

ORGANIZATION: BABCOCK & WILCOX COMPANY
NUCLEAR POWER GENERATION DIVISION
LYNCHBURG, VIRGINIA

REPORT NO.:	99900400/82-03	INSPECTION DATE(S)	8/17-18/82	INSPECTION ON-SITE HOURS:	15
CORRESPONDENCE ADDRESS: The Babcock & Wilcox Company Nuclear Power Generation Division ATTN: Mr. D. E. Guilbert, Vice Pres. & Gen. Mgr. P. O. Box 1260 Lynchburg, VA 24505					
ORGANIZATIONAL CONTACT: Mr. D. V. Ferree, QA Manager TELEPHONE NUMBER: (804) 385-3335					
PRINCIPAL PRODUCT: Nuclear steam supply system and fuels, engineering services, and operating plant support. NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear activities is approximately 90% of the 1,600 employees of the Nuclear Power Generating Division. Principal activities include the design and procurement of nine projects; Bellefonte, Midland, Washington Public Power Supply System, North Anna, and Pebble Springs; and providing engineering services under 129 service contracts and 38 fuel reload contracts.					
ASSIGNED INSPECTOR:			<u>C. J. Hale</u>	<u>9/27/82</u>	
			C. J. Hale, Reactor Systems Section (RSS)	Date	
OTHER INSPECTOR(S):					
APPROVED BY:			<u>C. J. Hale</u>	<u>9/27/82</u>	
			C. J. Hale, Chief, RSS	Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : Babcock & Wilcox (B&W) Topical Report, BAW-10096A.					
B. <u>SCOPE</u> : This inspection was in response to a request from the NRC's Division of Systems Integration to inspect the development, verification, and use of computer codes POWER TRAIN, CADDs, and TRAP 2.					
PLANT SITE APPLICABILITY:					
None Identified.					
				DESIGNATED ORIGINAL	
				Certified By <u>Rheanne Jouts</u>	

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A. <u>VIOLATIONS:</u>			
None			
B. <u>NONCONFORMANCES:</u>			
Contrary to Section 5 of topical report BAW-10096A and procedure NPG-0903-13, an error identified in the hybrid computer program POWER TRAIN was not processed in accordance with the instructions of Exhibit C of NPG-0903-13.			
C. <u>UNRESOLVED ITEMS:</u>			
None			
D. <u>STATUS OF PREVIOUS INSPECTION FINDINGS:</u>			
This area was not inspected during this inspection. The following is a listing of those previous findings that currently are considered open.			
1. (Open) Unresolved Item (82-01): Certain structural analyses may not meet regulatory requirements in that they do not appear to be sufficiently detailed with respect to assumptions, bases, source of inputs, reference to the hardware design drawings, analytical model-to-hardware relationship, and interpretation of results.			
2. (Open) Unresolved Item (82-01): Procurement controls for flow control valves do not appear to comply with QA program commitments, in that valves were furnished that were not designed to provide the required minimum flow of two gallons per minute in the closed position at a pressure differential of 820 pounds per square inch, and which B&W-NPGD source surveillance and vendor drawing review failed to detect.			
3. (Open) Nonconformance (82-02): The Historical Document List (HDL) did not serve as an index to safety-related Procurement Authorization (PA) records in the Records Center as evidenced by the fact that PA's 83-768661-00 through 83-768661-09, related to the design and procurement of MK-B5 fuel assemblies and axial blanket fuel assemblies for the SMUD Rancho Seco Cycle 6 fuel reload, were not identified on the HDL.			
4. (Open) Nonconformance (82-02): The first page of calculations 32-1119748-00 and 32-1122317-00, did not have a completely filled out CDS form. The section of the form titled "Summary of Result" did not contain a summary of the results of the calculation.			

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5. (Open) Nonconformance (82-02): PUL's were not used to indicate needed changes/additions known at the time of release or to indicate input requirements unavailable at the time of release, for safety-related calculation summary; e.g., 86-1123144-00. These documents were various types of calculation summaries (e.g., 32-1122317-00), which were known at the time to have a PUL relating to the need for verification of source data/references outstanding against it. Further, these design documents were reviewed, released, and transmitted to users without any indication that changes may be required as a result of clearing PUL's that were outstanding.
6. (Open) Nonconformance (82-02): Certain PUL's issued from January 1981 to March 1981 were not: (1) listed on the HDL against the affected calculation; (2) distributed by Release Administration; or (3) associated with the document to be revised and retained in the Records Center.

E. OTHER FINDINGS OR COMMENTS:

1. Background

The Reactor Systems Branch (RSB) of the NRC's Division of Systems Integration requested the Vendor Program Branch of Region IV to conduct an inspection of the development, verification, and use of the POWER TRAIN, CADDs, and TRAP-2 computer codes. These codes are being reviewed currently by the RSB and a Safety Evaluation Report is being prepared.

2. Findings

The applicable procedures in B&W's Administrative Manual were reviewed. Records reviewed to verify implementation included computer program manuals, certification files, and certification test case files for the POWER TRAIN and CADDs programs.

TRAP-2 records were not reviewed during this inspection; however, this program's records were inspected during the 99900400/78-03 inspection which resulted in several modifications to B&W's procedures controlling computer program's development, verification, and use.

Both POWER TRAIN and CADDs are high use codes. CADDs 27.0 received Full Certification on March 31, 1982, and has been accessed for use 310 times since. POWER TRAIN V 1.0 received Full Certification on March 30, 1982, and since April 1, 1982, has accounted for almost all the activity in the Hybrid Computer Lab. POWER TRAIN is a hybrid computer code, utilizing both digital and analog computers, and is only executed in the Hybrid Computer Lab.

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On or about June 21, 1982, an error was identified in POWER TRAIN V 1.0. The error dealt with the calculation of the time derivatives of fuel and clad temperatures. B&W's analysis of the effects of this error was shown to have little effect on steady-state behavior; however, the error did predict that the fuel and clad temperatures would fall more rapidly during certain transients. B&W concluded that the consequences of the error were not safety significant and have already revised the program (POWER TRAIN V 2.0) and as soon as benchmark comparison runs are completed, the corrected version will be ready for Full Certification. A nonconformance (B. above) was identified in this area in that B&W personnel did not follow their established procedure for processing this code error.

The following items will be inspected further during subsequent inspections.

- a. The distribution and control of computer program manuals are specified in existing procedures; however, the procedures reviewed do not specify actions to be taken when receipt acknowledgements are not returned or what retention requirements apply to these records.
- b. The independent reviewer of CADDs 27.0 was the supervisor of the responsible engineer that developed the version. B&W procedures preclude only the responsible engineer's manager from this activity. The independence and effectiveness of using the supervisor in this capacity will be considered further.

DOCUMENTS EXAMINED

1	2	TITLE/SUBJECT	3	4
1.	6	Computer Information Report	8/2/82	
2.	8	CADDS Program Manual (Copy #29)	4/82	
3.	8	POWER TRAIN V Program Manual (#9)	2/80	
4.	3	NPG-902-06, Computer Program Dev. & Cont.	11/2/81	6
5.	3	NPG-903-03, Development and Control of Computer Programs Manuals)	1/5/81	6
6.	3	NPG-903-03	12/7/79	5
7.	3	NPG-903-03	11/17/78	4
8.	8	CADDS Certification File (3 Volumes)	8/79 to present	
9.	8	CADDS Certification Test Case (One Volume)		
10.	8	CADDS " " " (TMI-1 Volume)		
11.	8	POWER TRAIN V Certification File (One Volume)		
12.	3	NPG-0403-13, Hybrid Computer Prog. Dev. & Cont.	9/1-81	1
13.	3	NPG-0402-01, Preparing & Processing NPGD Calculations	3/1/82	15

Document Types:

- | | |
|------------------|---------------------------------|
| 1. Drawing | 5. Purchase Order |
| 2. Specification | 6. Internal Memo |
| 3. Procedure | 7. Letter |
| 4. QA Manual | 8. Other (Specify-if necessary) |

Columns:

- | |
|-----------------------------|
| 1. Sequential Item Number |
| 2. Type of Document |
| 3. Date of Document |
| 4. Revision (If applicable) |

