

September 7, 2000

Mr. J. B. Beasley, Jr.
Vice President
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Company, Inc.
Post Office Box 1295
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SUBJECT: EVALUATION OF INSERVICE INSPECTION REQUEST FOR RELIEF NO.
RR-32 DURING SECOND 10-YEAR INSPECTION INTERVAL OF VOGTLE
ELECTRIC GENERATING PLANT, UNIT 1 (TAC NO. MA9538)

Dear Mr. Beasley:

By letter dated April 26, 2000, Southern Nuclear Operating Company the licensee for Vogtle Electric Generating Plant, Units 1 and 2, submitted a request for relief (No. RR-32) from the requirements of the ASME Code, Section XI, 1989 Edition, for the second 10-year inservice inspection (ISI) interval of Vogtle Electric Generating Plant, Unit 1. RR-32 proposes to defer VT-1 visual examination of steam generator #2 nozzle inner radii from the first inspection period to the next period within the second 10-year ISI interval.

The staff has evaluated the licensee's relief request and concludes that relief is authorized pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.55a(a)(3)(i). The NRC staff's evaluation is enclosed.

Sincerely,

/RA/

Richard L. Emch, Jr., Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-424

Enclosure: As stated

cc w/encl: See next page

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Vogtle Electric Generating Plant

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ON THE SECOND 10-YEAR INTERVAL INSERVICE INSPECTION

RELIEF REQUEST NO. RR-32 ON ASME CODE, SECTION XI,

VOGTLE ELECTRIC GENERATING PLANT, UNIT 1

DOCKET NO. 50-424

1.0 INTRODUCTION

The inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (ASME Code) and applicable addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), except where specific written 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 (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 preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection 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 10-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) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable ASME Code, Section XI, for Vogtle Electric Generating Plant's second 10-year ISI interval is the 1989 Edition.

By letter dated April 26, 2000, Southern Nuclear Operating Company (SNC) the licensee for Vogtle Electric Generating Plant, Units 1 and 2, submitted a request for relief (No. RR-32) from the requirements of the ASME Code, Section XI, 1989 Edition, for the second 10-year ISI interval of Vogtle Electric Generating Plant, Unit 1(VEGP-1). RR-32 requests relief from the requirement of the Code concerning deferral of steam generator inner radii examination by

Enclosure

proposing alternative scheduling. The NRC has previously approved VT-1 visual examination of VEGP steam generator inner radii in lieu of ultrasonic examination for the second 10-year inspection interval. The licensee's alternative schedule would allow VEGP-1 to defer VT-1 examination of the inner radii of one of the steam generators from the first inspection period to the next period within the interval. The staff has evaluated the licensee's request for relief pursuant to 10 CFR 50.55a(a)(3)(i) for the second 10-year inservice inspection interval of VEGP-1.

2.0 DISCUSSION

Identification of Components

Steam Generator #2 Inlet Nozzle Inner Radius (11201-B6-002-IR-01)
Steam Generator #2 Outlet Nozzle Inner Radius(11201-B6-002-IR-02)

Code Requirements

ASME Code, Section XI, 1989 Edition, Table IWB-2500-1, Examination Category B-D, Item Number B3.140 requires that the inner radius volume of the steam generator inlet and outlet nozzles be volumetrically examined. Additionally, Table IWB-2412-1 requires that 16% to 34% of the total Category B-D examinations (except where deferral to the end of the interval is permitted) must be completed during the first period.

Relief Requested

The NRC has previously approved VT-1 visual examination of steam generator nozzle inner radius in lieu of volumetric examination at Vogtle units during the second 10-year ISI interval. However, the licensee requests that the scheduled VT-1 visual examination of Steam Generator #2 inlet and outlet inner radii during the first inspection period be deferred to the next inspection period of the current interval. This deferral will result in the licensee's failure to meet the minimum percentage of examination required in Category B-D for the first period of the second ten-year interval.

Basis for Relief

The licensee has indicated that performance of VT-1 visual examination of the steam generator inner radius whether it is performed by direct or remote visual is associated with a radiation dose penalty. Typically, direct VT-1 visual of the inner radii of both nozzles in a steam generator exposes an examiner to a total radiation dose in excess of 800 mRems and in performing remote VT-1 visual, the dose is in excess of 600 mRems. Currently, the industry is in discussions with the NRC to eliminate the Code-required volumetric examination of nozzle inner radii of the steam generator and the pressurizer. The licensee states:

Performance of the VT-1 examinations during the period of time discussions are being held between the industry and the NRC to optimize the examination requirements, constitutes a hardship to SNC without a compensating increase in the level of quality and safety.

Typical steam generator primary nozzle inner radii were designed such that fatigue usage factors are low; therefore, it is unlikely that fatigue cracking would initiate in these areas. In the unlikely event that a crack did initiate, industry fracture mechanics evaluations, based on conservative assumptions, have demonstrated that these nozzles have a large tolerance for flaws. In addition, probabilistic risk assessment calculations, performed with or without the required inservice inspections, gave such small probabilities of failure that the gain from inspection is considered to be meaningless.

The steam generator nozzle inner radii surface areas for Steam Generators 1, 2, 3, and 4 were visually examined during the FTY (first 10-year interval) and no cracking or flaws (fabrication or service-induced) were observed. Therefore, there were no observable fabrication flaws that could serve as a localized crack initiation site. With the low propensity for fatigue cracking to initiate and propagate to a critical size in these nozzles and with the absence of observable ID crack initiation sites, the proposed examination schedule should continue to provide reasonable assurance that the structural integrity of the nozzles will be maintained.

Alternate Examination

Examinations will be conducted in accordance with the proposed alternative schedule identified in Table 1 of RR-32 submittal. Specifically, the licensee will preform the VT-1 examination of steam generator #2 nozzle inner radii during the second period of the second 10-year ISI interval.

3.0 EVALUATION

The licensee's request for relief pertains to deferral of a scheduled VT-1 visual examination of Steam Generator #2 from the first inspection period to the second period of the current inspection interval. This would cause the percentage of examination required by the ASME Code, Section XI, 1989 in Category B-D to which the steam generator inner radius examination belongs, to go below the minimum required by Table IWB-2412-1 of the Code. The intent of the Code in specifying a minimum percentage of examinations in each examination category and not allowing deferral to the end of the inspection interval is that service-induced flaws are detected early during an inspection interval to prevent an undetected flaw to grow to a critical size. The staff believes that if there was neither any repair performed on the nozzles nor any identified flaw that currently requires successive inspections and if the nozzles have been previously examined, the deferral of examination from one inspection period to the next will have negligible impact on structural integrity of the steam generator nozzles. Moreover, the results of preservice volumetric examination and subsequent VT-1 examination during the first 10-year interval indicate that the inner radii of Steam Generator #2 have no recordable flaws.

The staff further concurs with the licensee's assessment that due to low fatigue usage factor in combination with large flaw tolerance of the nozzles, initiation and growth of fatigue cracks to critical size is highly unlikely within the time span of an inspection period (40 months). Therefore, the licensee's proposed alternative schedule for conducting VT-1 visual examination of the inner radii of Steam Generator #2 nozzles during the second inspection period instead of the first period provides an acceptable level of quality and safety.

4.0 CONCLUSION

The staff concludes that deferral of VT-1 visual examination of Steam Generator #2 nozzle inner radii from the first inspection period to the second within the current 10-year interval has negligible impact on the structural integrity of the nozzles, and therefore, provides an acceptable level of quality and safety. Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposed alternative schedule and relief from the Code requirement stated in Table IWB-2412-1 regarding minimum percentage for the examination category (B-D) of the component are authorized for VEGP-1 for the second 10-year interval.

Principal Contributor: P. Patnaik

Date: September 7, 2000