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November 9, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

SUBJECT: Oconee Nuclear Station - Units 1, 2, and 3
Docket No. 50-269,-270,-287
Request for Alternative 2005-ON-05

Pursuant to 10 CFR 50.55a(a)(3)(i), Duke Energy Corporation (DEC) requests the NRC to authorize the use of Alloy 690 welding filler material along with the associated ASME Boiler and Pressure Vessel Code, Section IX, Code Cases 2142-2. This code case would be applied as an alternative to the ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition thru 2000 Addenda.

This request is to allow the application of Alloy 690 type weld filler material for repairs associated with plugging of steam generator tubesheets. Specifically, Code Case 2142-2 establishes welding classifications and requirements for filler metal designated UNS N06054 Ni-Cr-Fe (Inconel 52M). Code Case 2142-2 has not been incorporated by reference into the regulations; therefore its use requires NRC approval.

The NRC has previously approved the use of Inconel 52/152 for DEC applications. For example, DEC received approval on September 10, 1999 to apply Alloy 690 (and the associated Code Cases) to the Oconee replacement steam generators (TAC Nos. MA6209, MA6210, and MA6211), and January 8, 2001 to apply Alloy 690 (and the associated Code Cases) for Unit 1 reactor vessel head weld repairs (TAC No. MB0854).

Industry studies show that Alloy 690 weld filler materials possess a high resistance to primary water corrosion. Inconel 52M is considered superior to 52/152 for this application.

A detailed description of this proposed alternative, including a background discussion and justification is included as an

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attachment to this letter. Use of this alternative weld material is scheduled to start on Unit 2 on November 9, 2005. Entry into Mode 4, where steam generators may be relied on for decay heat removal, is presently scheduled for November 15, 2005. Although the current application is on Unit 2, approval is requested for use on all three Oconee units, due to the reasonable expectation that steam generator tubesheet plugging may be required on any of the three Oconee units in the future.

Questions regarding this request may be directed to Randall Todd at (864) 885-3418.

Very truly yours,



for Ron Jones

Ron Jones

Attachment:

Request for Alternative, Serial Number 2005-ON-05

U. S. Nuclear Regulatory Commission
November 9, 2005

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xc w/att:

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L. N. Olshan, Project Manager, Section 1
Project Directorate II
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xc(w/o attch):

M. E. Shannon,
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Mr. Henry Porter
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Bureau of Land and Waste Management
SC Dept. of Health & Environmental Control
2600 Bull St.
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**Duke Energy Corporation
Oconee Nuclear Station**

SUBJECT: Request for Authorization to Use Alloy 690 Welding Filler Metal Per Code Case 2142-2 (UNS N06054) in accordance with 10 CFR 50.55 (a)(3)(i)

Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI 1998 Edition thru 2000 Addenda.

Description of Code Requirement(s) for Which an Alternative is Requested

The applicable ASME Code to be utilized for the repairs in association with Fusion Welded Tube Plugging of Steam Generator Tubes at Oconee Nuclear Station is the ASME Code Section XI 1998 Edition thru 2000 Addenda. IWA-4712 for welded tube plugging requires that Section III weld filler metal meet NB-2000 (or an ASME approved Code Case). The applicable Code allows the use of some Alloy 690 filler metal equivalents, but does not include the use of UNS N06054 (or Inconel 52M produced by Special Metals Corporation).

In earlier requests, Duke Energy has received authorization to use Inconel 52 and 152 on repairs to other Class 1 components.

Code Case 2142-2 introduces and classifies a new nickel based weld metal that is equivalent to Alloy 690. Code Case 2142-1 contains Inconel 52/152 (UNS N06052) classification and is approved for use by the NRC. Code Case 2142-2 establishes welding classifications and other requirements for bare wire filler metal for UNS N06054 Ni-Cr-Fe. This later revision of the Code Case 2142 has not been incorporated by reference into the regulations; therefore, its use requires NRC approval.

Description of Proposed Alternative

In lieu of the requirements of the 1998 Edition thru the 2000 Addenda of the ASME Code, the use of Alloy 690 equivalent weld filler metal is proposed for repairs associated with the plugging of steam generator tubing. At present, use of this filler metal is needed for less than 5 tube repairs. Additional repairs during future steam generator outages may be a potential.

Duke Energy requests the use of ASME Code Case 2142-2 that groups the new weld filler metal in the same welding category as other commonly used nickel based weld filler metals. This allows the use of appropriate existing welding procedures and performance qualifications with the new weld metal.

Justification for Using the Proposed Alternative

Industry studies have demonstrated that 52M designated weld metal is comparable to Alloy 600(82/182) and Alloy 690 (52/152) weld material. Alloy 690 (52M/152M) is directly comparable in physical and mechanical properties to Alloy 690(52/152). Both alloys provide equivalent resistance to primary water stress corrosion cracking (PWSCC), however, 52M provides enhanced resistance to ductility-dip cracking (DDC) or cold cracking during fabrication with the addition of Boron and Zirconium. Also, 52M weld deposits tend to be extremely "clean"; free of inclusions, oxides and porosity mainly as a consequence of the controlled low levels of aluminum and titanium. This material also exhibits good resistance to root-cracking.

Background Information

Repairs to steam generator tubes with the use of a welded plug are common and are not a "first of a kind" repair. The currently identified usage will be to plug a vacant tube location in the Oconee-2 Once Thru Steam Generator for the reason of tube sample removal. The tube removal task requires that the tubesheet penetration be plugged to establish a primary-to-secondary pressure boundary. The plugging method is an ASME Section XI qualified technique for fusion welding. An approved certified vendor will be utilized for this scope of work. This vendor is familiar with the benefits of this substitute material and has performed procedure qualifications and welding with this material with success.

Quality and Safety Provided by the Proposed Alternative

Alloy 690 material has been shown to be a superior material in resisting Primary Water Stress Corrosion Cracking (PWSCC). As well, the Alloy 690 material in the specification form of Inconel 52M has demonstrated to have better weldability over similar Inconel 52 products.

Multiple requests for use of alternate Alloy 690 weld material in the form of Inconel 52/152 have been authorized including the McGuire Nuclear Station Unit 1 and 2 and Catawba Nuclear Station Unit 1 for use in the replacement steam generator and associated tasks in 1999. Also, approval of alternate Alloy 690 weld material was received for multiple reactor vessel head repairs in 2001.

ASME Code Case 2142-2 establishes the uniform chemical and material properties and the classification of the weld metal with respect to its welding characteristics. Code Case 2142-2 establishes the F-No. for the American Weld Society (AWS) specification AWS 5.14 and Unified Number System (UNS) designation UNSN06054 (Inconel 52M) as F No. 43 for both procedure and performance qualification purposes. This Code Case sets the specifications and F-No. assignments completely describe this material. For welding purposes the filler metal is similar in welding characteristics to other approved nickel based weld metals.

The use of Alloy 690 welding filler metal in the form of UNSN06054 (Inconel 52M) for the steam generator tube repairs at Duke Energy Oconee Nuclear Station will provide a superior corrosion protection and will provide improved weldability over Inconel 52/152. An evaluation of the specific application which includes weld procedure and performance qualifications has produced acceptable results. Therefore, the proposed alternative provides an acceptable level of quality and safety.

Duration of the Proposed Alternative

The proposed alternative applies to the steam generator tube repairs at the Oconee Nuclear Station.

Originated By: Charles R. Frye
Charles R. Frye

11/7/05
Date

Reviewed By: Basil W. Carney Jr.
Basil W. Carney Jr.

11/8/2005
Date

CASES OF ASME BOILER AND PRESSURE VESSEL CODE

CASE
2142-2

Approval Date: August 7, 2003

See Numeric Index for expiration
and any reaffirmation dates.

Case 2142-2

F-Number Grouping for Ni-Cr-Fe Filler Metals
Section IX (Applicable to all Sections, including
Section III, Division 1, and Section XI)

Inquiry: What alternate rules may be applied to grouping UNS N06052 and UNS N06054 Ni-Cr-Fe welding filler metals meeting the chemical requirements of Table 1 but otherwise conforming to AWS 5.14 to reduce the number of welding procedure and performance qualifications?

Reply: It is the opinion of the Committee that UNS N06052 and UNS N06054 Ni-Cr-Fe welding filler metals meeting the chemical requirements of Table 1 but otherwise conforming to AWS A5.14 may be considered as F-No. 43 for both procedure and performance qualification purposes. Further, these materials shall be identified as UNS N06052 and UNS N06054 in the Welding Procedure Specification, Procedure Qualification Record, and Performance Qualification Records.

This Case number shall be shown on the Manufacturer's Data Report.

TABLE 1
CHEMICAL REQUIREMENTS

Element	Composition, UNS N06052, %	Composition, UNS N06054, %
Carbon, max.	0.04	0.04
Manganese, max.	1.00	1.00
Phosphorus, max.	0.02	0.02
Sulfur, max.	0.015	0.015
Silicon, max.	0.50	0.50
Chromium	28.0-31.5	28.0-31.5
Molybdenum, max.	0.50	0.50
Nickel	Balance	Balance
Columbium, max.	0.10	0.5-1.0
Aluminum, max.	1.10	1.10
Aluminum and Titanium, max.	1.50	1.50
Copper, max.	0.30	0.30
Iron	7.0-11.0	7.0-11.0
Titanium, max.	1.0	1.0
Other elements, max.	0.50	0.50

The Committee's function is to establish rules of safety, relating only to pressure integrity, governing the construction of boilers, pressure vessels, transport tanks and nuclear components, and inservice inspection for pressure integrity of nuclear components and transport tanks, and to interpret these rules when questions arise regarding their intent. This Code does not address other safety issues relating to the construction of boilers, pressure vessels, transport tanks and nuclear components, and the inservice inspection of nuclear components and transport tanks. The user of the Code should refer to other pertinent codes, standards, laws, regulations or other relevant documents.