UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 21, 2009

Mr. Gene F. St. Pierre
Site Vice President
c/o Michael O'Keefe
Seabrook Station
NextEra Energy Seabrook, LLC
P.O. Box 300
Seabrook, NH 03874

SUBJECT: SEABROOK STATION, UNIT NO. 1 - RELIEF REQUEST FOR ALTERNATE REQUIREMENTS FOR ASME CLASSIFICATION OF LINES AND COMPONENTS ATTACHED TO THE PRESSURIZER STEAM SPACE (TAC NO. ME0252)

Dear Mr. St. Pierre:

By letter dated December 11, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML083500098), FPL Energy Seabrook, LLC, submitted a relief request from the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(c) pertaining to the pressurizer upper level instrument piping/lines and associated components. Specifically, 10 CFR 50.55a(c) requires that reactor coolant pressure boundary components meet the requirements for Class 1 components as specified in Section III of the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code (Code). These lines and components were designed and constructed to meet the Code requirements for Class 2 components. The proposed alternative would allow these lines and associated components to remain as designed and constructed.

The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's analysis in support of the request for relief. The NRC staff concludes that compliance with the ASME Code, Section III design requirements for Class 1 components consistent with the requirements of 10 CFR 50.55a(c) would result in hardship without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance that the pressurizer upper level instrument lines and associated components, as designed and constructed, will perform their intended safety functions. The request is authorized for the Seabrook Station pursuant to 10 CFR 50.55a(a)(3)(ii) for the remaining life of the plant.

The NRC staffs' evaluation and conclusions are contained in the enclosed safety evaluation. This completes the NRC staff's efforts on TAC No. ME0252.

If you have any questions, please contact the Seabrook Project Manager, Mr. Dennis Egan, at 301-415-2443.

Sincerely,

EDDIE MILLER FOR HKC

Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure: As stated

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST ASSOCIATED WITH THE PRESSURIZER UPPER LEVEL INSTRUMENT PIPING AND ASSOCIATED COMPONENTS

FPL ENERGY SEABROOK, LLC

SEABROOK STATION, UNIT NO. 1

DOCKET NO. 50-443

1.0 INTRODUCTION

By letter dated December 11, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML083500098), FPL Energy Seabrook, LLC, submitted a relief request from the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(c) pertaining to the pressurizer upper level instrument piping/lines and associated components. Specifically, 10 CFR 50.55a(c) requires that reactor coolant pressure boundary components meet the requirements for Class 1 components as specified in Section III of the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code (Code). These lines and components were designed and constructed to meet the Code requirements for Class 2 components. The proposed alternative would allow these lines and associated components to remain as designed and constructed.

2.0 REGULATORY EVALUATION

Section 50.55a(c) of 10 CFR states, in part:

> (c) Reactor coolant pressure boundary.
>
> (1) Components which are part of the reactor coolant pressure boundary must meet the requirements for Class 1 components in Section III of the ASME Boiler and Pressure Vessel Code, except as provided in paragraphs (c)(2), (c)(3), and (c)(4) of this section,
>
> (2) Components which are connected to the reactor coolant system and are part of the reactor coolant pressure boundary as defined in § 50.2 need not meet the requirements of paragraph (c)(1) of this section, Provided:
>
> (i) In the event of postulated failure of the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system ...

Section 50.55a(a)(3)(ii) of 10 CFR states that proposed alternatives may be authorized if it can be demonstrated that compliance would result in hardship without a compensating increase in the level of quality and safety.

ENCLOSURE

3.0 TECHNICAL EVALUATION

3.1 Items for Which Relief is Requested

The three affected lines and associated components of the pressurizer portion of the Reactor Coolant (RC) System are shown on the licensee's Piping and Instrumentation Drawing (P&ID) 1-RC-D20846 (Updated Safety Analysis Report (USAR) Figure 5.1-4). These details are tabulated below:

Table 3-1: Affected Pressurizer Lines and Components on P&ID 1-RC-D20846

P&ID Drawing Location	Line Details	Root Valve
E-7	RC-82-1-2501-3/4" ¾" piping downstream of RC-V129 ¾" Pipe Tee (Condensate Pot) ½" tubing above Condensate Pot ½" tubing downstream of Condensate Pot (first section)	RC-V129
D-7	RC-83-1-2501-3/4" ¾" piping downstream of RC-V130 ¾" Pipe Tee (Condensate Pot) ½" tubing above Condensate Pot ½" tubing downstream of Condensate Pot (first section)	RC-V130
E-4	RC-86-1-2501-3/4" ¾" piping downstream of RC-V135 ¾" Pipe Tee (Condensate Pot) ½" tubing above Condensate Pot ½" tubing downstream of Condensate Pot (first section)	RC-V135

As a clarification to the scope of this relief request the licensee also provided the following information. The licensee indicated that the Seabrook Station design includes flow restrictors (orifices) that serve as Code Class break locations. A Seabrook Station-specific Westinghouse calculation performed in March 1985 resulted in the conclusion that an orifice size of 0.3775 inches provides sufficient flow restriction for the pressurizer heaters to generate the necessary heat to avoid a situation in which Reactor Coolant System depressurization results in a low pressurizer pressure trip or Emergency Core Cooling System injection. Thus, it was concluded that an orifice of this size or smaller provides the flow restriction necessary for an orderly shutdown. For this reason, relief was not requested for these other lines.

3.2 Code Requirement

Section 50.55a(c) of 10 CFR requires that components which are part of the reactor coolant pressure boundary must meet the requirements for Class 1 components in Section III of the ASME Code, except "...[c]omponents which are connected to the reactor coolant system and are part of the reactor coolant pressure boundary as defined in § 50.2 need not meet the requirements ... [p]rovided: [i]n the event of postulated failure of the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system."

Westinghouse Electric Company has issued Nuclear Safety Advisory Letter (NASL), "NSAL-00-006: Pressurizer Upper Level Instrument Safety Classification" and NSAL 07-09, Rev. 01, "Safety Classification of Small Lines Connected to the Pressurizer Steam Space." In these letters, Westinghouse indicated that the aforementioned instrument lines should be classified as ASME Code Class 1, given that a break in these lines would not result in a shutdown and cooldown "in an orderly manner."

Therefore for the lines and components listed in Section 3.1 the requirements of ASME Code Class 1 apply.

The original design and analysis of the ASME Section III Code piping and instrument piping (including tubing) systems at Seabrook Station were performed in accordance with the 1971 Edition with the Winter 1972 Addenda of Section III of the ASME Code. The Code of Construction for the ASME Code piping and instrument piping systems within the scope of this relief request was the 1977 Edition with the Winter 1977 Addenda.

3.3 Proposed Alternative

The licensee states that the piping, tubing, and valves identified in the request were designed and constructed using the ASME Code, Section III, Subsection NC (Class 2) requirements. The proposed alternative would allow the piping, tubing, and valves to remain as designed and constructed (ASME Code Class 2) in lieu of upgrading the current design configuration and replacing these items with items manufactured and constructed to ASME Section III, Subsection NB (ASME Code Class 1).

3.4 Licensee Basis for the Alternative

The licensee states that upgrading the affected components to ASME Code, Section III, Subsection NB (Class 1), would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety because the scope of the change would require substantial time and resources to upgrade the plant design configuration and perform plant modification work to replace the affected items. A modification of this type would be costly in time, materials, personnel radiation exposure, and radioactive waste and would not result in a compensating increase in the level of quality or safety. The estimated time for the potential removal and re-installation of the affected piping, tubing and valves would be approximately 1,000 man-hours. The estimated additional engineering man-hours for upgrading the design configuration and issuing design change packages would also be approximately 1,000 man-hours. Additionally, it is estimated that personnel radiation exposure would amount to 3.9 person-REM.

Although the components identified in the alternative meet most of the Section III requirements for Class 1 items, they do not meet all Section III requirements for Class 1 items. For example, the valves do not meet the component certification requirements of Section III, which require that a valve be stamped by an appropriate ASME Certificate Holder with the Class 1 identification mark and be certified by an appropriate ASME Certificate Holder on the Section III Code Data Report (Form NPV-1) for being in full compliance with Code Class 1 requirements.

To justify the proposed alternative, the licensee compared the ASME Code, Section III requirements in Subsection NB for Class 1 components to the design rules in Subsection NC for Class 2 components using the applicable editions and addenda of the ASME Code. The comparison considered each Article of Subsections NB and NC (covering the areas of materials, design, fabrication and installation, examination, testing, protecting against overpressure, nameplates, stamping and reports) and determined whether the differences were technical, quality, or administrative requirements.

Differences in Section III administrative requirements such as; certification and stamping, furnishing of a Stress Report, and marking of items, were determined to not reduce the quality or safety of the items and would only affect literal compliance with the ASME Code. Minimal differences were identified in quality requirements between Class 1 and Class 2, because most quality requirements are contained in the General Requirements Subsection NA and are equally applicable to both Class 1 and Class 2. No differences in quality requirements were identified that would reduce the quality or safety of the items.

There were some differences in technical requirements between Class 1 and Class 2 in the areas of piping and tubing material examination (NB/NC-2510), valve design (NB/NC-3500), and piping design (NB/NC-3600). However, replacing the affected items would provide minimal increase in quality and safety, as demonstrated in the following paragraphs discussing the technical requirement differences.

For piping and tubing material examination, the later provisions of NB-2501(a) in the Summer 1983 Addenda exempted 1 inch and less seamless pipe, tubes and fittings from the examination requirements of NB-2500, thus making the Class 1 rules the same as Class 2 and eliminating the technical difference between Class 1 and Class 2.

Based on the original Code used for piping design, there were considerable differences between Class 1 and Class 2 requirements, but these differences were eliminated for smaller piping in the Summer 1975 Addenda change to NB-3630(d). This change allowed 1 inch and smaller Class 1 piping to be designed to NC-3600, thus making the Class 1 design rules the same as Class 2. The Seabrook piping systems were originally designed to the 1971 Edition with Winter 1972 Addenda of Section III of the ASME Code. An as-built reconciliation analysis was performed to the 1977 Edition with Winter 1977 Addenda of the Code. Also, as-built reconciliations were performed for branch qualifications to the 1980 Edition with the Winter 1981 Addenda of the Code and for flange qualifications to the 1983 Edition with Winter 1983 Addenda of the Code. Based on the reconciliations to the later Codes described above, the affected piping, tubing, and fittings technically meet the requirements of the Code Class 1 rules. No increase in quality or safety would be realized by changing the design Code Class of the aforementioned piping, tubing, and fittings.

In the area of valve design, the requirements in NB-3500 are considerably different than the requirements in NC-3500. However, the small valves that are affected have been evaluated to the applicable requirements in NB-3500 and all the valves were found to meet the technical requirements of NB-3500 applicable to small valves. Therefore, there are no technical differences between the installed Class 2 valves and the requirements for Class 1 valves that would reduce the assurance that the valves would perform their intended safety function. No

increases in quality and safety would be realized by replacing the valves with valves constructed to Class 1 requirements.

Based on the preceding discussions the licensee concluded that for the piping, tubing, and valves identified in this request, the technical, quality, and administrative differences between the Section III ASME Code requirements for Class 1 and Class 2 would have minimal impact on the ability of these items to perform their intended safety function.

3.5 NRC Staff Evaluation

The piping and instrument piping (including tubing) identified in the relief request were designed and analyzed in accordance with the 1971 Edition with the Winter 1972 Addenda of Section III of the ASME Code. A provision added in the Summer 1975 Addendum to the 1974 Edition in subparagraph NB-3630(d) allowed Class 2 rules to be used for Class 1 design for piping less than or equal to 1 inch in size. An as-built reconciliation analysis was performed to the 1977 Edition with the Winter 1977 Addenda of the Code. Also, as-built reconciliations were performed for branch qualifications to the 1980 Edition with the Winter 1981 Addenda of the Code and for flange qualifications to the 1983 Edition with Winter 1983 Addenda of the Code. Based on the provisions and as-built reconciliations, the affected piping and instrument piping technically meet the requirements of the Code Class 1 rules. Therefore, the NRC staff finds that the design rules used for the affected Class 2 piping provide an equivalent level of safety to Class 1 design requirements in later ASME Code editions and addenda.

In a letter dated July 22, 2009, (ADAMS Accession No. ML092080563) responding to the staff's request for additional information, the licensee stated that there are no piping/tubing supports within the scope of the relief request. The licensee clarified that the piping/tubing sections are short (less than 4 inches in length), and their stress analyses demonstrated that piping/tubing supports are not required for the components within the scope of the relief request. Based on its review, the staff agrees with the licensee's clarification.

Addressing the valve design aspects related to the relief request, the licensee indicated that the requirements for Class 1 small valves are considerably different than the requirements for Class 2 small valves. However, the affected valves were evaluated to the Class 1 requirements and found to meet all of the technical requirements found in NB-3500. Based on the considerations above, the NRC staff finds that for the affected Class 2 valves the Class 2 requirements provide an equivalent level of safety to Class 1 requirements provided in the ASME Code.

Regarding the material examination facets of the affected piping and components, the later provisions of NB-2501(a) in the Summer 1983 Addenda exempted 1 inch and less seamless pipe, tubes and fittings from the examination requirements of NB-2500, thus there are no technical differences between the Class 1 and Class 2 rules. Had the design and construction of these systems been completed at a later date, the current Class 2 configuration would meet the Class 1 material examination requirements of NB-2500. Based on the considerations above, the NRC staff finds that the Class 2 material examination requirements provide an equivalent level of safety to the ASME Code Class 1 requirements.

The bounding effect of the above differences in fabrication, installation, examination, and material quality is the potential for a slight decrease in the quality of these lines and associated

components compared to those constructed to meet ASME Code Class 1 requirements. From the preceding discussions, the NRC staff concludes that for the piping, tubing, and valves identified in this request the differences between Section III requirements for Class 1 and Class 2 construction would have minimal impact on the ability of these items to perform their intended safety function. Therefore, authorizing this alternative to allow continued operation with the current design configuration would not adversely impact the health and safety of the public.

Further, the licensee has demonstrated that upgrading the affected piping and valves to ASME Code, Section III, Class 1 requirements would result in a hardship or unusual difficulty because the scope of the change would require substantial time, resources and personnel radiation exposure to upgrade the current design configuration without a compensating increase in the level of quality and safety.

Therefore, the NRC staff finds that compliance with ASME Code, Section III, Class 1 requirements for the lines and associated components described in the alternative would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

The NRC staff concludes that the proposed alternative to the requirements of 10 CFR 50.55a(c) is authorized for the Seabrook Station on the basis that compliance with the ASME Code, Section III design requirements for Class 1 components would result in hardship without a compensating increase in the level of quality and safety pursuant to 10 CFR 50.55a(a)(3)(ii). The licensee's proposed alternative provides reasonable assurance that the pressurizer upper level instrument and other lines and associated components, as designed and constructed, will perform their intended safety functions. The alternative is authorized for the remaining life of the plant.

Principal Contributors: C. Basavaraju
W. Jessup

Date: August 21, 2009

If you have any questions, please contact the Seabrook Project Manager, Mr. Dennis Egan, at 301-415-2443.

Sincerely,

/ra/ (GMiller for)
Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure: As stated

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