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PY-CEI/NRR-2846LUnited States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555Perry Nuclear Power Plant
Docket No. 50-440
Responses to Requests for Additional Information Regarding In-Service Examination
Program Relief Requests IR-050, IR-051, and IR-052 (TAC Nos. MC3169, MC3170 and
MC3171)

Ladies and Gentlemen:

This letter provides responses to the Nuclear Regulatory Commission (NRC) Request for Additional Information dated November 9, 2004 pertaining to the Perry Nuclear Power Plant (PNPP) requests for relief from certain Inservice Inspection (ISI) requirements associated with the implementation of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. This letter supplements the May 14, 2004 PNPP letter (PY-CEI/NRR-2754L), which submitted Relief Requests IR-050, IR-051, and IR-052 for NRC review and approval.

NRC review and approval of the Relief Requests as supplemented is still requested before January 1, 2005 as stated in the May 14, 2004 letter.

If you have questions or require additional information, please contact Mr. Henry L. Hegrat, FirstEnergy Nuclear Operating Company Fleet Licensing, at (330) 315-6944.

Very truly yours,



Attachments:

1. Response to Request for Additional Information
2. Nozzle Assembly Drawings
3. Commitment

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III
State of Ohio

A017

**RESPONSES TO REQUESTS FOR ADDITIONAL INFORMATION REGARDING
PERRY NUCLEAR POWER PLANT IN-SERVICE EXAMINATION PROGRAM
RELIEF REQUESTS IR-050, IR-051 AND IR-052**

RELIEF REQUEST # IR-050

NRC REQUEST

IR-050, "Proposed Alternatives and Technical Basis," Item 11 provides the proposed alternative as Table VIII-S10-1, "Performance Demonstration Detection Test Acceptance Criteria." What are the proposed values for "False Call Test Acceptance Criteria" when the number of flawed grading units and the minimum detection criteria under "Detection Test Acceptance Criteria" are 20 and 14, respectively?

RESPONSE

When the number of flawed grading units and the minimum detection criteria under "Detection Test Acceptance Criteria" are 20 and 14, the "False Call Test Acceptance Criteria" values will be 30 unflawed grading units and a maximum of 5 false calls.

RELIEF REQUEST # IR-051

IR-051, "ASME Boiler & Pressure Vessel Code Section XI Requirements," states that the only Category C-F-2 item numbers applicable to PNPP are C5.51, C5.52, and C5.81. Item No. C5.81 covers pipe branch connections of branch piping with a nominal pipe size (NPS) greater than or equal to 2. The subject components affected by this relief request are identified as Class 2, Category C-F-2, carbon steel piping welds greater than NPS 4.

NRC REQUEST

Please explain how Item C5.81 will be affected by this relief request.

RESPONSE

The Perry Nuclear Power Plant (PNPP) is a Boiling Water Reactor and in accordance with Note 1 of Table IWC-2500-1, Category C-F-2, the requirements for examination of welds in piping less than or equal to 4 inches only apply to Pressurized Water Reactors. Thus, all of PNPP's Item No. C5.81 welds are greater than NPS 4 and are within the stated scope of the relief request. Therefore, for all of PNPP's Item C5.81 welds, in lieu of the surface examination requirements of Table IWC-2500-1, Category C-F-2, the alternative requirements of Code Case N-663 will be used.

NRC REQUEST

What Class 2 components (examination categories and item numbers) are affected in Section III, "Relief Requested" ?

RESPONSE

Section I of the relief request identifies the Class 2 components for which relief is requested (i.e., all Category C-F-2 piping welds greater than NPS 4). Within Section II of the relief request, it states that the only Category C-F-2 items that are applicable to PNPP are C5.51, C5.52, and C5.81. Thus, components affected by the relief requested in Section III of the relief request are Category C-F-2, Item No. C5.51, C5.52 and C5.81 piping welds.

NRC REQUEST

IR-051, "Basis for Relief" states that: "Table 4-11 *"Summary of Degradation-Specific Inspection Requirements and Examination Methods,"* of the EPRI report lists the required degradation mechanisms to be evaluated in Class 1, 2, and 3 piping." Table 4-11 is not mentioned in the Electric Power Research Institute report, and the title mentioned above belongs to Table 4-1. What table is being referenced in this section?

RESPONSE

Table 4-11 was a typographical error. It is in fact Table 4-1 of EPRI TR-112657, Rev B-A.

RELIEF REQUEST # IR-052

NRC REQUEST

Provide the number of nozzles included in this request and the identification of each nozzle.

RESPONSE

The relief would be applied to the RPV nozzle to shell welds that remain to be examined for the PNPP Second 10-year inspection interval. The component identification, description, and last time examined are as follows.

Component Identification

Last Exam

1B13-N1A-KB Recirculation Outlet Nozzle N1A to Vessel Weld	RFO5 (1996)
1B13-N1B-KB Recirculation Outlet Nozzle N1B to Vessel Weld	RFO5
1B13-N2A-KB Recirculation Inlet Nozzle N2A to Vessel Weld	RFO5
1B13-N2B-KB Recirculation Inlet Nozzle N2B to Vessel Weld	RFO5
1B13-N2C-KB Recirculation Inlet Nozzle N2C to Vessel Weld	RFO2 (1990)

Component Identification (Continued)

Last Exam (Continued)

1B13-N2D-KB Recirculation Inlet Nozzle N2D to Vessel Weld	RFO5
1B13-N2E-KB Recirculation Inlet Nozzle N2E to Vessel Weld	RFO5
1B13-N2F-KB Recirculation Inlet Nozzle N2F to Vessel Weld	RFO5
1B13-N2G-KB Recirculation Inlet Nozzle N2G to Vessel Weld	RFO5
1B13-N2H-KB Recirculation Inlet Nozzle N2H to Vessel Weld	RFO5
1B13-N2J-KB Recirculation Inlet Nozzle N2J to Vessel Weld	RFO2
1B13-N2K-KB Recirculation Inlet Nozzle N2K to Vessel Weld	RFO5
1B13-N3A-KB Main Steam Nozzle N3A to Vessel Weld	RFO1 (1989)
1B13-N3B-KB Main Steam Nozzle N3B to Vessel Weld	RFO5
1B13-N3C-KB Main Steam Nozzle N3C to Vessel Weld	RFO5
1B13-N3D-KB Main Steam Nozzle N3D to Vessel Weld	RFO5
1B13-N7-KB Top Head Spare Nozzle N7 to Vessel Weld	RFO6 (1997)
1B13-N9A-KB Jet Pump Instrumentation Nozzle N9A to Vessel Weld	RFO2
1B13-N9B-KB Jet Pump Instrumentation Nozzle N9B to Vessel Weld	RFO5
1B13-N16-KB Vibration Monitoring Nozzle N16 to Vessel Weld	RFO1

NRC REQUEST

In the submittal it states, "The examination volume required by IWB-2500-7(b) for the reactor vessel pressure retaining nozzle-to-vessel welds extends far beyond the weld and the heat affected zones into the base metal, and is unnecessarily large." It further states, "Note that residual stresses in the weld and heat affected zones of the nozzle-to-shell welds are minimal as all these welds, including in-process weld repairs if any, were subjected to post-weld heat treatment during vessel fabrication." Provide analyses to indicate the extent and magnitude of stresses associated with reactor pressure vessel (RPV) nozzle-to-vessel welds at PNPP in support of the contention that highly stressed areas of the reactor vessel nozzle-to-shell welds will be included in the proposed examination volume.

RESPONSE

Specific weld residual stress analysis for the PNPP's nozzles is not readily available. However, EPRI Technical Report 1003557, "BWRVIP-108: BWR Vessel and Internals Project Technical Basis for the Reduction of Inspection Requirements for Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii", which is referenced in IR-052, concludes that the probability of failure due to the limiting loading event of low temperature over-pressurization is less than 1×10^{-6} for 40 years, even without any inservice inspection. Within Section 4 of BWRVIP-108, there is a detailed evaluation of BWR nozzle stresses. These operational stresses and the residual weld stresses were factored in to the Probabilistic Fracture Mechanics Evaluation given in Section 5 of the report. Within the assumptions for this evaluation, it states, "the Residual stress at the nozzle-to-shell weld is modeled using a cosine through-wall distribution with a mean of 8 ksi at each surface."

NRC REQUEST

In accordance with guidance provided to staff for review of relief requests, provide detailed drawings which depict the examination volume that has been examined during previous inspections and the proposed examination volume. The weld sketches should show the exact dimensions of the as installed welds and the positions of any repairs to those welds so that the licensee will be able to precisely locate the extremities (widest sections) of the nozzle-to-vessel welds and any repair weld areas so that the new examination volumes will encompass these repair weld areas.

- (a) Discuss the documentation available of the actual cross-sectional dimensions and precise locations of repaired areas for all RPV nozzle-to-vessel welds at PNPP. Discuss the process for defining new examination volumes that encompass these repair weld areas.
- (b) If examination personnel are to identify the extremities (widest sections) of the nozzle-to-vessel welds, what positive means of examination will be used to identify the weld extremities, such as, weld etching, etc.? Will the weld extremities be identified on both the inside diameter and outside diameter of the vessel to ensure complete coverage of the welds?

RESPONSE

As stated in IR-052, all of the PNPP's nozzles are of the configuration depicted by ASME XI Figure IWB-2500-7(b). The PNPP's vessel was fabricated by Chicago Bridge and Iron – Nuclear (CBIN). Attachment 2 provides the CBIN drawing for the Main Steam Nozzle-to-Vessel weld and mark-ups of that weld configuration denoting the current ASME XI required coverage and the proposed coverage. This configuration is typical of all of the subject nozzle-to-vessel welds.

Since fabrication, there have been no repairs to any of the PNPP's nozzle-to-vessel welds. Detailed records of the in-process repairs that were made to the nozzle-to-vessel welds during fabrication are not available. Until such time that the Nuclear Regulatory Commission (NRC) staff formally approves Code Case N-613-1, to ensure that the in-process repairs are encompassed in the examination areas, the PNPP staff will extend the Code Case N-613-1 examination volume out from ½ inch on either side of the weld to 1 inch on either side of the weld (see Attachment 2).

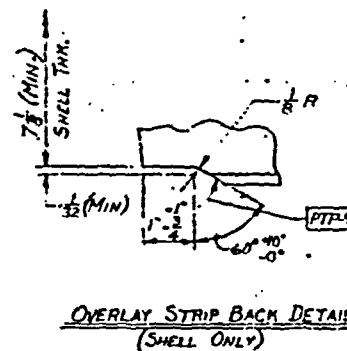
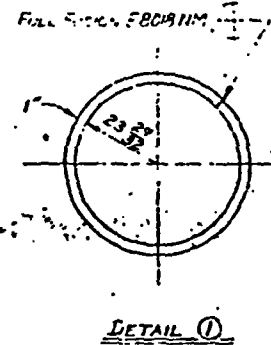
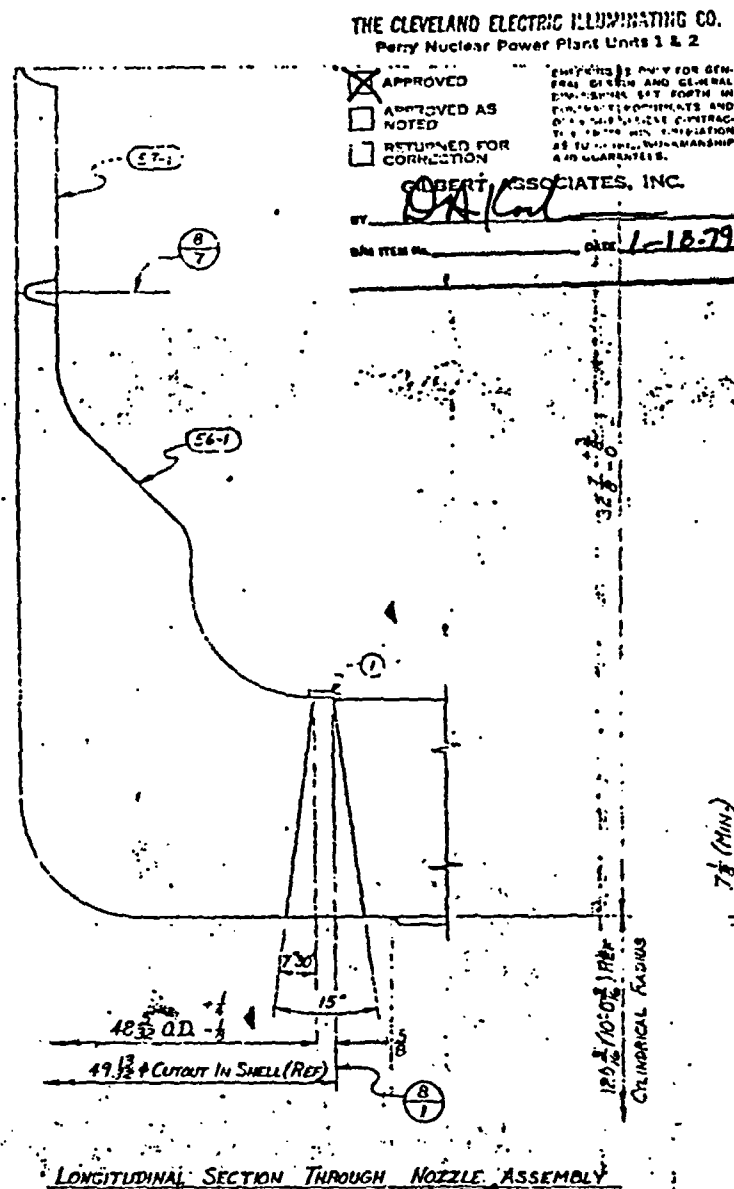
All of the subject nozzle-to-vessel welds were made using the Submerged Arc Welding method with the root of the weld being on the outside of the vessel and the face of the weld being on the inside of the vessel (see Attachment 2). As such, the widest section of the weld is not visible to the examination personnel. Complete coverage is determined by calculating the weld width from the drawings and scanning the appropriate distance on either side of the weld centerline, which was marked with punch marks by CBIN when the vessel was fabricated.

NRC REQUEST

In the submittal it states, "In addition, these regions have been extensively examined during the fabrication and installation periods before the vessels were put in service and during the inservice examinations already performed." What is the date that the last inservice examination was performed on the welds and base metal and what were the results? If necessary, can comparisons be made between past and present examinations, with the reduced base metal examination volume?

RESPONSE

The refueling outage in which the subject nozzle-to-vessel welds were last examined is given in the list provided in the response for the first RAI for IR-052 (Pages 2 and 3 of this attachment). Some of the exams were manual exams and some were automated. In the case of the automated exams, comparisons to previous data could be made but not for the manual exams. However, the preservice and inservice exams did not find any recordable indications that we are tracking for growth or changes so the need to compare future examination results to previously recorded indications is not applicable.



Q	Q	DESCRIPTION	Q
56-1	4	N3 NOZZLE FORGING	
57-1	4	N3 SAFE END FORGING	
58-1	4	BURP 1 1/2 x 5 (FORGING) 13 0 1/2 x 13 1/2 17 1/2 BAP 15 1/2)	

ORIGINAL • ELECTRO
Acoustic Power Station and Detachment

- ☐ D. Approved for comments
Review and approval for approval
- ☐ Approved in the Comments
Review and approval in the FINAL
FORM
- ☐ Answer to EDS No
- ☒ Approved: No type of action required
- ☒ Approved: Submit and send letter
- ☐ Carried the letter and approval
to the Bureau

Reviewed by: _____
Date 1-11-74
VFF No 321-2493

GILBERT W.O. No.
ASSOC., INC.

FEB 6 74 4549

PERRY I
MPL# B15D003

37	1/2 SAFE END FORGING
56	N3 NOZZLE FORGING
24	*4 SHELL RING
8	SEAF DETANS (NOZZ
5	TOLERANCE SYMBOLS
4	GENERAL NOTES
1	VESSEL OUTLINE

APPROVED FOR RELEASE BY NSA
COLLECTED FOR RFE
CCP - 72-72
DATE 1-25-79
BY 104

CHICAGO BRIDGE & IRON CO

GEC NUCLEAR COMPANY

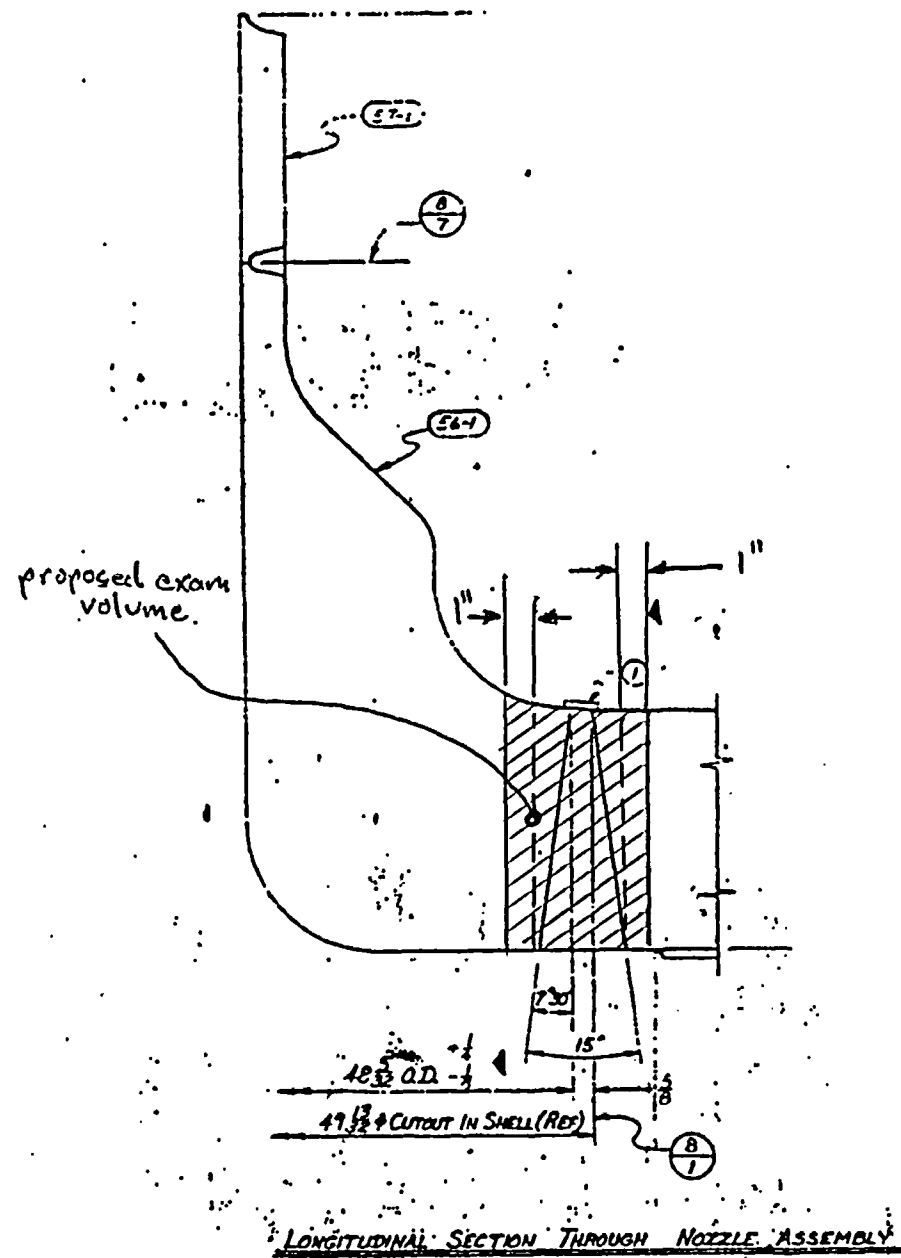
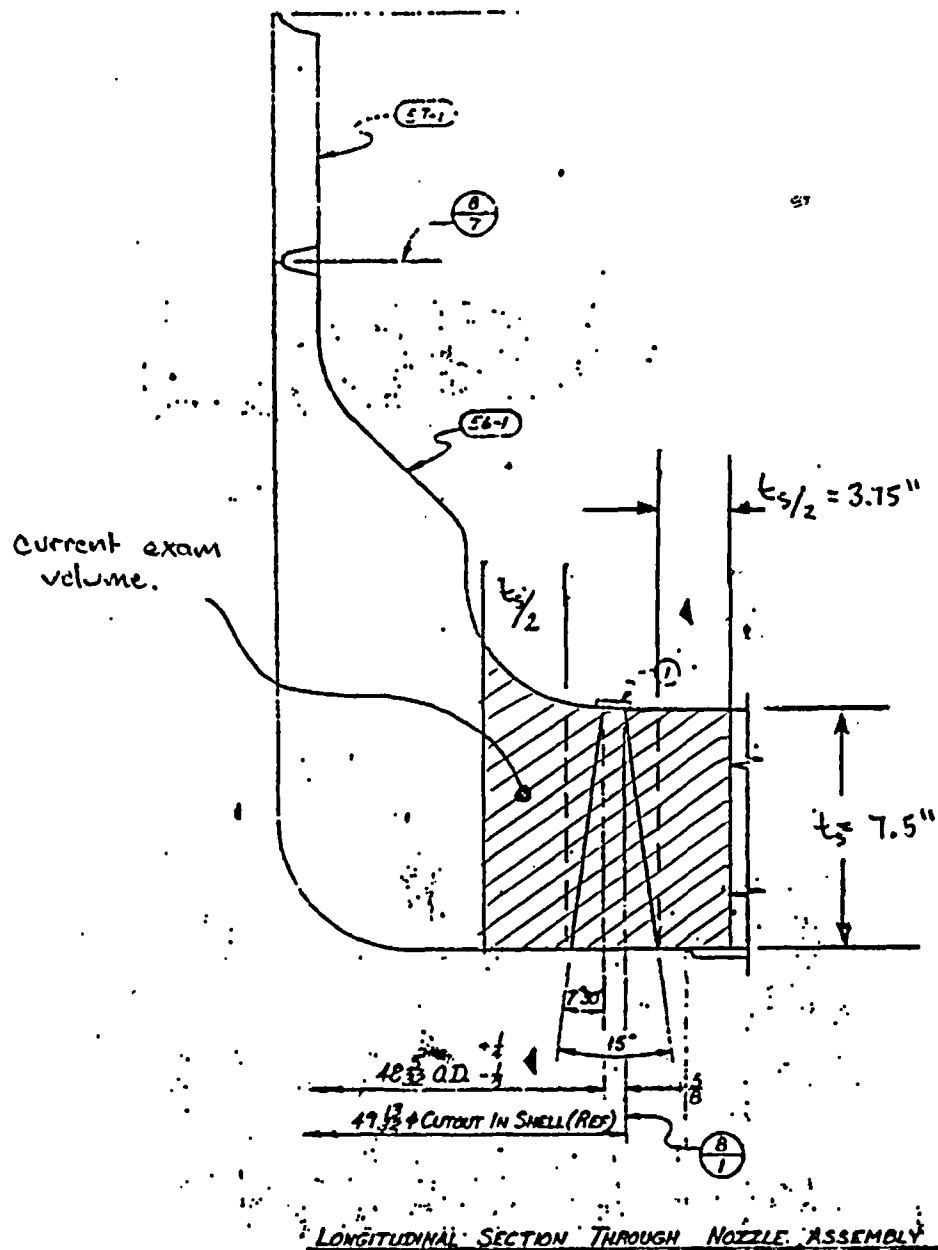
N3 NOZZLE ASSEMBLY
(STEAM OUTLET)

73-0894

73-0894

73-0894

73-0894



Regulatory Commitment

The following table identifies the actions that are considered to be a regulatory commitment. Any other actions discussed in this document represent intended or planned actions, are described for the NRC's information, and are not regulatory commitments. Please notify Mr. Henry L. Hegrat, FirstEnergy Nuclear Operating Company, Fleet Licensing, at (330) 315-6944 of any questions regarding this document or any associated regulatory commitments.

Commitment

1. Until such time that the Nuclear Regulatory Commission (NRC) staff formally approves Code Case N-613-1, to ensure that the in-process repairs are encompassed in the examination areas, the PNPP staff will extend the Code Case N-613-1 examination volume out from ½ inch on either side of the weld to 1 inch on either side of the weld (see Attachment 2).