December 20, 2001

Mr. William R. McCollum, Jr.
Vice President, Oconee Site
Duke Energy Corporation
P.O. Box 1439
Seneca, South Carolina 29679

SUBJECT: THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN REQUEST FOR RELIEF NO. 2001-013, REVISION 1, FOR OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 (TAC NOS. MB2909, MB2910, AND MB2911)

Dear Mr. McCollum:

By letter dated October 25, 2001, you submitted Relief Request 2001-13 which proposed an alternative to certain requirements of the American Society of Mechanical Code, Section XI, for the Oconee Nuclear Station, Units 1, 2, and 3. Specifically, you proposed an alternative to use ultrasonic examination in lieu of hydrostatic pressure tests on certain main steam system values.

The NRC staff has reviewed Relief Request 2001-013 as documented in the enclosed Safety Evaluation. The staff concludes that compliance with the Code requirements would result in a hardship without a compensating increase in the level of quality and safety. Furthermore, the proposed visual inspections that will be performed during system pressure tests, combined with the proposed nondestructive examination, provide reasonable assurance of the continued structural integrity of the subject main steam welds. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the third interval.

On December 6, 2001, we granted verbal approval of this relief request.

Sincerely,

/RA/

Richard J. Laufer, Acting Chief, Section 1
Project Director II
Division of Project Licensing Management
Office of Nuclear Reactor Regulation

Docket Nos: 50-269, 50-270, and 50-287

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD 10-YEAR INTERVAL INSERVICE INSPECTION

REQUEST FOR RELIEF NO. 2001-013, REVISION 1

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

DUKE ENERGY COMPANY

DOCKET NUMBERS 50-269, 50-270, AND 50-287

1.0 INTRODUCTION

Inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first ten-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The Code of record for the Oconee Nuclear Station, Units 1, 2, and 3, third 10-year ISI interval is the 1989 Edition of the ASME Code, Section XI.

The staff has reviewed the information concerning ISI program Requests for Relief No. 2001-013, Revision 1, third 10-year interval for Oconee Nuclear Station, Units 1, 2, and 3 provided in a Duke Energy Company (the licensee) letter dated October 25, 2001.

The information provided by the licensee in support of the request for relief from Code requirements has been evaluated and the basis for disposition is documented below.

2.0 REQUEST FOR RELIEF 2001-013

2.1 Components

The licensee states:

> During the Unit 3 refueling outage 3EOC-19, ten Main Steam Isolation valves are scheduled to be replaced. The equivalent valves on Units 1 and 2 are also scheduled for replacement during upcoming outages 1EOC20 and 2EOC19. Therefore this request also applies to those similar Main Steam valve replacements on Units 1 and 2. Valves 1, 2, 3 MS-82 and 1, 2, 3 MS-84 are ASME XI Class 2 on the upstream side and ASME XI Class 3 on the downstream side. The other valves referenced are isolations between ASME Section XI Code piping and non-safety related piping, the upstream side of these valves is ASME XI and the downstream side is non-safety related. The normal operating temperature and pressure for these valves is 1050 PSIG @ 630 degrees F. The valves, piping, and welding filler material are carbon steel. The plan is to install only the new valves but a potential exists that short sections of pipe may also be added to avoid obstructions in the field that might interfere with future ISI inspections. The butt welds on the valves and piping on the Section XI Class 2 side of the valves are the subjects of this request. The welds cannot be isolated from the steam generators. The existing welds on the components being replaced were originally fabricated and installed per USAS B31.1.0, 1967 Edition. The new valves will be installed per ASME B31.1, 1998 Edition, no addenda. As previously stated, these welds are classified as ASME Section XI class 2.

VALVE TAG NUMBER	SIZE	SCHEDULE OF END PREP	ASME XI CLASS
1,2,3MS-0017	12”	.562 (schedule 60)	2/NA
1,2,3MS-0024	6”	.432 (schedule 80)	2/NA
1,2,3MS-0026	12”	.562 (schedule 60)	2/NA
1,2,3MS-0033	6”	.432 (schedule 80)	2/NA
1,2,3MS-0035	8”	.500 (schedule 80)	2/NA
1,2,3MS-0036	8”	.500 (schedule 80)	2/NA
1,2,3MS-0076	12”	.562 (schedule 60)	2/NA
1,2,3MS-0079	12”	.500 (schedule 80)	2/NA
1,2,3MS-0082	6”	.432 (schedule 80)	2/3
1,2,3MS-0084	6”	.432 (schedule 80)	2/3

2.2 Code Requirement for Which an Alternative is Requested

The licensee proposes:

> Paragraph 137.8.3 of 1998 Edition, No Addenda, of ASME B31.1 requires that a system hydrostatic test be performed in accordance with paragraph 137.3.2.

However, for systems governed by Section XI, the pressure testing requirements of ASME Section XI take precedence over the other construction code requirements for repairs and replacements.

Subsection IWA-4700 of the 1989 Edition, No Addenda, of ASME Section XI requires that "after repairs by welding on the pressure containing boundary, a system hydrostatic test shall be performed in accordance with IWA-5000, System Pressure Test."

Duke Energy Corporation (DEC) considers compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, DEC requests approval of an Alternative to the hydrostatic test required by Subsection IWA-4700 of the 1989 Edition, No Addenda, of ASME Section XI.

2.3 Basis for Relief

The licensee states:

The subject valves will be replaced beginning with the Unit 3 refueling outage 3EOC-19 and upcoming Unit 1 EOC20 and Unit 2 EOC19 respectively. These valves will be installed to ASME B31.1 1998 with no addenda. The mandatory minimum NDE specified by table 136.4 of ASME B31.1 for welds with a design temperature of 630 degrees F and pressure of 1050 psig with a thickness of ¾"of a inch or less is a visual inspection. All of the replacement welds meet these criteria. Paragraph 137.8.3 of ASME B31.1 requires that repairs or additions to nonboiler piping be retested in accordance with the provisions of paragraph 137.3.2. Paragraph 137.3.2 allows the owner as an alternative to hydrostatic testing, to leak test the additions.

However, the subject replacements are also classified as ASME XI Class 2. Subsection IWA-4700 of the 1989 Edition, No Addenda, of ASME Section XI requires that "after repairs by welding on the pressure containing boundary, a system hydrostatic test shall be performed in accordance with IWA-5000, System Pressure Test." This requirement takes precedence over the requirements of ASME B31.1.

Performing a hydrostatic test on the replacement welds for the subject valves would require filling and pressurizing the secondary side of the steam generators as well as several hundred feet of feedwater and main steam piping associated with each generator. Well over 200 man-hours would be used (for each outage) just to prepare for and recover from the hydrostatic test. This time is need for such items as:

1. Installing additional supports for the main steam lines prior to the hydrostatic pressure test and restoration afterwards.

2. Adjusting approximately 20 spring hangers for the main steam lines and restoration afterwards.

3. Gagging 16 relief valves for the higher pressure and restoration after the test.

4. Repacking approximately 100 valves after the hydrostatic test (required due to both the higher hydrostatic test pressure and the use of water on valves designed for steam).

5. Isolating over 30 instruments and restoring them afterwards.

6. Inspecting at least 10 other valves (relief valves and stop valves) after completion of the hydrostatic test.

This work would extend each outage at least 5 days and cost approximately 3 million dollars in lost revenues. In granting several previous requests, the NRC has concurred that compliance with the specified requirements for a hydro of this system would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. For example, reference Oconee Request for Relief 94-06, requested by letter of July 18, 1994 and approved by letter of April 12, 1995 (NRC TAC No. 91173).

DEC proposes to perform an ultrasonic inspection of the subject welds. The ultrasonic examination will be performed in accordance with the requirements of ASME Section V, Article 5, with acceptance standards of ASME Section III, NC-5330 1992 Edition of ASME Section III. Additional NDE in the form of a dye penetrant inspection of the root pass of each weld and a magnetic particle examination of the external surface of each final weld will be performed per paragraph 5340 and 5350 of the 1992 Edition of ASME Section III. A visual inspection of the interior surface of the root pass of each weld will be performed. A system leakage test, (VT-2) will be performed prior to operation.

DEC has concluded that the proposed alternative provides an acceptable level of quality and safety while avoiding any hardship or unusual difficulty and therefore would meet requirements for NRC approval. Therefore, DEC believes the proposed alternative is the most desirable option for the examination of the subject welds.

Relief is requested in accordance with 10CFR 50.55a(a)(3)(ii) for the reasons described, compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase level in quality.

2.4 Proposed Alternative

The licensee proposes:

Duke Energy proposes that the initial root pass of the subject welds will receive a dye penetrant examination on the exterior and a visual examination of the inside surface. In addition, the internal quality of the root of the welds will be visually monitored through completion of the weld.

The completed welds will receive a surface magnetic particle examination and ultrasonic examination. The ultrasonic examination will be performed in accordance with the requirements of ASME Section V, Article 5, T-522 “Written Procedure Requirements” and T-542.8, “Ferritic Welds in Ferritic Pipe”, 1992 Edition with no addenda. Since access for the examination will only be from the pipe side 45-degree and 60-degree

shear wave beam angles will be used with a full V-path calibration to examine the full volume of weld metal. The acceptance standards of ASME Section III, NC-5330, 1992 Edition will be applied. In addition, the ultrasonic procedure will be qualified through a blind test as described in Attachment B. The dye penetrant and magnetic particle examinations will be performed in accordance with ASME Section V, Article 6 and 7 respectively. The acceptance standards of ASME Section III, NC-5340 and NC-5350, 1992 Edition will be applied.

Prior to or immediately upon return to service, a visual examination (VT-2) shall be performed in conjunction with a system leakage test, using the 1992 Edition of Section XI, in accordance with paragraph IWA-5000, at nominal operating pressure and temperature.

The proposed alternative provides a reasonable assurance that no unallowable flaws will exist in the welds and meets the criteria for alternatives that provide an acceptable level of quality and safety per 10 CFR 50.55a (a)(3)(ii).

These welds will be subject to inclusion in the ISI program for the upcoming interval.

3.0 EVALUATION

The ASME Code, Section XI requires that after repairs by welding on the pressure retaining boundary, a system hydrostatic test shall be performed in accordance with IWA-5000, System Pressure Test. Because this presents a hardship, the licensee proposed an alternative to the Code-required hydrostatic test. In lieu of a hydrostatic test, the licensee proposed to perform a system leakage test (VT-2) at operating pressure and temperature in accordance with IWA-5000, 1992 Edition, along with an ultrasonic inspection, dye penetrant inspection of the root pass of each weld and a magnetic particle examination of the external surface of each final weld.

The licensee noted that performing a hydrostatic test on the replacement welds for the subject valves would require filling with water and pressurizing the secondary side of the steam generators as well as several hundred feet of feedwater and main steam piping associated with each generator. In addition, a hydrostatic test would require the licensee to install additional supports for the main steam lines, adjust approximately 20 spring hangers for the main steam lines, gagging 16 relief valves, repack approximately 100 valves, isolate over 30 instruments, and inspect at least 10 other valves (relief valves and stop valves) after completion of the hydrostatic test.

The staff determined that hydrostatic testing only subjects the piping components to a small increase in pressure over the design pressure and, therefore, does not present a significant challenge to pressure boundary integrity. Accordingly, hydrostatic pressure testing is primarily regarded as a means to enhance leak detection during the examination of components under pressure, rather than as a measure of the structural integrity of the components. Considering that hydrostatic pressure tests rarely result in pressure boundary leaks that would not occur

during system leakage tests, the staff finds that the increased assurance of the integrity of the subject Main Steam System replacement welds that could be achieved by the performance of a hydrostatic test is not commensurate with the burden of performing such a test.

The staff also determined that the licensee's proposed ultrasonic examination of the final weld, dye penetrant inspection of the root pass of each weld and a magnetic particle examination of the external surface of each final weld should reveal any conditions that are not acceptable. Therefore, the proposed visual inspections (VT-2) to be performed during system pressure tests, combined with nondestructive examination (NDE), provide reasonable assurance of the continued structural integrity of the subject Main Steam welds, which were repaired/replaced in accordance with B31.1-1998 requirements. The staff determined that requiring the licensee to perform the Code-required post-repair hydrostatic test in accordance with the ASME Code, Section XI, paragraph IWA-4700 and IWA-5000, would be a hardship without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

The staff concludes that for Request for Relief No. 2001-013, compliance with the Code requirements would result in a hardship without a compensating increase in the level of quality and safety. Furthermore, the proposed visual inspections (VT-2) that will be performed during system pressure tests, combined with the proposed NDE, provide reasonable assurance of the continued structural integrity of the subject Main Steam welds. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the third interval.

Principal Contributor: T. McLellan

Date: December 20, 2001