August 7, 2003

MEMORANDUM TO: Terence L. Chan, Chief
Piping Integrity & NDE Section
Materials and Chemical Engineering Branch
Division of Engineering

FROM: Donald G. Naujock, Materials Engineer ***/RA/***
Piping Integrity & NDE Section
Materials and Chemical Engineering Branch
Division of Engineering

SUBJECT: SUMMARY OF PUBLIC MEETING HELD JUNE 4 & 5, 2003, WITH EPRI- PDI REPRESENTATIVES (TAC NO. MB8789)

On June 4 & 5, 2003, the staff participated in a public meeting with representatives from the Electric Power Research Institute (EPRI) - Performance Demonstration Initiative (PDI) program and the Pacific Northwest National Laboratory (PNNL) at PNNL, Richland, Washington. EPRI provides PDI's business operations and technical support. PDI is a nuclear power industry initiative that was established to develop and administer the qualification requirements of Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," Section XI of the American Society of Mechanical Engineers (ASME), *Boiler and Pressure Vessel Code* (Code). The purpose of the meeting was to discuss PDI's approach for implementing selected aspects of Appendix VIII and associated items. The subjects discussed were the status of Supplements 5 and 7 specimens, qualifications, and coverage; status of Supplement 10 specimens and qualifications; expansion of Supplement 10 for site specific configurations, primary water stress corrosion cracking (PWSCC) requalifications, ultrasonic testing (UT) qualifications for cast austenitic piping, qualifications of identical replacement equipment, and the skill level of personnel scanning the pipe for an Appendix VIII examination. The meeting was a continuation of formal dialog between NRC and the industry on PDI's implementation of Appendix VIII. The dialog provides opportunities to discuss testing difficulties, review PDI's program methodology for the selected supplements, and address issues regarding the ASME Code and nondestructive examination (NDE) items of interest. The PNNL staff opened the meeting with an overview of the work being performed by Battelle Memorial Institute. Later in the meeting, PNNL provided a tour of their facility to acquaint those present with the types of work performed by PNNL. The meeting participants and agenda are listed in Attachments 1 and 2 respectively. Handouts provided by PDI for selected items in the agenda are provided in Attachments 3 though 11.

PDI expressed a concern about the number of requests for additional information from the staff on PDI generated generic relief requests. A generic relief request addresses the difference between Code and the PDI program. The generic relief requests are produced from discussions at the NRC/PDI public meetings and ASME Code committee meetings, and they provide guidance for licensees writing plant specific requests for relief. The staff's contributions to these generic relief requests are not all inclusive to plant specific applications. However, after several reviews, the staff's questions pertaining to plant specific application may be added to the generic relief request, which may be updated accordingly.

I Supplement 10, Status of PDI Dissimilar Metal Weld Program

PDI presented the status of personnel and procedure qualifications for dissimilar metal weld (DMW) examinations. The 10 CFR 50.55a(b)(2)(xv)(A) requires DMWs be examined axially and circumferentially from both sides of the weld. When an examination from both sides of the weld is not possible, full coverage credit may be claimed provided the examination is performed from one side of the weld with procedures and personnel qualified for single side examinations. To date, all DMW qualifications have been performed as single side examination with limitations. The limitations are mostly associated with axial flaws, tapered surfaces, closure welds, and welds to cast austenitic components. The staff asked PDI to develop a matrix showing qualification from the OD and ID with their associated limitations.

Limitations are placed on a candidate qualification to identify what was demonstrated in the performance test. For example, all of the candidates have a limitation for examinations for axial flaws because they were unable to detect axial flaws as part of the performance demonstration test. The staff expressed concerns regarding the industry's ability to verify the absence of detrimental axial flaws because of changes taking place in Code that minimize surface examinations, and the rapid crack growth rate in some austenitic weld materials. No suggestions for means of verifying the absence of axial flaws were provided during the meeting. The presentation is Attachment 3, "PDI Dissimilar Metal Weld Program Status," and the limitations are listed in Attachment 4, "PDI Dissimilar Metal Weld Program Limitations." PDI has scheduled over 60 individual DMW tests for the summer. To improve the DMW pass percentage, PDI is providing candidates with guided practice sessions. PDI is designing a practice set consisting of 10 or more flaws for DMW outside surface examinations. PDI is also developing a formal DMW training program to improve the examination pass rate and to reduce the retest frequency. The staff asked PDI to develop a matrix showing qualification from the OD and ID with their associated limitations.

Only one vendor has qualified for depth sizing DMW within the 0.125-inch root mean square error (RMSE) specified by Code. Because of the difficulty vendors have with sizing DMWs, PDI proposed issuing a letter (of accomplishment) to personnel and vendors that can size below 0.187-inch RMSE but not the Code-required 0.125-inch RMSE. For piping with 0.187-inch RMSE and greater, PDI proposed issuing a letter of performance to personnel and vendors based on a root mean square percentage (RMSP) of the through-wall dimension. The performance letter would document an examination error capability of 10% or less (RMSP). The staff does not understand the objective of PDI's approach to issue such letters to licensees and vendors because licensees not satisfying Code will still have to submit relief requests. The staff expressed concerns with these two approaches because the RMSE and RMSP calculations convey different meanings. Also, vendors are still attempting to achieve the 0.125-inch RMSE criterion. For DMWs, PDI will provide additional information on the use of RMSP and RMSE for values between 0.187 and 0.125-inches.

II Supplement 10, Re-qualifications

The staff believes that the industry's difficulties in detecting and sizing PWSCC is as challenging as IGSCC. Since personnel performing IGSCC examinations must re-qualify every three years, the staff questioned whether PWSCC examination skills may also need the same periodic re-qualification as what is currently required for IGSCC requalification. Discussions on

merging IGSCC and PWSCC into a single re-qualification test resulted in the general observation that such requalifications testing did not seem practical because they are performed with different procedures. The staff indicated that a possible means for addressing the question is periodic testing using mock-ups containing DMWs and IGSCC or PWSCC.

PDI presented the status of personnel and procedure qualifications for dissimilar metal weld (DMW) examinations (Supplement 10). The presentation is summarized in Attachment 5, "Supplement 10 Requalification." PDI believes that re-qualification testing does little to help examiners stay proficient. The limited DMW data shows that personnel testing for Supplement 10 have a higher passing percentage than those testing for Supplement 2 with IGSCC qualifications. Besides the small number of personnel taking the test for Supplement 10 qualifications, they also received extensive pre-training and guided practice on DMW mock-ups. The motivating forces driving personnel to hone their UT skills prior to testing appears effective for DMW qualification. The data for DMW qualifications is somewhat skewed because of the many limitations attached to the qualifications. The value of re-qualification, its effectiveness at motivating personnel to achieve high skill levels, the randomness of flaws and flaw types, and the process of selecting the correct procedure to detect random flaws need to be explored further. The NRC staff believes that the DMW and PWSCC pass percentage data is insufficient to draw any direction or correlation with IGSCC qualification results at this time. The participants at the meeting were requested to contribute ideas applicable to periodic verification of UT proficiency of identifying and characterizing stress corrosion cracking and inspecting DMWs at the next meeting. This subject will remain open.

III Supplement 10, Expansion Criteria for Plant Specific Configurations

PDI presented a process for expanding Supplement 10 qualifications to accommodate unique plant specific applications by developing a Section 5.0 to Supplement 10, Attachment 6, "Expansion Criteria Utilizing Plant Specific Mock-ups." Plant specific mock-ups are for configurations not included in a Supplement 10 qualification. The mock-ups would not be used to qualify personnel or equipment or to expand other essential variables. The mock-ups would contain cracks or alternative flaws exhibiting crack like acoustic responses, i. e., compressed notches. The proposed Section 5.0 to Supplement 10 was included in the presentation to show the wording for flaw types. PDI is in the formative stages of developing a guideline for expanding Supplement 10 for plant specific applications and for establishing the generic implication for an application.

The NRC staff supports the concept of using plant specific mock-ups due to the number of possible variations in similar weld geometries. However, the NRC staff is concerned with the process used to determine a site specific application and how the process will be monitored for generic implications. The process for determining if a configuration is unique to a particular plant or occurs multiple times at several plants, and the total number of plant specific applications in the industry will be addressed in the PDI guideline. When the guideline is completed, the staff will have a opportunity to study the proposed solutions to the staff's concern.

IV Status of Supplements 5 and 7 Status and Other PDI Code Actions

PDI presented the qualification status on Supplement 5 and 7 and an update on PDI sponsored Code activities. The personnel qualified for the various examination surfaces and UT technique and proposed Code cases are summarized in Attachment 7 (no title).

PDI presented the proposal of eliminating off-axis flaws from single side qualification requirements. Coverage for Supplement 7 stipulates that examinations from the outside surface of the outer 85% of the vessel be conducted with Supplement 6 single side access qualifications. The off-axis flaw requirement is in both the regulations and Code. PDI is developing a white paper on this subject which is intended to provide the technical basis for the proposal.

PDI presented the subject of reducing the examination volume for RPV welds. The presentation was based on the technical studies performed for the BWRVIP-05 topical report (ADAMS number for the safety evaluation is ML003690281). The presentation is summarized in Attachment 8, "Technical Basis for Minimizing Inspection Volume for BWR RPV Shell Welds and Nozzle-to-Shell Welds." There was discussion on the RPV-to-nozzle coverage requirements imposed by 10 CFR 50.55a(b)(2)(xv)(G) and (K). The staff expressed the view that 10 CFR 50.55a(b)(2)(xv)(G) is performed in conjunction with 10 CFR 50.55a(b)(2)(xv)(K). PDI believes that the criteria in 10 CFR 50.55a(b)(2)(xv)(K) is all inclusive and sufficient for these examinations. This item is a carry over from the February 2003 meeting and is still an open item for the NRC staff to address.

V Practical Application of Section XI, Article VIII-1100(c) and (d)

Code provides specific examples of tasks non-Appendix VIII qualified personnel can perform that are necessary for UT examinations but not affecting detection, sizing, and analyzing of flaws. Code requires the analysis of data be performed by knowledgeable personnel, i.e. Appendix VIII qualified. However, the Code is silent on the skill level and qualifications of personnel participating in non-analysis aspects of UT examinations, such as scanning pipe. PDI presented its position on Article VIII-1100(d) in Attachment 9, "PDI Position 03-02, Revision 1," which addresses the silent part of the Code. PDI's position is based on creating opportunities for Level I or Trainees to acquire the necessary time on the job to satisfy the minimum work experience requirement of ANSI/ASNT CP-189. PDI's position is also based on the level of site supervision provided by Appendix VIII qualified Level II and Level III personnel on the work performed by non-Appendix VIII qualified personnel. To reduce ambiguity in the Code, the staff suggested that PDI's position be presented to the consensus process of Code. The staff does not take exception with PDI's position, pending any Code action. No decision was made on taking this item up in Code.

VI Variability of Instrument and Search Unit Combinations

The staff asked PDI if technical data existed to support the Code interpretation that was added to Section XI, VIII-4100 in the 2002 Addenda, which states, "Components of the same manufacturer, and model or series, are substitutable without further consideration." PDI presented a white paper with technical justification supporting the Code action in Attachment 10, "Variability of Instrument and Search Unit Combinations." The technical justification is based on the large number of successful equipment and personnel qualification

under the PDI program. The staff does not take exception with PDI's technical data. No further action is contemplated for this item.

VII Discussion on Section XI, Appendix VIII, Supplement 9

Code is in the process of removing Appendix VIII, Supplement 9, "Qualification Requirements for Cast Austenitic Piping Welds." Code is attempting this change because of the unreliability of UT examinations of cast austenitic (CSST) piping. The staff expressed concern regarding the apparent inability to perform meaningful UT examinations of CSST piping and asked PDI to discuss the effects of the Code action on the PDI program. Since PDI is chartered to administer the implementation of Appendix VIII, the removal of Supplement 9 would stop the effort of developing examination criteria for CSST piping. PDI's presentation is Attachment 11, "Appendix VIII Supplement 9." In the absence of Supplement 9, CSST piping will be examined according to Section V, Article 4 and 5 or Section XI, Appendix III. As a result of the actions being taken by Code to remove performance-based UT requirement for CSST piping, the staff is evaluating the applicability of Section V, Article 4 and 5 and Section XI, Appendix III for UT examinations of cast austenitic piping and vessels.

From the ensuing discussion, there was a common acceptance that some cast austenitic piping may be inspectable from the inside surface (ID). Some inspectability is important because risk-informed inservice inspections (ISI) programs are based on examinations of the welds most susceptible to degradation mechanisms. The necessary examinations may be achieved by inspecting terminal pipe ends from the ID. PNNL has a project underway to purchase vintage cast austenitic weld configurations and to evaluate the ability of finding flaws with different UT techniques. The focus of the work will be on closure welds. It was mentioned that EPRI will request from the Westinghouse Owners Group (WOG) permission to provide PNNL access to WOG cast austenitic pipe specimens. NRC will provide the status of PNNL's project at the next meeting.

The next NRC - PDI semi-annual public meeting is tentatively scheduled for early October or December 2003 at a location to be determined.

Attachments: As stated (11)

1: Meeting Participants
2: Agenda for Meeting with EPRI - Presented June 4 & 5, 2003
3: PDI Dissimilar Metal Weld Program Status - Presented June 4 & 5, 2003
4: PDI Dissimilar Metal Weld Program Limitations - Presented June 4 & 5, 2003
5: Supplement 10 Requalification - Presented June 4 & 5, 2003
6: Expansion Criteria Utilizing Plant Specific Mockups - Presented June 4 & 5, 2003
7: Status of RPV Demonstration Program - Presented June 4 & 5, 2003
8: Technical Basis for Minimozing Inspection Volume for BWR RPV Shell Welds and Nozzle-to-Shell Welds - Presented June 4 & 5, 2003
9: PDI Position 03-02 Revision 1 - Presented June 4 & 5, 2003
10: Variablilty of Instrument and Search Unit Combinations - Presented June 4 & 5, 2003
11: Appendix VIII Supplement 9 - Presented June 4 & 5, 2003

under the PDI program. The staff does not take exception with PDI's technical data. No further action is contemplated for this item.

VII Discussion on Section XI, Appendix VIII, Supplement 9

Code is in the process of removing Appendix VIII, Supplement 9, "Qualification Requirements for Cast Austenitic Piping Welds." Code is attempting this change because of the unreliability of UT examinations of cast austenitic (CSST) piping. The staff expressed concern regarding the apparent inability to perform meaningful UT examinations of CSST piping and asked PDI to discuss the effects of the Code action on the PDI program. Since PDI is chartered to administer the implementation of Appendix VIII, the removal of Supplement 9 would stop the effort of developing examination criteria for CSST piping. PDI's presentation is Attachment 11, "Appendix VIII Supplement 9." In the absence of Supplement 9, CSST piping will be examined according to Section V, Article 4 and 5 or Section XI, Appendix III. As a result of the actions being taken by Code to remove performance-based UT requirement for CSST piping, the staff is evaluating the applicability of Section V, Article 4 and 5 and Section XI, Appendix III for UT examinations of cast austenitic piping and vessels.

From the ensuing discussion, there was a common acceptance that some cast austenitic piping may be inspectable from the inside surface (ID). Some inspectability is important because risk-informed inservice inspections (ISI) programs are based on examinations of the welds most susceptible to degradation mechanisms. The necessary examinations may be achieved by inspecting terminal pipe ends from the ID. PNNL has a project underway to purchase vintage cast austenitic weld configurations and to evaluate the ability of finding flaws with different UT techniques. The focus of the work will be on closure welds. It was mentioned that EPRI will request from the Westinghouse Owners Group (WOG) permission to provide PNNL access to WOG cast austenitic pipe specimens. NRC will provide the status of PNNL's project at the next meeting.

The next NRC - PDI semi-annual public meeting is tentatively scheduled for early October or December 2003 at a location to be determined.

Attachments: As stated:

Distribution EMCB R/F EMCB(B) BJBenney JBHixon WHBateman
Accession No.: ML032190386; Package ML032190496
Indicate in the box: "c" = Copy w/o attachment; "E" = Copy w/attachments; "N" = No Copy

OFFICE	EMCB:DE	E	EMCB:DE	
NAME	DGNaujock		TLChan	
DATE	8 / 7 /03		8 / 7 / 03	

OFFICIAL RECORD COPY

PUBLIC MEETING WITH EPRI-PDI, JUNE 4 & 5, 2003

PARTICIPANTS

NAME	ORGANIZATION
Donald Naujock	NRC:NRR:DE
Terence Chan	NRC:NRR:DE
Jeff Hixon	NRC:RES
Larry Casazza	PNNL
Steve Doctor	PNNL
Mike Anderson	PNNL
Randy Linden	PPL Susquehanna
Gary Lofthus	Southern Nuclear Comp.
Larry Becker	EPRI
Frank Ammirato	EPRI
Carl Latiolais	EPRI
Mike Gothard	EPRI
Bill Jensen	NMC Point Beach
Richard Fuller	Dominion Nuclear CT
Mike Bratton	Entergy Nuclear South
Darlene Tinley	Tennessee Valley Authority

ATTACHMENT 1

ATTACHMENT 2

AGENDA

ATTACHMENTS 3 THROUGH 11

HANDOUTS PROVIDED BY PDI