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MAY 01 2003

LRN-03-0200

PSEG Nuclear LLC

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

REQUEST FOR ADDITIONAL INFORMATION
INSERVICE INSPECTION PROGRAM RELIEF REQUEST
HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NPF-57
DOCKET NO. 50-354

SUBJECT: RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING REACTOR PRESSURE VESSEL NOZZLE WELD INSPECTION (TAC NO. MB7839) HOPE CREEK GENERATING STATION

By letter dated February 20, 2003, PSEG Nuclear LLC (PSEG) requested relief (HC-RR-B08) from the requirements of sub paragraph Figures IWB-2500-7 (a) and (b) of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition, in order to implement the alternative reduced volume of one-half (1/2) from the weld per ASME Code Case N-613-1. This request for relief is applicable to the second 10-year inservice inspection (ISI) interval

The Nuclear Regulatory Commission staff discussed the subject relief request with PSEG staff on April 9, April 16, and April 21, 2003 and requested additional information and clarification be provided. Pursuant to that request, PSEG is submitting the enclosed response to the request for additional information.

Should you have any questions regarding this request, please contact Mr. Howard Berrick at 856-339-1862.

Sincerely,

G. Salamon
Manager – Nuclear Safety and Licensing

Enclosure - Response to Request for Additional Information for Relief Request HC-RR-B08
Attachment 1 – ASME Boiler and Pressure Vessel Code Case N-613-1
Attachment 2 – Hope Creek Affected Components
Attachment 3 – Hope Creek Reactor Vessel Nozzle Design Configuration Drawings
Attachment 4 – Hope Creek Reactor Vessel Nozzle Repair Weld Drawings

A047

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ENCLOSURE

REQUEST FOR ADDITIONAL INFORMATION
HOPE CREEK GENERATING STATION

By letter dated February 20, 2003, PSEG Nuclear LLC (PSEG) requested relief (HC-RR-B08) from the requirements of sub paragraph Figures IWB-2500-7 (a) and (b) of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition, in order to implement the alternative reduced volume of one-half inch (1/2") from the weld per ASME Code Case N-613-1, at the Hope Creek Generating Station.

The Nuclear Regulatory Commission staff discussed the subject relief request with PSEG staff on April 9, April 16, and April 21, 2003. The Nuclear Regulatory Commission staff has requested answers to the following questions regarding the previously submitted relief request:

Question 1:

You are proposing to reduce the examination volume currently described in Figure IWB-2500-7 of Section XI of the ASME Boiler and Pressure Vessel Code (Code) to a volume that would encompass the weld and base metal one-half inch on either side of the weld. The basis for relief describes the examination volume as one-half inch base metal on either side of the weld at the widest part of the weld, for reactor pressure vessel (RPV) nozzles. Provide a sketch showing the configuration [IWB-2500 (a), or (b)] and examination volume. Please list all nozzle-to-vessel welds included within the scope of this request.

Response:

PSEG Nuclear proposes to utilize Code Case N-613-1 Ultrasonic Examination of Full Penetration Nozzles in Vessels, Examination Category B-D Item No.'s B3.10 and B3.90, Reactor Nozzle to Vessel welds, Figs. IWB-2500-7 (a), (b), and (c), Section XI Division 1. Code Case N-613-1, Figure 2, *Nozzle in Shell or Head (Examination Zones in Flange Type Nozzles Joined by Full Penetration Butt Welds)* as the basis for examination volume. [Attachment 1] The examination volume depicted, as A-B-C-D-E-F-G-H within Figure 2 will be applied. Dose rates of Hope Creek's reactor vessel nozzle to vessel welds range from approximately 0.80 – 10.0 R on contact. Reduction of the examination volume in accordance with this request for relief would lessen examination time and reduce personnel exposure by approximately 75%.

Attachment 2 lists all nozzle-to-vessel welds included within the scope of this request and its configuration design.

Copies of Hope Creek's reactor vessel nozzles design configuration drawings are contained within Attachment 3 for purposes of further clarification and information.

Question 2:

You state that the current Code requirements for base material adjacent to these welds (Code-required volume extends to one-half the vessel wall thickness) contain volumes not prone to inservice cracking, and you further state that creation of flaws during plant service is unlikely due to the low stresses in the base metal away from the weld.

(a) Please provide a technical basis to conclude that portions of the base metal over the entire regions currently specified by the Code are not susceptible to service-induced degradation.

(b) Please provide analyses to indicate the extent and magnitude of stresses associated with RPV nozzle-to-vessel welds at Hope Creek in support of the contention that creation of flaws during plant service is unlikely due to the low stresses in the base metal away from the weld.

Response:

(a) As previously stated in response to Question No. 1, PSEG Nuclear proposes to utilize Code Case N-613-1 [Attachment 1] as the basis for examination volume which requires Category B-D nozzle-to-vessel welds to be previously examined ultrasonically using the examination volumes of Figures IWB-2500-7 (a), (b), and (c). The applicable examination volume depicted as A-B-C-D-E-F-G-H within these figures will be applied for all nozzle-to-vessel welds listed in Attachment 2.

The procedures used have been satisfactorily demonstrated in accordance with the requirements of the ASME Section XI, Appendix VIII, Supplements 4, 6 and 7 (for the inner 15%) of the 1995 Edition with Editions and Addenda through 2000, as modified by the Performance Demonstration Initiative (PDI) program description. This demonstration was also conducted in accordance with the requirements of the Federal Register, Part II, Nuclear Regulatory Commission, 10CFR Part 50, Industry Codes and Standards; Amended Requirements; Final Rule dated September 26, 2002.

PSEG Nuclear has previously completed full volume examinations of the welds listed in Attachment 2 during preservice and inservice examinations. Preservice examinations were conducted in accordance with ASME XI 1977 Edition up through and including Summer 1978 Addenda as amended by 10CFR50.55a(b)(2)(IV)(a). The first Inservice Inspection (ISI) ten-year inspection interval exams were conducted in accordance with the 1983 Edition of ASME XI. In addition, the following Reactor Pressure Vessel (RPV) nozzle-to-vessel welds ultrasonic exams have been completed during the current second ten-year ISI interval, 1st period (May 2000): RPV1-N1A, N2A, N2B, N2C, N2J, N2K, N5A, N5B, and N9A. There have been no indications observed as a result of these examinations that required evaluation in accordance with the requirements of ASME IWB-3512.

(b) The technical basis for this approach proposed is derived from EPRI Technical Report 1003557 BWRVIP-108: BWR Vessel and Internals Project- Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii and GE Nuclear Energy: Hope Creek Feedwater Nozzle Fracture Mechanics Analysis Report NDEC-32480P Rev. 1, September 2001.

PSEG Nuclear will continue to perform ultrasonic examinations in accordance NUREG-0619 requirements and earlier regulatory commitments.

Question 3:

A significant issue is related to as-built weld configurations that may exist at Hope Creek, the interpretation of ultrasonic signals, and assurance of volumetric coverage. Because the examination of the subject nozzles is primarily by remote (automated ultrasonic methods that are implemented from the inner clad surface of the RPV), it is unclear how you will be able to locate the extremities (widest sections) of the nozzle-to-vessel welds precisely. It is not clear how repaired areas (fabrication or inservice) extending beyond the ideal weld cross-sectional area are identified and how these areas will be examined.

(a) Please discuss the documentation available of the actual cross-sectional dimensions and precise locations of repaired areas for all RPV nozzle-to-vessel welds at Hope Creek. Please discuss the process for defining new examination volumes that encompass these repair weld areas.

(b) Please describe the process for accurately determining the location of ultrasonic reflectors with respect to the proposed new examination volumes.

Response

(a) Hope Creek reactor vessel weld repairs to the reactor vessel base material areas are identified within PSEG Nuclear drawings PN1-B11-A001-0151 sheets 1 and 2. Review of the drawings determined that the repairs completed are encapsulated within the existing nozzle-to-vessel weld. (Reference Attachment 4)

(b) The examination of the subject nozzles is primarily conducted by manual ultrasonic methods as accessed from the exterior surface of the RPV. These exams will be conducted using techniques designed for detection and sizing of surface and subsurface flaws within the examination volume (A-B-C-D-E-F-G-H) oriented in a plane normal to the vessel inside surface and both transverse and parallel to the weld identified in Attachment 1 (*Code Case N-613-1)*, Figure 2, *Nozzle in Shell or Head (Examination Zones in Flange Type Nozzles Joined by Full Penetration Butt Welds).* Exam personnel are fully capable of visually identifying the extremities (widest sections) of the nozzle-to-vessel weld.

As previously stated in the response to Question 2, the procedures used have been satisfactorily demonstrated in accordance with the requirements of the ASME Section XI, Appendix VIII, Supplements 4, 6 and 7 (for the inner 15%) of the 1995 Edition with Editions and Addenda through 2000, as modified by the Performance Demonstration Initiative (PDI) program description and 10CFR50.55a.

References:

1. GE Nuclear Energy: Hope Creek Feedwater Nozzle Fracture Mechanics Analysis Report NDEC-32480P Rev. 1, September 2001. (PSEG Vendor Document # 325179)

2. EPRI Technical Report 1003557 BWRVIP-108: BWR Vessel and Internals Project-Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii

3. ASME XI Code Case N-613-1

ASME Boiler and Pressure Vessel

Code Case N-613-1

Ultrasonic Examination of Full Penetration Nozzles in Vessels,

Examination Category B-D,

Item No's. B3.10 and B3.90,

Reactor Nozzle-To-Vessel Welds,

Figs. IWB-2500-7(a), (b), and (c)

Section XI, Division 1.

CASE

N-613-1

CASES OF ASME BOILER AND PRESSURE VESSEL CODE

Approval Date: August 20, 2002

See Numeric Index for expiration and any reaffirmation dates.

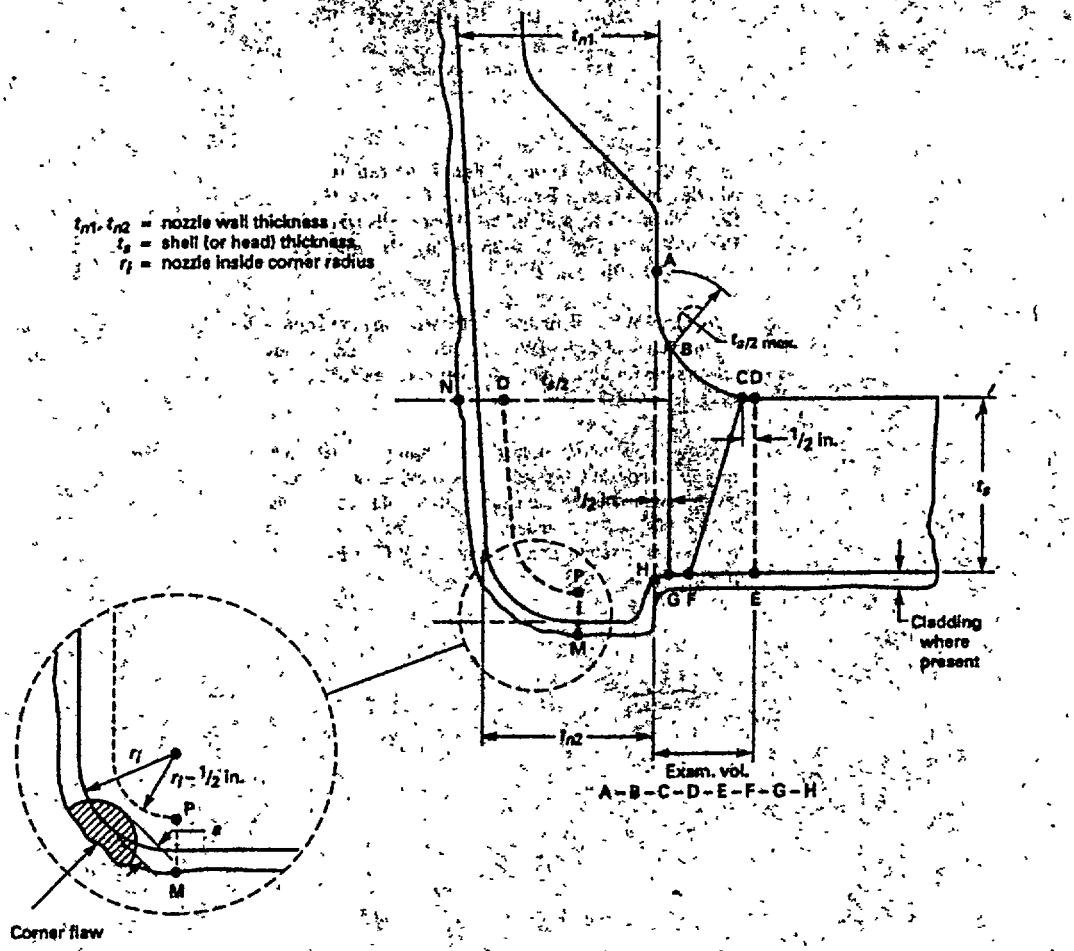
Case N-613-1
Ultrasonic Examination of Full Penetration Nozzles in Vessels, Examination Category B-D, Item No's. B3.10 and B3.90, Reactor Nozzle-To-Vessel Welds, Figs. IWB-2500-7(a), (b), and (c) Section XI, Division 1

Inquiry: What alternatives to the examination volume requirements of Figs. IWB-2500-7(a), (b), and (c) are permissible for ultrasonic examination of reactor-nozzle-to-vessel welds?

Reply: It is the opinion of the Committee that Category B-D nozzle-to-vessel welds previously ultrasonically examined using the examination volumes of Figs. IWB-2500-7(a), (b), and (c) may be examined using the reduced examination volume (A-B-C-D-E-F-G-H) of Figs. 1, 2, and 3

CASE (continued)

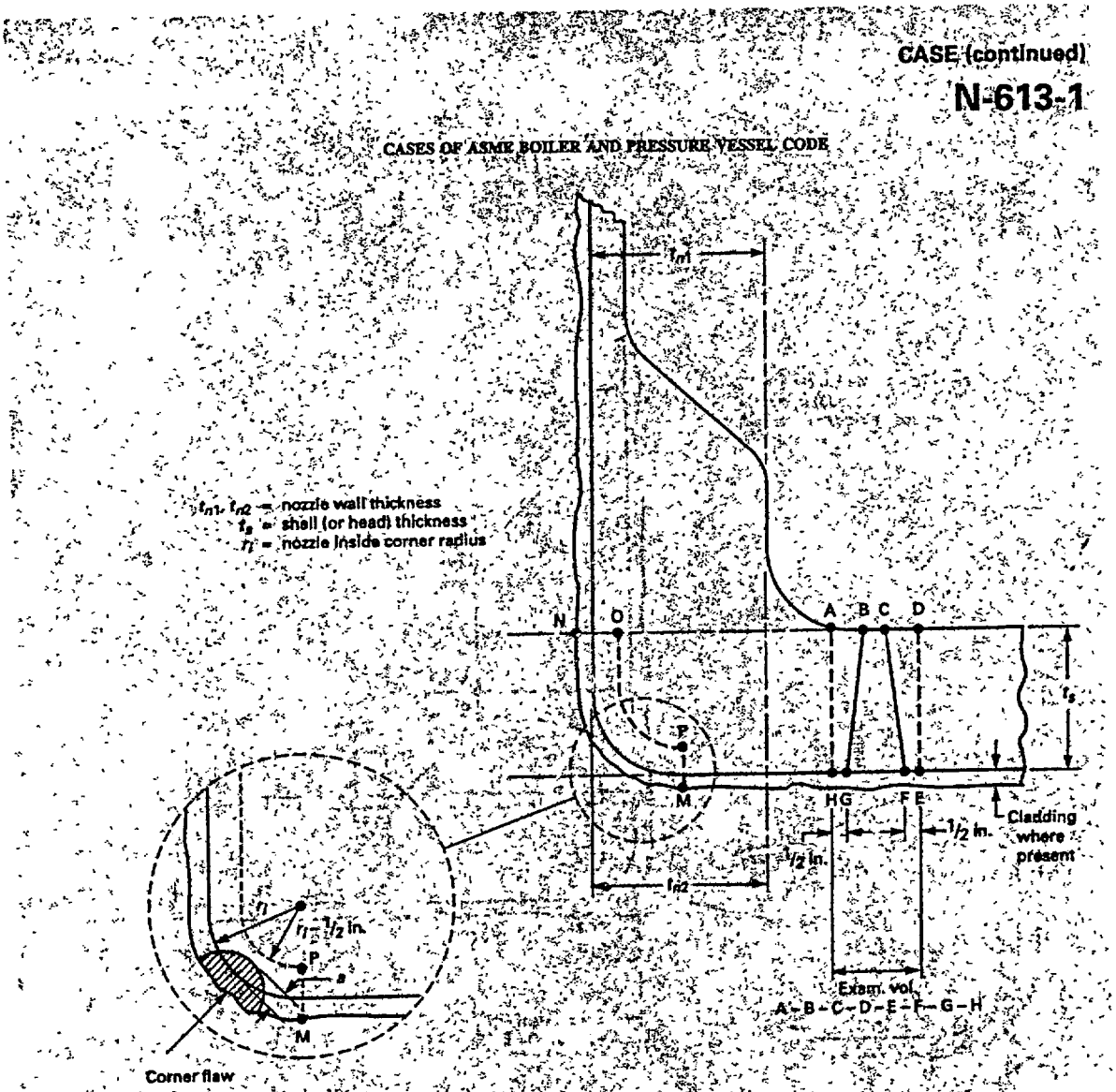
N-613-1



EXAMINATION REGION [Note (1)]	EXAMINATION VOLUME [Note (2)]
Shell (or head) adjoining region	C-D-E-F
Attachment weld region	B-C-F-G
Nozzle cylinder region	A-B-G-H
Nozzle inside corner region	M-N-O-P

NOTES:
(1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.
(2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. 1 NOZZLE IN SHELL OR HEAD
(Examination Zones in Barrel Type Nozzles Joined by Full Penetration Corner Welds)

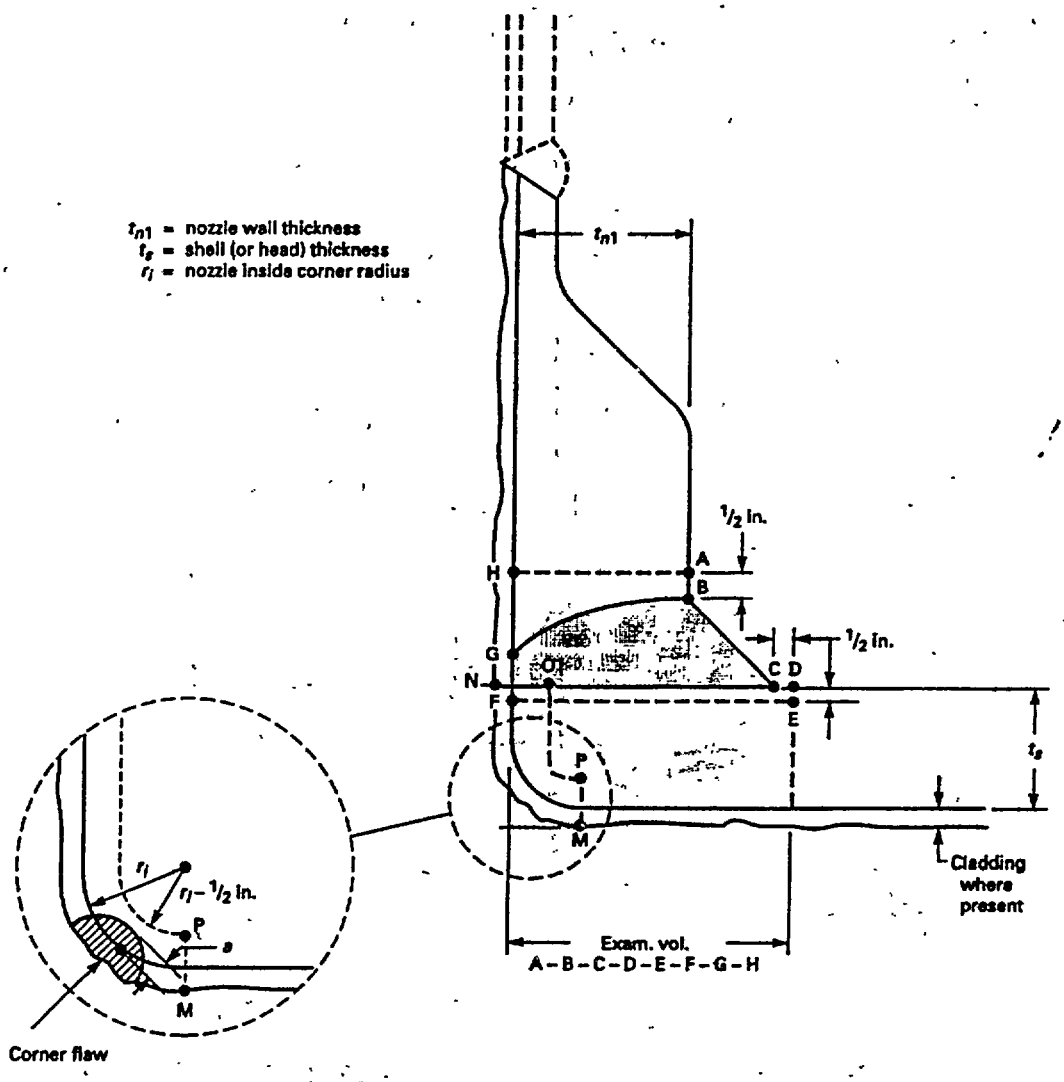


NOTES:
(1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.
(2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. 2 NOZZLE IN SHELL OR HEAD
(Examination Zones in Flange Type Nozzles Joined by Full Penetration Butt Welds)

CASE (continued)

N-613-1



EXAMINATION REGION [Note (1)]	EXAMINATION VOLUME [Note (2)]
Shell (or head) adjoining region	C-D-E-F-G
Attachment weld region	B-C-G
Nozzle cylinder region	A-B-G-H
Nozzle inside corner region	M-N-O-P

NOTES:
(1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.
(2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. 3 NOZZLE IN SHELL OR HEAD
(Examination Zones in Set-On Type Nozzles Joined by Full Penetration Corner Welds)

Hope Creek
Nozzle-to-Vessel Welds
Within
Scope of Request

Hope Creek Nozzle-to-Vessel Welds Within Scope of Request

Summary No	Component ID	Description	Nozzle Configuration	Full Coverage Exam Previously Completed
100185	RPV1-N1A	Loop A Recirculation System Outlet At 0 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100190	RPV1-N1B	Loop B Recirculation System Outlet At 180 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100195	RPV1-N2A	Recirculation System Inlet At 30 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100200	RPV1-N2B	Recirculation System Inlet At 60 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100205	RPV1-N2C	Recirculation System Inlet At 90 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100210	RPV1-N2D	Recirculation System Inlet At 120 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100215	RPV1-N2E	Recirculation System Inlet At 150 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100220	RPV1-N2F	Recirculation System Inlet At 210 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100225	RPV1-N2G	Recirculation System Inlet At 240 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100230	RPV1-N2H	Recirculation System Inlet At 270 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100235	RPV1-N2J	Recirculation System Inlet At 300 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100240	RPV1-N2K	Recirculation System Inlet At 330 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100245	RPV1-N3A	Main Steam Outlet Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100250	RPV1-N3B	Main Steam Outlet Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes

Hope Creek Nozzle-to-Vessel Welds Within Scope of Request

Summary No	Component ID	Description	Nozzle Configuration	Full Coverage Exam Previously Completed
100255	RPV1-N3C	Main Steam Outlet Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100260	RPV1-N3D	Main Steam Outlet Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100265	RPV1-N4A	Feedwater Inlet Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100270	RPV1-N4B	Feedwater Inlet Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100275	RPV1-N4C	Feedwater Inlet Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100280	RPV1-N4D	Feedwater Inlet Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100285	RPV1-N4E	Feedwater Inlet Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100290	RPV1-N4F	Feedwater Inlet Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100295	RPV1-N5A	Core Spray Inlet At 120 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100300	RPV1-N5B	Core Spray Inlet At 240 Deg Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100404	RPV1-N6A	Head Spray Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100405	RPV1-N6B	Spare Head Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100406	RPV1-N7	Head Vent Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100320	RPV1-N8A	Jet Instrumentation Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100325	RPV1-N8B	Jet Instrumentation Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes
100330	RPV1-N9A	Control Rod Drive (CRD) Hydraulic Return Nozzle to Vessel Weld	Code Case N-613-1 Figure 2	Yes

Hope Creek Nozzle-to-Vessel Welds Within Scope of Request

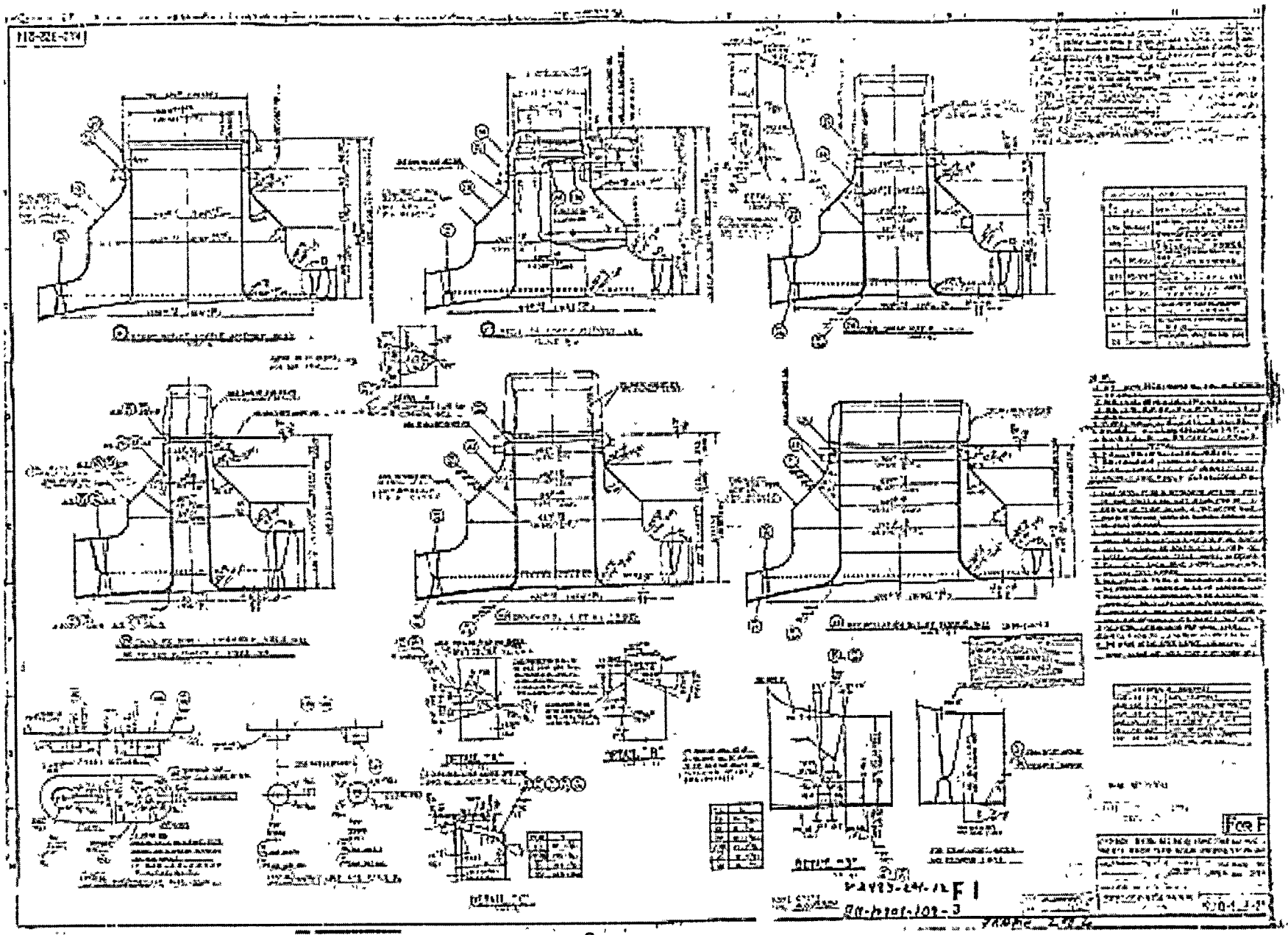
Summary No	Component ID	Description	Nozzle Configuration	Full Coverage Exam Previously Completed
100400	RPV1-N17A	Low Pressure Core Injection (LPCI) Nozzle to Vessel Weld At 45 Deg	Code Case N-613-1 Figure 2	Yes
100401	RPV1-N17B	Low Pressure Core Injection (LPCI) Nozzle to Vessel Weld At 135 Deg	Code Case N-613-1 Figure 2	Yes
100402	RPV1-N17C	Low Pressure Core Injection (LPCI) Nozzle to Vessel Weld At 225 Deg	Code Case N-613-1 Figure 2	Yes
100403	RPV1-N17D	Low Pressure Core Injection (LPCI) Nozzle to Vessel Weld At 315 Deg	Code Case N-613-1 Figure 2	Yes

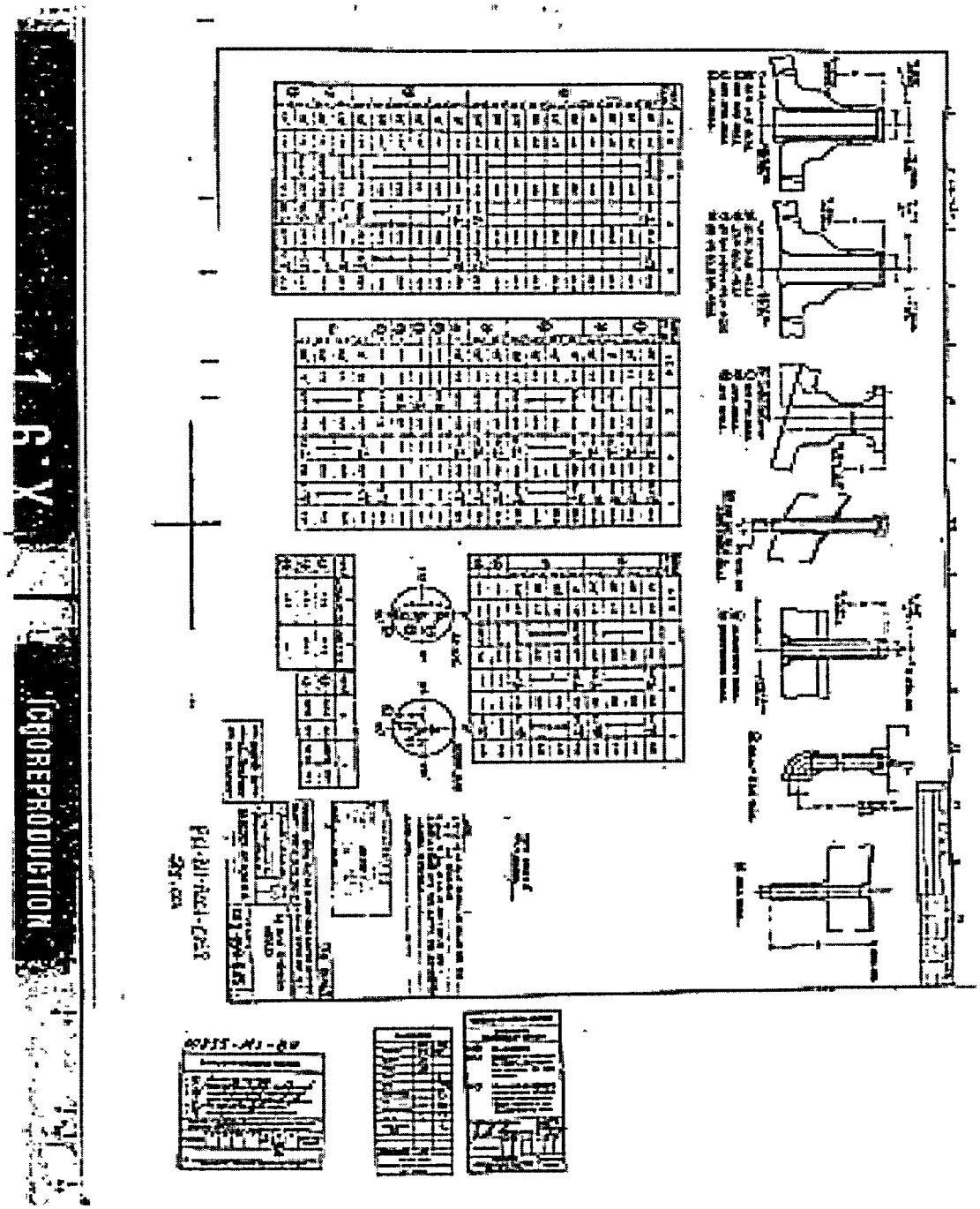
Hope Creek

Reactor Vessel Nozzle

Design Configuration Drawings

ATTACHMENT 3





Hope Creek

Reactor Pressure Vessel Nozzle

RPV Repair Weld Drawings

Hard copy of following General Electric / Babcock-Hitachi K.K. Drawings attached:

- PN1-B11-A001-0151, shts.1& 2
- PN1-B11-A001-0152, shts.1& 2