UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE INSPECTION PROGRAM FOR

FACILITY OPERATING LICENSE NO. NPF-12

SOUTH CAROLINA ELECTRIC & GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-395

1.0 INTRODUCTION

By letters dated January 25, 1982, November 10, 1982, May 23, 1983, September 27, 1984, and December 6, 1984, South Carolina Electric & Gas Company (SCE&G or the licensee) submitted its Inservice Inspection (ISI) Program for the first ten-year interval.

Technical Specification 4.0.5 for the Virgil C. Summer Nuclear Station, Unit No. 1 (Summer Station), states that the surveillance requirements for Inservice Inspection and Testing of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Class 1, 2, and 3 components shall be applicable as follows: Inservice Inspection of ASME Code Class 1, 2, and 3 components shall be performed in accordance with the ASME Code, Section XI, "Rules for the Inservice Inspection of Nuclear Power Plant Components," and applicable Addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

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 and the preservice examination requirements set forth in the ASME Code, Section XI, to the extent practical within the limitations of design, geometry, and materials construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first ten-year interval 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) on the date twelve months prior to the date of issuance of the Operating License, subject to the limitations and modifications listed therein. The components (including supports) may meet the requirements set forth in subsequent Editions and Addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein.

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of the determination and a request made for relief

from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

The licensee has prepared the Summer Station first ten year ISI Program to meet the requirements of the 1977 Edition, Summer 1978 Addenda to Section XI of the ASME Code, except that the extent of examination of Class 2 piping welds in the residual heat removal, emergency core cooling, and containment heat removal systems has been determined by the 1974 Edition, Summer 1975 Addenda, as required by 10 CFR 50.55a(b)(2)(iv)(A). The staff, with technical assistance from its contractor, Science Applications International Corporation (SAIC), has evaluated the first ten-year interval ISI Program, additional information related to the Program, and the requests for relief from certain ASME Code requirements determined by the licensee to be impractical for the Summer Station during the first inspection interval.

2.0 EVALUATION

The ISI Program has been evaluated for (a) application of the correct ASME Code, Section XI Edition and Addenda, (b) compliance with examination and test requirements of Section XI, (c) acceptability of the examination sample, (d) compliance with prior ISI commitments made by the licensee, (e) correctness of the application of system or component examination exclusion criteria, and (f) adequate information in support of requests for relief from impractical ASME Code, Section XI, requirements. The staff has determined the licensee's ISI Program does not reflect compliance with all of the requirements listed above. The following deficiencies in the ISI Program make the Program unacceptable:

1. Class 1 and 2 component integral attachments of the pressurizer, reactor coolant pumps, and steam generators have not been scheduled for examination. These integrally welded supports must be scheduled for examination in accordance with Tables IWB-2500-1 and IWC-2500-1 and with paragraphs IWB-5000 and IWC-5000.

2. There are no examinations scheduled on the Class 2 steam generator tubesheet-to-shell welds. A Class 2 tubesheet-to-shell weld at a structural discontinuity must be scheduled for examination in accordance with IWC-2500-1, Examination Category C-A, "Pressure Retaining Welds in Pressure Vessels," Item No. C1.30.

3. The licensee withdrew 14 Class 2 pressure test relief requests based on the exclusion criteria contained in IWC-1220. The licensee has misinterpreted Sub-article IWC-1220 of Section XI to the Code.

These exemptions do not apply to hydrostatic testing and visual examinations. Although Sub-article IWC-1220 of the 1977 Edition, Summer 1978 Addenda to Section XI states that certain components shall be exempted from the inservice examination requirements of IWC-2500, the intent of the ASME Code is to exempt these certain components only from the volumetric and surface examination requirements of IWC-2500. Sub-article IWC-1220 was changed in later ASME Code Editions and Addenda to make this point clear. In addition, Note (4) of Table IWC-2500-1, Examination Category C-H, states that "There are no exemptions or exclusions from these requirements except as specified in IWA-5214." The Class 2 components and piping, therefore, are required to be pressure tested and visually examined in accordance with the ASME Code. The necessary corrections to the ISI Program must be made.

4. Snubbers are not required to be examined in accordance with the ASME Code. The snubbers must be visually examined in accordance with the 1977 Edition, Summer 1978 Addenda of the Code, Tables IWB-2500-1 and IWC-2500-1.

With regard to the use of the proper Edition and Addenda to the Code, the TER concluded that the licensee must conform to the 1977 Edition with Addenda through Summer 1979. The licensee's program currently uses the 1977 Edition with Addenda through Summer 1978. The staff does not believe that an update through the Summer 1979 Addenda is necessary. After review of the differences between the two Addenda, the staff has concluded that the Addenda through Summer 1978, along with the licensee's Updated Component Support Plan, meets the intent of the later Addenda.

The information provided by the licensee in support of requests for relief from impractical requirements has been evaluated and the bases for granting relief from those requirements are documented in the attached SAIC Technical Evaluation Report (TER), SAIC-84/1658. We concur with the findings and recommendations contained in the TER with the exception of relief requests 1-PRESS-4, 1-PIPE-2, 2 -PIPE-1 and 2-PIPE-2. In these cases, the contractor recommended that relief be granted with the condition that a listing of the welds for which relief is requested and a description of the extent of examination coverage that can be obtained be provided by the licensee. It is the staff's position that if sufficient detailed technical justification is not provided at the time of the relief request, the relief request can not be granted. The licensee may refer to ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1," to reduce the number of welds for which relief is requested. Table 1 presents a summary of the reliefs requested and the status of the requests as determined by the staff. We have determined that the inspection requirements are impractical for those reliefs that are being granted and, pursuant to 10 CFR 50.55a(g)(6)(i), that the granting of the relief is authorized by law, will not endanger life or property or the common defense and security, and is otherwise in the public interest. In making this determination, we have given due consideration to the burden that could result if the requirements were imposed.

3.0 CONCLUSION

The staff concludes that the Summer Station, first ten-year ISI Program is not in compliance with 10 CFR 50.55a(g) and Technical Specification 4.0.5 and is, therefore, not acceptable.

Principal Contributors: G. Johnson
G. Wunder

Dated January 28, 1992

TABLE 1

SUMMARY OF RELIEF REQUESTS

Relief Request Number	System or Component	Exam. Cat.	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
1-RPV-1	Class 1 Piping	B-F	B5.10	RPV nozzle-to-safe end welds 1(DM) and 1a(DM) on drawings CGE-1-4100, CGE-1-4200, & CGE-1-4300	Volumetric and surface examinations	100% surface examination and volumetric examination to maximum extent practical	Granted
			B9.11	Safe end-to-pipe welds 2 and 15 on drawings CGE-1-4100, CGE-1-4200, & CGE-1-4300			
1-RPV-2	Reactor Pressure Vessel	B-A	B1.40	Closure head-to-flange weld 1	Volumetric examination	Volumetric examination to maximum extent practical	Relief not required
1-PRESS-1	Pressurizer	B-F	B5.20	Nozzle-to-safe end welds: Drawing No. — Weld No. CGE-1-4500 — 1 (DM) CGE-1-4501 — 1 (DM) CGE-1-4501 — 12 (DM) CGE-1-4501 — 23 (DM) CGE-1-4502 — 1 (DM) CGE-1-4503 — 46 (DM)	Volumetric and surface examinations	100% surface examination and volumetric examination to maximum extent practical	Granted
		B-J	B9.11	Safe end-to-pipe welds: Drawing No. — Weld No. CGE-1-4500 — 2 CGE-1-4501 — 2 CGE-1-4501 — 13 CGE-1-4501 — 24 CGE-1-4502 — 2 CGE-1-4503 — 45			

TABLE 1

SUMMARY OF RELIEF REQUESTS

Relief Request Number	System or Component	Exam. Cat.	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
1-PRESS-2	Pressurizer	B-D	B3.110 and B3.120	Nozzle-to-vessel welds 8 through 14 on Drawing No. CGE-1-2100 and nozzle inside radius sections	Volumetric examination	Volumetric examination to maximum extent practical	Granted
1-PRESS-4	Pressurizer	B-B	B2.11	Circumferential head-to-shell welds 1 and 4	Volumetric examination	Volumetric examination to maximum extent practical	Denied - additional information required
1-SG-1	Steam Generator	B-F	B5.30	Nozzle-to-safe end welds: Drawing No. / Weld No. CGE-1-4100 5(DM), 6(DM) CGE-1-4200 5(DM), 6(DM) CGE-1-4300 5(DM), 6(DM)	Volumetric and surface examinations	100% surface examination and volumetric examination to maximum extent practical	Granted
		B-J	B9.11	Safe end-to-pipe welds: Drawing No. / Weld No. CGE-1-4100 4, 7 CGE-1-4200 4, 7 CGE-1-4300 4, 7			

TABLE 1

SUMMARY OF RELIEF REQUESTS

Relief Request Number	System or Component	Exam. Cat.	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
1-PIPE-1	Class 1 Piping	B-J	B9.31	Branch connection welds: Dwg No. CGE-1-4100: welds 1(BC), 18(BC), 19(BC), 20(BC), 21(BC), 23(BC), 24(BC), 25(BC), 26(BC) Dwg No. CGE-1-4102: welds 24(BC), 26(BC) Dwg No. CGE-1-4200: welds 17(BC), 18(BC), 21(BC), 22(BC), 23(BC) Dwg No. CGE-1-4300: welds 17(BC), 18(3C), 19(BC), 21(BC), 23(BC), 24(BC) Dwg No. CGE-1-4302: welds 25(BC), 27(BC), 29(BC)	Volumetric and surface examinations	100% surface examination and volumetric examination to maximum extent practical	Granted
1-PIPE-2	Class 1 Piping	B-J	B9.11 and B9.12	Circumferential and longitudinal welds	Volumetric and surface examinations	100% surface examination and volumetric examination to maximum extent practical	Denied - additional information required

TABLE 1

SUMMARY OF RELIEF REQUESTS

Relief Request Number	System or Component	Exam. Cat.	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
2-HX-1	Class 2 Vessels	C-A	C1.10 and C1.20	Horizontal RHR HX (2) circ. shell weld 1 and head-to-shell weld 2; Regen. HX circ. shell welds 1-6 and head-to-shell welds 9 & 10; Letdown HX circ. shell weld 1 and head-to-shell weld 2; Excess letdown HX circ. shell weld 1; Vol. Control Tank circ. shell welds 1 & 2; Boron Inj. Tank circ. shell welds 1 & 2; RC Accum. (3) circ. shell weld 2 and head-to-shell weld 1	Volumetric examination	Volumetric examination to maximum extent practical	Granted

TABLE 1

SUMMARY OF RELIEF REQUESTS

Relief Request Number	System or Component	Exam. Cat.	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
2-HX-2	Class 2 Vessels	C-B	C2.20	Regen. HX nozzle-to-vessel welds 7 & 8; Boron Inj. Tank nozzle-to-vessel welds 3 & 4; RC Accum. (3) nozzle-to-vessel weld 5	Volumetric and surface examination	100% surface examination and volumetric examination to maximum extent practical	Granted
2-HX-3	Class 2 Vessels	C-A	C1.10 and C1.20	Letdown Reheat HX flange-to-shell weld 1 and head-to-shell weld 2; Seal Water HX flange-to-shell weld 1 and head-to-shell weld 2; RC Filter flange-to-shell weld 1 and head-to-shell weld 2; Seal Water Return Filter flange-to-shell weld 1 and head-to-shell weld 2	Volumetric examination	Surface and visual examinations	Granted

TABLE 1

SUMMARY OF RELIEF REQUESTS

Relief Request Number	System or Component	Exam. Cat.	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
2-HX-4	RHR Heat Exchanger	C-B	C2.20	Nozzle-to-vessel welds 3 and 4 on the horizontal RHR heat exchangers	Volumetric nd surface examinations	Surface examination of reinforcement saddle welds	Granted
2-SG-1	Steam Generators (3)	C-B	C2.20	Class 2 nozzle-to-vessel welds 9, 10, and 11	Volumetric and surface examinations	100% surface examination and volumetric examination to maximum extent practical	Granted
2-SG-2	Steam Generators (3)	C-A	C1.10 and C1.20	Class 2 circ. shell and head welds 5, 6, and 8	Volumetric examination	Volumetric examination to maximum extent practical	Granted
2-PIPE-1	Class 2 Piping	C-F	C5.21 and C5.22	Circumferential and longitudinal welds	Volumetric and surface examinations	100% surface examination and volumetric examination to maximum extent practical	Denied - additional information required

TABLE 1

SUMMARY OF RELIEF REQUESTS

Relief Request Number	System or Component	Exam. Cat.	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
2-PIPE-2	Class 2 Piping in RHR, ECC, and CHR Systems	C-F	C5.21 and C5.22	Circumferential and longitudinal welds	Volumetric and surface examinations	100% surface examinations and volumetric examinations to maximum extent practical	Denied - additional information required

ENCLOSURE 2

SAIC-84/1658

TECHNICAL EVALUATION REPORT
FIRST INTERVAL INSERVICE INSPECTION PROGRAM

VIRGIL C. SUMMER NUCLEAR STATION

Submitted to

U.S. Nuclear Regulatory Commission
Contract No. 03-82-096

Submitted by

Science Applications International Corporation
Idaho Falls, Idaho 83402

July 2, 1985

CONTENTS

TECHNICAL EVALUATION REPORT

FIRST INTERVAL INSERVICE INSPECTION PROGRAM

VIRGIL C. SUMMER NUCLEAR STATION

1. INTRODUCTION

Section 50.55a of 10 CFR Part 50 defines the requirements for the Inservice Inspection (ISI) Program for light-water-cooled nuclear power facilities. Incorporated by reference in this regulation is Section XI of the Boiler and Pressure Vessel Code published by the American Society of Mechanical Engineers (ASME), which provides the basis for implementing inservice inspection.*

Two types of inspections are required: (1) a preservice inspection conducted before commercial operation to establish a baseline and (2) periodic inservice inspections conducted during 10-year inspection intervals that normally start from the date of commercial operation. Separate plans for completing preservice inspection and each 10-year inservice inspection must be formulated and submitted to the Nuclear Regulatory Commission (NRC). The plan for each 10-year interval must be submitted at least 6 months before the start of the interval.

During the initial 10-year interval, inservice inspection examinations must comply with the requirements in the latest edition and addenda of Section XI incorporated in the regulation on the date 12 months before the date of issuance of the operating license. The program for the first interval for V. C. Summer, which began January 1, 1984, has been written to the 1977 edition with addenda through Summer 1978.

Section 2 of this report evaluates the first interval ISI Plan developed by the licensee, South Carolina Electric and Gas (SCE&G), for V. C. Summer for (a) compliance with this edition of Section XI, (b) compliance with ISI-related commitments identified during the NRC's review before granting an Operating License, (c) acceptability of examination sample, and (d) exclusion criteria.

Based on the date V. C. Summer's construction permit (March 1973) was issued, the plant's Class 1 and 2 components (including supports) were to be designed and provided with access to enable performance of inservice examinations and tests and to meet the preservice examination requirements

---

*Specific inservice test programs for pumps and valves (IST programs) are being evaluated in other reports.

of the 1971 Edition of the Code (10 CFR 50.55a(g)(2)). Paragraph 10 CFR 50.55a(g) recognizes that some requirements of the current edition and addenda of Section XI may not be practical to implement because of limitations of design, geometry, and materials of construction of components and systems that were designed to the older Code. The regulation therefore permits exceptions to impractical examination or testing requirements of the current Code to be requested. Relief from these requirements may be granted, provided the health and safety of the public are not endangered, giving due consideration to the burden placed on the licensee if the requirements were imposed. Section 3 of this report evaluates requests for relief dealing with inservice examinations of components and with system pressure tests.

The regulation also provides that ISI Programs may meet the requirements of subsequent Section XI editions and addenda, incorporated by reference in the Regulation, subject to approval by the NRC. Portions of such editions or addenda may be used, provided all related requirements of the respective editions or addenda are met. These instances are addressed on a case-by-case basis in Section 3 of this report. Likewise, Section XI provides that certain components and systems may be exempted from volumetric and surface requirements. In some instances, however, these exemptions are not acceptable to the NRC or are acceptable only with restrictions. As appropriate, exemptions are also discussed in Section 3 of this report.

The Preservice Inspection (PSI) Program for V. C. Summer, a 3-loop Westinghouse pressurized water reactor (PWR), was submitted as attachments to letters of November 18, 1980,[1] and April 29, 1981[2]. Other letters concerning PSI were issued May 7, 1981, June 4, 1981, July 2, 1981, August 25, 1981, and November 16, 1981.[3-7] The PSI program was evaluated by the staff in Safety Evaluation Report Supplement (SSER) #3 dated January 1982.[8] License condition No. 11 arose from this evaluation. Letters of January 25, 1982[9], November 10, 1982[10], May 23, 1983[11], September 27, 1984[12], and December 6, 1984,[13] transmitted the first Interval ISI program. The last two letters were submitted in response to a staff request for information dated July 23, 1984,[14] and provided the basis for this Technical Evaluation Report. Miscellaneous correspondence between NRC and the licensee is dated February 19, 1982,[15] January 27, 1983.[16] February 18, 1983,[17] April 13, 1983,[18] April 22, 1983,[19] June 8, 1983,[20] August 9, 1983,[21] and November 21, 1983.[22]

2. EVALUATION OF INSERVICE INSPECTION PLAN

2.1 Introduction

The approach being taken in this evaluation is to review the applicable program documents to determine the adequacy of their response to Code requirements and any license conditions pertinent to ISI activities. The rest of this section describes the submittals reviewed, the basic requirements of the effective Code, and the appropriate license conditions. The results of the review are then described. Finally, conclusions and recommendations are given.

2.2 Documents Evaluated

A chronology of documents on V. C. Summer PSI and ISI is given in Section 1 of this report. Those documents that impact this ISI program evaluation are (1) the latest revision of the Class 1 and 2 nondestructive examination (NDE) program and the response to the staff request for additional information, both of which were attached to the September 27, 1984, letter; (2) the latest revisions of the pressure testing and component support programs, both of which were attached to the December 6, 1984, letter; (3) portions of the V. C. Summer Final Safety Analysis Report (FSAR);[23] (4) portions of SSER #3;[8] and (5) to a lesser extent, the previous submittals on the first interval program.[9,10,11]

2.3 Summary of Requirements

The requirements on which this review is focused include the following:

(1) Compliance with Applicable Code Editions. The Inservice Inspection Program shall be based on the Code editions defined in 10 CFR 50.55a(g)(4) and 10 CFR 50.55a(b). The licensee for V. C. Summer has written the first interval program to the 1977 Edition with addenda through Summer 1978. These Code requirements are summarized in 2.3.1. below and detailed Code requirements are given in Appendix A. The 1974 Edition, Summer 1975 Addenda is being used for selecting Class 2 welds in systems providing the functions of residual heat removal, emergency core cooling, and containment heat removal. This is a requirement of 10 CFR 50.55a(b)(2)(iv)(a).

(2) Acceptability of the Examination Sample. Inservice volumetric, surface, and visual examinations shall be performed on ASME Code Class 1, 2, and 3 components and their supports using sampling schedules described in Section XI of the ASME Code and 10 CFR 50.55a(b). Sample size designations are identified as part of the Code requirements given in Appendix A.

(3) Exclusion Criteria. The criteria used to exclude components from examination shall be consistent with IWB-1220, IWC-1220, and 10 CFR 50.55a(b).

(4) PSI Commitments. The Inservice Inspection Program should address all license conditions, qualified acceptance conditions or other ISI-related commitments described in the Safety Evaluation Report (SER) and its supplements for the preservice examination.

2.3.1 Code Requirements

The following requirements are summarized from the 1977 Edition of Section XI with addenda through Summer 1978. Many requirements call for the examination of all areas while other requirements specify more limited examinations based on criteria such as representative percentage, components examined under other categories, material thickness, location relative to other welds or discontinuities, and component function and construction. For detailed requirements, see Appendix A of this report or the Code itself.

2.3.1.1 Class 1 Requirements. The following Class 1 components are to be examined in the first interval in accordance with Table IWB-2500-1:

(1) Pressure Retaining Welds in Reactor Vessel
(2) Pressure Retaining Welds in Vessels Other than Reactor Vessels
(3) Full Penetration Welds of Nozzles in Vessels
(4) Pressure Retaining Partial Penetration Welds in Vessels
(5) Pressure Retaining Dissimilar Metal Welds
(6) Pressure Retaining Bolting, Greater than 2 in. in Diameter
(7) Pressure Retaining Bolting, 2 in. and Less in Diameter
(8) Integral Supports for Vessels
(9) Pressure Retaining Welds in Piping
(10) Integral Supports for Piping, Pumps, and Valves
(11) Component Supports for Piping, Pumps, and Valves
(12) Pump Casings and Valve Bodies, including Pressure Retaining Welds
(13) Interior of Reactor Vessel, including Welded Core Support Structures, Interior Attachments, and Removable Core Support Structures
(14) Pressure Retaining Welds in Control Rod Housings
(15) All Pressure Retaining Components - Pressure Tests
(16) Steam Generator Tubing.

2.3.1.2 Class 2 Requirements. The following Class 2 components are to be examined in the first interval in accordance with Table IWC-2500-1:

(1) Pressure Retaining Welds in Pressure Vessels

(2) Pressure Retaining Nozzle Welds in Vessels

(3) Support Members

(4) Pressure Retaining Bolting Greater than 2-in. Diameter

(5) Pressure Retaining Welds in Piping

(6) Pressure Retaining Welds in Pumps and Valves

(7) All Pressure Retaining Components - Pressure Tests.

2.3.1.3 Class 3 Requirements. For systems or portions thereof required to operate in support of the below described safety functions, the following components are to be examined in accordance with Table IWD-2500-1.

(1) To support normal plant safety functions:

(a) Pressure retaining components

(b) Component supports and restraints

(c) Mechanical and hydraulic snubbers for components greater than 4-in. nominal pipe size.

(2) To support post-accident safety functions:

(a) Pressure retaining components

(b) Component supports and restraints

(c) Mechanical and hydraulic snubbers for components greater than 4-in. nominal pipe size.

(3) To support residual heat removal from spent fuel storage pool:

(a) Pressure retaining components

(b) Component supports and restraints

(c) Mechanical and hydraulic snubbers for components greater than 4-in. nominal pipe size.

2.3.2 Preservice Inspection Commitments

The following license condition pertains to PSI/ISI and comes from Section 5.2.4, SSER #3:[8]

"(11) SCE&G shall perform the following actions in conjunction with the first inservice examination:

a. Demonstrate the ability of the ultrasonic examination procedure to detect actual flaws and/or artificial reflectors in the volume subject to examination to the acceptance standards of Paragraph IWB-3500 in weldments representative of the design and materials of construction.

b. In the event that one-third thickness semi-circular reference flaws cannot be detected and discriminated from inherent anomalies, the entire volume of the weld shall be examined during the inservice inspection.

c. The reporting of the inservice inspection examination results shall be documented in a manner to define qualitatively whether the weldment and the heat affected zone and adjacent base metal on both sides of the weld were examined by ultrasonic angle beam techniques."

2.4 Compliance with Requirements

2.4.1 Applicable Code Edition

The initial inservice inspection interval examination program must comply (10 CFR 50.55a(g)(4)(i)) with the requirements of the latest edition and addenda of Section XI incorporated into 10 CFR 50.55a on the date 12 months before the date of issuance of the operating license. Based on a November 12, 1982, operating license for V. C. Summer (NUREG-0871),[24] the Code applicable to the first interval program is the 1977 Edition with Addenda through Summer 1979 (46 FR 20153, effective May 4, 1981). The licensee, however, prepared the first interval program to the 1977 Edition with addenda through Summer 1978. The licensee has interpreted[12] that NRC directed him to use the earlier Code (portions of FSAR Amendment 21)[23]. The following points must also be considered, however, when determining what edition and addenda of the code are applicable:

(a) The staff's correspondence was in the context of repair work required prior to the issuance of the operating license.

(b) Amendment 21 to the FSAR was dated October 1980, two years prior to issuance of the operating license. The Summer 1979 addenda became effective May 1981 in 10 CFR 50.55a.

(c) In January 1982, the staff issued Supplement #3 to the Safety Evaluation Report[8] which states that "The regulations require that the Virgil C. Summer Nuclear Station inservice inspection program be based on either the 1977 Edition or the 1980 Edition of Section XI, depending upon the operating license issue date (p. 5-5)." It further states: "We will evaluate the initial inservice inspection program after the applicable ASME Code Edition and Addenda can be determined based on 10 CFR 50.55a(g)... (p. 5-6).

A summary of the technical changes between the 1977 Edition with Summer 1978 Addenda (used by the licensee) and 1977 Edition with Summer 1979 Addenda (defined by the regulations) is given in Table 1. The only significant technical modifications are (1) the upgrade of acceptance standards in IWA-and IWB-3000 and (2) the addition of IWF.

The acceptance standards do not have an impact on the ISI program unless the examination detects a rejectable flaw. In such instances, the NRC staff generally handles the evaluation on a case-by-case basis.

The addition of IWF makes requirements for nonintegral attachments more stringent than previously contained in IWB, IWC, and IWD of 77S78. The selection process is governed by IWB, IWC, and IWD; but the examination is extended to the building structure. The licensee could, however, update the program to the 1977 Edition, Summer 1979 Addenda, without significant impact and should do so to meet the regulations and the latest relevant staff statements (in SSER #3).[8] If the licensee updates the program by upgrading the acceptance standards in IWA- and IWB-3000 and adding IWF as recommended, the other results of this review should not be impacted. As part of his update, the licensee should address these results by compliance or by other appropriate clarification or resolution.

The licensee is required by 10 CFR 50.55a(b)(2)(iv)(a) to use the 1974 Edition, Summer 1975 Addenda to select Class 2 welds in systems providing the functions of residual heat removal, emergency core cooling, and containment heat removal. In Section 4.5 and Attachment 7.3 of Procedure GTP-303, the licensee has committed to examine piping welds in the following systems in accordance with the 1974 Edition, Summer 1975 Addenda: (a) residual heat removal, (b) safety injection system, (c) service water system, (d) reactor building spray system, and (e) component cooling water system.[12]

2.4.2 Code Requirements

The first Interval ISI program of record (exclusive of pump and valve testing) is contained in three SCE&G procedures, GTP-303[12] for Class 1 and 2 piping and component NDE, GTP-304[13] for system pressure testing (including Class 3 requirements), and GTP-305[13] for component support examinations. These procedures are intended to supersede all previous ISI program procedures in their respective areas.

The programs submitted in the three procedures were reviewed and were determined acceptable, except in the following areas:

TABLE 1

SUMMARY OF TECHNICAL CHANGES
FROM S78 TO S79 ADDENDA OF 1977 EDITION OF SECTION XI
(Winter 1978 Addenda, Summer 1979 Addenda)

CLASS 1 (IWA, IWB)

IWA & IWB-3000 - Upgraded examination evaluation, including requirements for clad surfaces (IWA-3310(b) etc.) and surface flaws (IWA-3410 etc.)

IWA & IWB-5200 - Added IWA-5260 on requirements for pressure gauges used during hydrostatic tests and corrected IWB accordingly

IWA-6000 - General revision and clarification of records/reporting rules

IWA-7530 - Added references to IWF for PSI of repaired/replaced part

IWB-1220(a) - Revised exemption to include makeup capacity vs. break flow as criterion

Table IWB-2500-1: Changed B6.40 from ligaments between flange stud holes to threads in flange stud holes; moved examinations of non-integral supports from Category B-K-2 to IWF without significant changes

Figure IWB-2500-8: Added sketch of socket weld examination area

Figure IWB-2500-12: Provided more detailed RPV bolting examination requirements, including vessel flange threaded holes

Figures IWB-2500-13 to -15: Defined boundaries of integral attachments

Added IWB-4440 & 4450 on S/G tube plugging techniques.

CLASS 2 (IWC)

Nonintegral supports examinations moved from Categories C-C and C-E* (Table IWC-2500-1) to IWF without significant changes; defined boundaries of integral attachments (Figure IWC-2520-5)

CLASS 3 (IWD)

Revised Table IWD-2500-1 to same format as IWB-2500-1 and IWC-2500-1; added Fig. IWD-2500-1; more detailed definition of integral attachments; moved nonintegral supports to IWF without significant changes.

SUBSECTION IWF - Added W-78

*S-78 Categories C-C and C-E - References IWF and identifies this section as "in course of preparation."

(1) Examinations scheduled for Class 1 and 2, Categories B-H, B-K-1, and C-C, integrally welded supports, do not include some apparently integral supports shown in some FSAR drawings.[23]

(a) the pressurizer has what appear to be welded pads for lateral support (FSAR, Fig. 5.5-10).

(b) The reactor coolant pumps are shown to have three supports each welded to the pump casings (FSAR, Fig. 5.5-9).

(c) The steam generators appear to have supports welded to the lower head and Class 2 lateral supports welded to the lower shell (FSAR, Fig. 5.5-8).

(d) The pressurizer has two lifting trunnions.

Some of these attachments may have been excluded from the program because they do not bear a load during normal operation. Paragraphs IWB-2500 and IWC-2500 do not require the volumetric or surface examination of integrally welded attachments not used for support or restraint of components. However, the ASME Code Committee has indicated that the requirements of IWA-5000 for visual examination during hydrostatic pressure tests of IWB-5000 and IWC-5000 apply to these kinds of supports.[25] Therefore, these supports should be included in the program unless the licensee can demonstrate through relief requests that such examinations are impractical.

(2) There are no examinations scheduled on the Class 2 steam generator tube sheet-to-shell welds (Category C-A, Item C1.30). The licensee states in the program tables that the S/G "A" Class 1 tube sheet-to-lower head weld examination (Category B-B, Item B2.40) meets the requirements for examining the Class 2 tube sheet-to-shell welds. Unless the licensee can satisfactorily explain this statement and the examination plans (if any) for welds 5, 6, and 8 of isometric (GE-2-1100), a Class 2 tube sheet-to-shell weld at a structural discontinuity should be scheduled for examination.

(3) The pressure test program (GTP-304, Rev. 0[13]) contains a list of 14 Class 2 system relief requests. These same systems appear on a list of pressure tests to be conducted as part of Appendix J containment leak testing. The actual relief requests are not included, but earlier documents[9,10] contain relief requests in which Appendix J leak testing was to be an alternative to Code-required pressure testing. The licensee's most recent position,[12] however, has been to withdraw the 14 relief requests. Instead, he interprets that an exemption from each pressure test applies per Paragraph IWC-1220. This paragraph is not a valid basis for excluding components from the required pressure tests.

Category C-H, which governs Class 2 pressure testing, contains a note that "There are no exemptions (or) exclusions from these requirements except as specified in IWA-5214 (Repairs and Replacements)." The ASME Code Committee further clarified the definition

of the terminology in IWC-1220 of the 1983 Code edition. Hence, it is SAIC's position that all Class 2 systems are subject to pressure testing per Code requirements. In reviewing his classification of Class 2 system, the licensee can use the following definition from Examination Category C-H (1980 Edition): "The pressure-retaining boundary includes only those portions of the system required to operate or support the safety system function up to and including the first normally closed valve (including a safety or relief valve) or valve capable of automatic closure when the safety function is required."

(4) The component support program (GTP-305, Rev. 2[13]) distinguishes between (a) visual examinations of supports not required to be examined by the technical specifications (component supports) and (b) functional tests of mechanical and hydraulic snubbers required by the Technical Specifications (tech. spec. snubbers). Section 4.4.1 of GTP-305 clearly shows that all component supports required by the Code to be examined will be examined.

The examination schedules for tech. spec. snubbers, given in Sections 4.4.2 and 4.4.3 of GTP-305, are based on failure rates. It is also stated that the technical specifications govern the examination frequency of these snubbers. There is a Code requirement to visually examine snubbers in addition to testing samples for functional adequacy. Since the functional testing of snubbers in the Technical Specifications is based on sampling, all requirements in Tables IWB-2500 and IWC-2500 (77S78) may not be covered. There is no statement that the extent of examination required by the Code will be met with regards to the additional visual requirements of Categories B-K-2 and C-C in 77S78 or Category F-C in 77S79. It would, therefore, be appropriate for the licensee to insert a statement that indicates a commitment to examine all snubbers required by the applicable Code (77S79).

2.4.3 Preservice Inspection Commitments

The licensee has been required by license condition 11 (Section 5.2.4, SSER #3) to demonstrate the flaw detection capability of an ultrasonic examination procedure and take other prescribed corrective actions. These actions were to be completed in conjunction with the first inservice examination. SAIC has not received any documentation that indicates the progress of this item. However, the staff at NRC Headquarters has verbally informed SAIC that this license condition has been resolved to the satisfaction of NRC Region II staff.

2.5 Conclusions and Recommendations

Based on the preceding evaluation, it is concluded that the V. C. Summer first-interval ISI program meets the requirements of (1) the Code and (2) NRC regulations, except as summarized below.

(1) Because the selection of the applicable edition and addenda of the Code is determined by regulation (10 CFR 50.55a(b)(2) and (g)(4)(i)), the first interval ISI Program for V. C. Summer should be updated to the 1977 Edition with Addenda through Summer 1979. The differences between 77S78 and 77S79 are relatively minor, except for Section IWF.

(2) Class 1 and 2 component integral attachments identified in Section 2.4.2(1) should be scheduled for examination.

(3) A steam generator Class 2 tube sheet-to-shell weld should be scheduled for examination, if the weld is at a gross structural discontinuity (see Section 2.4.2(2)).

(4) The 14 Class 2 systems for which exemptions are claimed[12] from pressure test requirements per IWC-1220 should be scheduled for the pressure tests required by the Code, unless the licensee can reclassify them as not being covered by Section XI (see Section 2.4.2(3)).

(5) The licensee should commit to examining all snubbers covered by the Technical Specifications and required to be visually examined by the Code (see Section 2.4.2(4)).

Specific requests for relief are addressed in the following section.

3. EVALUATION OF RELIEF REQUESTS

SCE&G Procedure GTP-303 was issued with a letter of September 27, 1984,[12] and included 16 (8 each Class 1 and Class 2) relief requests. Procedures GTP-304 and GTP-305 were issued with a letter of December 6, 1984, and contained no relief requests.[13] Fourteen pressure test relief requests originally submitted on November 10, 1982,[10] were withdrawn on September 27, 1984.[12] The following sections evaluate the 16 pending relief requests.

3.1 CLASS 1 COMPONENTS

Subsections IWA and IWB of the Code govern the examination of Class 1 piping and components. Specific requirements are given in Table IWB-2500-1.

3.1.1 Reactor Vessel

3.1.1.1 Relief Request 1-RPV-2, Reactor Vessel Closure Head-to-Flange Weld, Category B-A, Item B1.40

Code Requirement

Essentially 100% of the length of the head-to-flange weld shall be volumetrically examined in accordance with Figure IWB-2500-5 during the first inspection interval.

Code Relief Request

Relief is requested from examining 100% of the length of the reactor vessel closure head-to-flange weld (SCE&G Drawing No. CGE-1-1300, weld no. 1).

Proposed Alternative Examination

No alternative examinations are proposed. However, the subject weld will be ultrasonically examined to the extent practical.

Licensee's Basis for Requesting Relief

The flange lifting lugs preclude 100% volumetric examination of the closure head-to-flange weld.

Evaluation

A small percentage of the head-to-flange weld is obstructed by lifting lugs. Hence, most of the weld will be Code examined. Since the lifting lugs are the only obstruction to 100% examination, the intent of the Code of examining essentially 100% of the weld has been fulfilled.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the weld discussed above, the Code requirements are met. Therefore, relief is not required.

Reference

Reference 12.

3.1.1.2 Relief Request 1-RPV-1, Reactor Vessel Nozzle-to-Safe End and Safe End-to-Pipe Welds, Category B-F, Item B5.10, and Category B-J, Item B9.11

Code Requirements

Category B-F: All dissimilar metal nozzle-to-safe end welds in the reactor vessel shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. The examinations may be performed coincident with the vessel nozzle examinations required by Examination Category B-D. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steels, (b) carbon or low alloy steels to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

Category B-J: For circumferential welds in pipe of nominal pipe size 4 in. and greater, surface plus volumetric examinations shall be performed in accordance with Figure IWB-2500-8 over essentially 100% of the weld length during each inspection interval. The examination shall include the following:

(a) All terminal ends in each pipe or branch run connected to vessels.

(b) All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed the following limits under loads associated with specific seismic events and operational conditions.

(1) primary plus secondary stress intensity of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of

(a) carbon or low alloy steels to high alloy steels;
(b) carbon or low alloy steels to high nickel alloys; and
(c) high alloy steels to high nickel alloys.

(d) Additional piping welds so that the total equals 25% of the circumferential joints in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop.

Code Relief Request

Relief is requested from volumetrically examining 100% of the required volume of each of the following reactor vessel nozzle-to-safe end and safe end-to-pipe welds:

SCE&G Drawing No.	Nozzle-to-Safe End Weld, B-F (dissimilar metal)	Safe End-to-Pipe Weld, B-J (similar metal)
CGE-1-4100	1(DM), 16(DM)	2, 15
CGE-1-4200	1(DM), 16(DM)	2, 15
CGE-1-4300	1(DM), 16(DM)	2, 15

Proposed Alternative Examination

No alternative examinations are proposed. However, to the extent practical, the required weld volume will be examined by the ultrasonic method. Surface examinations will be performed on essentially 100% of the required areas.

Licensee's Basis for Requesting Relief

The geometric configurations (changing thickness and direction) of the nozzles prevent ultrasonic examinations from being performed on the nozzle side base metal and, to some extent, on the piping side base metal as required by IWB-2500-8.

Severe metal thickness and direction changes may cause the majority of the sound to be attenuated or redirected away from the ultrasonic receiver due to the reflection characteristics of ultrasound. Under these circumstances, the operator would not be able to credit the weld with 100% UT examination.

RT of these welds would also be impractical because it would have no use in detecting laminations and very limited use in detecting fine tight cracks, the typical flaws expected while performing volumetric examination. In some cases, around systems containing radioisotopes, the film may be prematurely exposed during the setup or examination time. Such results would not be reliable, thus such data must be considered invalid.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time the 1971 Edition of the ASME Code, Section XI, was in effect. The first edition of Section XI had not been published until 1970. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IWA-1500 in subsequent editions) and (2) NRC regulations (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedures.

The licensee has asked in this relief request for substantial relief based on design limitations from volumetric examination requirements included in the referenced 1971 Code. These requirements have been modified in the currently applicable Code edition and addenda to obtain more practical results.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of UT is changing rapidly and significant improvements can be expected during this ten-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

The licensee should ensure that the surface examinations required for these Code items as well as the applicable system pressure tests specified in Article IWB-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed, and

(c) the Code-required surface examinations and system pressure tests are performed.

References

Reference 12.

3.1.2 Pressurizer

3.1.2.1 Relief Request 1-PRESS-4, Pressurizer Head-to-Shell Welds, Category B-B, Item B2.11

Code Requirements

All circumferential shell-to-head welds in the pressurizer shall be volumetrically examined in accordance with Figure IWB-2500-1 over essentially 100% of their length during the first inspection interval.

Code Relief Request

Relief is requested from 100% volumetric examination of the two pressurizer circumferential head-to-shell welds (SCE&G Drawing No. CGE-1-2100, weld nos. 1 and 4).

Proposed Alternative Examination

No alternative examinations are proposed. However, to the extent practical, restricted by the described limitations, the required weld metal and base metal areas will be examined by the ultrasonic method.

Licensee's Basis for Requesting Relief

The pressurizer vessel nozzles, axis pads, and other welded attachments preclude 100% volumetric examination from being performed on the subject welds.

Evaluation

The pressurizer head-to-shell welds are made partially inaccessible to volumetric examination by the design obstructions noted above. The licensee has committed to Code examining as much of these welds as is practical. However, though the extent of obstruction is not revealed, it is probably substantial. Since this relief request was first submitted with the response to NRC's request for information (RAI) and does not provide sufficient detail,(12) additional information is requested in the attached RAI to determine what the licensee considers impractical. The surfaces

adjacent to those portions of each weld that do not receive a Code-acceptable volumetric examination should alternatively be examined by surface methods to the extent practical. Provided the licensee makes a reasonable interpretation of what portion of the Code-required examination is impractical, these examinations together with the Code-required hydrostatic testing should provide adequate information on the integrity of the welds.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, the Code requirements are impractical. It is further concluded that the alternative examination discussed above will provide the necessary added assurance of structural reliability. Therefore, relief should be granted from volumetrically examining those portions of the subject welds that are obstructed provided

(a) the welds are volumetrically examined to the maximum extent practical as proposed (and adequately clarified in a subsequent licensee submittal),

(b) the surfaces adjacent to the obstructed volumes are surface examined to the extent practical in lieu of the required volumetric examination, and

(c) the Code-required system pressure tests are performed.

Reference

Reference 12.

3.1.2.2 Relief Request 1-PRESS-2, Pressurizer Nozzle-to-Vessel Welds and Inside Radius Sections, Category B-D, Items B3.110 and B3.120

Code Requirements

All nozzle-to-vessel welds and inside radius sections in the pressurizer shall be volumetrically examined in accordance with Figure IWB-2500-7 during the first interval of operation. The nozzle-to-vessel weld and adjacent areas of the nozzle and vessel are included. At least 25% but not more than 50% (credited) of the nozzles shall be examined by the end of the first examination period and the remainder by the end of the inspection interval.

Code Relief Request

Relief is requested from volumetrically examining 100% of the required volumes of the nozzle-to-vessel welds and inside radii of pressurizer nozzles identified by weld numbers 8 through 14 on SCE&G Drawing No. CGE-1-2100.

Proposed Alternative Examination

No alternative examinations are proposed. However, to the extent practical, ultrasonic examinations will be performed on the required external portion of the nozzle base metal and weld metal areas.

Licensee's Basis for Requesting Relief

The geometric configurations (changing direction and changing thickness) of the nozzles and the projected radiation/contamination levels of their inside radii may prevent ultrasonic examinations from being performed on the required weld metal and base metal areas as specified by IWB-2500-7.

Severe metal thickness and direction changes may cause the majority of the sound to be attenuated or redirected away from the ultrasonic receiver due to the reflection characteristics of ultrasound. Under these circumstances, the operator would not be able to credit the weld with 100% ultrasonic examination.

Radiographic testing of these welds would also be impractical because it would have no use in detecting laminations and very limited use in detecting fine tight cracks, the typical flaws expected while performing volumetric examination. In some cases, around systems containing radioisotopes, the film may be prematurely

exposed during the setup or examination time. Such results would not be reliable, thus such data must be considered invalid.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI, was in effect. The first edition of Section XI had not been published until 1970. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IWA-1500 in subsequent editions) and (2) NRC regulations (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedures.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

The licensee should ensure that the surface examinations required for these Code items as well as the applicable system pressure tests specified in Article IWB-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed, and

(c) the Code-required system pressure tests are performed.

Reference

Reference 12.

3.1.2.3 Relief Request 1-PRESS-1, Pressurizer Nozzle-to-Safe End and Safe End-to-Pipe Welds, Category B-F, Item B5.20, and Category B-J, Item B9.11

Code Requirements

Category B-F. All dissimilar metal nozzle-to-safe end welds in the pressurizer vessel shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. The examinations may be performed coincident with the vessel nozzle examinations required by Examination Category B-D. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steels, (b) carbon or low alloy steels to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

Category B-J. For circumferential welds in pipe of nominal pipe size 4 in. and greater, surface plus volumetric examinations shall be performed in accordance with Figure IWB-2500-8 over essentially 100% of the weld length during each inspection interval. The examination shall include the following:

(a) All terminal ends in each pipe or branch run connected to vessels.

(b) All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed the following limits under loads associated with specific seismic events and operational conditions.

(1) primary plus secondary stress intensity of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of

(a) carbon or low alloy steels to high alloy steels;
(b) carbon or low alloy steels to high nickel alloys; and
(c) high alloy steels to high nickel alloys.

(d) Additional piping welds so that the total equals 25% of the circumferential joints in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop.

Code Relief Request

Relief is requested from volumetrically examining 100% of the required volume of each of the following pressurizer nozzle-to-safe end and safe end-to-pipe welds:

Drawing No.	Nozzle-to-Safe End Weld, B-F (Dissimilar Metal)	Safe End-to-Pipe Weld, B-J (Similar Metal)
CGE-1-4500	1 (DM)	2
CGE-1-4501	1 (DM)	2
CGE-1-4501	12 (DM)	13
CGE-1-4501	23 (DM)	24
CGE-1-4502	1 (DM)	2
CGE-1-4503	46 (DM)	45

Proposed Alternative Examination

No alternative examinations are proposed. However, to the extent practical, the required weld volumes and the base metal areas will be examined by the ultrasonic method. Surface examinations will be performed on essentially 100% of the required areas.

Licensee's Basis for Requesting Relief

The geometric configurations (changing thickness and direction) of the nozzles prevent ultrasonic examinations from being performed on the nozzle side base metal and, to some extent, on the piping side base metal as required by IWB-2500-8.

Severe metal thickness and direction changes may cause the majority of the sound to be attenuated or redirected away from the ultrasonic receiver due to the reflection characteristics of ultrasound. Under these circumstances, the operator would not be able to credit the weld with 100% ultrasonic examination.

Radiographic testing of these welds would also be impractical because it would have no use in detecting laminations and very limited use in detecting fine tight cracks, the typical flaws expected while performing volumetric examination. In some cases, around systems containing radioisotopes, the film may be prematurely exposed during the setup or examination time. Such results would not be reliable, thus such data must be considered invalid.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI was in effect. The first edition of Section XI had not been published until 1970. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IWA-1500 in subsequent editions) and (2) NRC regulations (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedures.

The licensee has asked in this relief request for substantial relief based on design limitations from examination requirements included in the referenced 1971 Code. These requirements have been modified in the currently applicable Code edition and addenda to obtain more practical results.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

The licensee should ensure that the surface examinations required for these Code items as well as the applicable system pressure tests specified in Article IWB-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed, and

(c) the Code-required surface examinations and system pressure tests are performed.

Reference

Reference 12.

3.1.3 Steam Generators and Heat Exchangers

3.1.3.1 Relief Request 1-SG-1, Steam Generator Nozzle-to-Safe End and Safe End-to-Pipe Welds, Category B-F, Item B5.30, and Category B-J, Item B9.11

Code Requirements

Category B-F. All dissimilar metal nozzle-to-safe end welds in the steam generators shall be surface and volumetrically examined in accordance with Figure IWB-2500-8 during the first inspection interval. The examinations may be performed coincident with the vessel nozzle examinations required by Examination Category B-D. Dissimilar metal welds between combinations of (a) carbon or low alloy steels to high alloy steels, (b) carbon or low alloy steels to high nickel alloys, and (c) high alloy steel to high nickel alloys are included.

Category B-J. For circumferential welds in pipe of nominal pipe size 4 in. and greater, surface plus volumetric examinations shall be performed in accordance with Figure IWB-2500-8 over essentially 100% of the weld length during each inspection interval. The examination shall include the following:

(a) All terminal ends in each pipe or branch run connected to vessels.

(b) All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed the following limits under loads associated with specific seismic events and operational conditions.

(1) primary plus secondary stress intensity of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of:

(a) carbon or low alloy steels to high alloy steels;
(b) carbon or low alloy steels to high nickel alloys; and
(c) high alloy steels to high nickel alloys.

(d) Additional piping welds so that the total equals 25% of the circumferential joints in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop.

Code Relief Request

Relief is requested from volumetrically examining 100% of the required volume of each of the following steam generator nozzle-to-safe end and safe end-to-pipe welds:

SCE&G Drawing No.	Nozzle-to-Safe End Weld, B-F (dissimilar metal)	Safe End-to-Pipe Weld, B-J (similar metal)
CGE-1-4100	5(DM), 6(DM)	4, 7
CGE-1-4200	5(DM), 6(DM)	4, 7
CGE-1-4300	5(DM), 6(DM)	4, 7

Proposed Alternative Examination

No alternative examinations are proposed. However, to the extent practical, the required weld volume and the base metal areas will be examined by the ultrasonic method. Surface examinations will be performed on essentially 100% of the required areas.

Licensee's Basis for Requesting Relief

The geometric configurations (changing thickness and direction) of the nozzles prevent ultrasonic examinations from being performed on the nozzle side base metal and, to some extent, on the piping side base metal as required by IWB-2500-8.

Severe metal thickness and direction changes may cause the majority of the sound to be attenuated or redirected away from the ultrasonic receiver due to the reflection characteristics of ultrasound. Under these circumstances, the operator would not be able to credit the weld with 100% ultrasonic examination.

Radiographic testing of these welds would also be impractical because it would have no use in detecting laminations and very limited use in detecting fine tight cracks, the typical flaws expected while performing volumetric examination. In some cases, around systems containing radioisotopes, the film may be prematurely exposed during the setup or examination time. Such results would not be reliable, thus such data must be considered invalid.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is

also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI, was in effect. The first edition of Section XI had not been published until 1970. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IWA-1500 in subsequent editions) and (2) NRC regulations (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedures.

The licensee has asked in this relief request for substantial relief based on design limitations from examination requirements included in the referenced 1971 Code. These requirements have been modified in the currently applicable Code edition and addenda to obtain more practical results.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

The licensee should ensure that the surface examinations required for these Code items as well as the applicable system pressure tests specified in Article IWB-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed, and

(c) the Code-required surface examinations and system pressure tests are performed.

Reference

Reference 12.

3.1.4 Piping Pressure Boundary

3.1.4.1 Relief Requests 1-RPV-1, 1-PRESS-1, and 1-SG-1, Pressure-Retaining Welds in Piping, Category B-J, Item B9.11

Relief requests for these welds are addressed in Sections 3.1.1.2, 3.1.2.3, and 3.1.3.1.

3.1.4.2 Relief Request 1-PIPE-2, All Class 1 Piping Welds Greater than 4-in. Diameter and not Described in Relief Request 1-PIPE-1, Category B-J, Items B9.11 and B9.12

Code Requirements

For circumferential welds in pipe of nominal pipe size 4 in. and greater, surface plus volumetric examinations shall be performed in accordance with Figure IWB-2500-8 over essentially 100% of the weld length during each inspection interval. The examination shall include the following:

(a) All terminal ends in each pipe or branch run connected to vessels.

(b) All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed the following limits under loads associated with specific seismic events and operational conditions.

(1) primary plus secondary stress intensity of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of

(a) carbon or low alloy steels to high alloy steels;
(b) carbon or low alloy steels to high nickel alloys; and
(c) high alloy steels to high nickel alloys.

(d) Additional piping welds so that the total equals 25% of the circumferential joints in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop.

For longitudinal welds in pipe of nominal pipe size 4 in. and greater, surface plus volumetric examinations shall be performed for at least a pipe-diameter length, but not more than 12 in., of each

longitudinal weld intersecting the circumferential welds required to be examined.

Code Relief Request

Relief is requested from volumetrically examining 100% of the required volumes of certain Class 1 pipe welds (circumferential and longitudinal) greater than 4 inches diameter that are not described in relief request 1-PIPE-1 (3.1.4.3). Specific welds, apparently covered by this relief request and scheduled to be examined during this interval, are identified in Table 1.*

Proposed Alternative Examination

No alternative examinations are proposed. However, to the extent practical, the required weld volume and base metal area will be examined by the ultrasonic method. Surface examinations will be performed on essentially 100% of the required areas.

Licensee's Basis for Requesting Relief

The geometric and design configurations of the piping system constituent parts are such that limitations may occur for volumetric examinations of circumferential and longitudinal butt welds when welds occur at discontinuities such as required weld reinforcement, pipe-to-elbow, pipe-to-flange, pipe-to-valve, valve-to-elbow, flange-to-valve, diameter transitions, thickness transitions, and in areas where integral welded supports, lugs, hangers, etc. are installed. These limitations may preclude examination to all or some part of the required examination area specified in IWB-2500-8.

Volumetric examination from the fitting side will depend upon geometric configuration. For most pipe-to-fitting applications, volumetric examinations can be performed to the extent required by T-532 of ASME Code, Section V from the weld and pipe surfaces. In some instances, no volumetric examination can be performed on the fitting side when the fitting is a valve or flange. However, in most cases, 100% of the required weld material can be examined, except in instances where welds may occur at fitting-to-fitting connections.

*Table 1 was not supplied by the licensee, but was prepared by SAIC.

Table 1. WELDS REFERENCED TO RELIEF REQUEST 1-PIPE-2

CGE Dwg. No.	Weld No(s)	Physical Limitations
1-4100	8, 9[a]	Pipe to Elbow
	12	Weld Contour and Bevel on Elbow
	13	Weld Contour and Bevel on Pump
1-4101[b]	1, 15, 16	Pipe to Valve
	2, 14	Pipe to Elbow
1-4102[b]	7, 8, 23	Pipe to Valve
	14, 18	Pipe to Elbow
1-4103	1, 10, 11	Pipe to Valve
	16	Branch Connection
1-4104[b]	1, 17, 18	Pipe to Valve
	14	Pipe to Elbow
1-4200	12, 13[c]	(not listed)
1-4201[b]	2	Pipe to Elbow
	7	Pipe to Valve
1-4202[d]	1, 14, 15	Pipe to Valve
	3, 11	Pipe to Elbow
	20	Geometric Design (Nozzle)
1-4203[d]	1, 8, 9	Pipe to Valve
	12	Geometric Design (Nozzle)
1-4300	10, 11[a]	Pipe to Elbow
	12, 13[c]	(not listed)
1-4301[d]	1	Pipe to Valve
	4	Pipe to Elbow, Hanger Lugs
	5, 6	Hanger Lugs
	8, 9	Pipe to Valve
	13	Geometric Design (Branch Connection)
1-4302[b]	6	Pipe to Elbow
	10, 11, 24	Pipe to Valve
1-4303[d]	12, 13	Pipe to Elbow
	14, 15	Pipe to Valve
	18	Geometric Design (Branch Connection)
1-4304[d]	3	Pipe to Elbow
	4, 5	Pipe to Valve
1-4500	13[e,f]	Geometric Design (Nozzle)
1-4501[b,g]	9	Pipe to Elbow
	11, 22, 33	Pipe to Flange (Continued):

TABLE 1 (Continued)

CGE Dwg. No.	Weld No(s)	Physical Limitations
1-4502	2[h]	Geometric Design (Nozzle)
	13--17[i], 19, 20	Geometric Design (Tee)
	18, 23	Geometric Design (Reducer)
	22	Pipe to Elbow
1-4503[b,g]	1	Geometric Design (Nozzle)
	32, 33	Pipe to Valve
	39, 40	Geometric Design (Tee)
1-4504[d]	1	Geometric Design (Nozzle)
	2-11, 13-18, 20	Pipe to Elbow
	24, 25	Pipe to Valve

a. Listed in updated weld limitation list; but not in Procedure GTP-303[12] because examination requirements are apparently met without these welds.

b. For these drawings, the number of welds required to be examined (according to GTP-303) exceeds the number with scan limitations.[12]

c. Listed in Procedure GTP-303, but not in updated weld limitation list.[12]

d. For these drawings, the number of welds with scan limitations exceeds the number required to be examined (according to GTP-303).[12]

e. Isometric shows weld to be near branch connection, not nozzle.

f. Weld #13 not included in Procedure GTP-303 (p. 34 of Attachment 7.2.[12]

g. GTP-303 (pp. 82 and 129 of Attachment 7.2) mistakenly assigns terminal end piping welds to relief request 1-PIPE-2, but they are covered by 1-PRESS-1.

h. Only Weld 2 of Dwg. 1-4502 is included in examination requirements of GTP-303 (p. 35 of Attachment 7.2); all other welds are said to be covered by examination of welds #2-12 of Dwg. 1-4500.

i. Scan limitation list shows weld #14 limitation as geometric design (tee), but isometric shows weld adjacent to reducer, like welds #18 and #23.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI, was in effect; the first edition of Section XI had not been published until 1970. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IWA-1500 in subsequent editions) and (2) NRC regulations (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedures.

The licensee has asked in this relief request for substantial relief based on design limitations from examination requirements included in the referenced 1971 Code. These requirements have been modified in the currently applicable Code edition and addenda to obtain more practical results.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

Before this relief request is finally approved, the licensee should provide with it a list of all welds with scan limitations required to be examined during the first interval. He has submitted such a list for the other Class 1 weld-related relief requests but has indicated that such a list, based on the 1977 Code Edition, cannot now be completed for this relief request because the preservice inspection was done to the 1974 Edition.

For purposes of this evaluation, we have prepared a list of the specific welds apparently covered by this relief request, from a general listing of welds with scan limitations provided by the licensee. In Table 1 we have compared it on a drawing-by-drawing basis with the examination amount (no. of welds the licensee plans

to examine during each examination period of the interval), as listed in Attachment 7.2 to Procedure GTP-303.*

As indicated in the footnotes in Table 1, the numbers of welds to be examined and the numbers with scan limitations generally do not coincide. This indicates that the licensee needs to spell out at this time which piping welds he intends to examine. To the extent the Code permits, the 25% sample of Category B-J welds should be chosen to minimize the number of welds with scan limitations. In instances where PSI experience and similar piping/weld geometry cannot be used to define scan limitations before first-interval examinations, the licensee should so indicate in GTP-303 or other appropriate documentation. In the process of preparing the list of piping welds to be examined during the first interval, the licensee should correct minor inconsistencies such as identified by footnotes (e) to (i) of Table 1.

The licensee should ensure that the surface examinations required for these Code items as well as the applicable system pressure tests specified in Article IWB-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed,

---

*Procedure GTP-303, the list of scan limitations, and the isometric drawings are Attachments IV, V, and VI, respectively, of Reference 12. In GTP-303, the licensee generally does not identify by weld number the piping welds to be inspected.

(c) an up-to-date list of Category B-J piping welds to be inspected during the first interval is submitted, based on the best information available at this time,

(d) this list is updated in a revised relief request submitted at the end of the interval in accordance with 10 CFR 50.55a (g)(5)(iv), and

(e) the Code-required surface examinations and system pressure tests are performed.

Reference

Reference 12.

3.1.4.3 Relief Request 1-PIPE-1, Piping System Branch Connection Welds Greater than 2-in. Diameter, Category B-J, Item B9.31

Code Requirements

For welds in branch connections greater than 2 in., surface plus volumetric examination shall be performed in accordance with Figures IWB-2500-9, 10, and 11 over essentially 100% of the weld length during each inspection interval. The examinations shall include the following:

(a) All terminal ends and joints in each pipe or branch run connected to vessels.

(b) All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed the following limits under loads associated with specific seismic events and operational conditions.

(1) primary plus secondary stress intensity of $2.4S_m$ for ferritic steel and austenitic steel, and

(2) cumulative usage factor U of 0.4.

(c) All dissimilar metal welds between combinations of

(a) carbon or low alloy steels to high alloy steels;
(b) carbon or low alloy steels to high nickel alloys; and
(c) high alloy steels to high nickel alloys.

(d) Additional piping welds so that the total equals 25% of the circumferential joints in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop.

Code Relief Request

Relief is requested from volumetrically examining 100% of the required volume of each of the following branch connection welds:

SCE&G Drawing No.	Weld Number
CGE-1-4100	17(BC), 18(BC), 19(BC), 20(BC), 21(BC), 23(BC), 24(BC), 25(BC), 26(BC)
CGE-1-4102	24(BC), 26(BC)
CGE-1-4200	17(BC, 18(BC), 21(BC), 22(BC), 23(BC)
CGE-1-4300	17(BC), 18(BC), 19(BC), 21(BC), 23(BC) 24(BC)
CGE-1-4302	25(BC), 27(BC), 29(BC)

Proposed Alternative Examination

No alternative examinations are proposed. However, surface examinations will be performed on essentially 100% of the required areas. To the extent practical, where results are meaningful, a volumetric examination will be performed on the required areas.

Licensee's Basis for Requesting Relief

The geometric configurations (changing thickness and direction) of pipe branch connections prevent 100% volumetric examinations from being performed on branch connection welds and the required base metal areas. Practical and meaningful alternative techniques to volumetrically examine the required areas are not presently available.

Severe metal thickness and direction changes may cause the majority of the sound to be attenuated or redirected away from the ultrasonic receiver due to the reflection characteristics of ultrasound. Under these circumstances, the operator would not be able to credit the weld with 100% ultrasonic examination.

Radiographic testing of these welds would also be impractical because it would have no use in detecting laminations and very limited use in detecting fine tight cracks, the typical flaws expected while performing volumetric examination. In some cases, around systems containing radioisotopes, the film may be prematurely exposed during the setup or examination time. Such results would not be reliable, thus such data must be considered invalid.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI, was in effect; no ISI rules had been published before that date, and no inservice inspection requirements existed prior to that date. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IWA-1500 in subsequent editions) and (2) NRC regulations (10 CFR

50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedures.

The licensee has asked in this relief request for substantial relief based on design limitations from examination requirements included in the referenced 1971 Code. These requirements have been modified in the currently applicable Code edition and addenda to obtain more practical results.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

The licensee should ensure that the surface examinations required for these Code items as well as the applicable system pressure tests specified in Article IWB-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed, and

(c) the Code-required surface examinations and system pressure tests are performed.

Reference

Reference 12.

3.1.5 Pump Pressure Boundary

No relief requests.

3.1.6 Valve Pressure Boundary

No relief requests.

3.2 CLASS 2 COMPONENTS

Subsections IWA and IWC of the Code govern the examination of Class 2 piping and components. Specific requirements are given in Table IWC-2500-1.

3.2.1 Pressure Vessels

3.2.1.1 Relief Request 2-HX-1, Class 2 Vessel Head-to-Shell and Flange-to-Shell Welds, Category C-A, Items C1.10 and C1.20

Code Requirements

Essentially 100% of the shell circumferential welds at gross structural discontinuities shall be volumetrically examined in accordance with Figure IWC-2520-1 during each inspection interval. A gross structural discontinuity is defined in NB-3213.2. For multiple vessels with similar design, size, and service (such as steam generators and heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.

Essentially 100% of the circumferential head-to-shell welds shall be volumetrically examined in accordance with Figure IWC-2520-1 during each inspection interval. For multiple vessels with similar design, size, and service (such as steam generators and heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.

Code Relief Request

Relief is requested from volumetrically examining 100% of the required volume of each of the following Class 2 vessel shell and head circumferential welds:

Vessel	SCE&G Drawing No.	Weld Nos.	Code Item Nos.
Horizontal RHR HX(2)	CGE-2-1110	1, 2	C1.10, C1.20
Regenerative HX	CGE-2-1120	1-6 9, 10	C1.10 C1.20
Letdown HX	CGE-2-1130	1, 2	C1.10, C1.20
Excess Letdown HX	CGE-2-1150	1	C1.10

Vessel	SCE&G Drawing No.	Weld Nos.	Code Item Nos.
Volume Control Tank	CGE-2-1200	1, 2	C1.10
Boron Injection Tank	CGE-2-1210	1, 2	C1.20
RC Accumulators (3)	CGE-2-1220	1, 2	C1.20, C1.10

Proposed Alternative Examination

No alternative examinations are proposed. However, to the extent practical, the required weld volume and base metal area will be examined by the ultrasonic method.

Licensee's Basis for Requesting Relief

The design geometric configurations (changing thickness and direction) and/or adjacent welded attachments of the described welds prevent volumetric examination from being performed on the required base metal and weld metal areas as specified by IWC-2520-1.

Severe metal thickness and direction changes may cause the majority of the sound to be attenuated or redirected away from the ultrasonic receiver due to the reflection characteristics of ultrasound. Under these circumstances, the operator would not be able to credit the weld with 100% ultrasonic examination.

Radiographic testing of these welds would also be impractical because it would have no use in detecting laminations and very limited use in detecting fine tight cracks, the typical flaws expected while performing volumetric examination. In some cases, around systems containing radioisotopes, the film may be prematurely exposed during the setup or examination time. Such results would not be reliable, thus such data must be considered invalid.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI, was in effect. The first edition of Section XI had not been published until 1970 and examination requirements for Class 2 components were not included until the 1974 Edition. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IWA-1500 in subsequent editions) and (2) NRC regulations (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedures.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

The licensee should ensure that the applicable system pressure tests specified in Article IWC-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed, and

(c) the Code-required system pressure tests are performed.

Reference

Reference 12.

3.2.1.2 Relief Request 2-HX-3, Welds in Class 2 Vessels Whose Shells and Heads are 1/2-Inch Thick or Less, Category C-A, Items C1.10 and C1.20

Code Requirements

Essentially 100% of the shell circumferential welds at gross structural discontinuities shall be volumetrically examined in accordance with Figure IWC-2520-1 during each inspection interval. A gross structural discontinuity is defined in NB-3213.2. For multiple vessels with similar design, size, and service (such as steam generators and heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.

Essentially 100% of the circumferential head-to-shell welds shall be volumetrically examined in accordance with Figure IWC-2520-1 during each inspection interval. For multiple vessels with similar design, size, and service (such as steam generators and heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.

Code Relief Request

Relief is requested from volumetrically examining the head-to-shell and flange-to-shell welds of the following vessels:

Vessel	SCE&G Drawing No.	Welds	Code Items
Letdown Reheat HX	CGE-1140	1, 2	C1.10, C1.20
Seal Water HX	CGE-2-1160	1, 2	C1.10, C1.20
RC Filter	CGE-2-1310	1, 2	C1.10, C1.20
Seal Water Return Filter	CGE-2-1320	1, 2	C1.10, C1.20

Proposed Alternative Examinations

These welds will be examined using surface and visual techniques. Should ultrasonic methods and techniques become available which would enhance and improve the ultrasonic examinations, such methods and techniques would be employed for the ultrasonic examination of these welds.

Licensee's Basis for Requesting Relief

The thickness of the material utilized for the construction of these components (0.1875 in. or less) is such that meaningful results cannot be expected with present state-of-the-art ultrasonic examinations.

Evaluation

For the examination of piping and nozzle-to-vessel welds, the Code considers that ultrasonic methods of volumetric testing require a material to be greater than 1/2-inch thick before the primary beam can be reflected back without near zone interference. If these welds are 1/2-inch thick or less, they are required only to be examined by surface methods. Hence, it is appropriate to apply this criterion equally to all ultrasonic examinations of material 1/2-inch thick or less. The licensee's proposed surface and visual examinations should provide adequate information on the integrity of the subject vessels.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the examinations discussed above, the Code requirements are impractical. It is further concluded that the alternative examinations discussed above will provide necessary added assurance of structural reliability. Therefore, the following are recommended:

(a) Relief should be granted from the required volumetric examinations of the subject vessels.

(b) As a condition of relief, the proposed surface and VT-1 visual examinations should be performed in lieu of the required volumetric examinations.

Reference

Reference 12.

3.2.1.3 Relief Request 2-SG-2, Steam Generator Class 2 Circumferential Shell and Head Welds, Category C-A, Items C1.10 and C1.20

Code Requirements

Essentially 100% of the shell circumferential welds at gross structural discontinuities shall be volumetrically examined in accordance with IWC-2520-1 during each inspection interval. A gross structural discontinuity is defined in NB-3213.2. For multiple vessels with similar design, size, and service (such as steam generators and heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.

Essentially 100% of the circumferential head-to-shell welds shall be volumetrically examined in accordance with IWC-2520-1 during each inspection interval. For multiple vessels with similar design, size, and service (such as steam generators and heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.

Code Relief Request

Relief is requested* from volumetrically examining 100% of the required volumes of Welds 5, 6, and 8 (SCE&G Dwg. No. CGE-2-1100) of the three steam generators.

Proposed Alternative Examinations

No alternative examinations are proposed. However, to the extent practical, the required weld volumes will be examined by the ultrasonic method.

Licensee's Basis for Requesting Relief

The design geometric configurations (changing thickness, direction, lugs and weld pads) prevent volumetric examination from being performed on the required base metal and weld metal areas as specified by IWC-2500-1.

---

*This request inadvertently discusses nozzles rather than circumferential shell and head welds. It is treated in this report as a request for the shell and head welds. Question 6 of the attached request for information addresses the problems of this relief request.

Severe metal thickness and direction changes may cause the majority of the sound to be attenuated or redirected away from the ultrasonic receiver due to the reflection characteristics of ultrasound. Under these circumstances, the operator would not be able to credit the weld with 100% ultrasonic examination.

Radiographic testing of these welds would also be impractical because it would have no use in detecting laminations and very limited use in detecting fine tight cracks, the typical flaws expected while performing volumetric examination. In some cases, around systems containing radioisotopes, the film may be prematurely exposed during the setup or examination time. Such results would not be reliable, thus such data must be considered invalid.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI, was in effect. The first edition of Section XI had not been published until 1970, and examination requirements for Class 2 components were not included until the 1974 Edition. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IWA-1500 in subsequent editions) and (2) NRC regulations (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedures.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools are among the most up-to-date that are commercially available at the time of the examinations.

The licensee should ensure that the applicable system pressure tests specified in Article IWC-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed, and

(c) the Code-required system pressure tests are performed.

Reference

Reference 12.

3.2.1.4 Relief Request 2-HX-2, Class 2 Nozzle-to-Vessel Welds, Category C-B, Item C2.20

Code Requirements

All nozzles in vessels over 1/2 in. in nominal thickness at terminal ends of piping runs shall be surface and volumetrically examined in accordance with Figure IWC-2520-4 during each inspection interval. Terminal ends are the extremities of piping runs that connect to vessels. Only those piping runs selected for examination under Examination Category C-F are included.

Code Relief Request

Relief is requested from volumetrically examining 100% of the required volumes of the following nozzle-to-vessel welds:

Vessel	SCE&G Drawing No.	Welds
Regenerative HX	CGE-2-1120	7, 8
Boron Injection Tank	CGE-2-1210	3, 4
RC Accumulators (3)	CGE-2-1220	5

Proposed Alternative Examinations

No alternative examinations are proposed. However, to the extent practical, the required weld volumes will be examined by the ultrasonic method. Surface examinations will be performed on essentially 100% of the required areas.

Licensee's Basis for Requesting Relief

The design geometric configurations (changing thickness and direction) of the nozzle welds prevent volumetric examination from being performed of the required base metal and weld metal areas as specified by IWC-2520-4.

Severe metal thickness and direction changes may cause the majority of the sound to be attenuated or redirected away from the ultrasonic receiver due to the reflection characteristics of

ultrasound. Under these circumstances, the operator would not be able to credit the weld with 100% ultrasonic examination.

Radiographic testing of these welds would also be impractical because it would have no use in detecting laminations and very limited use in detecting fine tight cracks, the typical flaws expected while performing volumetric examination. In some cases, around systems containing radioisotopes, the film may be prematurely exposed during the setup or examination time. Such results would not be reliable, thus such data must be considered invalid.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI, was in effect. The first edition of Section XI had not been published until 1970, and examination requirements for Class 2 components were not included until the 1974 Edition. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IWA-1500 in subsequent editions) and (2) NRC regulations (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedures.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

The licensee should ensure that the applicable system pressure tests specified in Article IWC-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed, and

(c) the Code-required surface and system pressure tests are performed.

Reference

Reference 12.

3.2.1.5 Relief Request 2-HX-4, Residual Heat Removal (RHR) Heat Exchanger Nozzle Welds Obstructed by Reinforcing Saddles, Category C-B, Item C2.20

Code Requirements

All nozzles in vessels over 1/2 in. in nominal thickness at terminal ends of piping runs shall be surface and volumetrically examined in accordance with Figure IWC-2520-4 during each inspection interval. Terminal ends are the extremities of piping runs that connect to vessels. Only those piping runs selected for examination under Examination Category C-F are included.

Code Relief Request

Relief is requested from performing the Code-required volumetric and surface examinations of the nozzle-to-vessel welds on the horizontal RHR heat exchangers (SCE&G Dwg. No. CGE-2-1110, Welds 3 and 4).

Proposed Alternative Examination

The reinforcement saddle welds will be examined by surface methods.

Licensee's Basis for Requesting Relief

Each RHR heat exchanger nozzle-to-vessel weld is made inaccessible by a reinforcing saddle covering the weld.

Evaluation

The reinforcing saddles covering these nozzle-to-vessel welds prevent the performance of the Code-required examinations. The 1980 Edition of the Code (Winter 1981 addenda) recognizes that the reinforced design exists and specifies that the saddle-to-pressure boundary fillet welds be surface examined. This alternative is proposed by the licensee. The newer Code also specifies a volumetric examination from the inside, if accessible, or a visual (VT-2) examination during pressure tests for leakage at a tell-tale (weep hole) if the inside is not accessible. It is reasonable to consider that the interiors are inaccessible for examination purposes because examination would violate ALARA principles. The visual examinations, however, should be included as additional alternatives.

Conclusions and Recommendations

Based upon the above evaluation, it is concluded that for the welds discussed above, the Code requirements are impractical. It is further concluded that the alternative examinations discussed in the evaluation above will provide necessary added assurance of structural reliability. Therefore, the following are recommended:

(a) Relief should be granted from the examination requirements for the subject nozzle-to-vessel welds.

(b) Each saddle-to-pressure boundary fillet weld should be surface examined at the Code-required frequency as proposed.

(c) The joints should also be visually (VT-2) examined for leakage during system pressure testing.

Reference

Reference 12.

3.2.1.6 Relief Request 2-SG-1, Class 2 Steam Generator Nozzle-to-Vessel Welds, Category C-B, Item C2.20

Code Requirements

All nozzles in vessels over 1/2 in. in nominal thickness at terminal ends of piping runs shall be surface and volumetrically examined in accordance with Figure IWC-2520-4 during each inspection interval. Terminal ends are the extremities of piping runs that connect to vessels. Only those piping runs selected for examination under Examination Category C-F are included.

Code Relief Request

Relief is requested from volumetrically examining 100% of the required volumes of the Class 2 steam generator nozzle-to-vessel welds (SCE&G Drawing No. CGE-2-1100, welds 9, 10, and 11).

Proposed Alternative Examinations

No alternative examinations are proposed. However, to the extent practical, the required weld volumes will be examined by the ultrasonic method. Surface examinations will be performed on essentially 100% of the required areas.

Licensee's Basis for Requesting Relief

The design geometric configurations (changing thickness and direction) of the nozzle welds prevent volumetric examination from being performed of the required base metal and weld metal areas as specified by IWC-2520-4.

Severe metal thickness and direction changes may cause the majority of the sound to be attenuated or redirected away from the ultrasonic receiver due to the reflection characteristics of ultrasound. Under these circumstances, the operator would not be able to credit the weld with 100% ultrasonic examination.

Radiographic testing of these welds would also be impractical because it would have no use in detecting laminations and very limited use in detecting fine tight cracks, the typical flaws expected while performing volumetric examination. In some cases, around systems containing radioisotopes, the film may be prematurely exposed during the setup or examination time. Such results would not be reliable, thus such data must be considered invalid.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI, was in effect. The first edition of Section XI had not been published until 1970, and examination requirements for Class 2 components were not included until the 1974 Edition. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, review of the applicable (1) Code sections (from IS-141 in addition to IWA-1500 in subsequent editions) and (2) NRC requirements (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent has been striving to address access and inspectability requirements with the best available instrumentation and procedures.

On the basis of this interval, the Code requirement to examine [illegible] only in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

The licensee should ensure that the applicable system pressure tests specified in Article IWC-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed, and

(c) the Code-required surface and system pressure tests are performed.

Reference

Reference 12.

3.2.2 Piping Pressure Boundary

3.2.2.1 Relief Request 2-PIPE-1, Pressure-Retaining Longitudinal and Circumferential Welds in Class 2 Piping Not Covered by Relief Request 2-PIPE-2, Category C-F, Items C5.21 and C5.22

Code Requirements

One hundred percent of each circumferential weld over 1/2 in. nominal wall thickness shall be surface and volumetrically examined in accordance with Figure IWC-2520-7 during each inspection interval. The welds selected for examination shall include

a. all welds at locations where the stresses under the loadings resulting from Normal and Upset plant conditions as calculated by the sum of Equations 9 and 10 in NC-3652 exceed the specified value;

b. all welds at terminal ends (see (e) below) or piping or branch runs;

c. all dissimilar metal welds;

d. additional welds, at structural discontinuities (see (f) below) such that the total number of welds selected for examination includes the following percentages of circumferential piping welds;

For pressurized water reactors:

1. none of the welds exempted by IWC-1220;
2. none of the welds in residual heat removal and emergency core cooling systems;
3. 10% of the main steam system welds 8 in. nominal pipe size and smaller;
4. 25% of the welds in all other systems.

e. terminal ends are the extremities of piping runs that connect to structures, components (such as vessels, pumps, and valves) or pipe anchors, each of which act as rigid restraints or provide at least two detrees of restraint to piping thermal expansion;

f. structural discontinuities include pipe weld joints to vessel nozzles, valve bodies, pump casings, pipe fittings (such as, elbows, tees, reducers, and flanges conforming to ANSI Standard B16.9), and nine branch connections and fittings;

g. examination requirements are under development.

Longitudinal welds over 1/2 in. nominal wall thickness shall be surface and volumetrically examined in accordance with Figure IWC-2520-7 (2.5 t at the intersecting circumferential weld) during each inspection interval.

Code Relief Requests

Relief is requested from volumetrically examining 100% of the required volumes of all Class 2 pressure-retaining piping welds subject to the above Code requirements.

Proposed Alternative Examinations

No alternative examinations are proposed. However, to the extent practical, the required weld volume and base metal areas will be examined by the ultrasonic method. Surface examinations will be performed on essentially 100% of the required areas.

Licensee's Basis for Requesting Relief

The geometric and design configurations of piping system constituent parts are such that limitations may occur for volumetric examinations of circumferential and longitudinal butt welds when welds occur at discontinuities such as pipe-to-elbow, pipe-to-flange, pipe-to-valve, valve-to-elbow, flange-to-valve, diameter transitions, thickness transitions, and in areas where integral welded supports, lugs, hangers, etc. are installed. These limitations may preclude examination to all or some part of the required examination areas specified in IWC-2520-7.

Volumetric examination from the fitting side will depend upon geometric configuration. For most pipe-to-fitting applications, volumetric examinations can be performed to the extent required by T-532 of ASME Code Section V from the weld and pipe surfaces. In some instances, no volumetric examination can be performed on the fitting side when the fitting is a valve or flange. However, in most cases, 100% of the required weld material can be examined, except in instances where welds may occur at fitting-to-fitting connections.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI, was in effect. The first edition of Section XI had not been published until 1970 and examination requirements for Class 2 components were not included until the 1974 Edition. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IS-1500 in subsequent editions) and (2) NRC regulations (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedure.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

Before this relief request is finally approved, the licensee should provide with it a list of all welds with scan limitations required to be examined during the first interval. He has submitted such a list for the other Class 2 weld-related relief requests (except 2-PIPE-2) but has indicated that such a list, based on the 1977 Code Edition, cannot now be completed for this relief request because the preservice inspection was done to the 1974 Edition. However, he should prepare the best possible list based on available information. This list can be updated as better information becomes available or at the end of the interval.

In instances where PSI experience and similar piping/weld geometry cannot be used to define scan limitations before first-interval examinations, the licensee should so indicate in GTP-303 or other appropriate documentation. In the process of preparing the list of piping welds to be examined during the first interval, the licensee should make the various attachments to Reference 12 consistent with each other. Any welds not covered by Code Items C5.21 and C5.22 (such as weld 57 of Dwg. 2-2101) should be covered by a separate relief request if necessary.

The licensee should ensure that the applicable system pressure tests specified in Article IWC-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed,

(c) an up-to-date list of Category C-F piping welds to be volumetrically examined during the first interval is submitted, based on the best information available at this time,

(d) this list is updated in a revised relief request submitted at the end of the interval in accordance with 10 CFR 50.55a (g)(5)(iv), and

(e) the Code-required surface and system pressure tests are performed.

Reference

Reference 12.

3.2.2.2 Relief Request 2-PIPE-2, Pressure-Retaining Longitudinal and Circumferential Welds in Class 2 Piping of Emergency Core Cooling (ECC), Residual Heat Removal (RHR), and Containment Heat Removal (CHR) Systems, Category C-F, Items C5.21 and C5.22, Categories C-F and C-G, (Items C2.1 and C2.2 in 1974 S75)

Code Requirements

74S75, Category C-F, Items C2.1 and C2.2:

The following pressure-retaining weld areas in piping, pumps, and valves in systems circulating reactor coolant shall be volumetrically examined over 100% of their lengths:

(a) circumferential butt welds at structural discontinuities.

(b) circumferential butt welds in piping within 3 pipe diameters of the centerline of rigid pipe anchors, or anchors at the penetration of the primary reactor containment, or at rigidly anchored components.

(c) longitudinal weld joints in pipe fittings (i.e., in tees, elbows, reducers).

(d) pump casing and valve body weld joints.

This includes the weld metal and base metal for one-wall thickness beyond the edge of the weld.

74S75, Category C-G, Items C2.1 and C2.2:

For systems circulating other than reactor coolant, the corresponding requirements are the same as for Category C-F except the areas selected shall be a representative 50% sampling among the total number of welds covered by (a) to (d) above.

77S78, Category C-F, Items C5.21 and C5.22:

One hundred percent of each circumferential weld over 1/2 in. nominal wall thickness shall be surface and volumetrically examined in accordance with Figure IWC-2520-7 during each inspection interval. Longitudinal welds over 1/2 in. nominal wall thickness are to be surface and volumetrically examined in accordance with Figure IWC-2520-7 (2.5t at the intersecting circumferential weld) during each inspection interval.

Code Relief Requests

Relief is requested from volumetrically examining 100% of the required volumes of all Class 2 pressure-retaining piping welds subject to the above Code requirements.

Proposed Alternative Examinations

No alternative examinations are proposed. However, to the extent practical, the required weld volume and base metal areas will be examined by the ultrasonic method. Surface examinations will be performed on essentially 100% of the required areas.

Licensee's Basis for Requesting Relief

The geometric and design configurations of piping system constituent parts are such that limitations may occur for volumetric examinations of circumferential and longitudinal butt welds when welds occur at discontinuities such as pipe-to-elbow, pipe-to-flange, pipe-to-valve, valve-to-elbow, flange-to-valve, diameter transitions, thickness transitions, and in areas where integral welded supports, lugs, hangers, etc. are installed. These limitations may preclude examination to all or some part of the required examination areas specified in IWC-2600-7.*

Volumetric examination from the fitting side will depend upon geometric configuration. For most pipe-to-fitting applications, volumetric examinations can be performed to the extent required by T-532 of ASME Code Section V from the weld and pipe surfaces. In some instances, no volumetric examination can be performed on the fitting side when the fitting is a valve or flange. However, in most cases, 100% of the required weld material can be examined, except in instances where welds may occur at fitting-to-fitting connections.

Evaluation

It is agreed that the limitations noted above could inhibit the ability to obtain good ultrasonic or radiographic results with the practices and procedures presently in use by the licensee. It is also recognized that these limitations are the result of plant design specifications.

---

*No such figure no. appears in either 74S75 or 77S78.

V. C. Summer's construction permit was issued in March 1973. At that time, the 1971 Edition of the ASME Code, Section XI, was in effect. The first edition of Section XI had not been published until 1970 and examination requirements for Class 2 components were not included until the 1974 Edition. Since the Summer plant system design and ordering of long lead time components were well under way by the time the Section XI rules became effective, full compliance with the access and inspectability requirements was not always practical. However, a review of the applicable (1) Code sections (from IS-141 in the 1971 Edition to IWA-1500 in subsequent editions) and (2) NRC regulations (10 CFR 50.55a(g)(2) and (g)(4)) indicates that the intent should be to keep striving to address both access and inspectability requirements with the best available instrumentation and procedure.

On the basis of the time left in this interval, the Code requirement to examine some areas early in the interval, and the licensee's commitment to examine welds to the extent practical, relief is justified for those welds that cannot presently be examined to Code requirements. However, the technology of ultrasonic testing is changing rapidly and significant improvements can be expected during this 10-year interval. It is clearly incumbent on the licensee to keep up with and use volumetric examination tools that are among the most up-to-date commercially available to maximize the quality of examination results.

Before this relief request is finally approved, the licensee should provide with it a list of all ECCS, RHRS, and CHRS welds with scan limitations required to be examined volumetrically during the first interval. He has submitted such a list for the other Class 2 weld-related relief requests (except 2-PIPE-1) but has indicated that such a list, based on the 1977 Code Edition, cannot now be completed for this relief request because the preservice inspection was done to the 1974 Edition. However, since he is required to use the 1974 Edition for extent of examination (per 10 CFR 50.55a-(b)(2)(iv)(A)), the welds to be examined will not change from PSI. A number of these system piping welds will no longer require volumetric examination because the pipe thickness is less than 1/2 in.

In instances where PSI experience cannot be used to define scan limitations before first-interval examinations, the licensee should so indicate in GTP-303 or other appropriate documentation. In the process of preparing the list of piping welds to be examined during the first interval, the licensee should make the various attachments to Reference 12 consistent with each other.

The licensee should ensure that the applicable system pressure tests specified in Article IWC-5000 are performed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, adherence to the Code requirements is impractical. It is further concluded that the proposed examinations will provide necessary assurance of structural reliability during this interval. Therefore, relief is recommended as requested provided

(a) the volumetric examinations are performed to the maximum extent practical,

(b) every effort is made by the licensee to assure that the equipment and procedures used to perform these examinations are among the most up-to-date that are commercially available at the time the examinations are performed, and

(c) an up-to-date list of ECCS, RHRS, and CHRS piping welds to be volumetrically examined during the first interval is submitted, based on the best information available at this time,

(d) this list is updated in a revised relief request submitted at the end of the interval in accordance with 10 CFR 50.55a (g)(5)(iv), and

(e) the Code-required surface and system pressure tests are performed.

Reference

Reference 12.

3.3 CLASS 3 COMPONENTS

No relief requests.

3.4 PRESSURE TESTS

No relief requests.

3.5 GENERAL

No relief requests.

4. REFERENCES

1. Letter, T. C. Nichols (SCE&G) to H. R. Denton (NRC), November 18, 1980; Rev. 1 PSI Program attached.

2. Letter, T. C. Nichols (SCE&G) to H. R. Denton (NRC), April 29, 1981; Rev. 2 PSI Program attached.

3. Letter, T. C. Nichols (SCE&G) to H. R. Denton (NRC), May 7, 1981; list of weld examination problems from PSI attached.

4. Letter, W. F. Kane (NRC) to SCE&G, June 4, 1981; meeting with PNL on PSI Program.

5. Letter, T. C. Nichols (SCE&G) to H. R. Denton (NRC), July 2, 1981; clarification of UT problems, per SER open items.

6. Letter, T. C. Nichols (SCE&G) to H. R. Denton (NRC), August 25, 1981; summary list of weld examination problems attached.

7. Letter, J. B. Cookinham (Westinghouse) to O. S. Bradham (SCE&G), November 16, 1981; Westinghouse explanation of UT procedure.

8. Safety Evaluation Report Related to the Operation of Virgil C. Summer Nuclear Station Unit 1, NUREG-0717, Supplement No. 3, January 1982.

9. Letter, T. C. Nichols. (SCE&G) to H. R. Denton (NRC), January 25, 1982; Rev. 0, First Interval ISI Program attached.

10. Letter, O. W. Dixon (SCE&G) to H. R. Denton (NRC), November 10, 1982; Rev. 1, First Interval ISI Program attached.

11. Submittal, O. W. Dixon (SCE&G) to H. R. Denton (NRC), May 23, 1983; Rev. 2, First Interval ISI Program attached.

12. Letter, O. W. Dixon (SCE&G) to H. R. Denton (NRC), September 27, 1984; response to request for additional information. Includes updated weld limitation list and revision to ISI NDE Program (Procedure GTP-303, Rev. 0).

13. Letter, O. W. Dixon (SCE&G) to H. R. Denton (NRC), December 6, 1984; includes updated pressure test plan (Procedure GTP-304, Rev. 0) and component support plan (Procedure GTP-305, Rev. 2).

14. Letter, NRC to SCE&G, July 23, 1984; request for additional information on First Interval ISI Program.

15. Letter, F. J. Long (NRC) to T. C. Nichols (SCE&G), February 19, 1982; findings of NRC routine safety inspection.

16. Letter, O. W. Dixon (SCE&G) to H. R. Denton (NRC), January 27, 1983; request for exception to IWA-1400 for ISI.

17. Letter, O. W. Dixon (SCE&G) to H. R. Denton (NRC), February 18, 1983; request for relief from hydro requirements, feedwater.

18. Letter, O. W. Dixon (SCE&G) to H. R. Denton (NRC), April 13, 1983; response to NUREG-0696, S/G mod.

19. Letter, T. M. Novak (NRC) to O. W. Dixon (SCE&G), April 22, 1983; answer to hydro request for relief.

20. Letter, T. M. Novak (NRC) to O. W. Dixon (SCE&G), June 8, 1983; answer to request for exception to IWA-1400.

21. Letter, O. W. Dixon (SCE&G) to H. R. Denton (NRC), August 9, 1983; request for relief from hydro requirements, feedwater.

22. Letter, T. M. Novak (NRC) to O. W. Dixon (SCE&G), November 21, 1983; answer to hydro request for relief.

23. V. C. Summer FSAR, pp 121.27-1 and -2, Amendment 21, October 1980.

24. Summary Information Report, October 1-December 31, 1983, NUREG-0871, Vol. 3, No. 1, June 1984.

25. File BC-79-710, Interpretation XI-80-03, Inquiry on ASME Section XI - Division 1, Examination of Welded Supports Category B-K-1, C-E-1, April 10, 1980.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

ENCLOSURE 3

EVALUATION TO SUPPORT IMPOSITION OF A COMPLIANCE BACKFIT

RELATED TO THE INSERVICE INSPECTION PROGRAM

SOUTH CAROLINA ELECTRIC & GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-395

I. BACKGROUND

By letters dated January 25, 1982, November 10, 1982, May 23, 1983, September 27, 1984, and December 6, 1984, South Carolina Electric & Gas Company (SCE&G, the licensee) submitted its Inservice Inspection (ISI) Program for the Virgil C. Summer Nuclear Station, Unit No. 1 (Summer Station) for the first 10-year interval. By letter dated the Commission issued its Safety Evaluation (SE) related to the ISI Program. This SE identified certain parts of the licensee's ISI program that were defficient. The staff's conclusion was that the licensee's program must be modified before it is considered acceptable. The specific deficiencies are discussed in detail in the next section.

II. EVALUATION

The Appendix to NRC Manual Chapter 0514, "NRC Program for Management of Plant Specific Backfitting of Nuclear Power Plants," states that "...if a licensee has implemented a technical resolution intended to meet an applicable regulatory staff position, and staff for an extended period simply allows the licensee resolution to stand with tacit acceptance indicated by non-action on the part of NRC, then a subsequent action to change the licensee's design, construction, or operation is a backfit." Since there was a seven year gap between the licensee's last submittal and the issuance of the SE on the ISI Program, the modifications required by the SE clearly constitute a compliance backfit as described in 10 CFR 50.109(a)(4)(i); therefore, in accordance with 10 CFR 50.109(a)(6), the objective of and reasons for the suggested modifications and the basis for invoking the compliance exception must be documented for the staff to impose the backfit.

A. Objectives and Reasons

The staff intends to require the licensee to conform with the regulations of the Commission and with their own Technical Specifications as they relate to the ISI Program. Compliance with these rules and the Technical Specifications is necessary to ensure the structural integrity of the various systems and thus to ensure public health and safety. The staff

has determined that modification of the licensee's ISI Program will be necessary to bring the facility into compliance with the regulations of the Commission and their own Technical Specifications. Until the modifications are made the facility does not comply with either 10 CFR 50.55a or with Section 4.0.5 of the Technical Specifications.

The four modifications detailed in the following paragraphs are necessary and sufficient to bring the licensee's ISI Program into compliance with applicable rules and commitments. These modifications are necessary, therefore, for the licensee's ISI Program to be considered acceptable.

(1) Class 1 and 2 component integral attachments identified in section 2.4.2(1) of the Technical Evaluation Report (TER) adopted by the staff's SE should be included in the ISI Program. Including these components is necessary in order to show compliance with Table IWB-2500-1 and Table IWC-2500-1 and with paragraphs IWB-5000 and IWC-5000 of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, 1977 Edition with Addenda through Summer 1978 (the Code). If these attachments were excluded from the program because they do not bear a load during normal operations, then they can be excepted from volumetric and surface inspections; however, the non-load bearing supports should be subjected to a visual examination during the hydrostatic pressure tests of IWB-5000 and IWC-5000 as explained in Code Interperetation XI-80-03 "Section XI-Division 1, Examination of Welded Supports Category B-K-1, C-E-1" dated April 10, 1980.

(2) The licensee states that the Steam Generator "A" Class 1 tubesheet-to-lower-head weld examination meets the requirements for examining Class 2 tubesheet-to-shell welds. Unless the licensee can adequately support this statement, a Class 2 tubesheet-to-shell weld at a structural discontinuity should be scheduled for examination in accordance wih IWC-2500-1, Examination Category C-A "Pressure Retaining Welds in Pressure Vessels," Item No. C1.30, "Tubesheet-to-Shell Weld."

(3) The licensee excluded 14 Class 2 systems from pressure test requirements, interpereting that an exemption from the pressure tests applies per paragraph IWC-1220. Note 4 of Table IWC-2500-1, Category C-H states that "There are no exceptions to these requirements (Visual, VT2) except as specified in IWA-5214." The exemptions in Sub-article 1220 do not apply to hydrostatic testing and visual examination. Although Sub-article IWC-1220 of the Code states that certain components shall be exempted from the examination requiremenst of IWC-2500, the intent was to exempt these certain components only from the volumetric and surface examinationn requirements of IWC-2500. Sub-article IWC-1220 was clarified in later editions and addenda to read that certain "...components(or parts of components) are exempted from volumetric and surface examination requirements of IWC-2500." The licensee misinterpereted Sub-article IWC-1220, and the 14 Class 2 systems are required to be pressure tested and visually examined.

(4) The licensee should commit to examining all snubbers covered by the Technical Specifications and required to be visuallly examined by the Code. The licensee's Technical Specifications sections 4.4.2 and 4.4.3 govern the examination frequency of snubbers. Since this examination is based on a sampling method, all the requirements of Tables IWB-2500-1 and IWC 2500-1 may not be covered. The licensee should review the requirements of these two tables and revise the ISI program accordng to the Code.

B. Basis for Invoking Compliance Exception

As noted above, the proposed modifications to the licensee's ISI Program are necessary to ensure the structural integrity of the various systems. The proposed modifications are also necessary in order to bring the licensee into compliance with 10 CFR 50.55a and with Section 4.0.5 of the licensee's own Technical Specifications which governs the surveillance requirements for Inservice Inspection of American Society of Mechanical Engineers components. The staff believes that adherence to the regulations, Technical Specifications, and Codes discussed in the evaluation above is necessary to ensure the public health and safety. This constitutes an adequate basis for invoking the compliance exception.

Principal Contributors: G. Johnson
T. McLellan
G. Wunder

Dated January 28, 1992

DISTRIBUTION
Docket File
NRC PDR
Local PDR

S. Varga	14-E-4
G. Lainas	14-H-3
L. Reyes	RII
E. Adensam	14-B-20
P. Anderson	14-B-20
G. Wunder	14-B-20
OGC	15-B-18
E. Jordan	MNBB-3701
ACRS (10)	P-315

Summer File

cc: Plant Service List