



PECO ENERGY

10 CFR 50.55a(a)(3)

PECO Energy Company
Nuclear Group Headquarters
965 Chesterbrook Boulevard
Wayne, PA 19087-5691

June 22, 1995

Docket Nos. 50-277
50-278

License Nos. DPR-44
DPR-56

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

Subject: Peach Bottom Atomic Power Station, Units 2 and 3
Submittal of Proposed Alternative Repair
Plan In Accordance with 10 CFR 50.55a(a)(3)

Dear Sir:

In our letter from G. A. Hunger, Jr. (PECO Energy Company) to U. S. Nuclear Regulatory Commission (USNRC), dated September 16, 1994, PECO Energy Company requested review and approval of the proposed repair plan for the Peach Bottom Atomic Power Station (PBAPS), Unit 2 core shroud, in accordance with 10 CFR 50.55a(a)(3), in the event that such a repair is determined to be necessary. Supplemental information regarding the PBAPS, Unit 2 repair was provided in our letter dated September 26, 1994. In our letter dated February 14, 1995, PECO Energy Company supplied revised repair plan information. This information was revised, in part, to include applicability to PBAPS, Unit 3.

In order to incorporate changes and improvements identified since the last submittal, and to demonstrate the acceptability of the repair design considering assumed complete cracking of weld H-8, Attachment 1 contains further revisions to the repair plan information. Additionally, attached are responses to questions that have been asked of similar Boiling Water Reactors. These responses are being submitted in anticipation of the same questions being asked of the PBAPS shroud repair plan.

We request that the attached repair plan information for PBAPS, Units 2 and 3 be reviewed and approved by August 1, 1995 in order to support a contingency repair option for the upcoming PBAPS, Unit 3 outage currently scheduled for September 1995.

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9507050136 950622
PDR ADDOCK 05000277
P PDR

Drawings located in Central Files

Change: NEC PDR

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W. Encl.
1 INP*

June 22, 1995

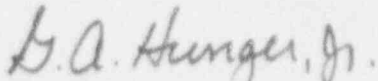
Page 2

Due to the requested expediency in the review of the package, PECO Energy Company welcomes a meeting with the USNRC to discuss the repair package and respond to any further questions.

Attachment 2 contains information proprietary to General Electric. General Electric requests that the Attachment 2 information be withheld from public disclosure in accordance with 10 CFR 2.790(a)(4). In accordance with 2.790(b)(1), an affidavit supporting this request is provided in Attachment 2.

If you have any questions, please contact us.

Very truly yours,



G. A. Hunger, Jr.,
Director - Licensing

Attachments

cc: T. T. Martin, Administrator, Region I, USNRC
W. L. Schmidt, USNRC Senior Resident Inspector, PBAPS

General Electric Company

AFFIDAVIT

I, **George B. Stramback**, being duly sworn, depose and state as follows:

- (1) I am Project Manager, Licensing Services, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.
- (2) The information sought to be withheld is contained in the GE proprietary reports GENE-771-60-0994, "*Shroud Mechanical Repair Program Peach Bottom Units 2 & 3 Seismic Analysis*", Revision 2, (GE Proprietary), June, 1995, GENE-771-58-0994, "*Shroud Mechanical Repair Program Peach Bottom Units 2 & 3 Shroud and Shroud Repair Hardware Stress Analysis*", Revision 4, (GE Proprietary), June, 1995 and drawings 105E1455, Rev. 2, "*Reactor Modification & Installation Drawing*" and those listed in the Attachment. These documents, taken as a whole, constitutes a proprietary compilation of information, some of it also independently proprietary, prepared by the General Electric Company. The independently proprietary elements that are drawings are delineated by the GE drawings being marked as proprietary information and the independently proprietary elements that are in reports are delineated by bars marked in the margin adjacent to the specific material.
- (3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), 2.790(a)(4), and 2.790(d)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).
- (4) Some examples of categories of information which fit into the definition of proprietary information are:

- a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;
- b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;
- c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of General Electric, its customers, or its suppliers;
- d. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, of potential commercial value to General Electric;
- e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

Both the compilation as a whole and the marked independently proprietary elements incorporated in that compilation are considered proprietary for the reason described in items (4)a., (4)b. and (4)e., above.

- (5) The information sought to be withheld is being submitted to NRC in confidence. That information (both the entire body of information in the form compiled in these drawings, and the marked individual proprietary elements) is of a sort customarily held in confidence by GE, and has, to the best of my knowledge, consistently been held in confidence by GE, has not been publicly disclosed, and is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.
- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.
- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination

of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

- (8) The information identified in paragraph (2) and the Attachment, above, is classified as proprietary because it constitutes a confidential compilation of information, including reports and detailed design drawing results of a hardware design modification (stabilizers for the shroud horizontal welds) intended to be installed in a reactor to resolve the reactor pressure vessel core shroud weld cracking concern. The development and approval of this design modification utilized systems, components, and models and computer codes that were developed at a significant cost to GE, on the order of several hundred thousand dollars.

The detailed results of the analytical models, methods, and processes, including computer codes, and conclusions from these applications, represent, as a whole, an integrated process or approach which GE has developed, and applied to this design modification. The development of the supporting processes was at a significant additional cost to GE, in excess of a million dollars, over and above the large cost of developing the underlying individual proprietary reports and drawings information.

- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's comprehensive BWR technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to avoid fruitless avenues, or to normalize or verify their own process, or to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

While some of the underlying analyses, and some of the gross structure of the process, may at various times have been publicly revealed, enough of both the analyses and the detailed structural framework of the process have been held in confidence that this information, in this compiled form, continues to have great competitive value to GE. This value would be lost if the information as a whole, in the context and level of detail provided in the subject GE drawings, were to be disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure would unfairly provide

competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing its analytical process.

STATE OF CALIFORNIA)
) ss:
COUNTY OF SANTA CLARA)

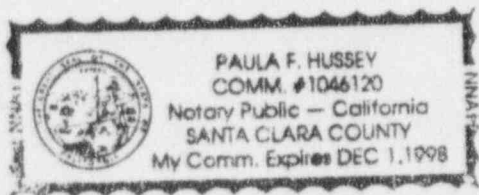
George B. Stramback, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at San Jose, California, this 19th day of June 1995.

George B. Stramback
George B. Stramback
General Electric Company

Subscribed and sworn before me this 19th day of June 1995.



Paula F. Hussey
Notary Public, State of California

Attachment

Drawing Number

| | | | |
|------|----------|--------|-----------------------------|
| B. | 112D6348 | Rev. 3 | Stabilizer Support Assembly |
| D. | 112D6350 | Rev. 3 | Rod, Tie |
| I. | 112D6353 | Rev. 2 | Support, Upper |
| AAA. | 112D6752 | Rev. 0 | Spacer, Upper Support |
| BBB. | 112D6777 | Rev. 0 | Nut, Tie Rod |

ATTACHMENT 1

| DOCUMENT DESCRIPTION | DOCUMENT NUMBER | PREVIOUS SUBMITTAL REVISION | CURRENT SUBMITTAL REVISION | REASON FOR CHANGE |
|--|-----------------|-----------------------------|----------------------------|-------------------|
| | | | | (SEE NOTE) |
| REPAIR HARDWARE, DESIGN SPEC. | 25A5579 | 2 | 3 | 8 |
| STABILIZER CODE, DESIGN SPEC. | 25A5580 | 2 | 4 | 7,8,9 |
| FABRICATION SPEC. | 25A5601 | 1 | 1 | 1 |
| CLEANING AND CLEANLINESS CONTROL | 21A2040 | 1 | 1 | 1 |
| INSTALLATION SPECIFICATION | 25A5581 | 0 | 2 | 8,9 |
| REACTOR VESSEL STRESS REPORT | 25A5607 | 2 | 4 | 7,9 |
| SHROUD & REPAIR HARDWARE STRESS ANALYSIS | 771-58-0994 | 2 | 4 | 7,9 |
| STABILIZER INSTALLATION, DESIGN REPORT | 771-59-0994 | 2 | 4 | 7,9 |
| SEISMIC ANALYSIS | 771-60-0994 | 1 | 2 | 7 |
| FIELD DISPOSITION INSTRUCTION | 0257-71067 | 1 | 1 | 1 |
| PARTS LIST | PL112D6347 | 1 | 1 | 1 |
| PARTS LIST | PL112D6348 | 0 | 1 | 1 |
| PARTS LIST | PL112D6349 | 0 | 0 | 1 |
| PARTS LIST | PL112D6358 | 0 | 0 | 1 |
| PARTS LIST | PL112D6359 | 0 | 0 | 1 |
| PARTS LIST | PL112D6360 | 0 | 0 | 1 |
| PARTS LIST | PL112D6495 | 0 | 0 | 1 |
| PARTS LIST | PL105E1455 | 1 | 2 | 8 |
| NUT, TIE ROD | 112D6313 | 0 | 0 | 1 |
| NUT, TOP SUPPORT | 112D6321 | 3 | 3 | 1 |
| BOLT, TOP SUPPORT | 112D6322 | 0 | 0 | 1 |
| NUT, TOP SUPPORT | 112D6323 | 0 | 0 | 1 |
| RETAINER | 112D6324 | 1 | 1 | 1 |
| SPRING, RETAINER | 112D6325 | 1 | 1 | 1 |
| SLEEVE, JACK | 112D6327 | 0 | 0 | 1 |
| WASHER, JACK | 112D6328 | 0 | 0 | 1 |
| RING, MID SUPPORT | 112D6331 | 2 | 2 | 1 |
| SCREW, MID SUPPORT | 112D6332 | 0 | 0 | 1 |
| LATCH | 112D6338 | 0 | 0 | 1 |
| UPPER STABILIZER | 112D6347 | 2 | 2 | 1 |
| STABILIZER SUPPORT ASSEMBLY | 112D6348 | 2 | 3 | 8 |
| TIE ROD ASSEMBLY | 112D6349 | 1 | 1 | 1 |
| ROD, TIE | 112D6350 | 2 | 3 | 8 |
| SPRING, LOWER | 112D6351 | 1 | 1 | 1 |
| SPRING, UPPER | 112D6352 | 2 | 2 | 1 |
| SUPPORT, UPPER | 112D6353 | 1 | 2 | 8 |
| SUPPORT | 112D6354 | 2 | 2 | 1 |
| CONTACT, LOWER | 112D6355 | 1 | 1 | 1 |
| SUPPORT, MID | 112D6356 | 1 | 1 | 1 |
| CONTACT, UPPER | 112D6357 | 1 | 1 | 1 |
| TIE ROD / SPRING ASSEMBLY | 112D6358 | 1 | 1 | 1 |
| MID SUPPORT | 112D6359 | 1 | 1 | 1 |
| LOWER STABILIZER | 112D6360 | 1 | 1 | 1 |
| BOLT, TOGGLE | 112D6489 | 2 | 2 | 1 |
| SUPPORT, LOWER | 112D6490 | 2 | 2 | 1 |
| TOGGLE | 112D6491 | 2 | 2 | 1 |
| PIN, TOGGLE BOLT | 112D6492 | 1 | 1 | 1 |
| WASHER, TOGGLE BOLT | 112D6493 | 1 | 1 | 1 |
| NUT, TOGGLE BOLT | 112D6494 | 2 | 2 | 1 |
| TOGGLE BOLT ASSEMBLY | 112D6495 | 1 | 1 | 1 |
| BOLT, JACK | 112D6496 | 1 | 1 | 1 |
| SPRING, RETAINER | 112D6497 | 1 | 1 | 1 |
| BRACKET, UPPER SPRING | 112D6498 | 2 | 2 | 1 |
| SCREW, TOP SUPPORT BOLTING | 112D6501 | 1 | 1 | 1 |
| COUPLING, TOP SUPPORT BOLTING | 112D6502 | 2 | 2 | 1 |
| EXTENSION, LOWER SPRING | 112D6503 | 1 | 1 | 1 |
| PIN | 112D6504 | 1 | 1 | 1 |
| PIN, CLEVIS | 112D6505 | 1 | 1 | 1 |
| ARM, TORSION | 112D5242 | 1 | 1 | 1 |
| BOLT, TORSION ARM | 112D5243 | 1 | 1 | 1 |
| NUT, LOCK | 112D5244 | 0 | 0 | 1 |
| MODIFICATION DRAWING | 105E1455 | 1 | 2 | 8 |
| SPACER, UPPER SUPPORT | 112D6752 | N/A | 0 | 8 |
| NUT, TIE ROD | 112D6777 | N/A | 0 | 8 |
| GE RESPONCES TO NRC QUESTIONS | DRF B13-01732 | N/A | 0 | N/A |

NOTES:

1. NO CHANGE SINCE LAST SUBMITTAL.
2. DRAWING CORRECTIONS, NO CHANGE IN DESIGN.
3. INCORPORATED UNIT 3 SEISMIC ANALYSIS INFORMATION.
4. MINOR MODIFICATION TO IMPROVE LOAD CAPACITY, FABRICATION, OR ASSEMBLY.
5. DELETED HEAT TREATMENT REQUIREMENT FOR THREADS.
6. INCORPORATED ANALYSIS OF CORE SPRAY PIPING INSIDE THE VESSEL
7. SCOPE INCREASE TO ADD WELD H8 EVALUATION
8. INCORPORATE LESSONS LEARNED IMPROVEMENTS
9. INPROCESS REVISION DUE TO PECO/GE COMMENTS AND APPROVAL



EIS IDENT: SHROUD STABILIZER HARDWARE

REVISION STATUS SHEET

DOCUMENT TITLE SHROUD STABILIZER HARDWARELEGEND OR DESCRIPTION OF GROUPS TYPE: DESIGN SPECIFICATIONFMF: PEACH BOTTOM 2 AND 3MPL NO: PRODUCT SUMMARY SEC. 7

| - DENOTE CHANGE

THIS ITEM IS OR CONTAINS A SAFETY-RELATED ITEM YES NO EQUIP CLASS CODE C

| REVISION | | | |
|--|------------|---|-----|
| A | RM-01386 | 9/12/94 | |
| 1 | J TROVATO | 9/24/94 | RJA |
| CONTROL ISSUE RM-01502 CHK BY: J TROVATO | | | |
| 2 | JL TROVATO | 11/17/94 | RJA |
| CN01859 CHK BY: JL TROVATO | | | |
| 3 | L FRENCH | JUN 13 1995 | RJA |
| CN02716 CHK BY: L FRENCH | | | |
| PRINTS TO | | | |
| MADE BY | | APPROVALS | |
| J.L. TROVATO 8-22-94 | | M.O. LENZ 9-12-94 | |
| CHKD BY: | | ISSUED | |
| J.L. TROVATO 9-12-94 | | 9-12-94 | |
| | | R.J. AHMANN | |
| | | GENERAL ELECTRIC COMPANY 175 CURTNER AVENUE SAN JOSE CALIFORNIA 95125 | |
| | | CONT ON SHEET 2 | |



1. SCOPE

1.1 This document defines the design and performance requirements for stabilizers for the core shroud which will functionally replace welds H1 through H7. The assumption of full 360 degree through wall cracking at the H8 weld shall be considered in the design analyses. A sketch of the welds and their nomenclature is given in Figure 1. All ASME Code requirements are given in the document of Paragraph 2.1.1.g. This specification herein contains those requirements that are not ASME Code requirements.

2. APPLICABLE DOCUMENTS

2.1 General Electric Documents. The following documents form a part of the specification to the extent specified herein.

2.1.1 Supporting Documents

| | |
|---|-------------|
| a. Arc Welding of Austenitic Stainless Steel | P50YP102 |
| b. Sensitization Tests for Austenitic Stainless Steel, Modified ASTM A262 Practice E | E50YP13 |
| c. Determination of Carbide Precipitation in Wrought Austenitic Stainless Steel (Modified ASTM A262 Practice A) | E50YP20 |
| d. Examination for Intergranular Surface Attack | E50YP11 |
| e. Age Hardening of NI-CR-FE Alloy X750 | P10JYP2 |
| f. Liquid Penetrant Examination | E50YP22 |
| g. Shroud Stabilizers | 25A5580 |
| h. Reactor Vessel Thermal Cycles | 729E762 |
| i. Seismic Analysis of Peach Bottom 2 Reactor Vessel and Internals | 383HA691 |
| j. Peach Bottom 2,3 Power Rerate Analysis | NEDC-32230P |



2.1.2 Supplemental Documents. Documents under the following identities are to be used with this specification:

- | | |
|-------------------------|----------|
| a. Reactor Components | 383HA715 |
| b. Essential Components | 22A3041 |

2.2 Codes and Standards. The following documents of the latest issue (or specified issue) form a part of this specification to the extent specified herein.

2.2.1 American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code

- a. Section III, Appendices, 1989 Edition.
- b. Section IX, Welding and Brazing Qualifications, 1989 Edition.
- c. Section III, Subsection NG, 1989 Edition.
- d. Section XI, Rules for Inservice Inspection, 1980 Edition, Winter 1981 Addenda.

2.2.2 American Society for Testing and Materials (ASTM)

- a. ASTM A-182, Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature.
- b. ASTM A-240, Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
- c. ASTM A-262, Detecting Susceptibility to Intergranular Attack in Stainless Steel.
- d. ASTM A-479, Specification for Stainless and Heat-Resisting Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels.
- e. ASTM A-480, Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
- f. ASTM B-637, Specification for Precipitation Hardening Nickel Alloy Bars, Forgings, and Forging Stock for High-Temperature Service.

2.3 PECO Energy Documents

- a. UFSAR, Peach Bottom Units 2 and 3.



3. GENERAL DESCRIPTION

3.1 The purpose of the shroud stabilizers is to structurally replace welds H1 through H7. Welds H1 through H6 are all of the circumferential welds in the shroud, as well as the (H7) bimetallic attachment weld of the shroud to the shroud support cylinder. These welds were required to both vertically and horizontally support the core top guide, core support plate, and shroud head; and to prevent core flow bypass into the downcomer region. The core top guide and core support plate horizontally support the fuel assemblies and maintain the correct fuel channel spacing to permit control rod insertion. The design analyses shall consider full 360 degree through wall cracking at the H8 weld. The H8 weld connects the shroud support plate to the shroud support cylinder.

4. REQUIREMENTS

4.1 Code

4.1.1 The shroud stabilizer components are not classified as ASME Section III Code components. However, material properties shall be obtained from the document in Paragraph 2.2.1.a, and welding qualification shall be performed in accordance with the document in Paragraph 2.2.1.b. The nomenclature for stress intensity used in this document is the same as that used in the document of Paragraph 2.2.1.c.

4.2 Structural Criteria

4.2.1 All structural analysis shall be performed in accordance with the criteria given in the Peach Bottom UFSAR. All of the load combinations given in Paragraph 4.3.5 shall be shown to satisfy the primary stress limits given in Tables C.5.2 and C.5.6 of the Peach Bottom UFSAR, with values of SFmin as defined in Paragraph 4.3.6. The appropriate SFmin values have been incorporated into the allowable stress intensity values given in Paragraphs 4.2.1.1 and 4.2.1.2.

4.2.1.1 The primary stresses (P_m , P_1 , and $P_1 + P_b$) in the existing shroud, during Normal and Upset events, shall be shown to be less than S_m , $1.5S_m$, and $1.5S_m$ respectively. During Emergency events, the allowable stresses are increased by a factor of 1.5 times the values for Normal and Upset events. During Faulted events, the allowable stresses are increased by a factor of 2.0 times the values for Normal and Upset events.

4.2.1.2 The stresses (P_m , $P_m + P_b$, and $P_m + P_b + Q$) in the repair hardware, during Normal and Upset events, shall be shown to be less than S_m , $1.5S_m$, and $3.0S_m$ respectively. During Emergency events, the allowable primary stresses are increased by a factor of 1.5 times the values for Normal and Upset events. During Faulted events, the allowable primary stresses are increased by a factor of 2.0 times the values for Normal and Upset events. Secondary stresses are not limited during Emergency and Faulted events.



4.2.2 The values of S_m and S_y as well as any other required material property shall be obtained from the document in Paragraph 2.2.1.a (ASME Code, Section III Appendices), except for alloy X-750. The values of S_m and S_y for alloy X-750 at operating temperature are 47,500 psi and 92,300 psi respectively. These values must be verified from the Certified Material Test Reports (CMTR's). The value of S_m must be determined using the method of Appendix III from the document of paragraph 2.2.1.a. If Certified Material Test Reports (CMTR's) are available, the value of S_m for XM-19, or for stainless steel may be determined using the method in Appendix III of the document in Paragraph 2.2.1.a.

4.2.3 The maximum permanent deflection of any point on the shroud adjacent to either the H2 or the H3 weld shall be less than 2.1 inches divided by S_{Fmin} , during all of the load combinations specified in Paragraph 4.3.5. The maximum permanent deflection of any point on the shroud adjacent to either the H5 or H6 weld shall be less than 0.75 inch divided by S_{Fmin} , during all of the load combinations specified in Paragraph 4.3.5. The maximum transient elastic deflection during the seismic event adjacent to either the H5 or H6 weld shall be less than 1.68 inch divided by S_{Fmin} specified in Paragraph 4.3.6. The allowable deflections are based on test data, and on Tables C.5.1 and C.5.5 of the Peach Bottom UFSAR.

4.3 Design Requirements

4.3.1 General. The shroud repair hardware shall be designed to horizontally support the top guide, core support plate, the fuel assemblies and the shroud head. The shroud repair shall be designed to prevent upward displacement of the shroud. The shroud repair shall be designed for a life equal to the remaining design life of the plant plus possible life extension. The shroud repair shall be removable.

4.3.2 Spring Preload

4.3.2.1 Installation Preload. All of the springs shall be installed with a preload due to bending deflection greater than the deflection resulting from the limiting design upset condition, exclusive of seismic events. The required installation spring bending preload is 0.05 inch for the upper springs and 0.01 inch for the lower springs.

4.3.2.2 Preload Relaxation. The design shall consider an End-of-Life preload relaxation of 5% for the upper springs near the H2 and H3 welds and a relaxation of 5% for the lower springs near the H5 and H6 welds. Potential axial preload relaxation due to a reduction in shroud stiffness resulting from assumed cracking at the H2, H3, H5, and H6 welds shall be considered.

4.3.3 Environmental Conditions

4.3.3.1 Temperature. The design temperature for the repair hardware is 550 degrees F. The operating temperature is 527 degrees F. Operating temperature shall be used for emergency and faulted evaluations.



4.3.3.2 Radiation. The maximum neutron radiation level (flux) at the shroud stabilizers in the shroud vessel annulus is $4.8E10$ neutrons/cm²/sec. This will not affect the properties of the stabilizer materials over the remaining life of the plant.

4.3.4 Physical Interfaces

4.3.4.1 The shroud repair hardware shall restrain the shroud during all of the load combinations in Paragraph 4.3.5. The allowable permanent motion is dependent on the safety significance of the portion of the shroud under consideration. The allowable permanent motion for those portions of the shroud, which affect control rod insertion, is given in Paragraph 4.2.3. For the remaining portion of the shroud below H3, the allowable permanent motion is determined such that the reflooding of the inside of the shroud up to two thirds of core height is assured. For the portion of the shroud above H2, the allowable motion is 2.6 inches, which assures that the core spray lines are not impacted by the shroud.

4.3.4.2 The shroud repair hardware must provide features which facilitate handling during installation. The upper and lower springs shall be movable without removing the tie rod and without welding, in order to permit inspection of the reactor pressure vessel with GERIS 2000.

4.3.4.3 The shroud repair hardware shall be designed and installed such that removal of jet pump inlet mixers can be performed without removal of any of the repair hardware.

4.3.4.4 All parts shall be captured and held in place with a method that will last for the design life given in Paragraph 4.3.1.

4.3.5 Load Combinations. The load combinations that the shroud and shroud repair shall be analyzed for are from the Peach Bottom UFSAR. The limiting Upset event is a Design Basis Earthquake (DBE), plus Normal pressure differences, plus dead weight. The Emergency 1 event is a Maximum Credible Earthquake (MCE), plus Normal pressure differences, plus dead weight. The Emergency 2 event is a main steam line LOCA, plus dead weight. The Faulted event is a Maximum Credible Earthquake (MCE), plus a main steam line LOCA, plus dead weight.

4.3.5.1 The pressure differences for these events are given in the table below. The pressure inside the shroud is higher than that outside of the shroud, and the pressure is higher below the core plate than above the core plate. These values include Power Rerate conditions based on 110% core flow, and 110% original power.

| <u>Component</u> | <u>Normal Pressure</u> | <u>LOCA Pressure</u> |
|----------------------|------------------------|----------------------|
| Shroud Support Plate | 33.03 psi | 51.0 psi |
| Core Plate | 23.67 psi | 28.0 psi |
| Upper Shroud | 9.35 psi | 30.0 psi |
| Shroud Head | 9.41 psi | 31.0 psi |



4.3.5.2 A new seismic analysis based on the documents in Paragraph 2.3 and 2.1.1.i shall be performed which includes the shroud stabilizers. The shroud stabilizers shall function for the entire continuum from an uncracked shroud to a fully cracked shroud. Therefore, multiple conditions must be analyzed, for both the DBE and the MCE events. As a minimum, the following shroud conditions shall be analyzed: an uncracked shroud with the installed stabilizers, a shroud with a through wall 360 degree crack at the H7 weld with the installed stabilizers, and a shroud with a through wall 360 degree crack at the H6 weld with the installed stabilizers. The limiting seismic loads on the stabilizer are given in the table below:

| <u>Component</u> | <u>DBE</u> | <u>MCE</u> |
|--------------------------|------------|-------------|
| Upper Spring | 17,110 lb. | 31,390 lb. |
| Lower Spring | 33,440 lb. | 92,900 lb. |
| Set of 4 Tie Rods (each) | 75,640 lb. | 117,600 lb. |

4.3.5.3 Two steady state thermal conditions shall be evaluated. The first is Normal operation with the shroud at 539 degrees F, and the stabilizer assembly at 527 degrees F. The second condition is an Upset transient (scram with loss of feedwater pumps) with the shroud at 433 degrees F, and the stabilizer at 300 degrees F. The number of events is defined by 729E762 (document 2.1.1.h).

4.3.5.4 During the recirculation line LOCA event, there is a force applied to the shroud of 169,000 lbs, with a moment of 13.0E6 in-lb acting at the base of the shroud. This is due to asymmetric pressures in the annulus between the shroud and the RPV. This force exists for a sufficient time to be treated as a static force.

4.3.6 Required Safety Factors. The minimum safety factors (SFmin) shall be 2.25 for Normal and Upset events, 1.5 for Emergency events, and 1.125 for Faulted events. These are based on Table C.5.5 of the Peach Bottom UFSAR.

4.4 Materials. ASTM specification material is acceptable for the Shroud Repair. CMTRs are required for all material.

4.4.1 The springs shall be made of nickel-chrome-iron alloy X-750 (UNS N07750). The cobalt content shall be limited to a maximum of 0.10%. Alloy X-750 shall be purchased per ASTM B-637 and age hardened per P10JYP2. Alloy X-750 material shall be tested per E50YP11. In lieu of testing per E50YP11, all finished components may incorporate the removal, after solution heat treatment, of a minimum of 0.030 inches of material from all surfaces of the original raw material form.



4.4.2 The tie rods may be made of either 304, 304L, 316, or 316L material with a maximum carbon content of 0.02%, and annealed at 1900 to 2100 degrees F followed by quenching in circulating water to a temperature below 400 degrees F. The tie rod material shall be tested per E50YP11 and E50YP20. The maximum hardness shall be RB90 for 304 and 304L. The maximum hardness shall be RB92 for 316 and 316L. XM-19 with a maximum carbon content of 0.04% may also be used for fabrication of the tie rods. XM-19 shall be annealed at $2,000 \pm 50$ degrees F, followed by rapid cooling, and shall be tested per E50YP13, or per ASTM A-262 Practice E.

4.4.3 Other parts shall be made of any of the materials listed in Paragraph 4.4. The filler material for any required weld buildups on 300 series stainless steel shall be Type 308L per P50YP102. All assembly welds shall satisfy P50YP102.

4.5 Leakage Due to Repair. Zero leakage is not required. However, the design shall control the normal operating condition leakage to prevent cavitation of the jet pumps. The leakage after any required load combination shall be limited such that core flooding to 2/3 the height of the core is assured.

4.6 Inspections. Liquid penetrant examination shall be performed on all final machined surfaces of all stabilizer components, and on all structural welds in accordance with the requirements E50YP22A.

4.7 Fabrication

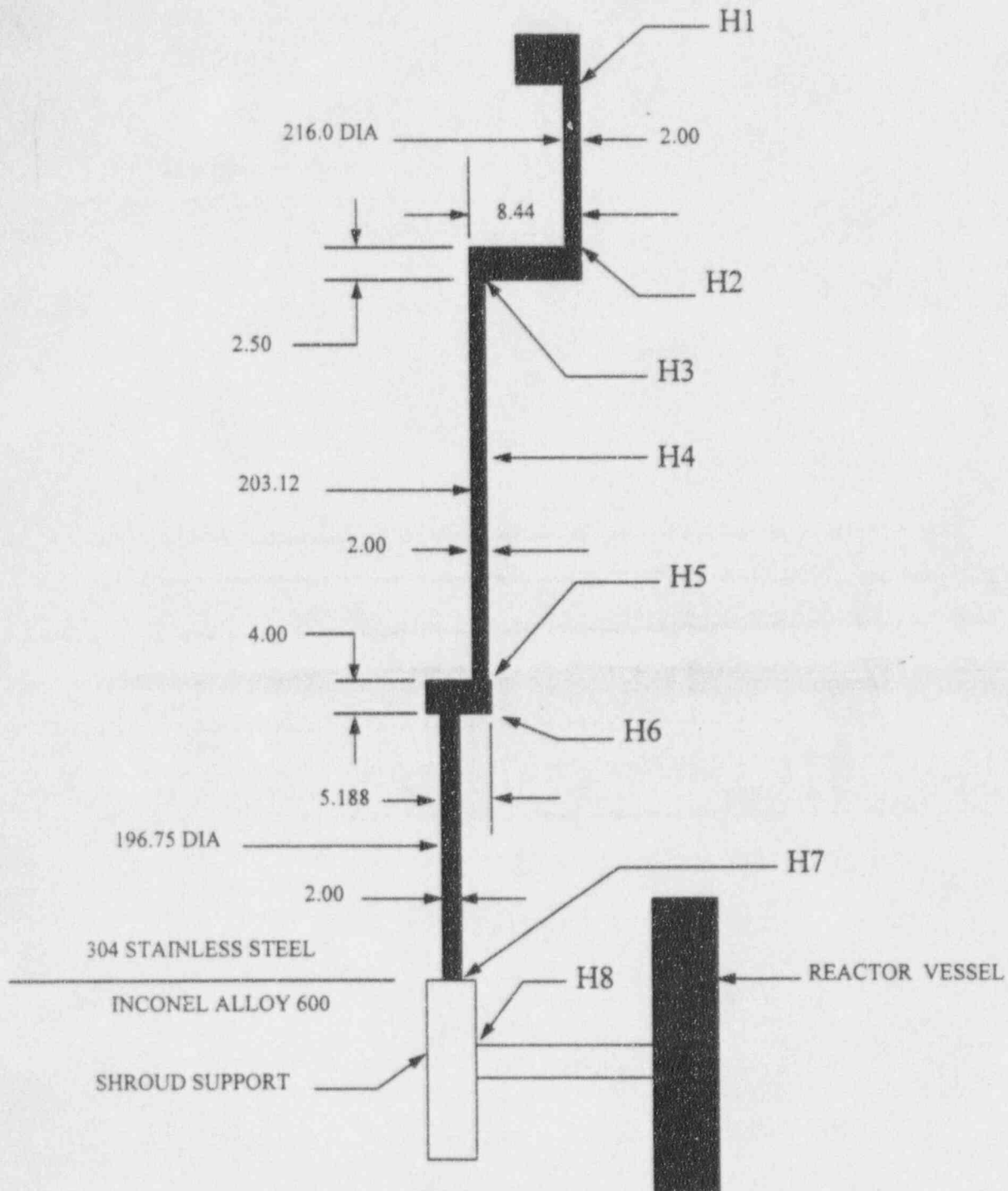
4.7.1 Welder and Weld Procedure Qualification. Welders and weld procedures shall be qualified per the document in Paragraph 2.2.1.b. Welder qualifications shall include limited access similar to the actual welds to be completed.

4.7.2 Root Pass. The root pass of all full penetration single sided stainless steel welded joints shall be made by the GTAW process. Protective gas back-purging is required for all full penetration single sided welded joints until a minimum of 3/16 inch of weld thickness is completed.

4.7.3 Weld Surface Finish. All welds shall have the final outer surface suitable for liquid penetrant examination. The final surface shall meet the hardness requirements of Paragraph 4.4.

5. QUALITY ASSURANCE

5.1 The shroud repair hardware components are Safety Related as referenced in Paragraph 2.1.2.b, and design, fabrication, and installation activities shall be controlled per a QA Program which satisfies 10CFR50 Appendix B, in order to assure safe and reliable components.



HORIZONTAL WELD LOCATIONS

FIGURE 1



EIS IDENT: SHROUD STABILIZERS

REVISION STATUS SHEET

DOC TITLE SHROUD STABILIZERS

LEGEND OR DESCRIPTION OF GROUPS

TYPE: CODE DESIGN SPECIFICATION

FMF: PEACH BOTTOM 2 AND 3

MPL NO: PRODUCT SUMMARY SEC. 7

THIS ITEM IS OR CONTAINS A SAFETY RELATED ITEM YES NO EQUIP CLASS CODE P

| REVISION | | | C |
|----------------------|--|------------------------|--|
| A | RM-01386 9/12/94 | | |
| 1 | J TROVATO 9/24/94 | RJA | |
| | CONTROL ISSUE RM-O1502 CHK BY: J TROVATO | | |
| 2 | JL TROVOTO | RJA | |
| | CN01859 CHK BY: JL TROVATO | | |
| 3 | L. FRENCH 6/13/95 | RJA | |
| | CN02716 CHK BY: L. FRENCH | | |
| 4 | M. BURT JUN 19 1995 | RJA | |
| | CN02808 ENGR: M.O.LENZ | | |
| | | | |
| PRINTS TO | | | |
| MADE BY | | APPROVALS | GENERAL ELECTRIC COMPANY 175 CURTNER AVENUE SAN JOSE, CALIFORNIA 95125 |
| J.L. TROVATO 8-22-94 | | M.O. LENZ 9-12-94 | |
| CHK BY | | ISSUED | CONT ON SHEET 2 |
| J.L. TROVATO 9-12-94 | | 9-12-94 R.J. AHMANN | |



1. SCOPE

1.1 This document defines the ASME Code design requirements for the analysis of the reactor pressure vessel (RPV) as a result of the installation of the shroud stabilizers. The shroud stabilizers function to structurally replace the horizontal shroud welds H1 through H7, and will add new points of application for forces applied to the RPV. In addition, the analysis shall consider the assumption of full 360 degree through wall cracking at the H8 weld between the shroud support plate and the shroud support cylinder.

2. APPLICABLE DOCUMENTS

2.1 General Electric Documents. The following documents form a part of this specification to the extent specified herein.

2.1.1 Supporting Documents

- a. Reactor Vessel - Power Rerate 25A5341 Rev. 0
- b. Reactor Pressure Vessel, Purchase Specification 21A1111 Rev. 9
- c. Reactor Vessel, Purchase Part 886D499 P2

| <u>Sheet No.</u> | <u>Revision No.</u> |
|------------------|---------------------|
| 1 | 11 |
| 2 | 8 |
| 3 | 3 |
| 4 | 6 |
| 5 | 3 |
| 6 | 4 |
| 7 | 6 |
| 8 | 0 |

- d. Reactor Thermal Cycles 729E762 Rev. 0
- e. Nozzle Thermal Cycles 135B9990

| <u>Sheet No.</u> | <u>Revision No.</u> |
|------------------|---------------------|
| 1 | 1 |
| 2 - 8 | 0 |

- f. Vessel Flange Bolting 885D911 Rev.2
- g. Nozzle End Preparation 107C5305 Rev.2
- h. Standard Requirements For Core Structure 21A3319 Rev.1



- i. "Fatigue Evaluation of the Peach Bottom II and III Reactor Vessels", G.E. Report No. GE-NE-523-61-0493, dated May 1993.

2.1.2 Supplemental Documents. Documents under the following identities are to be used with this specification:

- a. Shroud Stabilizer Hardware Design Specification 25A5579

2.2 Codes and Standards. The following documents of the specified issue form a part of this specification to the extent specified herein.

2.2.1 American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code

- a. Section III, 1965 Edition and Addenda through Winter 1965
- b. Section XI, 1980 Edition and Addenda through Winter 1981

2.2.2 Other Documents

- a. UFSAR, Peach Bottom 2 and 3
- b. Shroud Support VPF 1896-064-7
- c. Design Certification VPF 1896-142-1
- d. Design Stress Report VPF 1896-146-1
- e. Final Design Report VPF 1896-148-2

3. GENERAL DEFINITION

3.1 The purpose of the shroud stabilizers is to structurally replace all of the horizontal welds (H1 through H7) in the shroud. These welds were required to both horizontally and vertically support the core top guide, core support plate, and shroud head, and to prevent core bypass flow to the downcomer region. The core top guide and core support plate horizontally support the fuel assemblies and maintain the correct fuel channel spacing to permit control rod insertion, as well as having other structural functions. The H8 weld connects the shroud support plate with the shroud support cylinder. The analysis of the RPV shall consider full 360 degree through wall cracking at the H8 weld.

3.2 All of the non ASME Code requirements for the shroud stabilizers are defined in the Document of Paragraph 2.1.2.a. The ASME Code requirements are defined herein.



4. REQUIREMENTS

4.1 The shroud stabilizer construction shall be performed in accordance with a Section XI Replacement Program per the requirements of Article IWA-7000. The core shroud was not supplied as a ASME Code component. However, Section XI requires In Service Inspection (ISI) of the Core Support Structures. The required Replacement Program is different than most Replacement Programs, because the stabilizers are not a direct replacement. Instead, the structural functions of the shroud horizontal welds are replaced by new components. Any defects found in the shroud horizontal welds are acceptable after the installation of the stabilizers.

4.2 The shroud stabilizers shall be constructed to the original Owners Requirements (document of Paragraph 2.1.1.h) for the shroud, as there was no Code of Construction.

4.3 The shroud stabilizers change the points of application of the forces applied to the reactor pressure vessel from the core shroud. These new forces shall be analyzed in accordance with the original Code of Construction (document in Paragraph 2.2.1.a).

4.4 The new forces and their points of application are defined in Figure 1, and in Table 1. The values given in Figure 1, and in Table 1 shall be combined with the forces defined in the Design Specification (documents of Paragraphs 2.1.1.a through 2.1.1.e).

4.5 The original purchase specification for the reactor pressure vessel (document of Paragraph 2.1.1.b) specified that the boundary of jurisdiction of Section III of the ASME Code (document of Paragraph 2.2.1.a) shall include all attachments to the pressure boundary parts, but does not include the components that are welded to the attachments. Thus, the jurisdiction of the original Code of Construction included all weld build up pads used to attach internal components to the reactor pressure vessel, but did not include the shroud support within the boundary of Code jurisdiction. The boundary of ASME Code jurisdiction is shown in Figure 2.

4.6 The analysis required by this Design Specification shall be Certified.

5.0 PROFESSIONAL ENGINEER CERTIFICATION

To the best of my knowledge and belief, this Design Specification satisfies the requirements of the ASME Boiler and Pressure Vessel Code 1965 Edition with Addenda through Winter 1965.

Signature: Mark O. Lenz Date: June 19, 1995
License Number: 22212 State: California





ADDITIONAL DESIGN MECHANICAL LOADS

| <u>Force</u> | <u>DBE + Normal Pressure</u> | <u>MCE + Normal Pressure</u> | <u>MCE+LOCA</u> |
|----------------|------------------------------|------------------------------|-----------------|
| F ₁ | 33,400 lbs | 92,900 lbs | 92,900 lbs |
| F ₂ | 17,110 lbs | 31,390 lbs | 31,390 lbs |
| F ₃ | 172,910 lbs | 218,500 lbs | 372,650 lbs |

F₁, F₂, and F₃ are discrete loads applied over a small area. At any one point in time, F₁ and F₂ are each applied to one location. At any one point in time, F₃ is applied to 4 locations 90° apart for the installation of four shroud stabilizer assemblies. DBE is a Design Basis Earthquake (OBE). MCE is a Maximum Credible Earthquake (SSE).

For Normal Operation (d-pressure plus thermal loads) without consideration of seismic loads, F_s = 94,710 lbs.

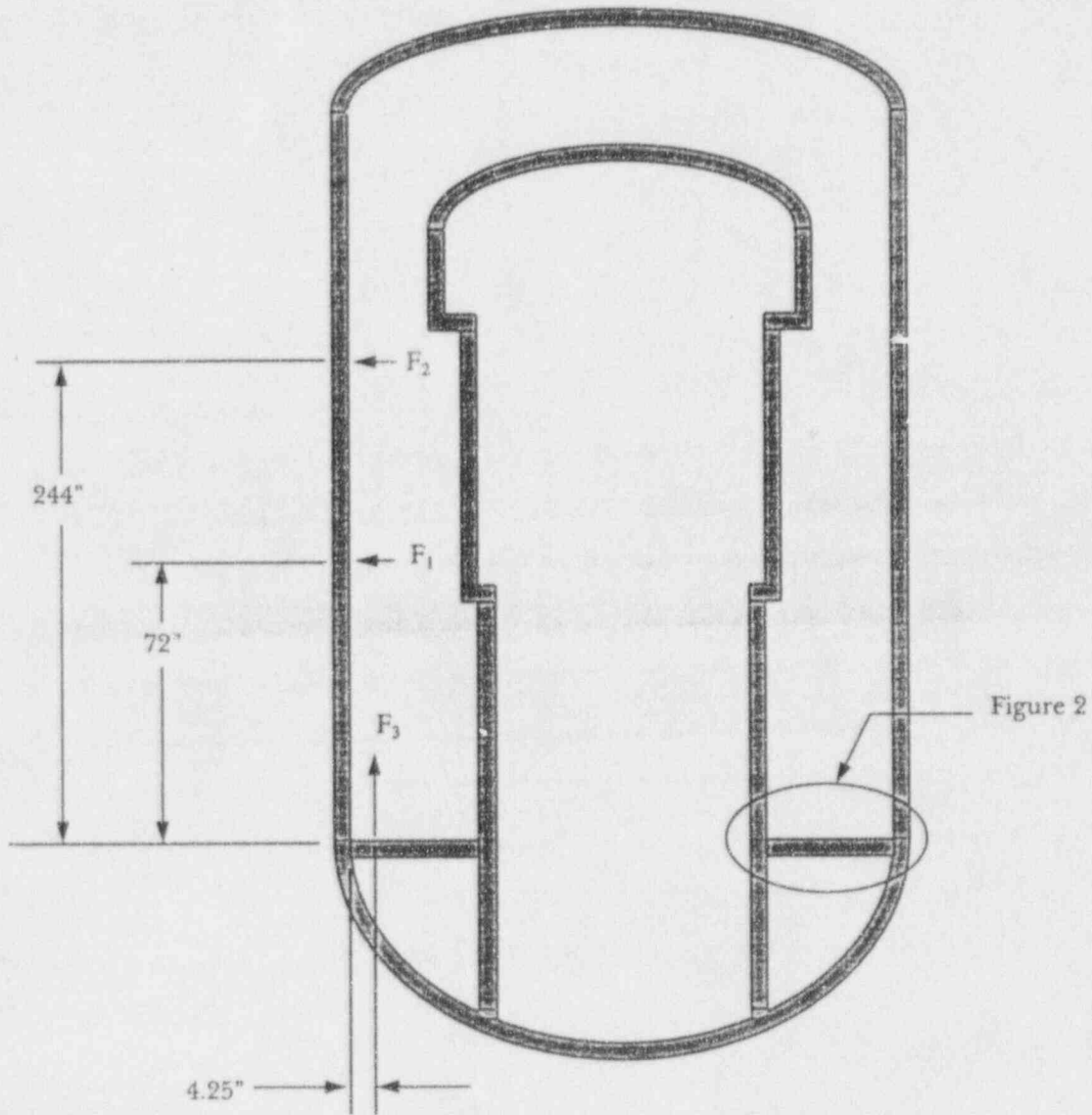
For the limiting Upset thermal transient without consideration of seismic loads, F_s = 249,985 lbs.

For a Main Steam Line LOCA without seismic loads, F_s = 248,500 lbs. This must be addressed with the same allowables as the MCE + Normal Pressure load case.

The number of thermal cycles is defined by documents 2.1.1.d and 2.1.1.i.

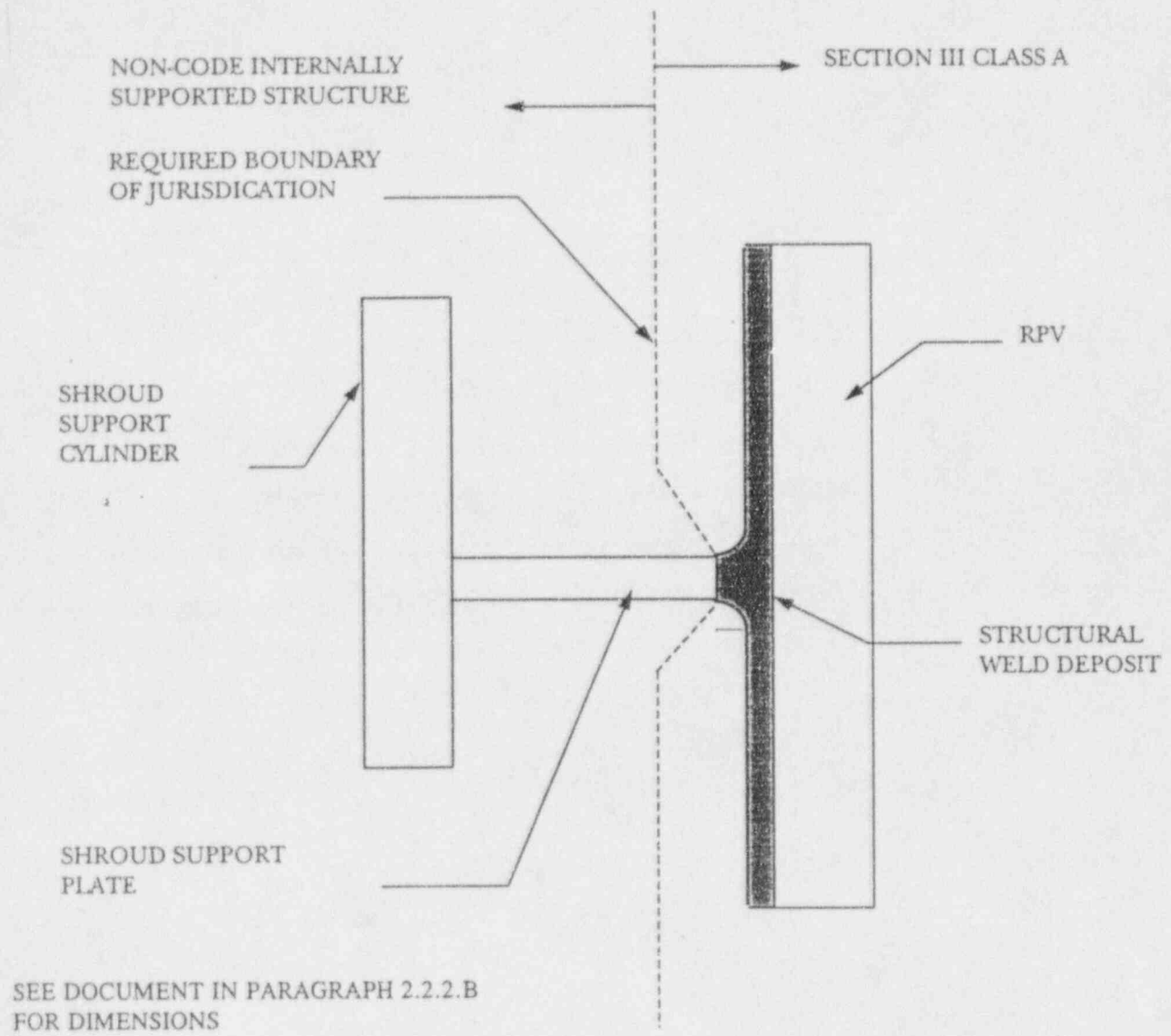
The stress intensities shall meet the stress allowables of the ASME Code, Section III, for the load combinations defined by the Peach Bottom UFSAR. The original Code of Construction did not include Faulted load combinations. Faulted load combinations shall meet the stress allowables as defined by the Peach Bottom UFSAR for the reactor pressure vessel.

TABLE 1



APPLICATION OF DESIGN MECHANICAL LOADS

FIGURE 1



BOUNDARY OF ASME CODE JURISDICTION

FIGURE 2



1. SCOPE

1.1 Purpose. This specification provides the engineering requirements for installing stabilizers which replace the H1 through H7 horizontal shroud welds in the Peachbottom reactor assembly.

1.2 If any conflict exists between this document and any other document referenced herein, this document shall govern.

1.3 This document, along with the reactor modification and installation drawing, defines all the engineering requirements for installation of the shroud stabilizers.

1.4 As used herein, the term "Installer" refers to the company or personnel contracted by the Plant Owner to install the shroud stabilizers.

2. APPLICABLE DOCUMENTS

2.1 General Electric Documents. The following documents form a part of this specification to the extent specified herein.

2.1.1 Supporting Documents

- a. 25A5579, Shroud Stabilizers
- b. 105E1455 , Reactor (Modification & Installation)
- c. 21A2040, Cleaning and Cleanliness Control
- d. D50YP5, Nickel-Graphite Thread Lubricant
- e. 112D6355, Contact, Lower
- f. 112D6360, Lower Stabilizer (lower contact assembly)
- g. 112D6357, Contact, Upper
- h. 112D6347, Upper Stabilizer Assembly (upper spring assembly)
- i. 112D6349, Tie Rod Assembly
- j. 112D6351, Spring, Lower
- k. 112D6331, Ring, Mid Support
- l. 112D6358, Tie Rod-Spring Assembly
- m. 112D6356, Support, Mid



- n. 112D6359, Mid Support Assembly
- o. 112D6490, Support, Lower
- p. 112D6495, Toggle Bolt Assembly
- q. 112D6493, Washer, Toggle Bolt
- r. 112D6494 Nut, Toggle Bolt
- s. 112D6505, Pin, Clevis
- t. 112D6348, Stabilizer Support Assembly
- u. 112D6752, Upper Support Spacer
- v. 112D6777, Nut, Tie Rod

2.1.2 Supplemental Documents

- a. NEDC-31735P GE BWR Operator's Manual - Materials and Processes

2.2 Codes and Standards. The following codes and standards of the latest issue (or specified issue) form a part of this specification to the extent specified herein.

2.2.1 American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code

None

3. DESCRIPTION

3.1 The purpose of the stabilizer installation is to structurally replace horizontal girth welds H1 through H7 in the shroud; weld designations and the design requirements for the stabilizers are defined in the 2.1.1.a design specification. The installation of the shroud stabilizers involves electric discharge machining (EDM) of some slots and holes in the existing structure, assembling the stabilizer hardware in the reactor, and preloading the threaded fasteners. No structural welding or defect removal by machining are involved.

4. RESPONSIBILITIES

4.1 The Installer shall accept full responsibility for his work. The Installer shall comply with the requirements of this document and the supporting documents listed herein.

4.2 The Installer shall take the responsibility for coordination of his work with the work of others including the coordination of work planning and radiation monitoring with the Plant Owner.



4.3 The Installer shall be responsible for providing all specialized handling, alignment, and installation equipment, as may be necessary to perform this work, except as otherwise agreed to by the Plant Owner.

4.4 The Installer, except as otherwise agreed to by the Plant Owner, shall be responsible for machining as specified and limited by the applicable modification drawing.

4.5 The Installer shall supply adequately qualified personnel for supervision and for performing the tasks required to complete the stabilizer installation.

5 REQUIREMENTS

5.1 General

5.1.1 During installation, the Installer, except as otherwise agreed to by the Plant Owner, shall complete data sheets and quality control check sheets as required by the specifications and instructions listed in this document. The Installer shall also keep log notes, records, etc., for future reference. Video tapes shall be taken of the completed repair. Tabular data entries designated for as-built measurements on the installation drawing shall be recorded.

5.1.2 Procedures and installation equipment shall be developed and designed to minimize the potential of loose parts within the Reactor Pressure Vessel (RPV).

5.1.3 Following completion of the installation of the stabilizers, verification, inspection and signoff shall be performed to ensure that all objects have been removed from the RPV.

5.1.4 All uncontaminated tools shall be stored in an uncontaminated controlled area and brought to the work area only as needed for fit-up and installation.

5.1.5 Refer to Paragraph 2.1.2.a for miscellaneous consumables approved for use in the reactor vessel.

5.2 Personnel Safety

5.2.1 Radiation Control

5.2.1.1 All work shall be done with the concurrence of and per the instructions of the authorized site Health Physics Personnel. At no time shall their requirements for dosimeter monitors, protective clothing or devices, time limits, exposure limits, etc., be violated.

5.2.1.2 Machining on contaminated surfaces, as required, shall be done in accordance with Health Physics and Safety Personnel requirements.

5.2.1.3 Radiation control practices shall be used to reduce exposure to workers to levels which are as low as reasonably achievable (ALARA).



5.2.2 Safety Precautions

5.2.2.1 Concern for personnel safety shall govern all work operations. All personnel working in hazardous locations shall be under constant surveillance by other personnel. All electric equipment shall be grounded or double insulated. Welding cables and leads shall be in good condition.

5.2.2.2 All work areas shall be kept neat and orderly. Protective measures and devices shall be used to keep all tools, equipment, and materials from inadvertently dropping into the RPV.

5.2.2.3 Care shall be exercised to keep contamination of articles which must enter and leave contamination zones to a minimum. In all cases, site radiation control requirements shall be met.

5.3 Cleaning and Cleanliness Control

5.3.1 During this stabilizer installation program, cleaning and cleanliness control shall be in accordance with the document listed in paragraph 2.1.1.c. In addition, no graphite lead pencils are allowed to contact stainless steel and nickel alloys.

5.4 Prerequisites

5.4.1 Jet Pump Throat Covers. Prior to the shroud stabilizer installation jet pump throat covers shall be installed as required.

5.4.2 Reactor Temperature. The reactor water temperature shall be less than 100°F, however the RHR shutdown cooling flow must be off whenever the installation activity in progress involves critical remote underwater handling in the annulus area.

6. INSTALLATION REQUIREMENTS

6.1 The installation sequence described below is not itself mandatory, so long as all specified installation requirements are accomplished. To assist in evaluating alternative sequences, the intent of some requirements, which are not self evident, are summarized in the step description.

6.2 Shroud head bolt (SHB) lug sets which straddle the 45, 135, 225, and 315 degree azimuths, on the shroud, are specified, on the 105E1455 Modification and Installation drawing, for locating the stabilizer support installation and for machining shroud head flange slots. These SHB lugs shall be determined and independently verified as a

prerequisite to any physical work at each of the four installation locations. Prior to removing the shroud head (SHBs may be unlatched), a common scribe line shall be



made on both the shroud and shroud head at each of the four installation locations, in accordance with the 105E1455 Modification and Installation drawing. This scribe line will then become the datum for locating the slots in the shroud head flange and installing the stabilizer support assemblies on the shroud flange.

6.3 Go-gage checks shall be performed on: the shroud flange and steam dam width for fit-up with the upper support (also checks for possible prior damage to the steam dam), and the jet pump restrainer bracket to RPV inside diameter clearance, 5.4 inch minimum, to allow passage of the lower spring (temporarily ignoring the jet pump restrainer bracket guide plates).

6.4 Install protective shielding for the feedwater sparger and core spray line.

NOTE: The below step is a contingency, which will only be performed if there is insufficient clearance to complete the installation.

6.5 Machine (EDM) the jet pump restrainer brackets, if required, as shown on the 105E1455 Modification and Installation drawing. EDM swarf shall be captured to the maximum extent practical.

6.6 Measure and record the outside-to-outside distance between the SHB lug sets, as shown on the 105E1455 Modification and Installation drawing.

6.7 Measure and record the annulus width at the top guide support ring and at the core support ring elevations as shown on the 105E1455 Modification and Installation drawing. Examine the RPV and shroud contact areas to assure that there are no abrupt discontinuities; if so, EDM spotface these areas flush. The vessel and shroud contact locations of the final stabilizer parts shall be simulated in taking these measurements.

CAUTION: Several piece parts are to be machined based on in-reactor measurements at a specific reactor azimuth. These parts shall then be designated by specific serial number, as recorded on the as-built data table on drawing 105E1455, for that specific azimuth.

6.8 Based on the in-reactor measurements, machine the RPV contact surface of the lower contact, drawing 112D6355, as shown on the 105E1455 Modification and Installation drawing. Assemble the lower contact as shown on the lower stabilizer assembly, drawing 112D6360.

6.9 Based on the in-reactor measurements, machine the RPV contact surface of the upper contact, drawing 112D6357, as shown on the 105E1455 Modification and Installation drawing. Assemble the upper contact as shown on the upper stabilizer assembly, drawing 112D6347.



6.10 Based on the in-reactor measurements of the outside-to-outside distance between the SHB lug sets, and the measurement of the outside dimension of the stabilizer support, machine the contact surface of the upper support spacer, 112D6752, in accordance with the 105E1455 Modification and Installation drawing. Assemble the upper support spacer, 112D6752 on the stabilizer support assembly 112D6348.

6.11 Working in the equipment pool, locate the proper datum on the shroud head flange as shown on the 105E1455 Modification and Installation drawing. Machine (EDM) slots in the shroud head flange as specified on the 105E1455 modification and installation drawing.

6.12 In accordance with the 105E1455 Modification and Installation drawing, machine (EDM) two holes in shroud support plate. EDM swarf shall be captured to the maximum extent practical.

6.13 Hone the holes in the shroud support plate. To assure the removal of microfissures from the EDM hole in the shroud support plate, the hone operation shall remove a minimum of 0.005 inch from the inside surface of the hole while meeting the final hole size requirement on the 105E1455 Modification and Installation drawing.

6.14 Install lower support, 112D6490, over the two shroud support plate holes using two toggle bolt assemblies, 112D6495, and two toggle bolt washers, 112D6493, and two toggle bolt nuts, 112D6493, as shown on the 112D6494 Modification and Installation drawing. Lubricant (D50YP5B) shall be applied to the threaded surfaces. Tension the two toggle bolts to the specified load, and tighten the toggle bolt nuts. Inspect to verify the installation of the lower support. Crimp the toggle bolt nuts, and inspect for proper crimping of the retainers.

6.15. Install the clevis pin, 112D6505, in the mating hole of the lower support in accordance with the requirements of the 105E1455 Modification and Installation drawing.

6.16 Complete the tie rod-spring assembly. Assemble the tie rod, assembly drawing 112D6349, with the lower spring, drawing 112D6351 (Drill pin hole and install lock pin.), and the lower stabilizer, drawing 112D6360 as shown on assembly drawing 112D6358. Lubricant (D50YP5B) shall be applied to the threaded surfaces.

6.17 Temporarily protect the exposed tie rod thread from damage.

CAUTION: Maneuvering of the tie rod-spring assembly must be done with extreme care to avoid damaging reactor hardware such as the jet pump sensing lines.

6.18 Install the tie rod-spring assembly, 112D6358, in accordance with the requirements of the 105E1455 Modification and Installation drawing. Maneuver lower spring clevis over clevis pin and support vertically.



6.19 Position the stabilizer support assembly, 112D6348, over the tie rod. Lower the stabilizer support assembly over the steam dam and locate properly on shroud flange in accordance with the requirements of the 105E1455 Modification and Installation drawing.

6.20 Rotate and position the lower stabilizer assembly, 112D6360, as shown on the 105E1455 modification and installation drawing. Verify that the lower stabilizer assembly latch is engaged in the tie rod slot.

6.21 While forcing the upper end of the tie rod radially inward, taking up clearance (0.25 inch diametrical) in the support block's clearance hole, measure the radial gap from the tie rod to the vessel wall at the mid support elevation. The tie rod itself should not be bowed while taking this measurement. The vessel contact locations of the mid support shall be simulated in taking these measurements. Based on this in-reactor measurement, machine the contact surfaces of the mid support, drawing 112D6356, in accordance with the requirements of the 105E1455 Modification and Installation drawing. Complete the mid support assembly as shown on the mid support assembly drawing, 112D6359.

6.22 Remove the temporary thread protection from the tie rod. Install the tie rod nut and torque in accordance with the requirements of the 105E1455 Modification and Installation drawing; continue to force the upper end of the tie rod radially inward during tensioning. Verify that the tie rod nut is properly locked by its retainers. Lubricant (D50YP5B) shall be applied to the nut threaded surfaces.

6.23 Install the mid support in accordance with the requirements of the 105E1455 Modification and Installation drawing. Verify that the mid support latch is engaged in the tie rod slot.

6.24 Install upper stabilizer (spring) assembly, 112D6347, in accordance with the requirements of the reactor modification drawing. Lubricant (D50YP5B) shall be applied to the 0.50 inch slot areas and the jacking bolt (threaded and moving surfaces). Engage with stabilizer support assembly and adjust the jacking bolt as specified on the 105E1455 Modification and Installation drawing to preload the upper spring. Check that the spring retainers are properly engaged to lock the jacking bolt.

6.25 Remove the protective shielding for the feedwater sparger and core spray line.

6.26 Repeat steps 6.3 through 6.25 for the installation of stabilizer hardware at the remaining azimuth locations. Step 6.11 is envisioned as an independent parallel activity.



7. EXAMINATION AND TESTING

7.1 Visual Examination. Visually examine the stabilizer installation preparations to verify that all of the required holes have been machined in the proper locations and that all debris has been removed from the area. Visually examine the installed stabilizers to verify compliance with the 105E1455 Modification and Installation drawing. To minimize inspection time, personnel exposure, and tooling requirements, installation requirements, as indicated on the installation drawing, may be verified by tool design, process control and mockup qualification testing.

8. RECORDS AND SUBMITTALS

8.1 Prior to implementation of this stabilizer installation program, the following procedures shall be submitted by the Installer and approved by the Owner.

- a. Installation and inspection procedures including sequence data sheets, measurement data sheets, quality control check sheets, drawings, sketches, instructions, etc.
- b. Cleaning and cleanliness control procedures.
- c. Machining procedures as applicable.
- d. As-built drawing (data required by 105E1455).

8.2 After implementation of this stabilizer installation program, all recorded data records, photographs, video tapes, logs, etc., shall be submitted by the Installer to the Owner for file and information within 30 days. The 105E1455 modification and installation drawing shall be updated to incorporate the in-reactor as-built measurements, and the as-built measurements with corresponding serial numbers of the parts machined as part of the installation process. One copy shall be submitted to GENE within 30 days.

9. DEVIATIONS AND SUBSTITUTIONS

9.1 All deviations, as a result of damaged equipment, nonconforming conditions, or any proposal by the Installer for substitutions, modifications, or relaxation of the specified materials, procedures or design shall be submitted to the Owner for consideration and approval.