REPORT OF AUDIT NO. 4

of the

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

performed by

TECHNICAL AUDIT ASSOCIATES, INC.

AT RICHLAND, WASHINGTON

on

July 20, 21, 22, 1983

August 29, 1983

APPROVED:

R. V. Laney

L. H. Roddis

H. E. Sheets

CONTENTS

I. Introduction

The Washington Public Power Supply System (Supply System or S.S.) retained Technical Audit Associates, Inc. (TAA) to review and comment on the Supply System's Plant Verification Program Plan (PVP), and to audit its implementation. TAA's review of the PVP plan 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 PVP completion. 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 completed 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.

This is the report of the fourth on-site audit conducted on July 20, 21, and 22, 1983. The audit agenda is attached

as Appendix A, and all agenda items were discussed. With the exception of L. H. Roddis, all members and consultants were present throughout. Mr. Roddis was present on July 21 and 22.

As in previous audits, TAA selected and reviewed numerous relevant documents before the audit began. These included all PFR's which had been issued, all FRC meeting minutes, and much of the correspondence between the FRC, Project, Burns and Roe, and General Electric related to PFR's. We received and reviewed the S.S.'s response to TAA's Findings No. 15 and 16 concerning equipment installation and alignment, correspondence between the S.S. and NRC Region V regarding prepurchase and inactive contracts, and various S.S., Bechtel, and contractor QA audit reports.

The TAA Panel forwarded to the S.S. a number of questions arising from their review of these documents. These formed the basis for audit discussions. The questions are attached as Appendix B.

No findings or observations resulted from this audit.

II. Project Status and NRC Construction Assessment Team (CAT) Visit

The WNP-2 Project Director, C. S. Carlisle, reviewed the status of the Project, giving particular attention to points of interaction with the QVP and design reverification programs. Construction and Test were reported to be about two weeks behind schedule, expressed in terms of system completion and turnover, preoperational tests completed, and major milestones. Critical items for plant completion were identified as system turnover, punch list work items, and preoperational testing.

Mr. Carlisle advised that the S.S. is planning a program to stress relieve critical reactor recirculating piping welds. He also stated that RHR system completion is controlling for loss of power testing and that, as a result, RHR as-built and final stress analysis may have to be handled as an addendum to the final design reverification report rather than included in it. He stated that BRI has received 75 percent of as-built data from construction and has completed 25 percent of the update of stress calculations.

The S.S. Project Construction Manager, H. A. Crisp, reviewed the recent CAT visit and comments. He then described the S.S.'s plans to respond to each of the areas of concern: as-built program; radiography and NDS; bolts, fasteners, and torquing; welding; disposition of deficiencies; and concrete. TAA will review the S.S. responses as a part of its assessment of QVP implementation.

III. S.S./Bechtel Program for Verifying Equipment Installation Completion

Mr. Crisp and Mr. Tony Arch of Bechtel discussed the above subject in the light of TAA's earlier Finding No. 15 and the S.S.'s written responses to it. That finding referred to a possible "hole" in the QVP program and was based on a design reverification program finding that RHR heat exchanger installations were apparently incomplete. In amplifying the S.S.'s earlier responses, they made these comments:

- The S.S. decided early in the QVP program that all Contract 215 equipment installations would be treated as incomplete, and hence would be included in Bechtel's construction completion scope rather than the QVP scope.

- Bechtel was in the process of strengthening its Equipment Installation and Alignment Procedure SWP/P-G-21 at the time of the RHR heat exchanger finding. Mr. Arch said he believes that the incomplete RHR heat exchanger installation would have eventually been discovered by Bechtel. In fact, it was discovered by S.S. Design Reverification Review personnel while checking on another related design change to the foundation.

- Bechtel's program for equipment completion includes reviewing drawings, installation manuals, and installation specifications, plus a walkdown inspection of 100 percent of approximately 430 equipment packages. Over 300 document package reviews and 83 walkdowns have been completed.

- The S.S. believes that the difficulties caused by Bechtel's taking over responsibility for the incomplete work of a terminated contractor are unique to the 215 contract, inasmuch as other contractors which were on-site at the time of work stoppage continued on the job.

TAA requested that the S.S. clarify the following points by letter:

- Was any 215 contractor equipment turned over directly by WBG to the S.S. Test and Startup Group?

- Provide a description of the scope of Bechtel's equipment completion program so as to show how it and the QVP program scope fit together and provide continuous and adequate coverage.

IV. QVP Status

Mr. R. T. Johnson, WNP-2 Project QA Manager, discussed the QVP program status, giving particular attention to several questions recently raised by NRC Region V. These concerns include the adequacy of sampling for prepurchased and inactive contracts, sample size for active contracts, sample expansion logic, vendor radiography and NDE verification, basis for determining the acceptability of contractor's work, and QVP implications of the CAT report.

Mr. Johnson reviewed the S.S.'s program for responding to Region V concerns. He stated that some of the task reports which are to be prepared may be issued as addenda to the QVP Program Overview Report. TAA requested copies of S.S. responses and will take these into consideration in preparing its assessment of QVP implementation.

V. Test and Startup Action on PFR's Referred to Them

This subject was discussed with WNP-2 Operations Manager, J. D. Martin, and Test and Startup Manager, G. K. Afflerbach. Mr. Afflerbach stated that he performs special tests which are required as a result of PFR's, according to the requirements of the FRC and to test procedures developed to satisfy those requirements. Test results are

then sent to Project Engineering and the FRC.

Both Mr. Martin and Mr. Afflerbach stated that the plant has shown satisfactory performance so far, based on having completed approximately 37 preoperational tests out of 106 to be completed.

VI. Review of Supply System Design Calculations

Mr. A. D. Kohler reported the results of a S.S. initiated review of design calculations made by the S.S. and internal audits involving those calculations. The review was performed by Stone and Webster's Engineering Assurance Division and was reported in June, 1983. This review was conducted as a result of questions about the correct handling of interfaces which arose during the design reverification program. The Stone and Webster review concluded that interfacing has been adequate and appropriate, but that increased administrative attention will be needed in the future to ensure that all aspects of the interface occur. Stone and Webster also observed that the S.S. Technology Directorate has been slow in responding to internal S.S. QA audits.

VII. Burns and Roe Calculation Closure Status

H. R. Canter and A. J. Forrest, both of BRI, reviewed the status of BRI's program for updating and closing design

calculations. This subject was raised by several PFR's which indicated that closure was late or that some calculations have not been reconciled to the latest design information.

Mr. Forrest reported that there has been a problem caused by lack of a unified calculation index and by administrative weakness in maintenance of calculation status and calculation records. He presented details of the total numbers of calculations, broken down by disciplines, concluding that only in the electrical discipline were significant recalculations or calculation update required. These affect a maximum of 22 cables which could require a size increase.

Mr. Forrest stated that all disciplines were found to require some additional calculation review, but that, except in the electrical area, these had minor technical significance. He presented an itemized account of all PFR's, showing those which are calculation related and those which have potential safety significance. This list shows two PFR's, RHR-25 and 30, are both calculation related and also have potential safety significance. Four others, HPCS-15 and 25, RFW-21, and EQ-11, involve calculations, but potential safety significance had not yet been determined.

In summary, the BRI presentation showed that calculation closure is handled by discipline supervisors, that stronger administrative controls are needed, that

a substantial number of calculations still require closure and approval, and that there is an across-the-board BRI program to do this. It should be noted that a majority of the calculations still unapproved are related either to the final as-built program still in progress or to the incorporation of hung loads in structural calculations which are to be performed at the time of room turnover.

The TAA Panel raised several questions concerning BRI's responses to specific PFR's referred to them by the FRC and the Project in which Burns and Roe stated that no action is required. These related to the BRI/GE interface and to considerations of optimizing an already satisfactory design. Mr. Forrest pointed out that the BRI/GE interface involves, in some instances, mandatory GE requirements, and in others GE recommendations which can, by agreement, be removed. PFR-HPCS-16 is such a case in which, by agreement between BRI and GE, a single rather than a double gasketed valve was used for a specific application. Discussion of PFR-HPCS-29 involved a question of whether an existing acceptable installation of an instrument line tap should be changed to a more optimum location. Mr. Forrest stated that BRI, after additional analysis, concluded that the installation is satisfactory and should remain as is. In both of these cases BRI responded to the PFR that no further action need be taken.

VIII. Supply System Corporate QA Audit of Design Verification Program

J. R. Zimmerschied and J. M. Walker, who conducted the above audit in June, 1983, at the request of the Findings Review Committee, reviewed and discussed their findings and observations with the TAA Panel. Their report is titled "WPPSS Quality Assurance Audit 83-259," dated July 9, 1983.

No major deficiencies were found, although three Findings Reports and a number of observations were described by the auditors. They stated that the Design Verification Program as it is being implemented meets the intent as expressed in the WNP-2 Plant Verification Program.

IX. Findings Review Committee's Classification and Closure of PFR's

G. D. Bouchey, the recently appointed FRC Chairman, J. R. Honekamp, former Chairman, members of the Findings Review Committee, N. S. Porter, C. H. McGilton, L. C. Oakes, A. G. Hosler, G. C. Sorenson, and R. J. Barbee, and the review supervisor, D. L. Whitcomb, discussed the above subject with the TAA review Panel. Many of TAA's written questions, Appendix B, were taken up and answered in these discussions.

The discussions emphasized the need for formal corrective action plans in those cases where valid findings could not be closed on the basis of completed corrective action. Such plans are to be reviewed and approved by the senior review engineer and the FRC, and the FRC is to be satisfied that a project tracking system is carrying the item to assure final closure.

The S.S. reviewed their schedule for completing the Design Verification Program. Completion is paced by the as-built program and BRI's update of HPCS and RHR stress calculations which will follow it. PFR's which may come from this source have not yet been evaluated by the FRC. The present schedule for report completion is September 1.

AGENDA

TAA AUDIT July 20, 21, 22, 1983

Wednesday, July 20, 1983 - WNP-2 Site, Building 1

7:30am	Meet at Multi-Purpose Facility for Transportation to site
8:00am-10:00am	C. S. Carlisle and H. A. Crisp o Summary status of WNP-2, schedule licensing, etc. o CAT issues and program to resolve them
10:00am-11:00am	H. A. Crisp / Bechtel Status and results from Bechtel review of equipment supports
11:00am-12:30pm	R. T. Johnson QVP update including additional activities from resolution of Region V questions or CAT issues
12:30pm-1:00pm	Lunch
1:00pm-2:00pm	Follow-up with R. T. Johnson as needed
2:00pm-4:00pm	J. D. Martin and G. K. Afflerbach (Service Building) o Discussion of the status of action items or information requests assigned to Test and Startup or Operations by the Design Reverification Program. o Summary review of the results to date from the test program and their implication relative to the quality of the design especially HPCS, RHR, and RFW.
4:00pm-5:00pm	J.R. Honekamp o Plant Tour

Thursday, July 21, 1983 - (Multi-Purpose Facility, Snohomish Room)

8:00am-10:30am	TAA Executive Session
11:00am-12:00N	A. D. Kohler Results and follow-up of Stone and Webster audit of the Supply System calculations

AGENDA - continued

TAA AUDIT July 20, 21, 23, 1983

Thursday, July 21, 1983 (continued) Multi-Purpose Facility, Snohomish Room

12:00N-12:30pm	Lunch
12:30pm-2:30pm	A. J. Forrest and H. R. Canter o Status report on BRI response to generic calculations closure issue o TAA follow-up of BRI responses to specific PFR's (R. V. Laney memo of 7/6/83) and questions related to documentation of GE/BRI interface design requirements.
2:30pm-4:00pm	Bouchey, Whitcomb, Honekamp, FRC members Follow-up of TAA questions on specific PFR's

Friday, July 22, 1983 - (Multi-Purpose Facility, Snohomish Room)

8:00am-9:30am	Bouchey, Whitcomb, Honekamp, FRC members Follow-up of TAA questions on specific PFR's if needed
9:30am-10:00am	G. D. Bouchey and J. R. Honekamp o Overview of structure, status and schedule of final report
10:00am-11:00am	Bouchey, Whitcomb, Yatabe, Porter, Honekamp o Follow-up of TAA questions on draft reports
11:00am-2:00pm	TAA Executive Session and working lunch
2:00pm-3:00pm	G. D. Bouchey, J. R. Honekamp and C. S. Carlisle o General discussion on completion of TAA reviews and reports
3:00pm	Exit Interview D. W. Mazur — R. B. Glasscock C. S. Carlisle — P. K. Shen J. Yatabe — L. T. Harrold

APPENDIX B

July 6, 1983

Questions for TAA's Fourth On-Site Audit

WNP-2, Richland, WA
July 20-22, 1983

1. Don Mazur's letter of June 8, 1983, responding to TAA Findings Nos. 15 and 16, and letter Timmins to Crisp dated May 17, 1983, advise that "BPC is reviewing all 383 equipment installations...etc." TAA would like to have an oral report on this program either from the S.S. or BPC, concerning its scope, number of installed equipments which have been or will be inspected, schedule, progress, and findings to date. A handout summary either at or before the meeting would be helpful.

2. In a letter P. K. Shen to A. D. Kohler dated May 9, 1983, a review of Supply System design calculations was put in place with a completion date of May 20, 1983. TAA requests an oral report on status and findings of the review and a copy of the report when completed.

3. TAA is interested in the outcome of various action items from the design verification program which have been turned over to Test or to Project Operations for closure. TAA would like an oral report from Test and Operations in which each activity advises what action they are taking, and explaining how each item will be tracked to closure.

4. In addition, we would like a report of test program results to date and their implications for the quality of plant design generally, and especially for the design of the RHR, RFW, and HPCS systems.

5. Please give TAA a QVP update, including any new activities resulting from CAT visit or other causes.

6. TAA requests a status report on BRI's response to the generic FRC question on calculation update and closure. This report should include a status report and findings from the BRI program to update electrical calculations mentioned in BRI's response to PFR-16. Refer to FRC Minutes of Meeting of May 13, 1983.

7. TAA requests BRI to explain more fully why, in responding to the following PFR's, BRI decided that no further action is required:

PFR No.	BRI Response Letter Date
HPCS-29	4-22-83
PB-4	4-22-83
HPCS-16	4-28-83
HPCS-18	4-26-83

July 13, 1983

Questions for TAA's Fourth On-Site Audit

WNP-2 Richland, WA.
July 20 - 22, 1983

Note - These are in addition to topics/questions contained in letter Laney to Honekamp, dated July 6, 1983.

1. The S.S. is preparing a revised Requirements Reverification Report (R.R.R.). What is the status? What consideration is being given, in making this revision, to clarifying the mandatory or non-mandatory use of GE interface criteria? G.E.'s criteria are cited frequently in the R.R.R. as evidence that certain FSAR requirements have been carried forward into design.

2. Referring to PFR HPCS-37, TAA notes that G.E.'s operational readiness review in February 1983 raised questions about instrument line slopes. What actions are being taken by the S.S. in response to the ORR?

3. Referring to the S.S.'s response to TAA finding No. 15, enclosed with Mr. Mazur's letter to R. V. Laney dated June 8, we note on page 2 the following statement: "Records will be checked to assure that applicable vendor requirements have been incorporated in the installation, etc." Would an earlier record check of the RHR heat exchanger documentation have revealed the missing shims?

4. Attachment 1, page 2 of S.S. letter 602-83-366 to Regional Administration, dated April 26, 1983, refers to "Strengthening Review of PP & IA Contracts". Please advise TAA of the scope, status and results of the special review referred to.

5. TAA requests Mr. Forrest to comment on the conclusions expressed by B & R in its letter BRWP - F - 83 - 1646 of Mar. 2, 1983, concerning QCIR's dispositioned by B & R Engineer H. C. Smith. Was a statistically significant sample examined? It appears that three out of nineteen dispositions required change. Does this support the overall conclusion of adequacy expressed in paragraph 2 of the letter?

6. TAA notes that Corporate Policy 4.3.7, "WNP-2 Findings Review Committee", dated Mar. 18, 1983, provides in paragraph 4.5 that "All valid PRFs which, in the judgment of the FRC, are safety significant or require an assessment of their impact on the adequacy of the design process shall be classified as findings." Using the below listed PFRs as examples, please explain how the FRC interprets and applies the quoted passage: HPCS-7, 17, 19, 29 and 43. The specific question is, why are these classified as

"Observations", when the PFRs appear to raise questions about the design process?

7. The same policy document, in paragraph 4.8, defines requirements for closeout of Findings. It requires that the FRC's assessment of impact be documented and that corrective action be complete, or RSE and FRC concur that no corrective action is required, or FRC is satisfied that the corrective action plan is in place and is being tracked in WNP-2 project systems. Please comment on the FRC's application of this passage, using as examples: HPCS 11, 15, 19, 46, 47 and 49. Which of these will be closed by corrective action plans reviewed and approved by the FRC? We note that HPCS-19 has been closed. Was there an FRC approved corrective action plan? How is it to be tracked?

July 18, 1983

TAA QUESTIONS FOR ON-SITE WNP-2 AUDIT

July 20-22, 1983

1. June 10, 1983 FRC meeting, page 2, stated that PFR-PB-4 is closed on the basis that the calculations did evaluate the 5-1/8" weld length adequacy.

   What calculations were submitted to make this statement?

2. Why is PFR-EQ-7 considered closed? (FRC meeting minutes - June 3, 1983, page 3)

   This PFR requires a complex and lengthy change review process which was not complete. The issue appears to be that the PMI has been revised to state that the DCRB will identify the need for procedure revisions to the responsible organization for implementation and tracking to completion.

3. Why is PFR-RHR-11 "considered closed" and PFR-RHR-16 "remains open and a finding"? (FRC meeting minutes - May 13, 1983, pages 4 and 5). Both PFR require updating electrical loads which is an on-going activity.

4. How will WPPSS determine that PFR-HPCS-9 (FRC meeting minutes - May 11, 1983, page 1) has been properly executed?

5. Has WPPSS accepted the below quoted B&R statement regarding pipe support calculations, PFR-RHR-32?

"Burns and Roe feels that each mathematics equation does not have to be updated to the new loads as long as the previous analysis is reviewed by a Pipe Support Engineer for the increased load, and notes under conclusion his results. It is then checked and approved."

The above statement contained in a B&R letter, dated June 1, 1983, signed by A. I. Cygelman to L. T. Harrold, Assistant Director, WNP-2 Engineering BRWP-F-83-4738.