Ref. 11).

The industry has provided utilities with guidance for vessel top head visual inspections to ensure that conditions approaching that which existed at Davis-Besse will not occur. Visual inspection guidelines have been provided (Ref. 5), and a workshop was conducted to thoroughly review industry experience, regulatory requirements, leakage detection, and analytical work performed to understand the causes of high wastage rates (Ref. 8).

Subsequent to significant wastage being discovered on the Davis-Besse RPV head, the industry has performed analytical work to determine how a small leak such as seen at several plants can progress to the significant amounts of wastage discovered at Davis-Besse. This work is referenced within the basis for the MRP Inspection Plan (Ref. 1, Appendix C) and was previously presented to the NRC (Ref. 12).

The analytical work shows that the corrosion rate is a strong function of the leakage rate. Finite element thermal analyses show that leak rates must reach approximately 0.1 gpm for there to be sufficient cooling of the RPV top head surface to support concentrated liquid boric acid that will produce high corrosion rates. The leak rate is in turn a strong function of the crack length. The effect of crack length above the J-groove weld on crack opening displacement and area has been confirmed by finite element modeling of nozzles including the effects of welding residual stresses and axial cracks. Leak rates have been calculated using crack opening displacements and areas determined by the finite element analyses and leak rate models based on PWSCC cracks in steam generator tubes.

Cracks that just reach the annulus through the base metal or weld metal will result in small leaks such as those that produced small volumes of boric acid deposits on several vessel heads at locations where the CRDM nozzles penetrate the RPV head outside surface. These leaks are typically on the order of 10^{-6} to 10^{-4} gpm. There is no report of any of these leaks resulting in significant corrosion. A leak rate of 10^{-3} gpm will result in the release of about 500 cubic inches of boric acid deposits in an 18-month operating cycle, which will be detectable by visual inspections.

The time for a crack to grow from a length that will produce a leak rate of 10^{-3} gpm to a leak rate of 0.1 gpm has been estimated by deterministic analyses based on the MRP crack growth models to be 1.7 years for plants with 602°F head temperatures. Probabilistic analyses show that there is less than a 1×10^{-3} probability that corrosion will proceed to the point that the inside surface cladding of the head would be uncovered over a significant area before the wastage would be detected by supplemental visual inspections as required under the MRP Inspection Plan. During the transition from leak rates of 10^{-3} gpm to 0.1 gpm, loss of material will be by relatively slow processes (Ref. 1, Appendix C).

The ability to detect leakage prior to the risk of structural failure is illustrated by Figure 26 of the Davis-Besse root cause analysis report (Ref. 11). There was visual evidence of boric acid deposits on the vessel head for five years prior to the degradation being detected. Guidance provided in the MRP Inspection Plan would not permit these conditions to exist without determining the source of the leak, including nondestructive examinations if necessary.

Therefore, while the exact timing of the event progression at Davis-Besse cannot be definitively established, the probable durations can be predicted with sufficient certainty to conclude that a visual inspection regimen can ensure continued structural integrity of the RCS pressure boundary.

ITEM (2) A:

(2) *Within 30 days after plant restart following the next inspection of the RPV head and VHP nozzles to identify the presence of any degradation, all PWR addresses are requested to provide:*

A. *the inspection scope and results, including the location, size, extent, and nature of any degradation (e.g., cracking, leakage, and wastage) that was detected; details of the NDE used (i.e., method, number, type, and frequency of transducers or transducer packages, essential variables, equipment, procedure and personnel qualification requirements, including personnel pass/fail criteria); and criteria used to determine whether an indication, "shadow," or "blackwall anomaly" is acceptable or rejectable.*

RESPONSE TO ITEM (2) A:

Within 30 days after plant restart following the next inspection of the RPV head and/or RPV head penetration nozzles to identify the presence of any degradation, FPLE Seabrook will provide the inspection scope, and results, including the location, size extent and nature of any degradation (cracking, leakage and wastage) that was detected.

ITEM (2) B:

(2) *Within 30 days after plant restart following the next inspection of the RPV head and VHP nozzles to identify the presence of any degradation, all PWR addresses are requested to provide:*

B. *the corrective actions taken and the root cause determination for any degradation found.*

RESPONSE TO ITEM (2) B:

Within 30 days after plant restart following the next inspection of the RPV head and/or RPV head penetration nozzles to identify the presence of any degradation, FPLE Seabrook will provide the corrective actions taken and the root cause determination for any degradation found.

References:

1. "PWR Reactor Pressure Vessel (RPV) Upper Head Penetrations Inspection Plan (MRP-75)," Revision 1, EPRI, Palo Alto, CA: 2002. 1007337.

2. Nuclear Energy Institute (NEI) Letter, "EPRI Technical Report 1007337, PWR Reactor Pressure Vessel (RPV) Upper Head Industry RVHP Inspection Program, (MRP- 75), Project Number 689" Alex Marion (NEI) to Brian Sheron (NRC), September 10, 2002.

3. North Atlantic letter NYN-01076, "Seabrook Station Response to NRC Bulletin 2001-01", August 2001.

4. "PWR Materials Reliability Program Response to NRC Bulletin 2001-01 (MRP-48), 1006284, August 2001, EPRI, Palo Alto, CA.

5. "Visual Examination for Leakage of PWR Reactor Head Penetrations on Top of RPV head: Revision 1 of 1006296, Includes Fall 2001 Results," Electric Power Research Institute (EPRI), Palo Alto, CA: March 2002, 1006899.

6. EPRI Document MRP-55, "Crack Growth Rates for Evaluating Primary Water Stress Corrosion Cracking (PWSCC) of Thick-Wall Alloy 600 Material;" July 2002.

7. NRC Letter, "Flaw Evaluation Criteria," Jack Strosnider, NRC, to Alex Marion, NEI, November 21, 2001.

8. "Proceedings: EPRI Boric Acid Corrosion Workshop, July 25-26, 2002 (MRP-77)," Electric Power Research Institute (EPRI) Report 1007336, September 2002.

9. EPRI TR-103696, "PWSCC of Alloy 600 Materials in PWR Primary System Penetrations", July 1994.

10. Walton Jensen, NRC, Reactor Systems Branch, Division of Systems Safety and Analysis (DSSA), Sensitivity Study of PWR Reactor Vessel Breaks, memo to Gary Holahan, NRC, DSSA, May 10, 2002.

11. Davis-Besse Nuclear Power Station Report CR2002-0891 , "Root Cause Analysis Report - Significant Degradation of the Reactor Pressure Vessel Head," April 2002.

12. Glenn White, Chuck Marks and Steve Hunt, Technical Assessment of Davis-Besse Degradation, Presentation to NRC Technical Staff, May 22, 2002.

ENCLOSURE 2 TO NYN-02116

FPL Energy Seabrook Commitments in Response to NRC Bulletin 2002-02
"Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs"

Number	Commitment:
1	FPLE Seabrook will conduct an EPRI MRP Inspection Plan supplemental visual inspection in refueling outage OR10.
2	FPLE Seabrook will provide the requested information in Item (2) A within 30 days after plant restart following the EPRI MRP Inspection Plan supplemental visual in refueling outage OR10.
3	FPLE Seabrook will provide the requested information in Item (2) B within 30 days after plant restart following the EPRI MRP Inspection Plan supplemental visual in refueling outage OR10.
4	If inspection plans change beyond refueling outage OR10, FPLE Seabrook will provide to the NRC, the examination methods, techniques, and scope of non-visual RPV head penetration examinations within 6 months prior to the start of the applicable refueling outage.