NEXTera ENERGY SEABROOK

September 7, 2012

SBK-L-12176
Docket No. 50-443

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Seabrook Station
Response to Request for Additional Information
Regarding Relief Request for Service Water Piping (TAC No. ME9187)

References:

1. NextEra Energy Seabrook, LLC letter SBK-L-11137, "Relief Request – Proposed Alternative in accordance with 10 CFR 50.55a (a)(3)(ii)," dated August 1, 2012. (ML12219A129)
2. NRC Letter, "Request for Additional Information Regarding Relief Request for Service Water Piping," dated September 4, 2012. (ML12226A462)

In Reference 1, NextEra Energy Seabrook, LLC (NextEra) submitted its request to use a proposed alternative in accordance with 10 CFR 50.55a (a)(3)(ii).

In Reference 2, the NRC requested additional information (RAI) in order to complete its review of the request.

Attachment 1 to this letter contains requested additional information. Attachment 2 to this letter contains the Affidavit of Mr. Paul S. Mazon of PMC Engineering, certifying that the material provided in Attachment 3 is proprietary in nature and requesting that the material in Attachment 3 be withheld from public disclosure under the provisions of 10 CFR 2.390, Public Inspections, Exemptions, Requests for Withholding. Attachment 3 contains the proprietary calculations and drawings related to the response to RAIs 9 and 14 in Attachment 1. Attachment 4 contains the non-proprietary versions of the proprietary calculations and drawings related to the response to RAIs 9 and 14 in Attachment 1. Attachment 5 contains the revised relief request.

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In addition, NextEra Energy Seabrook requests that relief be granted for the remaining portion of its third 10-year inservice inspection interval. The effective design life of the proposed repair remains at two refueling intervals (approximately 36 months).

Should you have any questions regarding this submittal, please contact Mr. Michael O'Keefe, Licensing Manager, at (603) 773-7745.

Sincerely,

NextEra Energy Seabrook, LLC

Kevin T. Walsh
Site Vice President

Attachments:

1. Response to Request for Additional Information - Regarding Relief Request for Service Water Piping.
2. Affidavit of Mr. Paul S. Mazon of PMC Engineering.
3. Proprietary calculations and drawings related to the response to RAIs 9 and 14 in Attachment 1.
4. Non-proprietary versions of the proprietary calculations and drawings related to the response to RAIs 9 and 14 in Attachment 1.
5. Relief Request RA-12-001, Revision 1

cc:

W.M. Dean, NRC Region I Administrator
J.G. Lamb, NRC Project Manager, Project Directorate I-2
M.K. Jennerich, NRC Resident Inspector

Attachment 1

Seabrook Station
Response to Request for Additional Information
Regarding Relief Request for Service Water Piping

Seabrook Station
Response to Request for Additional Information
Regarding Relief Request for Service Water Piping

NRC Question 1:
Sections 4 and 5.c of the relief request describe briefly the pre-repair inspection. It is not clear to the NRC staff the details of the inspection, such as, the sequence of the inspection and the acceptance criteria for the location that needs repair. Please provide a step-by-step description of how the examination of the subject service water (SW) pipe will be performed prior to the repair.

NextEra Energy Response:
Upon discovery of a questionable liner location (i.e. rust bloom, rust stain, cracked concrete), prior to further evaluation, several initial conditions must be met. The pipe wall surface will be cleaned and free of any debris, scale, rust, or other surface conditions that would interfere with the accurate profiling of the corroded surface. Furthermore, the nominal pipe wall thickness of the component and the minimum thickness will be known prior to contouring. This minimum thickness value is provided by Design Engineering through an approved calculation.

Once the initial conditions have been met, a chipping hammer or other suitable tool will be used to verify the surface to be profiled is down to clean metal. The degraded area and the adjacent base material will be tapped lightly to ensure that the surface is metal and not a tightly adhering scale layer. Upon confirmation of base metal, degradation will be verified as consistent with base material corrosion and that other types of potential degradation are not present, i.e. cracking or mechanical wear. Each assessed area will be photographed including an ASME visual acuity card with a clearly discernable image of the VT-1 characters. The photo will be reviewed by the System Engineer as well as certified ASME Level II visual examiner. Both will concur that the degradation present appears to be consistent with ID corrosion of the base metal.

The deepest part of the degraded area will then be profiled using a pin type contour gauge. To capture the deepest part of the degraded area the contour gauge is centered on the deepest part of the degraded area. Two subsequent profiles will be taken from the deepest area. The profiles will be compared to determine the greatest extent of degradation. Additionally, the surface profile will include 1.50" of clean, non-degraded base material (minimum) on both sides of the profile plot in order to establish a reference surface. The maximum depth of the degraded area will be determined by measuring the distance from the reference surface to the deepest point along the contour plot. The maximum depth of the degraded area will be subtracted from the commercial minimum wall thickness (87.5% of nominal wall thickness) and this value will be reported as the remaining thickness of the pipe.

If the remaining thickness of the pipe is greater than the calculated minimum thickness provided by Design Engineering, no further inspection action is required. If the remaining thickness of the pipe is less than the minimum thickness provided by Design Engineering, a UT measurement will be taken to determine the actual thickness of the pipe adjacent to the degraded area.

NRC Question 2:
Section 5.c of the relief request states that an initial [inside] surface cleanup will be performed. (a) Clarify whether the inside surface of the entire subject SW system pipe will be cleaned or only the location where the cement liner is damaged. (b) If only a portion of the pipe will be cleaned, explain which segment of the pipe will be cleaned. (c) If the cement liner is damaged (e.g., wall loss) but the inside surface of the metal pipe wall is not exposed to air/water, discuss whether the damaged liner location will be repaired as part of the pre-repair inspection effort. If not, please provide supporting justification.

NextEra Energy Response:
(a) Locations where the cement liner appears damaged are where the service water system piping will be cleaned of corrosion products and failed liner remnants and inspected.

(b) It is not feasible to clean the entire liner of the inspection scope, therefore the only portions of the service water system that will be cleaned and inspected include areas only where indications of degradation of the pipe are present, i.e. a rust nodule.

(c) If the cement liner is damaged, but no degradation is present on the pipe wall inside diameter metal surface (no rust staining), no further inspection of the location is required. The liner will be restored using Belzona or Splashzone as required.

NRC Question 3:
Section 5.c of the relief request describes a contour gauge that will be used to determine the extent of wall loss. (a) Confirm that the aforementioned "wall loss" is related to the metal pipe wall loss, not the cement liner wall loss. (b) Explain why a contour gauge is used initially in lieu of UT to determine the pipe wall loss. (c) Section 5.c of the relief request states that ultrasonic testing (UT) examination will be used to establish the existing surrounding area, consisting of good wall (sufficient wall thickness to support welding of the repair). Provide the value for the "sufficient wall thickness" to support welding of the repair. (d) Discuss why UT is not used to measure the thickness of both the cement liner and pipe wall. (e) Discuss how the degradation from the outside surface of the pipe will be determined and dispositioned. (f) It appears that UT will be used only at the location where the cement liner is damaged and the inside surface of the metal pipe is exposed to air/water. It appears that if the cement liner is not damaged at a location, then UT will not be used at that location. Therefore, for those pipe locations where the cement liner is not damaged, how would the degradation from the outside surface of the metal pipe be determined?

NextEra Energy Response:
(a) The aforementioned "wall loss" is related to metal pipe wall loss only.

(b) A contour gauge is used initially in lieu of UT to determine pipe wall loss due to the infeasibility of using UT. This is due to the surface condition of the corroded areas. Once a degraded area has been detected, it will be cleaned. The method by which the pipe will be cleaned does not result in a surface upon which a UT can be performed. The cleaning method does, however, ensure that the corrosion products are removed without further reduction of the base metal thickness. The resulting surface is non-uniform, preventing adequate transducer contact. Additional cleaning to a level where UT testing is possible would require more aggressive cleaning methods resulting in base metal removal. This more aggressive cleaning would put NextEra Energy Seabrook at risk of reducing pipe wall thickness below the minimum structural thickness and/or the minimum thickness on which a base metal repair can be performed, in addition to the added risk of a through-wall leak developing. To preclude these risks, a process for profiling degraded areas using a contour gauge has been developed.

(c) The existing surrounding wall will be location specific and dependent upon the relationship between the extent of the pipe wall degradation and the proposed size of the repair encapsulation. A minimum wall of 0.300 is acceptable. This value is based upon the Code required minimum plus the projected future metal loss anticipated to occur during the service life on the internal encapsulation (two operating cycles), with a design margin.

(d) NextEra Energy Seabrook does not measure thickness of the concrete liner, as its intended function is to act as a protective coating. Concrete depth measurement is inconsequential; of concern is its ability to provide a protective coating.

(e) The buried piping is both coal tar wrapped and has cathodic protection. Based upon this, external pipe wall degradation is not suspected. The present Seabrook Station NEI 09-14 Program for the Management of Buried Pipe Integrity is not performing indirect monitoring of the buried piping. However, direct inspections via piping excavation are being performed. To date one excavation identified no external corrosion on the exposed piping (floor drain piping). A subsequent excavation will be performed in October 2012, of the Service Water piping. Except for the direct, excavation approach and the internal inspection of damaged liner locations, no further inspection/monitoring of the outside surface of the buried piping will be performed.

(f) See response (e) above.

NRC Question 4:
(a) Discuss the minimum wall thickness (pipe and cement liner) that the repair is required to be performed. (b) Provide the technical basis of the minimum wall thickness. (c) Provide the approximate length of line numbers 1801-3 and 1818-3 that are covered in the relief request. (d) Section 4 of the relief request states that the subject pipe has 24-inch nominal diameter, standard schedule and 0.375-inch liner. Confirm that the pipe wall thickness is 0.375 inches and the cement liner wall thickness is also 0.375 inches.

NextEra Energy Response:
(a) The minimum pipe wall thickness required for a repair to be performed is 0.120 inches. NextEra Energy Seabrook does not take credit for the cement liner for structural or pressure boundary integrity.

(b) Minimum wall thickness is based on the Code Allowable Wall Thickness as determined in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Subsection ND3641, 1977 Edition. Further analysis using NB-3200, Design by Analysis Methodology, may be performed.

(c) Approximately 100 feet of pipe line SW-1801-003-153-24" will be inspected. Approximately 190 feet of pipe line SW-1810-003-153-24" will be inspected. Approximately 200 feet of pipe line SW-1818-003-153-24" will be inspected.

(d) NextEra Energy Seabrook confirms the pipe wall thickness is 0.375 inches and that the cement liner wall thickness is also 0.375 inches.

NRC Question 5:
(a) Explain the statement in Figure A of the relief request that reads: "...Center weld root standoff hub is optional and may be deleted..." (b) Explain why the center weld root standoff hub is optional and not a requirement. (c) Discuss the situation in which the center weld root standoff hub will be and will not be applied. (d) Discuss the purpose of the center weld root standoff hub.

NextEra Energy Response:
(a) The center weld root standoff hub was originally provided as an alignment aid in achieving the required 3/32" – 1/8" weld root gap at installation. This hub aids the encapsulation device in attaching to the inside diameter of the pipe.

(b)(c) The center weld root standoff hub are provided as an optional installation aid at locations where the internal pipe contact surface provides a uniform set-up gap using the standoff hub. If internal pipe contact surface irregularities interfere with a standoff hub such that the desired weld root gap cannot be achieved, the installer has the option of altering or removing the standoff hub.

(d) The purpose of the center weld root standoff hub was for positioning only, to assist the installer in attaining the weld root gap required to make a full penetration weld.

NRC Question 6:
Section 5 (second paragraph on page 2) of the relief request states that "...The encapsulation cap ID [inside diameter] will be such that the inside diameter is greater than the maximum diameter of the defective area plus a minimum of twice the nominal thickness of the pipe..." (a) Explain how twice the nominal thickness of the pipe (plus the maximum diameter of the defective area) is sufficient to cover the potential corrosion growth in the lateral direction of the pipe within the design life of the encapsulation. (b) Section 5 further states that the encapsulation ID cap is 6-inch diameter. Does this imply that the encapsulation application is limited to repair a defective area with a diameter of less than 6 inches? (c) Discuss whether the encapsulation needs to be bent to fit the contour of the pipe (i.e., would cold work be done on the encapsulation?).

NextEra Energy Response:
(a) Utilizing the corrosion rate of 40 mpy, over the service life of the internal encapsulation, results in a projected future metal loss of 0.120 inches. The twice nominal thickness of the pipe (2 x 0.375 = 0.750 inches) more than accommodates the metal loss in the lateral direction.

(2) The encapsulation device is limited to repair a defective area with a diameter of less than 6 inches.

(3) The encapsulation device is fabricated (reverse formed/machined) to fit the contour of the inside diameter for this specific 24-inch pipe application.

NRC Question 7:
Section 5.e of the relief request states that a corrosion rate of 40 mills per year (mpy) is assumed for the corrosion of the encapsulated pipe wall and inner surface of the cap and its attachment welds remain intact during the intended service life of the repair. (a) Explain how the 40 mpy is used in the encapsulation design. (b) Is the 40 mpy used in the corrosion loss of the base metal in the lateral direction as well as the depth direction of the pipe wall? (c) Explain how the corrosion rate is used to determine the corrosion of welds and inner surface of the cap. (d) Discuss all potential degradation mechanisms involving seawater affecting carbon steel piping. (e) Discuss the degradation mechanism(s) to which a corrosion rate of 40 mpy is applicable because a 40-mpy corrosion rate cannot possibly be applicable to all potential degradation mechanisms involving seawater affecting carbon steel piping. (f) Discuss whether a coating will be applied to the surface of the repair to minimize corrosion.

NextEra Energy Response:
(a) The 40 mpy corrosion rate is based upon 30 mpy from seawater corrosion of carbon steel plus the 10 mpy of soil/steel corrosion interaction.

(b) This corrosion rate is applied to the base metal depth and the lateral direction of the pipe wall.

(c) The 40 mpy is used to determine the corrosion of welds and inner surface of the cap by the consideration of a total material thickness loss of 0.120" over the service life of the encapsulation device (i.e. 3 years x 40 mills per year = 120 mills).

(d) Historically, the only potential degradation mechanisms observed carbon steel piping immersed in seawater is general corrosion in the form of general wasting or pitting.

(e) The 40 mpy corrosion rate is conservatively applied to both degradation mechanisms prescribed above in response (3).

(f) External to the encapsulation (pipe internal) an inconel liner is provided with the encapsulation device. In addition, a coat of Belzona or Splashzone will be applied along with the restoration of the concrete, around the cap.

NRC Question 8:
Figure A of the relief request shows that the weldment is applied the perimeter of the encapsulation. (a) Provide a detailed drawing of the weld design with respect to the contour of the encapsulation including dimensions if possible. (b) Provide the detailed plane view, side view, and 3-dimensional view of the repair design.

NextEra Energy Response:
(a)(b) Fabrication and installation drawings are proprietary documents. Proprietary copies are provided in Attachment 3; redacted copies are provided in Attachment 4.

NRC Question 9:
(a) Provide the thickness of the final repaired location, as compared to the thickness of the existing pipe with the cement liner. In this regard, provide the thickness of the encapsulation (the Inconel 625 liner and the air gap). (b) The staff's concern is that if the repaired location is much thicker than the existing wall thickness (pipe plus cement liner), the fluid flow will impinge on the side (the cross-sectional area, or skirt) of the encapsulation and affect its structural integrity. (c) Discuss any fluid dynamic calculations performed to address the forces impinging on the encapsulation and to ensure that the encapsulation will not be affected by the fluid flow. (d) Discuss any limitations on the number of the encapsulations that can be installed in the subject pipe run, so as not to restrict the fluid flow.

NextEra Energy Response:
(a)(b) The maximum final thickness of the 4" diameter encapsulation device is 0.975" thick. This is obtained from 0.700" specified nominal cap thickness + 0.060" fabrication thickness tolerance + 0.090" Inconel 625 liner thickness + maximum 0.125" root weld gap. The maximum final thickness includes an air gap minimum of 0.250". The maximum final thickness of the 6" diameter encapsulation device is 1.074" thick. This is obtained from 0.799" specified nominal cap thickness + 0.060" fabrication thickness tolerance + 0.090" Inconel 625 liner thickness + maximum 0.125" root weld gap. The maximum final thickness includes an air gap minimum of 0.250".

The specified maximum air gap for both the 4" and 6" diameter devices is 0.383". This is obtained from 0.250" specified nominal undercut + 0.000" fabrication thickness tolerance + 0.120" corrosion allowance.

By comparison, the cement liner thickness is 0.375".

(c) The flow impingement load is conservatively based on a Service Water System line velocity of 16 ft/s and addressed in PMC Engineering Solutions, Inc. Component Encapsulation Calculation Design Report No. 201218-S-0001, R1. The load is conservatively applied to the total encapsulation device height. No load reduction is attributed to the portion of the encapsulation device that is not exposed to the flow stream.

(d) Design Engineering tracks the impact on flow capability associated with internally installed components (e.g. Weko seals). The specific design change documentation will assess the encapsulation device installation impact and dictate the number of acceptable potential flow restrictions.

NRC Question 10:
The proposed relief request discusses the repair for wall thinning. Clarify whether the proposed design is also applicable to repair a 100-percent through-wall flaw (through the cement liner and pipe). If yes, describe how groundwater will not flow from outside into the inside of the pipe when a 100-percent through-wall flaw exists, which could cause corrosion inside the encapsulation. If not, confirm that the proposed repair method will not be applicable to a known 100-percent through-wall flaw.

NextEra Energy Response:
Yes, the design is applicable to repair a 100-percent through-wall flaw. In the instances where a through-wall leak is detected or results due to surface preparation, the through wall hole will be appropriately plugged with a common type device (e.g., plug) to stop any flow and facilitate the enclosure application. Concern over internal corrosion of the enclosure is addressed in the design by the consideration of the projected future metal loss anticipated to occur during the service life on the internal encapsulation (two operating cycles).

NRC Question 11:
Explain what is meant by "3/32 inch (Ref)" in Figure A of the relief request. Does this dimension refer to the root opening (i.e., the gap between the encapsulation and the pipe inside surface to facilitate the welding) or coating on the inside surface of the pipe prior to install the encapsulation?

NextEra Energy Response:
The "3/32 inch (Ref)" in Figure A of the relief request is the dimension of the weld root opening or the gap between the encapsulation device and the Service Water System pipe inside surface.

NRC Question 12:
Section 6 states that the encapsulation device will have a limited service life of two operating cycles (approximately 36 months). Describe how 36 month duration is obtained.

NextEra Energy Response:
Seabrook Station has two redundant trains of Service Water. During the 2012 fall refueling outage the A train of Service Water will be inspected, followed by the B train during the following outage. The 36-month service life duration is obtained by the total duration of the two full operating cycles between (18-months each). Encapsulations installed in the fall 2012 refueling outage will be replaced in the subsequent outage in which the A train will be available, i.e., fall 2015.

NRC Question 13:
Submit the design calculations including stress analyses of the encapsulation, the weld sizing calculations, and corrosion calculations of pipe wall thinning, as part of the design. The corrosion calculations should show that the encapsulation will contain the potential wall thinning and associated growth within the effective life of the design.

NextEra Energy Response:
Fabrication and Installation drawings and the Design Calculation are PMC Engineering Solutions, Inc. proprietary documents. Proprietary copies of the following documents are provided in Attachment 3; redacted copies are provided in Attachment 4:

- Encapsulation Component Calculation Design Report 201218-S-01, R1
- Fabrication Drawing 201218-M-0001, R3
- Installation Drawing 201218-M-0002, R1

NRC Question 14:
Provide the operating and design pressure and temperature of the subject piping.

NextEra Energy Response:
Operating conditions of piping lines SW-1801-003-153-24" and SW-1818-003-153-24" are 65°F and 75 psi. Design conditions are 200°F and 150 psi.

NRC Question 15:
Describe step-by-step how the repair will be performed.

NextEra Energy Response:
Preparation
The surface will be prepared, which means concrete will be removed down to good metal plus margin for welding access. All debris, scale, rust or other surface conditions will be removed.

Characterization
The flaw will be characterized in accordance with an Engineering procedure to determine the degradation mechanism and the minimum wall thickness. Engineering will evaluate if a repair is required and if the encapsulation device is necessary.

Repair
The flaw will be repaired as follows:
Repair materials will be issued and checked for correctness and quantity. Caution will be exercised during removal and reinstallation to prevent damage to the lining at the flange faces. A plug will be installed in a through-wall hole, if required, to alleviate root pass degradation due to air or water in-leakage.

Welding Of Encapsulation Device:
The pipe be welded will be cleaned to bright metal prior to welding and will include an area approximately 1 inch beyond the welded area for performance of final NDE (Liquid Penetrant or Magnetic Particle). The fit-up gap shall be approximately 3/32" or as specified on design drawing. Welding shall be performed by using site welding procedures qualified for the open root configuration. Final NDE shall be either Liquid Penetrant or Magnetic Particle examination to comply with ASME Class 3 piping systems. A physical installation review will be performed to verify installation is in compliance with all implementation procedures and applicable design documents.

NRC Question 16:
Figure A of the relief request shows the restored liner material. (a) Discuss whether the "restored liner material" is the same material as the existing cement liner material. (b) Describe how the restored liner material is attached/joined to the existing cement liner on one side and the encapsulation on the other side. (c) Discuss how the bonding of the restored liner to the existing liner and encapsulation will provide corrosion protection to the steel piping.

NextEra Energy Response:
(a) The "restored liner material" will be Carboline Splash Zone A-788 or Belzona ceramic R-metal.

(b) The material used to restore the liner is bonded to the encapsulation device, steel pipe and the existing cement liner by adhesion based on the inherent adhesional property of the material.

(c) The restored liner material has a negligible moisture vapor permeability property thus, will provide an effective corrosion barrier.

NRC Question 17:
Figure A identifies an "Inconel 625 liner." The encapsulation is SA 105 or SA 350 Grade LF2 as stated in Section 5.a of the relief request. (a) Explain how Inconel 625 liner is attached to the encapsulation. (b) Please confirm that the Inconel 625 liner is used to minimize corrosion of the encapsulation. However, the staff noted that the Inconel 625 liner is applied to the top of the encapsulation only and not the sides of the encapsulation (the side that faces the fluid flow in the cross-sectional area). Discuss how the sides of the encapsulation will be protected from corrosion.

NextEra Energy Response:
(a) The Inconel 625 liner is shop welded to the encapsulation device during fabrication.

(b) The Inconel 625 liner is used to minimize corrosion of the encapsulation device. Upon installation of the encapsulation device via weldment, restored liner material in the form of bonded epoxy, such as Belzona or Splashzone, will be applied from the remaining concrete to the top of the cap to preclude further corrosion.

NRC Question 18:
Figure A of the relief request shows that the weldment is in contact with the restored liner material. Discuss whether there is a limit imposed on the distance between two adjacent encapsulations (i.e., how close can two encapsulations be installed next to each other) to minimize weld shrinkage in the pipe and high weld stresses.

NextEra Energy Response:
At a minimum, a distance of $2.5\sqrt{Rt_{nom}} = \sqrt{(11.8125)(0.375)} = 5.262$ inches will be imposed; where R is the mean pipe radius, and t_{nom} is the nominal pipe thickness.

NRC Question 19:
Section 5.c of the relief request states that liquid penetrant or magnetic particle examination of the final attachment weld pass shall be performed. Discuss the acceptance criteria of the post-installation inspection results.

NextEra Energy Response:
The acceptance criterion below is applicable to both liquid penetrant and magnetic particle examination for ASME Section III, Subsection ND welds. Indications whose major dimensions are greater than 1/16 in. shall be considered relevant. The following relevant indications are unacceptable:

1. Any crack or linear indication.
2. Rounded indications with dimensions greater than 3/16 in.
3. Four or more rounded indications in a line separated by 1/16 in. or less, edge to edge.

4. Ten or more rounded indications in any 6 in.^{2} of surface with the major dimension of this area not to exceed 6 in. with the area taken in the most unfavorable location relative to the indications being evaluated.

NRC Question 20:
Section 5.d of the relief request states that "...[a] future excavation of the piping will be performed prior to the end of the 36 months service period for the purpose of defect removal from the exterior and repair of the external wrap..." (a) Discuss how the defect will be removed. (b) Does the above statement imply that the degraded pipe will be removed and a new pipe will be installed within 36 months of installing the encapsulation?

NextEra Energy Response:
(a) The defective portion of piping will be entered into the Corrective Action Program and scheduled for repair within two operating cycles. The defect will be removed by an accepted Code Repair via the OD of the pipe within the 36-month service period of the encapsulation device. The remaining material will be treated and coated with bonded epoxy, such as Belzona. The piping will be rewrapped.

(b) The degraded portion of the pipe will be removed and a Code Repair will be performed within 36 months of installing the encapsulation.

NRC Question 21:
Section 5.d of the relief request states that post repair monitoring is not possible because the pipe is buried. However, the licensee will place the repaired location into the NextEra Energy Seabrook Buried Pipe Inspection Program. (a) Describe how the buried pipe inspection program will monitor the repaired location. (b) Confirm that after the installation of the encapsulation, the pipe run will follow the requirements of the system leakage testing in accordance with the ASME Code, Section XI, IWA-5000 and IWD-5000 for buried piping.

NextEra Energy Response:
(a) Segments of buried piping where internal weld repairs have been performed shall be considered for high prioritization in the Buried Pipe Inspection Program. Internal weld repairs may damage the external coating, making the particular segment more susceptible to external induced corrosion, and such are prioritized for future inspection.

(b) Post-installation of the encapsulation, NextEra Energy Seabrook confirms it will follow the requirements of the system leakage testing in accordance with the ASME Code, Section XI, IWA-5000 and IWD-5000 for buried piping.

NRC Question 22:
The licensee submitted the relief request under Title 10, Code of Federal Regulations (CFR), paragraph 50.55a(a)(3)(ii). Section 4 of the relief request presents the hardship but the basis for the hardship is not clearly understood by the NRC staff. Clarify the hardship of performing an ASME Code repair, without a compensating increase in the level of quality and safety (i.e., how does the relief request satisfies 10 CFR 50.55a(a)(3)(ii)?).

NextEra Energy Response:

NextEra Energy Seabrook believes the act of removing a defect from the inside of the pipe, including drilling a hole and installing a plug, approximately 12' below the water table presents an industrial safety risk to individuals performing the repair. Some portions of the pipe are located approximately 25 feet below grade with pipe runs several hundred feet long. Full defect removal creates the potential for groundwater inleakage into the pipe while the individual is performing the repair and also potentially exposes the individual performing the repair to asbestos from the exterior pipe covering.

Excavating the site represents an undue hardship since the some portions of the pipe are located approximately 25 feet below grade and would require extensive excavation to uncover and make the repair. Sections of the pipe are also located adjacent to and below other safety related piping further complicating the excavation and creating the potential to damage safety related piping during the excavation.

For these reasons NextEra Energy Seabrook believes that that removal of the defect creates a hardship without a compensating increase in the level of quality or safety.

Attachment 2

Seabrook Station
Affidavit of Mr. Paul S. Mazon of PMC Engineering

AFFIDAVIT

I, Paul S. Manzon, state as follows:

1. I am the owner of PMC Engineering Solutions, Inc., Pottstown, PA, 19465. I am the inventor and owner of United States Patent 6,860,297, "Local degraded area repair and restoration component for pressure retaining items", and am addressing the proprietary documents listed in (2) below, containing information which is sought to be withheld, and am applying for its withholding.

2. The information sought to be withheld is contained in the following PMC Engineering Solutions, Inc. documents:

    a. Design Report 201218-S-01, Revision 1, "ASME Section III, Class 3, Design Report for Pressure Maintenance Component [*PMCap*] for 24" Buried Service Water System Pipe Wall Restoration, PMC Restoration Method (U.S. Patent 6,860,297)"

    b. Drawing 201218-M-0001, Revision 3, Sheets 1 and 2 of 2, "Service Water Pipe *PMCap* Shop Fabrication Details"

    c. Drawing 201218-M-0002, Revision 1, Sheets 1 and 2 of 2, "Service Water Pipe *PMCap* Installation Details"

3. In making this application for withholding of proprietary information of which it is the owner, PMC Engineering Solutions, Inc. relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4) and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for "trade secrets" (Exemption 4). The information for which exemption from disclosure is here sought also qualifies under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

4. Some examples of categories of information which fit into the definition of proprietary information are:

    a. Information that discloses a process, method, or apparatus, including supporting data and analysis, where prevention of its use by PMC Engineering Solutions, Inc.'s competitors without license from PMC Engineering Solutions, Inc. constitutes an economic advantage over other companies;

    b. Information which, if used by a competitor, would reduce their expenditure of resources or improve their competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

    c. Information which reveals aspects of past, present, or future PMC Engineering Solutions, Inc. customer funded development plans and programs, resulting in potential products to PMC Engineering Solutions, Inc.

    d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4) a., (4) b., and (4) d., above.

5. To address 10 CFR 2.390 (b) (4), the information sought to be withheld is being submitted to the NRC in confidence. The information is of a sort customarily held in confidence by PMC Engineering Solutions, Inc., and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by PMC Engineering Solutions, Inc. No public disclosures to third parties including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions which provide for the maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are set forth in paragraphs (6) and (7) following.

6. Approval of proprietary treatment of a document is made by me, Paul S. Manzon, owner of PMC Engineering Solutions, Inc. I am the person most acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within PMC Engineering Solutions, Inc. is limited on a "need to know" basis.

7. The procedure for approval of external release of such a document requires review by me, Paul S. Manzon, owner, PMC Engineering Solutions, Inc., for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside PMC Engineering Solutions, Inc. are limited to regulatory bodies, customers, potential customers, and their agents, suppliers, and business and licensees, Authorized ASME Code Nuclear Inspectors, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

8. The documents identified in paragraph (2) above, are classified as proprietary because they contain "know-how" and "unique information" developed by PMC Engineering Solutions, Inc. within our product development programs. The development of these documents, supporting methods, and information constitutes a major PMC Engineering Solutions, Inc. asset in this current market. Supporting aspects for the application to withhold information specific to each of the document containing proprietary information are as follows:

   a. Design Report 201218-S-01, Revision 1, "ASME Section III, Class 3, Design Report for Pressure Maintenance Component [*PMCap*] for 24" Buried Service Water System Pipe Wall Restoration, PMC Restoration Method (U.S. Patent 6,860,297)"

      Design Report 201218-S-01, Revision 1, outlines the specific methodologies used to document ASME Section III, Code compliance of the restoration hardware (*PMCap*) and the existing Service Water System pipe with *PMCap* installed on either a straight run of pipe or Long Radius elbow at any location within the buried portion of the Service Water System pipe. Also included in the Design Report are dimensions of the restoration hardware *(PMCap)*. The methodologies present the means of addressing the effects of each load and load combination set for Design, and Service Level A, B, C, and D Conditions as required in satisfying the ASME Section III Design Specification criteria and requirements applicable to restoration of the Service Water System pipe. The dimensions presented are the results of extensive evaluations performed to determine the most cost effective designs that will satisfy ASME Section III rules, criteria, and stress and load limit acceptance criteria. The development of these methods, processes, and dimensional data, applicable to ASME Code compliance evaluations, compliance, and their documentation process is a major PMC Engineering Solutions, Inc. asset in this current market. These methods and processes were developed at a very high level of effort and expense over the past several years during which PMC Engineering Solutions, Inc. has been offering the nuclear power industry its comprehensive PMC Restoration Method products and services which include those protected by U.S. Patent 6,860,297.

b. Drawing 201218-M-0001, Revision 3, Sheets 1 and 2 of 2, "Service Water Pipe *PMCap* Shop Fabrication Details"

   i. Drawing 201218-M-0001, Revision 3, contains specific shop fabrication details required to construct ASME Section III, Code stamped restoration hardware (*PMCaps*). The development of these shop fabrication details applicable to and supporting ASME Section III Code material, design, fabrication, examination, and testing requirements are a major PMC Engineering Solutions, Inc. asset in this current market. These shop fabrication details were developed at a very high level of effort and expense over the past several years during which PMC Engineering Solutions, Inc. has been offering the nuclear power industry its comprehensive PMC Restoration Method products and services which include those protected by U.S. Patent 6,860,297.

c. Drawing 201218-M-0002, Revision 1, Sheets 1 and 2 of 2, "Service Water Pipe *PMCap* Installation Details"

   i. Drawing 201218-M-0002, Revision 1, contains specific field installation details required to install ASME Section III, Code stamped restoration hardware (*PMCaps*). The development of these field installation details applicable to and supporting ASME Section III Code compliance of the *PMCaps* and the pipe with *PMCaps* installed are a major PMC Engineering Solutions, Inc. asset in this current market. These installation details were developed at a very high level of effort and expense over the past several years during which PMC Engineering Solutions, Inc. has been offering the nuclear power industry its comprehensive PMC Restoration Method products and services which include those protected by U.S. Patent 6,860,297.

9. The specific locations in the documents of all information sought to be withheld is as follows:

    a. Design Report 201218-S-01, Revision 1, "ASME Section III, Class 3, Design Report for Pressure Maintenance Component [*PMCap*] for 24" Buried Service Water System Pipe Wall Restoration, PMC Restoration Method (U.S. Patent 6,860,297)"

        i. Main body of Design Report – includes Cover Sheet and pages 1 through 29

            1. Page 4 of 29 - last 2 paragraphs of Section 4.2
            2. Page 5 of 29 - Sections 4.2.1.1 through 4.2.1.12
            3. Page 9 of 29 - 4" *PMCap* flat head thickness value
            4. Page 9 of 29 - 4" *PMCap* hub thickness value
            5. Page 9 of 29 - 4" *PMCap* mean radius thickness value
            6. Page 9 of 29 - 6" *PMCap* flat head thickness value
            7. Page 9 of 29 - 6" *PMCap* hub thickness value
            8. Page 9 of 29 - 6" *PMCap* mean radius thickness value
            9. Page 10 of 29 - Section 5.4.1 - Pipe with 4" and 6" *PMCap* B1 stress index values
            10. Page 10 of 29 - Section 5.4.1 - Pipe with 4" and 6" *PMCap* B2r stress index values
            11. Page 11 of 29 - Section 5.4.4 - Pipe with 4" and 6" *PMCap* B2r stress index values
            12. Page 11 of 29 - Section 5.4.4 - 24" LR Elbow with 4" and 6" *PMCap* installed B2 stress index values

13. Page 17 of 29 - Section 8.1.4.1 – 4" *PMCap* thickness value and resultant calculated $P_{4'' \text{ fluid load}}$ load value from formula

14. Page 17 of 29 - Section 8.1.4.1 – 6" PMCap thickness value and resultant calculated $_{P6'' \text{ fluid load}}$ load value from formula

15. Page 18 of 29 - Section 8.1.4.2 – 4" *PMCap* $P_{4'' \text{ fluid load}}$ load value and resultant direct stress value from

16. Page 18 of 29 - Section 8.1.4.2 – 4" *PMCap* thickness value and resultant height value from "h" value formula

17. Page 18 of 29 - Section 8.1.4.2 – 4" *PMCap* $P_{4'' \text{ fluid load}}$ load value, height value "h", and resultant moment value from moment value formula

18. Page 18 of 29 - Section 8.1.4.2 – 4" *PMCap* moment value and resultant local induced bending moment stress value from local induced bending moment stress formula

19. Page 18 of 29 - Section 8.1.4.2 – 4" PMCap direct stress value and local induced bending moment stress value from total pipe/Tee/elbow wall stress formula

20. Page 19 of 29 - Section 8.1.4.3 – 6" *PMCap* $P_{6'' \text{ fluid load}}$ load value and resultant direct stress value from

21. Page 19 of 29 - Section 8.1.4.3 – 6" *PMCap* thickness value and resultant height value from "h" value formula

22. Page 19 of 29 - Section 8.1.4.3 – 6" *PMCap* $P_{6'' \text{ fluid load}}$ load value, height value "h", and resultant moment value from moment value formula

23. Page 19 of 29 - Section 8.1.4.3 – 6" *PMCap* moment value and resultant local induced bending moment stress value from local induced bending moment stress formula

24. Page 19 of 29 - Section 8.1.4.3 – 6" *PMCap* direct stress value and local induced bending moment stress value from total pipe/Tee/elbow wall stress formula
25. Page 20 of 29 - Section 8.2.1 – B1 stress index
26. Page 20 of 29 - Section 8.2.1 – B2 stress index
27. Page 21 of 29 - Section 8.2.2 – B1 stress index
28. Page 21 of 29 - Section 8.2.2 – B2 stress index
29. Page 21 of 29 - Section 8.2.3 – B1 stress index
30. Page 21 of 29 - Section 8.2.3 – B2 stress index
31. Page 22 of 29 - Section 8.2.5 – B1 stress index
32. Page 22 of 29 - Section 8.2.5 – B2 stress index
33. Page 23 of 29 - Section 8.2.6 – B1 stress index
34. Page 23 of 29 - Section 8.2.6 – B2 stress index
35. Page 24 of 29 - Section 8.3.1 – B1 stress index
36. Page 24 of 29 - Section 8.3.1 – B2 stress index
37. Page 25 of 29 - Section 8.3.2 – B1 stress index
38. Page 25 of 29 - Section 8.3.2 – B2 stress index
39. Page 25 of 29 - Section 8.3.3 – B1 stress index
40. Page 25 of 29 - Section 8.3.3 – B2 stress index
41. Page 26 of 29 - Section 8.3.5 – B1 stress index
42. Page 26 of 29 - Section 8.3.5 – B2 stress index
43. Page 27 of 29 - Section 8.3.6 – B1 stress index

44. Page 27 of 29 - Section 8.3.6 – B2 stress index

ii. Appendix A, 22 pages

1. Sections A.1.2 through A.2.12.2 in their entirety and Section A.5

iii. Appendix B, 22 pages

1. Sections B.1.2 through B.2.12.2 in their entirety and Section B.5

iv. Appendix C, 4 pages

1. Sections B and C in their entirety

b. Drawing 201218-M-0001, Revision 3, Sheets 1 and 2 of 2, "Service Water Pipe *PMCap* Shop Fabrication Details"

i. Sheet 1 of 2

1. NOTE 2 – thickness value of stock forging

ii. Sheet 2 of 2

1. PLAN VIEW – dimensional value of formed or machined radius
2. PLAN VIEW - Part 101 (*PMCap*) diameter tolerance
3. PLAN VIEW - Part 102 (*PMCap*) diameter tolerance
4. SECTION A/2 – Part 101 or 102 partial penetration weld prep size for attachment of Part 201 or 202
5. SECTION A/2 – Part 201 or 202 to Pressure Cap Part 101 or 102 partial penetration weld size
6. SECTION A/2 – Part 101 or 102 Hub (skirt) weld prep land formed or machined radius
7. SECTION A/2 – Part 101 or 102 flat head portion undercut formed or machined (REF.) radius

8. SECTION B/2 – Part 101 or 102

    a. Overall height (thickness dimensions)

    b. Hub (skirt) thickness dimension

    c. Hub (skirt) weld prep land dimension

    d. Undercut radius dimension

    e. Undercut depth dimension

9. SECTION B/2 – Part 201 or 202 – plug weld size

c. Drawing 201218-M-0002, Revision 1, Sheets 1 and 2 of 2, "Service Water Pipe *PMCap* Installation Details"

    i. Sheet 1 of 2

        1. INSTALLATION NOTES - Notes 3.1 and 3.3

        2. ELEVATION OR PLAN VIEW – size of fillet weld in weld symbol

    ii. Sheet 2 of 2

        1. Section IN/2 - size of fillet weld in weld symbol

10. Public disclosure of the information sought to be withheld is likely to cause substantial harm to PMC Engineering Solutions, Inc.'s competitive position and foreclose or reduce availability of profit-making opportunities. The information is part of PMC Engineering Solutions, Inc.'s comprehensive PMC Restoration Method products and services offerings which include those protected by U.S. Patent 6,860,297, and its commercial value extends beyond the original development costs. The value of the technology base goes beyond the information contained in the documents and includes development of the expertise to determine and apply the appropriate data, requirements, criteria, limitations, approaches and methodologies used in the development and preparation of the design, design details, and supporting documentation for the restoration covered by the information sought to be withheld.

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The research, development, engineering and analytical costs comprise substantial investment of time and money by PMC Engineering Solutions, Inc.

The precise value of the expertise to devise a restoration method and apply the appropriate and correct Code and regulatory requirements to the restoration is difficult to quantify, but it clearly is substantial.

PMC Engineering Solutions, Inc.'s competitive advantage will be lost if its competitors are able to use the results of the PMC Engineering Solutions, Inc. experience to develop or modify their own restoration method or if they are able to claim an equivalent understanding by demonstrating that they can develop the same or similar restoration method.

The value of this information to PMC Engineering Solutions, Inc. would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive PMC Engineering Solutions, Inc. of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Sincerely,

Paul S. Manzon
Owner
PMC Engineering Solutions, Inc.