REPORT OF AUDIT

of the

WASHINGTON PUBLIC POWER SUPPLY SYSTEM'S
PLANT VERIFICATION PROGRAM FOR WNP-2

performed by

TECHNICAL AUDIT ASSOCIATES, INC.
AT RICHLAND, WASHINGTON ON
NOVEMBER 19-22, 1982

January 10, 1983

APPROVED:

R. V. Laney

L. H. Roddis, Jr.

H. E. Sheets

CONTENTS

Summary of Findings and Observations*

The Findings from this audit are stated below, together with a page number reference to the text.

Finding No. 1

Based on a review of documents in the S.S.'s files, we believe that the Supply System personnel engaged in design reverification activities and members of the Findings Review Committee meet the criteria for assessing independence set forth in the S.S. memorandum of June 30, 1982. (page 7)

Finding No. 2

All three design reverification plans should give greater consideration to system-to-system interactions. We recommend that a spot check be made of the adequacy of those portions of important interfacing systems which are vital to the functioning of the three systems being reverified. (page 10)

Finding No. 3

The S.S. should incorporate in the reverification process for each of the three systems a way of showing clearly how FSAR design commitments are reflected into engineering requirements documents, and into final detail design. (page 11)

*See Introduction, which follows, for discussion of these terms.

Finding No. 4

The S.S. should select and validate the design of a small number of A-E specified, plant specific, pre-purchased components from the three systems, checking on vendor design and A-E review of vendor design. (page 12)

Finding No. 5

In view of the significant number of additional loads which have been added to floors and bulkheads since they were originally designed, especially the additional loads represented by piping supports and restraints, we believe that the S.S. should make a spot check of a selected heavily loaded area to determine if the original structural design is still adequate. The bulkhead which supports the Main Steam Isolation Valve may be an appropriate example for this purpose. (page 14)

Finding No. 6

We recommend that QVI-09 be revised to make clear that its purpose is to permit, with the A-E's case-by-case approval, certain specific deviations from the AWS D1.1 code when found upon reinspection in selected applications. If this were done, we would see no objection to its use as a basis for disposing of the specified deviations.

We recommend also that the Supply System clarify whether QVI-09 is intended to apply to the sacrificial shield wall and pipe whip restraints. (page 17)

Finding No. 7

The apparent coincidence of discontinuing film quality review of WBG radiographic film, coupled with the subsequent decline in the percentage of welds actually rejected for weld quality should be investigated by the S.S. and the results documented. (page 18)

Finding No. 8

If it is true that the Burns and Roe team engineer has authority to accept or reject structural welds which do not meet the acceptable deviation criteria of QVI-09, we believe that this authority should be withdrawn and that such decisions should be referred to the responsible B&R structural design supervisor. (page 19)

The Observations from this audit follow, together with a page reference to the text.

Observation No. 1

The S.S. should consider incorporating into the design reverification program a separate check of the effectiveness of the as-built drawing program, both as to its timeliness for producing as-builts and as to their accuracy in reflecting the actual plant hardware as installed. (page 13)

Observation No. 2

We believe that dealing with the uncertainties of turbine disc cracking requires a total systems

evaluation, including water chemistry, turbine operation, and condenser leakage. In its turbine planning, the S.S. should determine as exactly as possible the conditions obtaining in other turbines on which it is relying for its strategic planning model, and compare those conditions with the conditions which can realistically be maintained for the WNP-2 turbine. Until this has been done and the data analyzed, the S.S. should be cautious about assuming three years of satisfactory service. (page 22)

Observation No. 3

TAA believes that the present period of transition of design responsibility from Burns and Roe to S.S. Technology is a time of exceptional vulnerability for configuration control, and that additional means should be explored and adopted to assure that Generation and Technology have adequate and continuing inter-ties. (page 23)

AUDIT REPORT

Introduction

The Washington Public Power Supply System retained Technical Audit Associates, Inc. to, first, review and comment on the Supply System's Plant Verification Program Plan (PVP), and, second, to audit its implementation. TAA's review of the PVP was completed and our final report on the plan submitted on August 6, 1982.

TAA is now engaged in auditing the Supply System's implementation of the PVP, an activity which will continue until readiness for fuel load in August, 1983. We have been asked to give principal attention to those portions dealing with the reverification of design, the Quality Verification Program (QVP), which addresses the quality of construction before July, 1981, and the effectiveness of management actions to resolve quality problems arising since July, 1981. The ultimate objective of this continuing audit is to enable TAA, at the conclusion of the PVP and before fuel load, to state a knowledgeable opinion on the adequacy of implementation of the PVP and the extent to which it provides substantive confirmation that WNP-2's design and construction comply with applicable Regulatory and Safety Analysis Report commitments.

To assist the TAA panel to prepare for this audit, the panel chairman selected a number of internal Supply System documents which were sent to each panel member and the two panel consultants. These documents are listed in Attachment D. Based on a reading of these documents, panel members

prepared and forwarded in advance to the Supply System a number of questions which provided a framework for the on-site audit, November 19-22, 1982. These questions are appended as Attachment C. Additional documents were reviewed by the TAA panel during and after the audit. These are listed in Attachment E.

The audit agenda is appended as Attachment A, and a list of the persons interviewed as Attachment B. All agenda items were taken up during the audit. With the exception of Dr. Salomon Levy, all TAA panel members and consultants shown on Attachment F were present throughout.

In the preceding Summary and throughout this report we have used either a Finding or an Observation to present our conclusions and recommendations. A Finding is a conclusion or recommendation which, in our opinion, is sufficiently important to require a formal response from the Supply System, leading either to a mutually satisfactory disposition or to continued dialogue. Each Finding should be formally resolved.

An Observation is a conclusion or recommendation of lesser importance for which no formal resolution is expected.

Opening Session

The opening session was attended by representatives of the Managing Director, Technology, Quality Assurance, Generation, Licensing, the QVP program, the WNP-2 Project, and the TAA Panel.

A vue-graph presentation was made by S.S. personnel of the status of PVP implementation. Questions Number 3, 7, 9, 11, 13, 16, 17, 20, 21, and 23 (see Attachment C) were discussed, and satisfactory answers were received. Following this opening session, the Panel was supplied a file showing the steps which the S.S. has taken to assure that personnel engaged in the design verification portion of the PVP program meet the S.S.'s "Criteria for Assessing Independence", dated June 30, 1982.

Finding No. 1

Based on a review of documents in the S.S.'s files, we believe that the Supply System personnel engaged in design reverification activities and members of the Findings Review Committee meet the criteria for assessing independence set forth in the S.S. memorandum of June 30, 1982.

Design Reverification Program

The design verification audit was divided into two parts. In part one, Duane Renberger, John Yatabe, and D. Whitcomb reported on the status of the program and answered and discussed TAA Panel questions number 1, 2, 4, 5, 6, 8, and 14 (see Attachment C). In part two, the TAA Panel met separately with the team responsible for reverifying the requirements and design of the High Pressure Core Spray System (HPCS). By meeting with the team members alone, we were able to learn of team viewpoints and attitudes free of management constraints.

Part one, the discussions with Technology management, related to program schedule, the adequacy of personnel resources, and the structure of the HPCS Reverification Plan. (Reverification plans for the Residual Heat Removal System (RHR) and the Reactor Feedwater System (RFW) were available at the time of the audit, but not before. Hence the audit focused on the HPCS plan.)

John Yatabe made a vue-graph presentation covering program objectives, schedule, and process flow. He discussed system selection, requirements reverification, the selection of sampling criteria, and the performance of reverification. TAA Panel members expressed the importance of considering system interactions, such as the potential for HPCS system to be flooded by a break in another system, or to be flooded by intentional operation of the fire protection system.

Following its subsequent review of all three of the system reverification plans, the Panel notes that the following words appear, in slightly different form, in each:

> "Incorporation of primary requirements necessary for proper functioning of the HPCS (RFW, RHR) system, then, such as requirements for cooling, flood and fire protection, pipe whip restraint, missile protection, etc., will only be reverified to the point of assuring that provisions have been incorporated into the plant design via some other systems to accommodate those requirements. The systems provided to accommodate these interface requirements will not be reviewed for adequacy as part of this effort. This approach will provide confidence on a "spot check" basis that the remaining systems are designed correctly." (See HPCS Plan, page 1-25.)

We understand but are not convinced that this concluding assertion is justified. It assumes that the systems being reverified are typical of the remaining systems, and that reverifying the selected systems validates the design process as well as the design of the remaining systems.

This seems to overlook the fact that the systems selected for validation were designed largely by GE, whereas the interfacing systems of concern, such as fire protection, compartment drains, HVAC, and pipe whip restraints are plant-specific and hence were probably designed by the architect-engineer. In addition, system interactions occur not only between systems

which are physically interconnected, but also between systems which share a common space or area. A number of the interfacing concerns involve such system-to-system spatial relationships, such as accessibility for maintenance, hazard from fire protection flooding, and missile hazards.

We believe that the S.S.'s present interpretation for all systems of System Design Review Question No. 11 (HPCS page 1-10, Table 1-1) is too narrow, and that a spot-check should be made of the adequacy of those portions of important interfacing systems, where those interfacing systems are vital to the functioning of the HPCS, RHR, or RFW systems.

Finding No. 2

All three design reverification plans should give greater consideration to system-to-system interactions. We recommend that a spot check be made of the adequacy of those portions of important interfacing systems which are vital to the functioning of the three systems being reverified.

Responding to a question on the major FSAR commitments, Yatabe presented and discussed a document titled, "Design Verification", which describes the process linking the FSAR, engineering requirements documents, and the detailed design. The TAA Panel understands that both sections A and B of this document will be followed for each of the three systems, HPCS, RHR, and RFW, thus assuring increased attention to tracking FSAR requirements. Some members of the TAA

Panel, however, found that the HPCS plan gives insufficient visibility into how design commitments are incorporated into engineering requirements documents, and how they are ultimately verified by the design verification check lists in the Plans, with the result that external observers, including S.S. managers, may find it difficult to understand the Plan's logic. A specific suggestion on this point was offered by Charles Miller, TAA consultant, for S.S.'s consideration.

Finding No. 3

The S.S. should incorporate in the reverification process for each of the three systems a way of showing clearly how FSAR design commitments are reflected into engineering requirements documents, and into final detail design.

In discussing the system level and component level sampling matrices which appear in the HPCS plan, TAA members asked whether the S.S. intended to reconfirm the adequacy of design of various pre-purchased components. The S.S. pointed out that most of the components in the systems being reviewed were specified by GE as NSSS supplier, and have been used, and hence validated, on other earlier plants. Generally, the HPCS plan does not provide for reconfirming the design of vendor supplied equipment. The TAA Panel suggested that the design of some A-E specified, plant-specific, pre-purchased components ought to be reverified as part of the

total process. The Panel notes also that some components in the three systems being reverified will receive their principal design and construction validation through the test program.

Finding No. 4

The S.S. should select and validate the design of a small number of A-E specified, plant specific, pre-purchased components from the three systems, checking on vendor design and A-E review of vendor design.

Yatabe gave the TAA Panel a handout showing the professional experience of each member of the three reverification teams. The Panel noted that the teams could be strengthened by the addition of persons having system design experience.

Part two of TAA's audit of design reverification was an interview with the six members of the HPCS team, under the leadership of Paul Macbeth. Principal topics of discussion were the selection of the sampling points (who made the selections and why); the need for considering system interactive effects; and how independent the team members feel as they go about their reverification tasks. Team members described the logic for their own selection of the sampling points, making clear that the choice had been largely delegated to them. They showed a good understanding of the purpose of the program and gave convincing justification for the sampling points chosen. It appeared to the Panel that system interactions

had not weighed as heavily in plan preparation as would be desirable.

The S.S. team members exhibited an understanding of the need for total objectivity in their work. They made clear to the Panel that they have been given complete freedom to perform their reverification tasks in a manner which satisfies their own professional standards.

The TAA team learned in the course of the above discussions that verification of the timely completion of as-built drawings is not currently a part of the HPCS plan. This led to the following observation.

Observation No. 1

The S.S. should incorporate into the design reverification program a separate check of the effectiveness of the as-built drawing program, both as to its timeliness for producing as-builts and as to their accuracy in reflecting the actual plant hardware as installed.

During the plant tour, TAA team members were struck by the massive weights, heavy structural loads, and access congestion caused by pipe and equipment restraints and supports, many of which have been added to the plant after the initial structure was designed. This observation led to a question of whether the original loadings which had been assumed in designing floors and bulkheads may now have been exceeded and whether the original structural design is now satisfactory.

Finding No. 5

In view of the significant number of additional loads which have been added to floors and bulkheads since they were originally designed, especially the additional loads represented by piping supports and restraints, we believe that the S.S. should make a spot check of a selected heavily loaded area to determine if the original structural design is still adequate. The bulkhead which supports the Main Steam Isolation Valve may be an appropriate example for this purpose.

Construction Quality Verification Program

Messrs. R. Knawa, C. Anderson, and R. Ramsgate of the Supply System and M. Leach of Bechtel gave TAA an informal presentation on the status of the QVP program. TAA was given handouts on overall program status and on Contract 215 (WBG) system completion status. In addition, contract completion reports, deficiency disposition reviews, and the reevaluation of personnel qualifications were discussed. TAA questions number 31 and 32 were answered.

TAA members commented that the several QVP audit reports and contractor completion reports which we have reviewed seem to have one common feature, namely, that none of them reports finding any significant quality deficiencies in work done before July, 1980. Since a ten percent sample of safety related hardware is being reinspected as part of the QVP program, the virtual absence of significant defects might seem surprising. Knawa pointed out that a number of hardware defects had already been identified at the time of work stoppage. He suggested that the small number of additional defects which have been found is due to the fact that most of the problems were already known when work was stopped in 1980.

Leach reported that the principal problem which has been encountered in verifying QA documentation, especially construction contractor documentation, was locating and assembling verification records for an entire system, since the relevant documents had originally been filed by date of origin rather

than by system. A large amount of relocating and resorting work has been required, but it has generally succeeded in locating the correct records.

In discussing the ten percent reinspection of structural steel welds, the TAA team was informed of and discussed reverification instruction QVI-09 "Special Structural Steel Reinspection Criteria", dated May 13, 1982. The TAA Panel raised several questions concerning QVI-09 which were not satisfactorily answered during the audit. Subsequently, the Supply System furnished additional information by letter D. C. Timmins to R. V. Laney of December 2, 1982, and by letter J. R. Honekamp to R. V. Laney of December 22, 1982. Our review of QVI-09 and the information contained in these letters reveal the following:

(a) QVI-09 authorizes the A-E field engineer to make generic dispositions of certain specific deviations from AWS D1.1 when found in selected weld applications during reverification inspections.

(b) While QVI-09 is currently being used to determine the acceptability of discrepancies found during reverification inspections, it may also be used, under the A-E's direction, to disposition deviations of the same type found in new construction.

(c) The text of QVI-09, especially the eight page "Justification," makes the document appear to be a significant revision of the AWS code, rather

than merely an identification of specific acceptable deviations.

(d) The Supply System intends to inform the NRC of QVI-09 as part of Amendment 27 to the SAR.

(e) The draft notification attached to the Honekamp letter referred to above, to be forwarded with Amendment 27, appears to be inconsistent with QVI-09 with respect to its applicability to the sacrificial shield wall and pipe whip restraints. (Compare para. 3.1, page 2, Attachment 2 to QVI-09, with the final sentence of the draft notification to be a part of Amendment 27.)

The TAA Panel inspected several examples of welds which had been inspected and accepted to QVI-09 criteria during a tour of the plant.

Finding No. 6

We recommend that QVI-09 be revised to make clear that its purpose is to permit, with the A-E's case-by-case approval, certain specific deviations from the AWS D1.1 code when found upon reinspection in selected applications. If this were done, we would see no objection to its use as a basis for disposing of the specified deviations.

We recommend also that the Supply System clarify whether QVI-09 is intended to apply to the sacrificial shield wall and pipe whip restraints.

TAA raised a question concerning the discontinuance of review for film quality as a basis for accepting certain WBG radiographic film, referred to in an S.S. letter to the NRC of September 1, 1982, concerning reportable condition No. 175. (See TAA question number 45, Attachment C.) This question was discussed with Mr. Knawa and, in a subsequent meeting, with Mr. Roger Johnson, WNP-2 Q.A. Manager. Based on these discussions and on review of Bechtel's explanatory letter BEC WNP-2-0437, of April 22, 1982, the Panel concluded that there was justification for discontinuing the film quality review. However, it was noted (S.S. letter to NRC of September 1, 1982, Attachment A, p. 3) that the percentage of welds actually rejected for weld quality declined from 4.73% (65 of 1373) to 1.21% (16 of 1317) after discontinuance of film quality review, with no apparent reason. TAA believes that this anomaly needs to be reconciled in order to demonstrate that it is not due to discontinuing the film quality review.

Finding No. 7

The apparent coincidence of discontinuing film quality review of WBG radiographic film, coupled with the subsequent decline in the percentage of welds actually rejected for weld quality should be investigated by the S.S. and the results documented.

TAA discussed the "team concept" for reverification inspection which is being used by the S.S., described in QVI-08,

"Reverification Inspection Team Concept", dated May 13, 1982. One member of the reinspection team is a Burns and Roe Design Engineer who is responsible for "accepting or rejecting those items judged by the Bechtel Quality Control Engineer as out of tolerance to the inspection criteria." (QVI-08, page 2, para. 3.3c) Discussions brought out that the B&R engineer can accept structural welds provided they conform to the acceptable deviation criteria of QVI-09. This is a satisfactory practice provided QVI-09 is clarified as recommended in Finding 6. However, we were also told that the B&R team engineer can accept structural welds which do not meet the acceptable deviation criteria of QVI-09. The limits of this authority to accept or reject outside QVI-09 are unclear to us, and are not explained in QVI-08.

Finding No. 8

If it is true that the Burns and Roe team engineer has authority to accept or reject structural welds which do not meet the acceptable deviation criteria of QVI-09, we believe that this authority should be withdrawn and that such decisions should be referred to the responsible B&R structural design supervisor.

Construction Quality Assurance Effectiveness

In assessing management's effectiveness in quality assurance since restart in July, 1981, TAA discussed various audit reports, audit findings, potentially reportable conditions, and the timeliness and effectiveness of management's actions when confronted with quality problems. Roger Johnson, WNP-2 Project Q.A. Manager, responded to TAA questions numbers 15, 18, 19, 22, 24, 25, 27, 28, 29, 30, 44, 45, 46, and 47, which probed into many of these matters. In addition, as a specific example, the TAA panel investigated the S.S. program for dealing with the possibility of stress corrosion cracking in low pressure turbine discs.

Mr. Johnson's reply to the panel's questions were generally satisfactory, indicating that the present level and competence of quality audit, surveillance, and inspection by S.S. corporate Q.A., Project Q.A., and Bechtel Q.A. are satisfactory. Several minor problems were noted which, when corrected by the S.S., will further improve ongoing quality assurance. These problems are:

- increased project pressure is required to overcome procedural problems causing twelve month old NRC inspection items to remain unclosed.

- Project response to quality findings from S.S. corporate Q.A. audits would benefit from a Program Director level system for tracking such findings until closed.
- the Project should exert greater pressure on Burns and Roe to clear up old audit findings.

TAA's discussion with Dr. Shen, John Yatabe, A. McDonald, and W. Bibb on stress corrosion cracking in low pressure turbine discs explored the attention being given by S.S. management to this generic problem. We found them to be informed on the current status of this problem, both in the U.S. and abroad. Answers were provided to TAA questions 34 through 43.

We learned that a S.S. plan for minimizing the chances of cracking in the early years of operation is being developed. The avoidance of unfavorable environmental conditions, especially the presence of oxygen and other impurities in feedwater, is particularly important for a BWR reactor coupled to a Westinghouse turbine. The specifications for steam purity from the reactor manufacturer may not be entirely compatible with the steam purity prescribed by the turbine manufacturer. The Supply System thus faces a complex of problems in minimizing turbine disc cracking -- water/steam purity control, condenser leakage control, and avoidance of turbine overspeed. This makes it quite important, as the S.S. recognizes, to make the best use of available operational experience

elsewhere (for example, Taiwan), and to continue the present program of identifying and locating spares and defining a long range strategy.

TAA believes the S.S. needs to obtain additional detailed information concerning the specific turbines which they are using as models to assist them in developing their strategic plans. Such information as elapsed time between manufacture and first operation, as-built dimensions and stresses for shrink fits, and feedwater steam purity operating history would be useful.

Without data of the kind indicated, there does not appear to be adequate justification for the S.S.'s present optimistic assumption that they can expect three years of satisfactory service.

Observation No. 2

We believe that dealing with the uncertainties of turbine disc cracking requires a total systems evaluation, including water chemistry, turbine operation, and condenser leakage. In its turbine planning, the S.S. should determine as exactly as possible the conditions obtaining in other turbines on which it is relying for its strategic planning model, and compare those conditions with the conditions which can realistically be maintained for the WNP-2 turbine. Until this has been done and the data analyzed, the S.S. should be cautious about assuming three years of satisfactory service.

Plant Performance and Operating Envelope Verification

In discussing the status of operating procedures preparation with J. D. Martin, the Panel noted that, with over one thousand plant operating procedures now written, the Generation staff appears to be far ahead of Technology, which is still collecting the System Technical Turnover Packages (STTP). We raised the following question: how will the S.S. assure that the systems which are reflected in Operating Procedures are exactly the same as the systems reflected in the STTP's, these latter being of a later vintage? It has been noted elsewhere that operating plants experience difficulty keeping system descriptions in their engineering files current with the actual hardware because of continuing system changes.

Messrs. Martin and Cowan pointed out that Generation and Technology both draw upon the same information source, namely Burns and Roe's Design Control Log, which contains the latest design information. Hence, Generation's system descriptive material should match with Technology's. They also stated that Generation and Technology coordinate with one another's activities in various ways, and that both are in the approval circuits for materials prepared by the other. Finally, it is intended that Technology will have staff members at the plant site to assure close liaison.

Observation No. 3

TAA believes that the present period of transition of design responsibility from Burns and Roe to S.S.

Technology is a time of exceptional vulnerability for configuration control, and that additional means should be explored and adopted to assure that Generation and Technology have adequate and continuing inter-ties.

During the Panel's discussions with Messrs. Martin, Afflerbach, and Cowan, answers were provided to TAA question numbers 10, 12 and 33. In the matter of Burns and Roe's responsibilities in the test program (question number 12), we understand that, although there is a satisfactory working agreement, the S.S. has not yet prepared a written confirmation, but intends to do so. The TAA Panel will want to review this document when it is complete.

During the session on Performance and Operations, Doug Timmins gave the TAA Panel a brief account of the work of the independent Electrical Separation Task Force, whose work is to be completed in January, 1983. The TAA Panel has requested that the Task Force report be sent to us for information.

ATTACHMENT A

TECHNICAL AUDIT ASSOCIATES, INC., AUDIT

November 19, 20, 21, and 22, 1982

A G E N D A

Friday, November 19, 1982

8:00 a.m.	TAA Executive Session Hanford House	
10:30 a.m.	Opening Session with Supply System Supply System, Snohomish Room	
	Scope of Audit	R. V. Laney
	Agenda - who will be addressing TAA's initial inquiry areas	J. R. Honekamp
	Program Status and Summary of NRC meeting on Plant Verification	J. R. Honekamp
	Response to TAA inquiry areas of a more general nature	J. R. Honekamp/ D. L. Renberger/ J. M. Yatabe/ R. T. Johnson
	QA Audit Program responsibilities for conduct of audits, tracking of findings, evaluation of responses	R. B. Glasscock/. R. T. Johnson
12:00 N	LUNCH	
1:30 p.m.	Status of Requirements and Design Reverification Supply System, CDC Bldg.	D. L. Renberger/ J. J. Yatabe
2:30 p.m.	Interview High Pressure Core Spray (HPCS) System Team Supply System, CDC Bldg.	P. J. MacBeth/ et al

Saturday, November 20, 1982

8:00 a.m.	Quality Verification Program WNP-2 Site, Trailer 30 Status report on QVP, including system completion, prepurchase and inactive site contracts, and special tasks. Identify problems found and actions taken. Performance as compared to schedule. Show the significance of QVP findings to the quality of work performed before 1980 shutdown.	R. L. Knawa
10:00 a.m.	Project Quality Assurance WNP-2 Site, Trailer 56 (Includes working lunch) Review of selected quality problems which have arisen since 1981 startup, emphasizing Supply System management method of dealing with the problems and the effectiveness of their actions. TAA has submitted a number of questions based on their review of documents transmitted to them. The intent is not for TAA to track each item to closure but rather by examining a number of examples to assess the effectiveness of management action to resolve quality problems identified since restart.	R. T. Johnson
3:00 p.m.	WNP-2 Tour	J. R. Honekamp/ Shift Manager (2242)

Sunday, November 21, 1982

a.m.	TAA Executive Session Hanford House	
1:00 p.m.	Presentation of Supply System Plans for Dealing with Stress Corrosion Cracking of the Discs in the Westinghouse Main Turbine Supply System, Shen's Conference Room 2-212	P. K. Shen/ D. L. Renberger/ et al

Monday, November 22, 1982

8:00 a.m.	Interviews with the Plant Staff on the Process for and the Status of the Preparation, Review, and Approval of Plant Procedures and Technical Specifications WNP-2 Site, Service Bldg. Conference Room	J. D. Martin/ C. M. Powers/ K. D. Cowan/ L. H. McGilton
9:30 a.m.	Overview of Electrical Separation Task Force Activities WNP-2 Site, Service Bldg. Conference Room	D. C. Timmins
10:00 a.m.	Interviews with Test and Startup on the Status of the Test Program and the Process for Review and Approval of Test Procedures and Test Results WNP-2 Site, Service Bldg. Conference Room	G. K. Afflerbach/ D. C. Timmins/ D. M. Myers
1:00 p.m.	TAA Exit Interview Supply System, Ferguson's Conference Room	D. W. Mazur/ R. G. Matlock/ W. C. Bibb/ R. B. Glasscock/ P. K. Shen/ J. R. Honekamp

LIST OF PERSONS INTERVIEWED DURING

TAA ON-SITE AUDIT, NOV. 19-22, 1982

Carl Anderson, QVP Program, S.S.
G. K. Afflerbach, Test and Startup Mgr., WNP-2, S.S.
W. C. Bibb, Director of Power Generation, S.S.
Jack Cole, HPCS Team Member, Technology, S.S.
K. D. Cowan, Technical Mgr., WNP-2 Operations
R. B. Glasscock, Director Licensing and Assurance, S.S.
J. F. Gorman, HPCS Team Member, Technology, S.S.
J. R. Honekamp, Technical Asst., Managing Director, S.S.
T. J. Houchins, Manager of Audits and Surveillance, Corp. QA, S.S.
R. T. Johnson, Manager of QA, WNP-2, S.S.
T. H. Keheley, HPCS Team Member, Technology, S.S.
R. L. Knawa, Manager, Qual. Verification Prog., S.S.
M. N. Leach, Bechtel Supervisor, Qual. Verification Prog.
Paul J. Macbeth, HPCS Team Leader, Technology, S.S.
J. D. Martin, WNP-2 Plant Manager
R. G. Matlock, Director WNP-2 Program, S.S.
D. W. Mazur, Director Operations, S.S.
A. McDonald, Plant Mgr., Hanford/Packwood Generation, S.S.
Dennis Meyers, Test Working Group Member, WNP-2 Eng., S.S.
Adolfo B. Rafer, HPCS Team Member, Technology, S.S.
R. Ramsgate, QVP Program, S.S.
D. L. Renberger, Dep. Director, Technology, S.S.
P. K. Shen, Director Technology, S.S.
G. C. Sorenson, Manager Licensing Programs, S.S.
David T. Thonn, HPCS Team Member, Technology, S.S.
D. C. Timmins, Tech. Asst., WNP-2 Proj. Mgr., S.S.
D. L. Whitcomb, Reverification Lead Engineer, S.S.
J. M. Yatabe, Asst. Director Systems Engineering, Technology, S.S.

LIST OF PERSONS PRESENT AS OBSERVERS ONLY

W. Chin, Bonnville Power Authority (partial attendance)
Richard A. Feil, NRC, Resident (partial attendance)
Benjamin Reusche, Bonnville Power Authority (exit interview only)
A. D. Toth, NRC, Resident (partial attendance)

page one: second bullet refers to "actual" review of test procedures extending beyond criteria to the complete procedure, but calls this "unstructured" with "no disposition of...comments...required." Can the S.S. be satisfied with "no disposition" of AE comments?

page two: final paragraph does not commit Burns & Roe to review and approve test results, nor does it relate test results to certification. The allusion to "ability to certify" is unclear to us.

We continue to believe that there should be a more explicit statement of the AE's responsibilities in the Performance Verification (Test) Program, and that it should include review and acceptance of test results.

13. What information is in hand to show that design reverification personnel meet S.S. independence criteria?

14. Request design reverification personnel who address the TAA panel to describe briefly the professional qualifications of their team members.

TAA QUESTIONS FOR WNP-2 PVP AUDIT, OCTOBER 13-15
(Set #1)

1. Design reverification program schedule.

   Has a complete schedule been established? Has the actual program met the schedule from start to October 1982? Is the program ahead or behind schedule? How does the complexity of systems or components affect schedule?

2. Burns & Roe documentation.

   Has any deficiency been found in the Burns & Roe documentation? Has Burns & Roe supplied the needed documentation for the transfer of engineering information to the Supply System? Are Burns & Roe system descriptions complete and have Burns & Roe drawings the latest revisions? How many deficiencies have been found?

3. System Technical Turnover Package.

   This identifies a complete and thorough documentation. How much additional work by the Supply System is required in addition to the technical information supplied by Burns & Roe?

4. System Technical Turnover Package - SDE Instruction 3.1, Attachment 4.1.

   The following statement is made:
   "The Engineer has reviewed the following items in sufficient detail to be reasonably certain of the general completeness of the data/information pertaining to this system."

   Are the underlined adjectives necessary? It is suggested that they be omitted.

5. Design Reverification - SDE Instruction 3.5, pages 2, 35, 26, 27.

   What is the percentage of reverification by:

   a) design review
   b) alternate calculations
   c) component testing

   On what basis is a selection made among the above 3 methods?

6. Design Reverification - SDE Instruction 3.5, Page 1.

2.3 Potential Finding:
How many potential deficiencies have been found out of how many systems and components?

7. Design Requirements

Has agreement been reached regarding the value of seismic loads?

8. System and Component Interference.

As part of the reverification plan, how many interferences of systems or components have been identified?

9. Manufacturing Q.C.

During design reverification walkdowns, how many deviations from design drawing have been found in critical areas?

10. Turbine, Generator and Pump - Readiness for Operation.

The turbines, generator and some pumps have been installed for a considerable length of time. What steps are being taken to check this machinery for full power operation? The turbines and generator have been rotated for years and the machinery may have deteriorated to some extent.

11. System Technical Turnover Package.

Is there a reliable method of tracking and controlling design changes which are "in process" at the time of turnover of design responsibility?

12. Burns and Roe letter, Forrest to Holmberg, of July 30, 1982, seems to us to leave several questions unanswered regarding B&R responsibilities in the test program, as follows:

page one: second bullet refers to "official" scope of review of procedures being limited to acceptance criteria. Is there an "unofficial" scope which differs?

TAA QUESTIONS FOR WNP-2 PVP AUDIT, OCTOBER 13-15
(Set #2)

(NOTE: This list supplements Set #1, questions 1 through 14, attached to my letter to J. R. Honekamp dated September 28, 1982.)

15. Refer to Burns & Roe letter to NRC Region 5, dated August 24, 1982, concerning a 10CFR21 potentially reportable condition #82-04. Was the condiction described therein, related to the ECCS pump discharge pressure switches, discovered as a result of a systematic casualty analysis program or by accident?

16. How does the S.S. assure that design reverification reviewers do not overlook and fail to report a potential finding to the FRC?

17 Are the STTPs complete enough to give adequate assistance to operating personnel with respect to operating, testing, and maintaining the plant? Can operating, testing, and maintenance procedures be prepared by the S.S. based on the STTP content as described in SDE 3.1?

Who checks STTPs for accuracy and completeness?

18. The problems identified with WBG welds and radiographs and the successively wider sampling which the S.S. found necessary are reported in QVP progress reports to Region V, Nos. 2, 7, 8, 9, 10, and 11. The WBG review was reported complete in report No. 11, page 5, with 87.8 percent of radiographs found acceptable, 9.1 percent rejected for film quality, and 3 percent rejected for weld quality. Give the TAA panel a summary report of WBG welding review as it stands now.

Although WBG was the principal contractor responsible for making safety-grade welds, we assume it was not the only such contractor. Has the S.S. satisfied itself with respect to the weld and radiograph quality of other on-site contractors? How was this done?

19. IE bulletin 82-01 reported examples of altered radiographs by AP&E, Inc. Advise the TAA panel of any additional WNP-2 actions on 82-01, following the project's interim report to Region V of June 24, 1982. Bulletin 82-01, Rev. 1, Supplement 1, reported an additional contractor/supplier, ITT Grinnell Industrial Piping, Inc., from whom altered radiographs have been received by some nuclear plants (WNP-2 not included).

Has the S.S. considered the possibility that these may be examples of a generic problem related to safety-grade welds and radiographs received from the shops of off-site suppliers? For example, were the individual's motivations for altering

radiographs peculiar to the person or shop, or did they stem from conditions which might reasonably be expected to exist elsewhere? Is any further inquiry indicated?

20. What procedures does the S.S. have in place to assure follow-up and satisfactory close out of action items related to 10CFR21 reportable conditions or 1E bulletins?

21. The S.S. has reported difficulty in obtaining access to records of work performed under closed-out contracts. What is the present status?

22. Most nuclear power plant constructors receive letters from time to time alleging that certain work has not been performed in a safe manner, or has not followed proper procedures, or that other potentially unsafe conditions exist.

    How does the S.S. handle allegations of this kind? Are they investigated and disposed of by some formal process, or are they handled informally. At what management level are they handled?

10/28/82

TAA QUESTIONS FOR WNP-2 PVP AUDIT
(Set #3)

(NOTE: This list supplements Set #1, questions 1 through 14, Set #2, questions 15 through 22, previously submitted to the Supply System.)

23. QA Audit No. 82-218 - There is no evidence of Project Engineering review of vendor drawings, specifications and other documents. In addition, the audit does not touch on as-building procedure and policy and, in particular, how these will fit with SS reverification program.

24. 10 CFR 21 Potentially Reportable Condition #82-04 - What were GE requirements on location of pressure switches for RHR? Will the reverification program recognize other water hammer findings about BWR RHR systems?

25. 10 CFR 21 Potentially Reportable Condition #82-06 - How does reverification plan to address separation?

26. Duplicates Question 20.

27. What is the status of access to the closed out contractors' and suppliers' records? My recollection is that some of these QA records are in very poor shape, and in others, unobtainable.

28. What contractual remedy exists if a contractor, Johnson Control, does not utilize qualified personnel nor maintains a Quality/Certification program? (ref. Report #2 to NRC.)

29. What changes in sampling procedures were made, if any, as a result of finding unacceptable radiographs on Contract 215, WBG? (ref. Report #7 and 8 to NRC)

30. What weld inspection or radiographs require disposition by the architect-engineer and why? (ref. Reports #8 and 10 to NRC.)

31. What is the policy regarding quality verification and reinspection for off-site shops? (ref. Report #10 to NRC and audit reports.)

32 What and who determines sampling size and statistical sampling logic?

33. What action has the S.S. taken or planned as a result of IE Information Notice 82-16 on HPCI/RCIC high steam flow set points?

TAA STEAM TURBINE QUESTIONS FOR WNP-2 PVP AUDIT (Set #4)

34. What does WPPSS plan to do in addition to memo of 9 September 1982 by J. M. Yatabe to R. V. Laney, with enclosures, in view of statement in EPRI-project 1398-5 Volume 2, page 3-24, "It should be noted that cracking occurred in the single BWR plant in which Westinghouse rotors were used (Plant 0-1) and that the cracking in this plant was more widespread and more severe than in any of the PWR plants."?

35. What is blade length of last stage in the Westinghouse turbine?

36. Is the steam reheated before the Westinghouse low pressure unit?

37. Is the arrangement in the Westinghouse turbine such that water cutting can occur, as described in EPRI report?

38. How many reports and what are the titles of the reports which Westinghouse has submitted to the NRC, as mentioned in "WNP-2 Status of Turbine Missile Issue"?

39. a) When will WPPSS know NRC's reaction to Westinghouse inspection methods and reports which have been submitted to NRC?
    b) What will WPPSS do if NRC requires substantial changes to Westinghouse proposed methods and approval if delayed beyond WPPSS start up?

40. What are the details of the WPPSS surveillance program which the NRC has accepted?

41. The memo on "Recommended Strategy-WNP-2 Turbine" has four Recommended Course of Action. This statement leaves open questions as follows:
    a) What does the procurement contract define?
    b) What does the specifications identify?
    c) What is the recommended steam purity in oxygen and copper at turbine entrance?
    d) What action will be taken if a condenser leak occurs?

42. Is the recommended strategy satisfactory for WNP-2 considering the long building period, the long storage of the turbine, and the increased knowledge of stress corrosion cracking?

43. Turbine history
    a) When was the turbine delivered to WPPSS in Richland?
    b) When was the turbine accepted by WPPSS?
    c) When was the turbine first rotated?
    d) How long has it been rotated?
    e) Was steam used for rotation?
    f) In what turbine was steam used?
    g) What steam purity was specified for this use?
    h) Total length of steam rotation use?
    i) Has turbine been inspected - will it be inspected?

TAA QUESTIONS FOR WNP-2 PVP AUDIT
(Set #5)

44. Refer to letters Matlock to Engelken (NRC) of September 23 and September 28, 1982, concerning reportable conditions #22, 37, 40, 49, 53, 54, 60, 64 and 82 in electrical cable routing, and reportable conditions #10, 58, 62 and 83 in concrete expansion program, and #73, deficiencies in grout.

Both letters refer to "reopening" these 10CFR50.55's, which indicates they once had been closed. If this interpretation is correct, i.e. if they were once closed and have now been reopened, TAA has these questions:

a) What was the justification for closing them, and when was this done?

b) What was the reason for reopening?

c) Has the SS considered whether these may be examples of a wider problem?

45. Refer to letter Matlock to Engelken (NRC) of September 1, 1982, on reportable condition #175, WBG radiographs, Attachment A, page 2, para 5.

This paragraph states that, after reshooting 192 WBG radiographs, it was found that there was no significant difference between the original WBG and the new Bechtel film; that all 192 welds were accepted; and that, as a consequence, the review program for evaluating film quality was modified. Explain in what respects the review program was modified, and whether the original 1373 radiographs were re-reviewed to the new standard.

46. Refer to letter Glasscock to Forrest (B&R) of September 27, 1982, QA-82-201, subject, SS QA audit of Burns & Roe No. 82-219.

On page 4 of the report is a reference to previously identified QFR's, showing that QFR 2 from Audit Report 82-4 is overdue and therefor has become a violation of 10CRF50. What additional management level action has the SS taken towards B&R, in addition to the September 27 letter to Forrest, to bring about compliance with QFR 2.

Section A, page 1, final paragraph states that a B&R verification checklist was completed by an employee who was involved in the original design. What has B&R done to correct?

Section A, page 3, para. 2. What has B&R done about the pre-xeroxed" checklists with signatures filled in? What investigation has SS made of the implications of this practice?

47. Bechtel Audit 5.4-1, 8-23-82 thru 9-9-82. Has a response, scheduled for October 18, 1982, been received?

LIST OF DOCUMENTS REVIEWED BY TAA PANEL IN PREPARATION FOR NOV. 19-22 ON-SITE AUDIT

1. WNP-2 Program Director's Monthly Progress Reports for July, August, and September, 1982.

2. 10 CFR 50.55(e) Potentially Reportable Conditions for August and September, 1982.

3. NRC Region V Inspection Reports issued in August, 1982.

4. Supply System Corporate Audit Reports issued in August and September, 1982.

5. Bechtel Audit Reports issued in August and September, 1982.

6. Contractor Audit Reports issued in August and September, 1982.

7. Summaries of QVP Contractor Audit Reports for Peter Kiewitt Sons Co. (210A), Oliver B. Cannon & Son (234), Sentry Automatic Sprinkler Co. (217), Oliver B. Cannon & Son (219), The Waldinger Corp. (216), Pittsburg DesMoines Steel Co. (213A).

8. NRC IE Bulletin 82-01 of March 31, 1982; Rev. 1 of May 7, 1982, and Rev. 1, Supplement 1 of August 18, 1982, concerning Alteration of Radiographs by Assoc. Piping and Engineering and ITT Grinnell Industrial Piping.

9. WNP-2 letter to NRC Region V in response to IE Bulletin 82-01.

10. Supply System (John M. Yatabe) letter of Sept. 9, 1982, to TAA (R.V. Laney) forwarding internal S.S. report, "Status of Turbine Safety Issues", and S.S. internal memorandum of Aug. 17, 1982, "Recommended Strategy-WNP-2 Turbine.

11. "Steam Turbine Disc Cracking Experience", EPRI report NP-2429, Volume 2 of 7, Data Summaries and Discussion.

12. Paper "Finding the Flaws in Nuclear Power Plants", by Evan Herbert, published in IEEE Spectrum, Sept., 1982.

13. Article "Serendipity - and Nondestructive Examination", by Spencer H. Bush, published in the National Academy of Engineering "Bridge", Spring, 1982.

14. IE Bulletin 81-03 on Flow Blockage of Cooling Water by Clams and Mussels, dated April 10, 1981.

15. WNP-2 letter to NRC Region V of July 6, 1981, responding to IE Bulletin 81-03.

16. Supply System procedures: System Technical Turnover Package, SDE Inst. 3.1; Design Reverification, SDE Inst. 3.5; WNP-2 Findings Review Committee (CPP 4.3.7).

17. Supply System bi-monthly progress reports to NRC concerning progress of Restart and Quality Reverification Programs per 10 CFR 50.54(f) of July 17, 1980: Reports No. 1, dated Oct. 16, 1980, through No. 12, dated Oct. 19, 1982.

18. Supply System Corporate Assessment of Quality Verification Program, dated June 3, 1982.

19. QVP Office Response to above assessment dated Aug. 13, 1982.

20. Bechtel Audits No. 10.4.2 and 13.3.1 of Johnson Controls, Inc., dated June 28-July 6, 1982.

21. Fishbach-Lord formal audit report 82-13, of July 23, 1982.

22. Bechtel Audit No. 13.8.1 of Sentry/Lord, of April 1, 1982.

23. Bechtel Audit No. 10.7.1 of WBG, of Aug. 3, 1982.

24. WNP-2 Project QA Audit No. 82-1 of Quality Verification Program, dated Jan. 20, 1982.

25. Bechtel Audit No. 13.4.1 of The Waldinger Corp., dated March 4, 1982.

26. WNP-2 Project Quality Control Audit of Bechtel/ Pittsburg DesMoines Steel, No. 13.7.1, dated Jan. 28 to Feb. 4, 1982.

27. "High Pressure Core Spray System Design Reverification Plan", Oct. 29, 1982.

28. Charles Q. Miller Progress Reports to TAA Panel Nos. 1 and 2, dated Sept. 17, 1982, and Nov. 12, 1982.

29. Salomon Levy letter report to the TAA Panel dated Nov. 15, 1982.

LIST OF DOCUMENTS RECEIVED AND REVIEWED BY TAA DURING AND AFTER AUDIT OF NOV. 19-22

1. Supply System notes titled "Design Verification" presented by J. M. Yatabe.

2. Vue-graphs, "WNP-2 Plant Verification Meeting with NRC", Nov. 10, 1982.

3. Qualifications of HPCS Team Members, presented by J. M. Yatabe.

4. "Quality Verification Program Summary Status Report", dated Nov. 19, 1982, presented by R. Knawa.

5. "Deficiency Evaluation Sheet, Small Bore ISOS", presented by R. Knawa.

6. WPPSS Instruction QVI-08, "Reverification Inspection Team Concept", dated May 13, 1982.

7. WPPSS Instruction QVI-09, "Special Structural Steel Reinspection Criteria, dated May 13, 1982.

8. S.S. document titled "Contract 215 Reverification Program."

9. Bechtel letter to S.S., BEC WNP-2-82-0437 of April 22, 1982, concerning "WNP-2 Reverification of WBG Pipe Weld Radiographs."

10. General Electric Co. letter, "Nuclear Wheel Newsletter No. 2", dated Nov. 12, 1982, plus Attachment I, "Nuclear Wheel Sonic Test Results."

11. General Electric "Nuclear Newsletter No. 2", Nov. 8, 1982.

12. Table I, "Steam Purity Recommendations", presented by J. M. Yatabe as an extract from a Westinghouse letter setting purity recommendations for steam entering the WNP-2 turbine.

13. "WNP-2 Plant Operations Summary", dated Oct., 1982, presented by J. D. Martin.

14. File of ten (10) WPPSS internal memos which reflect that the professional backgrounds of the Design Reverification Team Members and the Findings Review Committee Members have been examined and have been found to meet the S.S. Criteria of Independence.

15. Residual Heat Removal System Design Reverification Plan, dated November 5, 1982.

16. Reactor Feedwater System Design Reverification Plan, dated November 8, 1982.

17. Supply System letter D. C. Timmins to R. V. Laney et al, dated December 2, 1982, with enclosures concerning Structural Welding Code and the American Welding Society.

18. Supply System letter J. R. Honekamp to R. V. Laney et al, dated December 22, 1982, enclosing AWS D1.1 pages 20, 21, and 22; page 1 of Structural Welding Code General Provisions; and Supply System Memo SCN 82-165, containing a draft SAR change notice.

Technical Audit Associates, Inc.
Plant Verification Program Plan Evaluation Team
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March 8, 1983

Mr. Robert V. Laney
Technical Audit Associates
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Dear Bob:

Subject: RESPONSE TO TAA AUDIT REPORT DATED JANUARY 10, 1983

Enclosed is our response to your first audit report for the Phase II Program. We have addressed each TAA finding as well as observation No. 1 since this observation is closely tied to the design reverification program.

If you have questions related to our response, please call.

Very truly yours,

John Honekamp

John R. Honekamp
Technical Specialist

Enclosure

cc: Mr. F. B. Jewett, Jr.
Mr. L. H. Roddis, Jr.
Mr. H. E. Sheets
Mr. S. Levy
Mr. C. Miller

RESPONSE TO TAA AUDIT REPORT
DATED JANUARY 10, 1983

TAA Finding No. 1

Based on a review of documents in the Supply System's files, we believe that the Supply System personnel engaged in design reverification activities and members of the Findings Review Committee meet the criteria for assessing independence set forth in the Supply System memorandum of June 30, 1982.

Supply System Response

No response required.

TAA Finding No. 2

All three design reverification plans should give greater consideration to system-to-system interactions. We recommend that a spot check be made of the adequacy of those portions of important interfacing systems which are vital to the functioning of the three systems being reverified.

Supply System Response

The design reverification plans as currently written include the principle functional interfaces (e.g., water supply, containment isolation, pipe and equipment mounting, electrical power supply and instrumentation and control). Cross-system interactive design dependencies were not included in the original plans to their ultimate design impact. However, a few cross-system interactive design dependencies (e.g., HPCS diesel heat loads, jet impingement loads and RHR pump room flooding) were included to check if the correct design input had been fed into the dependent system design. In response to the TAA concerns expressed during the November, 1982 audit, the Supply System has augmented the basic plans to include several cross-system interactive reviews covering equipment qualification, fire protection and pipe break/jet impingement/flooding/missile protection. Draft copies of these supplemental review plans were transmitted to TAA in advance of the January, 1983 audit. We believe that the design review plans as supplemented by the interactive reviews address the TAA concerns and provide a substantive check of both the primary functional interfaces and key cross-system interactions.

TAA Finding No. 3

The Supply System should incorporate in the reverification process for each of the three systems a way of showing clearly how FSAR design commitments are reflected into engineering requirements documents and into final detail design.

Supply System Response

As discussed during the January, 1983 TAA Audit, the process by which the reverification reviews check if FSAR commitments are incorporated into the implementing design documents and the final design consists of several steps. First, FSAR commitments are compared with the design implementing documents. The results of this comparison are contained in the Requirements Reverification Report which was transmitted for your review on January 17, 1983. Implementation of the design requirements into the final design is checked in the Design Reverification Reviews. These reviews utilize a series of system level, component level and field inspection checks to probe details

of the design for a sample of key components and system design features. The checks cover a range of design process elements from specification of design inputs to feedback of as-built data from the field. Some of these checks have a direct relationship to specific FSAR commitments while others, due to the depth of the review, are several levels of detail removed from the basic FSAR commitment. However, the record of the reviews will indicate what was checked, how it was checked and the source of the information used in addition to the results of the check.

TAA Finding No. 4

The Supply System should select and validate the design of a small number of A-E specified, plant specific, prepurchased components from the three systems, checking on vendor design and A-E review of vendor design.

Supply System Response

The design verification plans as currently written include a number of components procured (prepurchased) by the A-E (Burns & Roe). These components are listed in Enclosure 1. As indicated, some of these component procurements by the A-E were based on process specifications provided by the NSSS vendor (General Electric) while others were specified and purchased by Burns & Roe. While it is true that these components are "standard" items (pumps, valves, motor controllers, etc.), they are representative of the major components and design interfaces involved in the systems under review. The main plant specific A-E specified components in these systems are the piping and supports. In this area, our sample includes pipe and supports designed by the A-E, by an A-E subcontractor (Gilbert Commonwealth) and by a construction contractor (Johnson Controls). In response to your request for A-E specified, plant specific prepurchased components, we will include in our review several Quality Class I, Seismic Category I instrument racks procured by Burns & Roe. These instrument racks will, of necessity, be selected from systems other than HPCS, RHR or RFW. The HPCS and RHR instrument racks were provided by GE, and the RFW instrument racks are not Quality Class I, Seismic Category I. The review of these instrument racks will address the following general areas:

- Was the design, as specified, adequate for its intended operation?
- Did the vendor provide what was specified (i.e., check vendor qualification tests)?
- Were the instrument racks installed as designed and delivered, or if changes were made, were they reconciled with the vendor design/ qualification tests?

TAA Finding No. 5

In view of the significant number of additional loads which have been added to floors and bulkheads since they were originally designed, especially the additional loads represented by piping supports and restraints, we believe that the Supply System should make a spot check of a selected heavily loaded area to determine if the original structural design is still adequate. The bulkhead which supports the Main Steam Isolation Valve may be an appropriate example for this purpose.

Supply System Response

Initially, local pipe hanger and restraint loadings outside containment were considered in structural wall and floor designs by using specified load levels for equipment types for floor loadings. This loading level varies by area within the plant. Burns & Roe established criteria for controlling spatial separation of hanger and support loads that may be applied to embedded plates or by means of expansion bolts which were given to contractors for their detailed designs. Burns & Roe reviews the contractor design and resulting local loadings from the different contractors to assure that structures to which supports are attached are not overloaded. In addition, since January 1982, Burns & Roe checks the local loading caused by pipe support designs prior to issuance for construction.

In the room turnover process, Burns & Roe performs a walkdown to identify areas of highly loaded or congested areas. The local hanger and restraint loads are assembled and an overall slab loading check is made. The results of the walkdown and slab loading check are documented in calculations.

Because of reviews resulting from the retrofit of hydrodynamic loads into the equipment and structures attached to and inside of the containment, additional controls were instituted to assure acceptable load levels were maintained for these areas. Particular emphasis was placed on the radial beams and the primary containment structure. Burns & Roe reviews all attachments to these structures and verifies the overall structures' capacity to accept the required loads.

As a check of the Burns & Roe program, the design reverification reviews will review the north wall of the steam tunnel which supports seismic restraints, pipe whip restraints, dead load of mainsteam line and other piping. The wall was chosen on the basis of being a very heavily loaded wall. The review will include:

- Review Burns & Roe walkdown results as documented in calculations.
- Perform walkdown to identify supports and equipment attached to north steam tunnel wall.
- Review overall wall loading calculations to verify their completeness and adequacy. This includes evaluating applicable load combinations.

TAA Finding No. 6

We recommend that QVI-09 be revised to make clear that its purpose is to permit, with the A-E's case-by-case approval, certain specific deviations from the AWS D1.1 code when found upon reinspection in selected applications. If this were done, we would see no objection to its use as a basis for disposing of the specified deviations.

We recommend also that the Supply System clarify whether QVI-09 is intended to apply to the sacrificial shield wall and pipe whip restraints.

Supply System Response

Quality Verification Instruction No. 09 (QVI-09) has been revised to make clear that it is a generic disposition for limited deviations from AWS D1.1 in specific applications. Enclosure 2 provides the Burns & Roe input to the revised section of QVI-09.

The inspection criteria contained in QVI-09 (Enclosure 3) and FSAR Amendment 27 (Enclosure 4) are both correct as written. Category B of the inspection criteria does include the sacrificial shield wall (SSW) and pipe whip restraints (PWRs). However, the reinspection of both of these areas was completed prior to the use of QVI-09. Hence, the statement in FSAR Amendment 27 that the SSW and the PWRs were reinspected to AWS D1.1 is correct.

TAA Finding No. 7

The apparent coincidence of discontinuing film quality review of WBG radiographic film, coupled with the subsequent decline in the percentage of welds actually rejected for weld quality should be investigated by the Supply System and the results documented.

Supply System Response

The Supply System has directed Bechtel to review all the data from both phases of the WBG radiograph reevaluation for trends or patterns that explain the apparent anomaly in the results. This includes an examination of the film density data taken during the first phase of the program. A draft report of the Bechtel review has just been issued. Upon evaluation of the Bechtel report, the Supply System will determine if further investigation is warranted.

TAA Finding No. 8

If it is true that the Burns & Roe team engineer has authority to accept or reject structural welds which do not meet the acceptable deviation criteria of QVI-09, we believe that this authority should be withdrawn and that such decisions should be referred to the responsible B&R structural design supervisor.

Supply System Response

The activity referred to in Finding No. 8 is the Team Inspection conducted under Quality Verification Instruction No. 08 (QVI-08). This activity utilizes Burns & Roe (BRI) design engineers as members of field inspection teams reexamining work completed prior to the July, 1980 stop work. The BRI engineers disposition minor deviations within their discipline authority on the Quality Control Inspection Report (QCIR) if they are acceptable as is. Deviations which are not acceptable as is or which require more extensive evaluation are dispositioned via the normal Nonconformance Report process. It is our position that the Team Inspection process conducted under QVI-08 meets the requirements of 10CFR50 Appendix B for identification and control of nonconforming conditions.

As indicated during your November, 1982 audit, the Quality Verification Program (QVP) management identified several problems in reviewing the records of dispositions prepared by one of the BRI engineers formerly assigned to the Team Inspections. Based on this review, QVP management has requested that BRI evaluate all the dispositions prepared by this engineer. The results of this evaluation are expected to be available in March.

The basic reinspections conducted under QVI-08, except for the reevaluations mentioned above, have been completed. However, the procedure is being revised to strengthen the Team Inspection process in the event that additional reinspections are required as part of the Quality Verification Program.

TAA Observation No. 1

The Supply System should consider incorporating into the Design Reverification Program a separate check of the effectiveness of the As-Built Drawing Program, both as to its timeliness for producing as-builts and as to their accuracy in reflecting the actual plant hardware as installed.

Supply System Response

TAA did not request a response to the observations presented in the audit report. However, Observation No. 1, which relates to as-built drawings, is so closely tied to the Design Reverification Reviews that a response is warranted. It is correct that problems have been encountered in producing final as-built data for use by Burns & Roe in their final stress reconciliation. As discussed during the January, 1983 audit, delays in completion of some pipe supports and problems in producing satisfactory as-built data has resulted in a schedule slippage in our design reverification activities in the piping and support area. However, it is not correct that the Design Reverification Reviews do not include a check of the effectiveness of the as-built program. The piping and support segment of the Design Reverification Reviews have always included an independent verification of the accuracy of the as-built configuration used by Burns & Roe for their final stress reconciliation. As a result of delays in this area, we may need to modify the sequence in which we planned to conduct our reviews. However, checks of the as-built configuration will be performed.

In addition to the as-built configuration checks in the pipe and support area, a number of other field inspection checks are included in the Design Reverification Reviews. Some examples include: confirmation that name plate data on selected mechanical, electrical and I&C components match the specified requirements, a check that manufacturer and model number of selected Class IE components match the equipment qualification records and checks that selected components are installed per functional and general arrangement drawings.

The primary focus of the Design Reverification Reviews in this area is on the accuracy of as-built records. While some information on timeliness of as-built data may fall out of the design reverification checks, an overall assessment of the schedular aspects of the as-built program is more properly addressed by the WNP-2 program management. For your information, the as-built program as required to meet IEB 79-14 is receiving substantial management attention and resources and is an integral part of construction completion.

ENCLOSURE 1

A-E PREPURCHASED COMPONENTS INCLUDED
IN DESIGN REVERIFICATION PLANS

Component Description		Process Requirements Specified By	Component Purchased By	Component Manufactured By
HPCS				
Valve	HPCS-V5	GE*	BRI	Velan
Valve	HPCS-RV-35	GE	BRI	J.E. Louergon Co.
Restricting Orifice	HPCS-RO-4	BRI*	BRI	Permutit
Pump Suction Strainer	HPCS-ST-2	GE	BRI	Zurn
Water Leg Pump Motor	HPCS-M-3	BRI	BRI	GE
Motor Controller for Water Leg Pump	HPCS-42-4A7C	BRI	BRI	Gould
RHR				
Valve	RHR-V-3B	GE	BRI	Velan
Valve	RHR-V-24B	GE	BRI	Anchor Darling
Flow Control Valve	RHR-FCV-64B	GE	BRI	Fisher
Valve Motor Operators	(Various)	GE	BRI	Limitorque
Motor Controllers	(Various)	BRI	BRI	ITE
Circuit Breaker	RHR-P-2B	BRI	BRI	Westinghouse
RFW				
Main Feed Pump	RFW-P-1A	GE	BRI	Ingersoll Rand
Feed Water Heaters	COND-HX-5A	Westinghouse	BRI	S.W. Eng.
	RFW-HX-6A	Westinghouse	BRI	S.W. Eng.
Flow Control Valve	RFW-FCV-15	BRI	BRI	Fisher
Valve	RFW-V-32	BRI	BRI	Anchor Darling
Valve	RFW-V-6J	BRI	BRI	Velan

*GE = General Electric; BRI = Burns & Roe, Inc.

ENCLOSURE 1

A-E PREPURCHASEC COMPONENTS INCLUDED
IN DESIGN REVERIFICATION PLANS

Component Description		Process Requirements Specified By	Component Purchased By	Component Manufactured By
Signal Converter	RFW-E/P-10	BRI	Circle AW	Fisher
Flow Element	RFW-FE-15	BRI	BRI	Vickery Simms
Flow Transmitter	RFW-FT-15	BRI	Circle AW	Rosemount
Signal Converter	RFW-E/P-15	BRI	BRI	Fisher
Motor Controller	RFW-42-7A3C	BRI	BRI	ITE

ENCLOSURE 2

Burns and Roe, Inc.

Nuclear Project No. 2 – Washington Public Power Supply System • P.O. Box 200 • Richland, Washington 99352 • 509-377-2501 • 509-943-8200

Subject: Work Order 3900/4000
Washington Public Power Supply System
WNP-2
Contract 215
RCSW - Quality Verification Instruction Manual
Justification for WNP-2 Visual Examination
Criteria (QVI-09)
Responds To: N/A

RECEIVED
JAN 19 1983
QVP OFFICE

January 19, 1983
BRWP-F-83-0434
Response Required By: N/A

Washington Public Power Supply System
P.O. Box 968
Richland, WA 99352

Attention: Mr. R.L. Knawa

Reference: BRWP-F-83-0088, dated January 7, 1983

Gentlemen:

Attached is Attachment 1, "Justification for WNP-2 Visual Examination Acceptance Criteria" for incorporation into QVI-09 of the RCSW - Quality Verification Instruction Manual.

The wording has been modified slightly for clarification since the "draft" which was transmitted earlier.

Should there be any questions regarding this matter, please contact this office.

Very truly yours,

R L Schlosser

for A.I. Cygelman,
Manager, Site Engineering

AIC/WNC/RLS/bab
Attachment
cc: WS Chin, BPA
HA Crisp, 901A
BA Holmberg, 906D
RT Johnson, 917B
TA Mangelsdorf, BPC

JUSTIFICATION FOR WNP-2 VISUAL EXAMINATION ACCEPTANCE CRITERIA

The use of the AWS D1.1 code for the WNP-2 Plant was specified by the Engineer as the applicable structural welding code on behalf of the Owner, and as such AWS D1.1-72 is identified in the FSAR. Unlike the ASME code, the use of the code is not a mandatory State or NRC regulatory requirement. The Engineer has the authority under the AWS code to modify selected provisions of the AWS code to suit a particular application.

It is important to understand that the AWS D1.1 code is the applicable structural code for both completed work (first-line inspection) and ongoing construction. Site construction and inspection procedures require that welds be made to the applicable AWS criteria and that the first-line inspection be performed in accordance with the AWS D1.1 code. In cases where deviations are evaluated by the Engineer to be non-significant in terms of the ability of the component to perform its designed function, the Engineer has the authority to disposition the deviation "accept-as-is" as appropriate, or compensate for the deviation by additional evaluation or have construction performed to an approved, revised design.

During the initial QVP reinspections of completed work, a number of minor deviations with respect to some AWS criteria were encountered which were evaluated by the Engineer as acceptable in certain categories of application. Since the specific deviations had been evaluated by the Engineer to be acceptable for these categories of application, the processing of additional deviations of the same type in the same categories served no purpose.

Thus, a generic disposition was developed by the Engineer for acceptance of specified deviations from the AWS D1.1, 1972 code in selected applications. This generic disposition has taken the form of a revised inspection criteria for use by the QVP for reinspection of completed work. These criteria are embodied within the reverification inspection requirements in Attachment 2 of QVI-09.

BA Holmberg - 906D
JD Martin - 927M
RG Matlock - 901A
RM Nelson - 905A
PL Powell - 905A
GC Sorensen - 340
CD Taylor - 905A
WW Waddel - 570
JM Yatabe - 410
Docket File
kt/file-906D
PL2/LB
BAH/LB-906D
LTH/LB-906D
GDB/LB-370
JDM/LB-927M
sf(2)

WG Conn - B&R RO
A [illegible]eraaen - B&R NY
NS Reynolds - D&L
WNP-2 Files

ENCLOSURE 3

Docket No. 50-397

RECEIVED
JAN 21 1983
WNP-2 Program Director

January 17, 1983
G02-83-007

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: NUCLEAR PROJECT NO. 2
WNP-2 PROJECT VISUAL EXAMINATION ACCEPTANCE CRITERIA FOR REVERIFICATION INSPECTION OF WELDED STRUCTURES (QVI-09, REV. 0)

During a reinspection of structural steel and miscellaneous metal welds, certain exceptions were taken to AWS D1.1. These exceptions are described in the attached report, QVI-09, and referenced in the WNP-2 FSAR, Page 3.8-190.

Very truly yours,

G. D. Bouchey, Manager
Nuclear Safety and Regulatory Programs

sm

Attachment

cc: R Auluck NRC
WS Chin BPA
R Feil NRC

AUTHOR: CD Taylor			FOR SIGNATURE OF: GD Bouchey		
SECTION					
FOR APPROVAL OF	RM Nelson	BA Holmberg	LT Harrold	JD Martin	GC Sorensen
APPROVED	1/5/83	1/18/83	1/12/83	1/13/83	1/14/83
DATE					

WP-387

QVI-09
Rev. 0

WNP-2 PROJECT

VISUAL EXAMINATION ACCEPTANCE CRITERIA

FOR

REVERIFICATION INSPECTION

OF

WELDED STRUCTURES

Approved _____ 5-12-82
Burns & Roe, Inc.
A. I. Cygelman

Attachment 2
(Page 1 of 9)

1.0 SCOPE

This document provides visual examination acceptance criteria for reverification inspection of structural steel and miscellaneous metal welding performed in accordance with AWS D1.1, the Structural Welding Code. These criteria reflect requirements consistent with the engineering approval specified in AWS D1.1 for evaluation of structural welding. This document also includes acceptance standards for light gauge HVAC ductwork, and other systems which are not specifically covered by AWS D1.1.

1.1 These criteria shall be used by Construction Quality Control for performing reverification inspection by including it on the QCIR as an applicable inspection reference criteria document to evaluate deviations to AWS D1.1.

2.0 CODES AND STANDARDS

The criteria in this document provide the basis for visual examination of AWS D1.1 welding. The required engineering approval, as specified in Paragraphs 3.7.4 and 3.7.5 of AWS D1.1 has been provided by the Architect Engineer. Authorization for this is given in Paragraph 1.1 of AWS D1.1.

3.0 BASIS FOR EVALUATION

The applicable weld categories will be entered on the QCIR as a part of the inspection reference criteria based upon the definitions described below.

3.1 Category A Welds

Must be in accordance with the visual acceptance criteria of the specified section of AWS D1.1. This category applies to elements of fans, cranes, rotating equipment, and other machinery subject to frequent stress reversals.

3.2 Category B Welds

Have an acceptance level modified to meet the required service conditions. This category applies to members of the building frame that carry principal design loads, radial beams, sacrificial shield wall, pipe whip restraints, pipe supports, and similar principal load bearing structures.

3.3 Category C Welds

Are connections between Category B Steel and Miscellaneous Metal.

3.4 Category D Welds

Are not part of the main building frame, but rather provide support or framing for electrical, instrumentation, and HVAC systems, components and equipment. Also included in the D Category are welds joining miscellaneous metal including, but not limited to, stairways, embedments, fan housings, doors, windows, hatches, frames, ledger angles, gratings and their supports.

3.5 Category E

Is an acceptance level established for relatively thin materials such as HVAC ductwork, cable trays, and unistrut supports.

4.0 ACCEPTANCE CRITERIA

Acceptance shall be based on the weld joint meeting each criteria listed for the applicable category. Skewed joints will be evaluated in accordance with Contract Specifications and Project Engineering Directives.

4.1 Category A Welds

4.1.1 Category A welds must comply with the visual examination requirements of the specified section of AWS D1.1.

4.2 Category B Welds

4.2.1 Oversize Fillet Welds

The weld shall meet or exceed the specified size requirements. Either or both fillet weld legs may exceed design size. Welds may be longer than specified. Continuous welds may be accepted in place of intermittent welds. Unequal leg fillet welds are acceptable, provided the smaller leg meets or exceeds minimum requirements.

4.2.2 Undersize Welds

4.2.2.1 The fillet leg dimension shall not under run the nominal fillet size by more than 1/16 inch. For flange to web joints the undersize condition may not be within two flange thicknesses of the weld end.

4.2.2.2 Groove welds may be underfilled by 5 percent or 1/32-inch, whichever is greater.

4.2.3 Porosity and Slag

4.2.3.1 The weld may contain a maximum of 5 percent by surface area of unaligned porosity and/or slag.

4.2.4 Profile

4.2.4.1 Convexity height, roll over, and butt weld reinforcement are acceptable.

4.2.5 Craters

4.2.5.1 The weld may have an underfilled crater, provided the underfill depth does not exceed 1/16 inch, and the crater has a smooth contour blending gradually with the adjacent weld and base metal without acute notches.

4.2.6 Undercut

4.2.6.1 Continuous undercut shall not be greater than: 1/32 inch for material 3/8 inch and less; 1/16 inch for material over 3/8 inch thick.

Intermittant undercut may be twice the value for continuous undercut for a maximum accumulated length of 10% of weld length. Localized undercut less than 3/8 inch in length may be accepted provided the depth does not exceed 3/32 inch for thickness 3/4 inch and less or 1/8 inch for thickness over 3/4 inches.

4.2.7 Cracks

4.2.7.1 Cracks are unacceptable.

4.2.8 Fusion

4.2.8.1 Incomplete fusion between weld metal and base metal is unacceptable.

4.2.9 Weld Spatter

4.2.9.1 Weld spatter shall be acceptable.

4.2.10 Arc Strikes

4.2.10.1 Arc strikes are acceptable provided there are no cracks.

4.2.11 Backing Fitup

4.2.11.1 The fitup of backing bars is not a basis for rejection.

4.3 Category C Welds

4.3.1 The welds on the main frame member side shall meet the requirements for Category B.

4.3.2 The welds on the miscellaneous metal side shall meet the requirements for Category D.

4.4 Category D Welds

4.4.1 Oversize Fillet Welds

4.4.1.1 The weld shall meet or exceed the specified size requirements. Either or both fillet weld legs ~~may exceed design size. Welds may be longer~~ than specified. Continuous welds may be accepted in place of intermittent welds. Unequal leg fillets are acceptable, provided the smaller leg meets or exceeds minimum requirements.

4.4.2 Undersize Welds

4.4.2.1 The fillet leg dimension shall not under run the nominal fillet size by more than 1/16 inch.

4.4.2.2 Groove welds may be undersize by 5 percent or 1/16 inch, whichever is greater.

4.4.3 Porosity and Slag

4.4.3.1 Porosity and slag are not a basis for rejection.

4.4.4 Profile

4.4.4.1 Convexity height, roll over, and butt weld reinforcement are acceptable.

4.4.5 Fusion

4.4.5.1 Incomplete fusion between weld metal and base metal is unacceptable.

4.4.6 Undercut

4.4.6.1 Undercut not exceeding 3/32" for material up to 3/4" thick, and 1/8" for material over 3/4" thick, may be acceptable for the full length of the weld.

4.4.7 Craters

4.4.7.1 Underfilled groove weld craters shall be accepted provided the depth of underfill is 1/16 inch or less. Underfilled single-pass fillet weld craters shall be accepted provided the crater length is less than 5 percent of the weld length. On multi-pass fillet welds a crater depth of 1/16 inch or less is acceptable.

4.4.8 Cracks

4.4.8.1 All cracks are unacceptable.

4.4.9 Misalignment

4.4.9.1 Misalignment not in excess of the thinner member thickness is acceptable.

4.4.10 Arc Strikes

4.4.10.1 Arc strikes are acceptable provided there are no cracks.

4.4.11 Backing Fit-Up

4.4.11.1 The fit-up of backing bars is not a basis for rejection.

4.4.12 Weld Spatter

4.4.12.1 Weld spatter shall be acceptable.

4.5 Category E Welds

4.5.1 Oversize Fillet Welds

4.5.1.1 The weld meets or exceeds specified size requirements. Either or both fillet weld legs may exceed design size. Welds may be longer than specified. Continuous welds may be accepted in place of intermittent welds. Unequal leg fillets are acceptable, provided the smaller leg meets or exceeds minimum requirements.

4.5.2 Undersize Welds

4.5.2.1 The fillet leg dimension may not under run the nominal fillet size by more than 1/16 inch. Fillet weld size need not be greater than the thickness of the thinner member.

4.5.2.2 Groove welds may be undersize by 5 percent by 1/32 inch, whichever is greater.

4.5.3 Porosity or Slag Inclusions

4.5.3.1 Porosity or slag inclusions are not a criteria for rejection.

4.5.4 Profile

4.5.4.1 Convexity height, roll over, and weld reinforcement are acceptable.

4.5.5 Cracks

4.5.5.1 All cracks are unacceptable.

4.5.6 Fusion

4.5.6.1 Incomplete fusion between weld metal and base metal is unacceptable.

4.5.7 Undercut

4.5.7.1 (Same as 4.2.6.1)

4.5.8 Misalignment

4.5.8.1 Misalignment is not a basis for rejection.

4.5.9 Corner Welds

4.5.9.1 Corner welds used to seal ductwork are designated partial penetration welds. Such welds do not require full fusion. Weld reinforcement greater than the material thickness shall verify the adequacy of the weld, provided that the toes of the weld have complete fusion.

4.5.10 Burn-through

4.5.10.1 Fillet welds joining turning vanes to turning vane rails or to heavier gauge ductwork may exceed the profile and convexity limits as previously described and are acceptable for this application. Minor burn-through on vanes will be permitted up to 1/4 inch in length, provided equivalent lengths of fillet welds are added to compensate for welds weakened by burn-through 4.5.10.2. Burn-through is permitted provided there are no visible through-thickness holes. Metal flow on the inside of the duct is permitted, provided it is fused completely with the parent metal and metal thickness is not reduced by greater than 50 percent.

4.5.11 Arc Strikes

4.5.11.1 Arc strikes are acceptable provided there are no cracks.

4.5.12 Weld Spatter

4.5.12.1 Weld spatter shall be acceptable.

4.5.13 Backing Fit-Up

4.5.13.1 The fit-up of backing bars is not basis for rejection.

TABLE 3.8-9 (Continued) Page 3 of 8

REFERENCE NUMBER	DESIGNATION	TITLE	EDITION
18	AISC-69	Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings	Feb. 12, 1969
19	AISC-68	Specification for the Design of Light Gauge Cold-Formed Steel Structural Members	1968
20	AWS D1.1-72	Structural Welding Code	1972**
21	AWS D12.1-61	Recommended Practice for Welding Reinforcing Steel, Metal Inserts, and Connection in Reinforced Concrete Construction	1961

** As part of the WNP-2 Quality Verification Program, visual reinspection of selected structural steel welds, including radial and structural framing systems, steam tunnel beams, and pipe hangers (AISC scope only), was performed under Supply System procedure QVI-09, Attachment 2.*** This procedure included alternative acceptance criteria to AWS D1.1.

These alternative acceptance criteria were established by the Architect/Engineer and determined to be acceptable based on specific knowledge of the design and the significance of these types of minor deficiencies. The criteria were implemented in order to provide a conservative and practical basis for performing a reinspection of the structural steel. Sacrificial shield wall and pipe whip restraint weld reinspections were performed to AWS D1.1.

*** Transmitted to NRC via letter GO2-83-007, G. D. Bouchey to A. Schwencer, "WNP-2 Project Visual Examination Acceptance Criteria for Reverification Inspection of Welded Structures", dated January 7, 1983.