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## NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

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| TO: Mr. E. Case | FROM: Duke Power Co.<br>Charlotte, 1N.C. 28242<br>W. O. Parker, Jr. | DATE OF DOCUMENT: 3-1-78<br>DATE RECEIVED: 3-8-78 |

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DESCRIPTION: Ltr trans the following: 1P

ENCLOSURE: Info & evaluation concerning fracture toughness of the steam generator & reactor coolant pumps support materials & with attached drawings & supporting info.... 6 inche

JCM 3-10-78

PLANT NAME: Oconee Units 1-2-3

DIST PER R. INGRAM 3/8/78

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WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

March 1, 1978

TELEPHONE: AREA 704
373-4083

Mr. Edson G. Case, Acting Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. R. Reid, Chief
Operating Reactor Branch #4

Reference: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

With regard to your letter dated October 4, 1977, please find attached information and evaluation concerning fracture toughness of the steam generator and reactor coolant pumps support materials of the Oconee Nuclear Station.

Very truly yours,

William O. Parker, Jr.

RLG:ge

Attachments

7806900038

ATTACHMENT 1

ATTACHMENT 1

RESPONSE TO REQUEST FOR ADDITIONAL
INFORMATION CONCERNING FRACTURE TOUGHNESS
OF STEAM GENERATOR AND REACTOR COOLANT PUMP
SUPPORT MATERIALS

OCONEE NUCLEAR STATION

1. Provide engineering drawings of the steam generator and reactor coolant pump supports sufficient to show the geometry of all principal elements. Provide a listing of materials of construction.

   Response:

   Engineering drawings of the steam generator and reactor coolant pump supports are included as part of Attachment 2. Drawings indicating the materials of construction are also included.

2. Specify the detailed design loads used in the analysis and design of the supports. For each loading condition (normal, upset, emergency and faulted), provide the calculated maximum stress in each principal element of the support system and the corresponding allowable stresses.

   Response:

   Loading for steam generator support skirt - MK No. 97 were as follows:

| | Normal & Upset | Emergency | Faulted |
|---|---|---|---|
| Design | OK | Uplift - 1.888 KIPs<br>Overturning moment - 40,080 IN-KIPs | Uplift - 2,015 KIPs<br>Overturning moment - 250,000 IN-KIPs |
| Calculated Max Stress | OK | OK | 14 KSI |
| Allowable Stress | 17 KSI | 13.5 KSI (Primary Membrane Only) | 24.5 KSI |

   The steam generator top lateral supports are subject to a maximum bending stress of 44.7 KSI. The reactor coolant pump support design criteria is indicated on Drawing OM-100-223 (Attachment 2).

3. Describe how all heavy section intersecting member weldments were designed to minimize restraint and lamellar tearing. Specify the actual section thicknesses in the structure and provide details of typical joint designs.

State the maximum design stress used for the through-thickness direction of plates and elements of rolled shapes.

Response:

There is no major loading on the steam generator skirt to show cause for concern about lamellar tearing.

4. Specify the minimum operating temperature for the supports and describe the extent to which material temperatures have been measured at various points on the supports during the operation of the plant.

Response:

No minimum operating temperature were specified for support materials.

5. Specify all the materials used in the supports and the extent to which mill certificate data are available. Describe any supplemental requirements such as melting practice, toughness tests and through-thickness tests specified. Provide the results of all tests that may better define the properties of the materials used.

Response:

Materials used were as follows. All material meets the criteria in section II of the ASME Code.

| NSS-3 | Part # | Specification | Mill Cert. Available | Special Test Results |
|---|---|---|---|---|
| Support Skirt | 96 | SA302,GRB | Yes | None |
| Gusset Plate | 98 | SA515,GR.70 | Yes | None |
| Base Plate | 97 | SA515,GR.70 | Yes | None |

| NSS-4 | Part # | Specification | Mill Cert. Available | Special Test Results |
|---|---|---|---|---|
| Support Skirt | 96 | SA302,GRB | Yes | None |
| Gusset Plate | 98 | SA515.70 | Yes | None |
| Base Plate | 97 | SA515,GR.70 | Yes | None |

| NSS-9 | Part # | Specification | Mill Cert. Available | Special Test Results Impacts at 40°F |
|---|---|---|---|---|
| Support Skirt | 96 | SA-533,GRB,CL1 | Yes | None |
| Gusset Plate | 98 | SA515,GR.70 | Yes | None |
| Base Plate | 97 | SA515,GR.70 | Yes | None |

Additional information is included in Attachment 3.

6. Describe the welding procedures and any special welding process requirements that were specified no minimize residual stress, weld and heat affected zone cracking and lamellar tearing of the base metal.

Response:

Welding specifications for the steam generators are included in Attachment 3. Welding of the reactor coolant pump supports is discussed in Section 4.2.5 of the FSAR.

7. Describe all inspections and non-destructive tests that were performed on the supports during their fabrication and installation, as well as any additional inspections that were performed during the life of the facility.

Response:

Welding and Non-Destructive Examination (NDE) were as follows:

| Location of Weld | Joint | Procedure | Special Requirements | NDE |
|---|---|---|---|---|
| Skirt to lower head | WG-57 | NSS-3 Submerged Arc<br>NSS-4 Submerged Arc<br>NSS-9 No weld | Preheat-Post Weld Heat Treat | MT,UT<br>MT,UT |
| Gusset to Support Skirt | WG-70 | NSS-3 Manual<br>NSS-4 Metal<br>NSS-9 Arc | Prehead-Post Weld Heat Treat | MT |
| Gusset to Base Plate | WG-65 | NSS-3 Manual<br>NSS-4 Metal<br>NSS-9 Arc | Preheat-Post Weld Heat Treat | MT |
| Long Seam (Vertical) on Skirt | WG-64 | NSS-3 Submerged Arc<br>NSS-4<br>NSS-9 | Preheat-Post Weld Heat Treat | MT,RT |
| Circumferential (Transition) Seam on Skirt | WG-61 | NSS-3 Submerged Arc<br>NSS-4<br>NSS-9 | Preheat-Post Weld Heat Treat | MT,RT |
| Skirt to Base Plate | WG-65 | NSS-3<br>Gen. A. Submerged Arc<br>Gen. B. Manual Metal Arc<br>NSS-4 Either Flux Core, Submerged Arc or Manual Metal Arc<br>NSS-9 Flux Core | Preheat-Post Weld Heat Treat<br>Preheat-Post Weld Heat Treat<br>Preheat-Post Heat Treat<br>Preheat-Post Heat Treat | MT<br>MT<br>MT<br>MT |

NOTE 1.
MT = Magnetic Particle Test
UT = Ultrasonic Test
RT = Radiograph Test

ATTACHMENT 2

LIST OF DRAWINGS

| | |
|---|---|
| 0-65D | Steam Generator Lateral Supports and Hanger Steel for Support of Reactor Coolant Pump Constant Support Hangers |
| 0-65G | Reactor Coolant Pump Support Steel |
| 0-65V | Tie Plates for Steam Generator Lateral Supports |
| 0-71A | Foundation for Steam Generators |
| OM-201-398 | Constant Support Hangers for Reactor Coolant Pump Motors |
| OM-1100-223 | Reactor Coolant Pump Design Data |
| 129304E | List of Materials for Steam Generator |
| 149804E | List of Materials for Steam Generator |
| 146454E | List of Materials for Steam Generator |
| 146480E | Assembly and Details of Support Skirt |
| 149830E | Assembly and Details of Support Skirt |
| 129330E | Assembly and Details of Support Skirt |