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Part 21 (PAR)

Event # 47981

<b>Rep Org:</b> SHAW NUCLEAR SERVICES	<b>Notification Date / Time:</b> 05/31/2012 16:17 (EDT)
<b>Supplier:</b> JOSEPH OAT CORPORATION	<b>Event Date / Time:</b> 05/31/2012 (EDT)
	<b>Last Modification:</b> 05/31/2012
<b>Region:</b> 1	<b>Docket #:</b>
<b>City:</b> CHARLOTTE	<b>Agreement State:</b> Yes
<b>County:</b>	<b>License #:</b>
<b>State:</b> NC	
<b>NRC Notified by:</b> DAVID BARRY	<b>Notifications:</b> STEVEN VIAS R2DO
<b>HQ Ops Officer:</b> JOHN KNOKE	PART 21 GROUP
<b>Emergency Class:</b> NON EMERGENCY	
<b>10 CFR Section:</b>	
21.21(d)(3)(i) DEFECTS AND NONCOMPLIANCE	

PART 21 - DUCTILITY OF REINFORCING STEEL FOR EMBEDMENTS NOT IN ACCORDANCE WITH CODE REQUIREMENT

"The reporting organization provided information pertaining to the identification of a noncompliance associated with the steel reinforcing material (rebar) attached to embedments being supplied as basic components for the Vogtle Units 3 and 4, nuclear project, based on reinforcing bar that exceeded the limit for yield strength.

"The results of the evaluation of this condition as documented by Shaw Nuclear and conducted in accordance with the procedure for performing evaluations required by 10 CFR 21.21, has concluded that the noncompliance could potentially create a substantial safety hazard, if it were to remain uncorrected. Therefore, it has been determined that this noncompliance is reportable under the requirements of 10 CFR Part 21."

The facility containing a defect is Vogtle, Units 3 and 4, embedments for Westinghouse AP1000 CA20 module supports.

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10 CFR 21.21

**The Shaw Group Inc.**  
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Charlotte, NC 28202  
704-331-5856  
FAX: 225-987-3970



David P. Barry  
President, Nuclear Division of the Power Group

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May 31, 2012

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

**SUBJECT: 10 CFR PART 21 REPORT REGARDING DUCTILITY OF REINFORCING  
STEEL FOR EMBEDMENTS NOT IN ACCORDANCE WITH CODE  
REQUIREMENT**

The attachment to this letter provides information pertaining to the identification of a noncompliance associated with the steel reinforcing material (rebar) attached to embedments being supplied as basic components for the Vogtle Units 3 and 4, nuclear project, based on reinforcing bar that exceeded the limit for yield strength.

The results of the evaluation of this condition as documented by Shaw Nuclear and conducted in accordance with the procedure for performing evaluations required by 10 CFR §21.21, has concluded that the noncompliance could potentially create a substantial safety hazard, if it were to remain uncorrected. Therefore, it has been determined that this noncompliance is reportable under the requirements of 10 CFR Part 21.

If you have any questions, please contact Mr. Geoffrey Grant, Vice President of Licensing, Regulatory Affairs and Compliance.

Sincerely,

David Barry  
President  
Shaw Nuclear Services

cc: Regional Administrator, USNRC, Region II

Attachment

**10 CFR PART 21 REPORT REGARDING NONCOMPLIANCE  
IDENTIFIED IN EMBEDMENTS SUPPLIED TO CONSTRUCTION PROJECT**

(i) Name and address of the individual or individuals informing the Commission.

David Barry, President, Shaw Nuclear Services  
28 South Tryon Street, Suite 400  
Charlotte, NC 28202  
704-331-5856  
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(ii) Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.

Vogle, Units 3 and 4, embedments for Westinghouse AP1000 CA20 module supports

(iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.

Joseph Oat Corporation  
2500 Broadway  
Camden, NJ 08104

(iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

The Westinghouse AP1000 design drawing for concrete that includes general notes, states that reinforcing bars shall be deformed bars conforming to ASTM [American Society for Testing and Materials] A706, "Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement," and shall be Grade 60, for reference, all bars conforming to ASTM A706, Grade 60 comply with the ductility requirements set in ACI [American Concrete Institute] 318 and 349, Paragraph 21.2.5. This note also states that reinforcing bars may be deformed bars conforming to ASTM A615, "Deformed and Plain Billet-Steel Bars for Concrete Reinforcement," Grade 60 supplementary requirement S1; ductility requirement set in ACI 318 and 349, Paragraph 21.2.5 as required by the ACI code.

ACI 349, Paragraph 21.2.5 states that reinforcement resisting earthquake-induced flexural and axial forces in frame members and in wall boundary elements shall comply with ASTM A706 and ASTM A615 and that Grades 40 and 60 reinforcement are permitted in these members if (a) the actual yield strength based on mill tests does not exceed the specified yield strength by more than 18,000 psi (retests shall not exceed this value by more than an additional 3000 psi) and (b) the ratio of the actual ultimate tensile strength to the actual tensile yield strength is not less than 1.25.

Contrary to these requirements, based on testing of two heats of #9 reinforcing bar, it was found that the actual yield strength exceeded the specified yield strength by more than 18,000 psi and for one of the heats tested the ratio of actual ultimate tensile strength to the actual tensile yield strength was less than 1.25.

The test results for the two heats tested are provided, as follows:

Test1: X29MM Rebar #9, Heat ID K113904 (ASTM A615 Grade 60)

Yield: 87930 psi, 606.26 MPa

Tensile: 109910 psi, 757.8MPa

Test 2: X29MM Rebar #9, Heat ID K113910 (ASTM A615 Grade 60)

Yield: 93290 psi, 643.21 MPa

Tensile: 112280 psi, 774.14 MPa

If uncorrected, this nonconforming condition could potentially result in the affected embedments not being capable of supporting the required load during a seismic event.

(v) The date on which the information of such defect or failure to comply was obtained.

May 29, 2012

(vi) In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for, being supplied for, or may be supplied for, manufactured, or being manufactured for one or more facilities or activities subject to the regulations in this part.

The total number of nonconforming components is approximately 218 embedments (202 plus an additional 16 spares) fabricated for use on the Vogtle Unit 3 AP1000 project. These embedments are associated with the Westinghouse AP1000 CA20 module for Vogtle Unit 3.

None of the nonconforming embedments have been used in the construction of Vogtle Units 3 and 4. The nonconforming embedments have been identified with "hold" tags and the nonconforming items will be reworked or replaced to restore compliance prior to use.

(vii) The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.

The nonconforming embedments have been identified with "hold" tags. This was completed by Shaw on March 30, 2012.

Additionally, Shaw will confirm that the nonconforming embedments are reworked or replaced to restore compliance prior to use.

(viii) Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.

Verify that the requirements for reinforcing steel ductility are met during manufacture of embedments.

(ix) In the case of an early site permit, the entities to whom an early site permit was transferred.

Not applicable.