1. Allegation Category: QA/QC 5A, Repairs, Rework, and Maintenance

2. Allegation Numbers: AW-37 and AQ-52

3. Characterization: It was alleged that a 4- or 6-inch stainless steel check valve was disassembled for a weld repair without a written procedure for the disassembly and reassembly (AW-37) and site personnel interchanged parts of diaphragm valves during disassembly and reassembly operations (AQ-52)

4. Assessment of Safety Significance:

AW-37: In its assessment of this allegation, the NRC Technical Review Team (TRT) found that Brown & Root (B&R) procedure CP-CPM-6.9, Rev 0, "General Piping and Inspection Procedure," Section 3.6.17, contained the detailed requirements for the control of the disassembly and reassembly of valves during the installation process. The control was implemented by use of an operation traveler which directed craft personnel to disassemble and reassemble the valve in accordance with the manufacturer's instruction. The TRT examined a typical operation traveler, MW 79-106-5600, dated March 19, 1979, for the installation of valve tag numbers 8616A&B in the boron recycle piping system at the 831-foot elevation in the Auxiliary Building. The TRT found that the manufacturer's instruction was attached to the traveler in compliance with the procedure. The TRT also noted that the disassembly and reassembly operations required a quality control (QC) inspection and evidence of that inspection by the inspector's signature and date on the traveler. The QC inspection was required by B&R procedure QI-QAP-11.1-26, "ASME Pipe Fabrication and Installation Instruction."

The TRT was unable to identify the valve referred to in the allegation; however, by reviewing the applicable procedure and a typical operation traveler for valve installation, the TRT found evidence of compliance with procedural controls for performance of valve disassembly and reassembly in accordance with manufacturer's instructions.

RIV inspection report (IR) 79-22 provided the details of the RIV investigation of the subject of allegation AW-37, including interviews with the alleger and a witness to the event alleged. The report concluded: the witness stated that the valve in question was a 6" check valve and that proper repair and resolution of the initial discrepancy was complete and documented. Furthermore, there is no evidence that would suggest that a procedure discrepancy (lack of a procedure for valve disassembly/assembly) cited by the alleger would have a potential detrimental impact on the health and safety of the public.

Although the valve alleged may have been disassembled and reassembled without a procedure (at the time of the repair), the RIV inspection found that an acceptable repair was accomplished. Also, the alleger acknowledged that defects in safety-related components did not go uncorrected. Region IV found that there was no evidence to suggest that the procedure discrepancy cited by the alleger would have a potential detrimental impact on the health and safety of the public.

The TRT concludes that disassembly and reassembly of this type of valve (swing check) is a simple process by the craft personnel and that since valves are subjected to testing and/or inspection during system pressure (hydro) testing, the N-5 walkdown, flushing, startup procedures, and pre-operational testing, the Region IV finding is valid.

AQ-52: To assess the allegation that site personnel interchanged parts of diaphragm type valves during the installation process, the TRT reviewed B&R procedures applicable to the control of materials and equipment, piping installation and inspection, and the disassembly of valves. Included in this review were CP-CPM-6.9, Rev. 0, "General Piping and Inspection," CP-CPM-6.9E, "Pipe Fabrication and Installation," ACP-3, "Receipt Storage and Issue," CP-CPM 8.1, "Receipt Storage and Issuance of Items," MCP-10, "Storage and Storage Maintenance of Mechanical Equipment," CP-CPM-9.18, "Valve Disassembly/Reassembly," and QI-QAP 11.1-26, "Piping Fabrication and Installation Inspection."

From this review the TRT found that the valve disassembly and reassembly, and the control of the removed valve parts, were required by CP-CPM-6.9 as follows: "All parts removed from the valve shall be stored in a heavy duty plastic bag, or in the case of a large valve, a wooden or cardboard box. The mechanical superintendent (MS) shall mark the box/bag with the valve number." The TRT noted that while this procedure intended to require that parts be reassembled to the same valve body from which they were originally removed, there was no explicit instruction to prevent the reassembly of parts into a different valve body.

The TRT found that the process for the installation of a valve was further controlled by a construction operation traveler for valve disassembly and reassembly. The traveler specifically identified the valve by the tag number and serial number and stated the assigned location at which the valve was to be installed. The traveler also included instructions for the disassembly and reassembly of the valve and control of the removed parts in accordance with CP-CPM-6.9D.

The TRT examined a typical traveler (MW-79-107-5600 dated March 19, 1979) for the disassembly and reassembly (for installation) of a 3-inch manually operated (handwheel) diaphram valve, Tag No. 8616B, Serial 75-4105-12-3, which was installed in the boron recycle piping system (Ref. drawing BRP-BR-X-AB-018, Rev 2) in the Unit 1 Auxiliary Building at the 831-foot elevation. The manufacturer's instruction for disassembly and reassembly and the mechanical supervisor's request to disassemble and reassemble, were included with the traveler. The required QC inspection signatures and date were on the traveler. The TRT found that the activity prescribed by the traveler was in compliance with the applicable construction installation and inspection procedures. Since procedure CP-CPM-6.9E requires identification of the parts traceable to the valve number from which the parts were removed, and the operation traveler identifies that valve number, compliance with the operations prescribed by the traveler requires that parts be reassembled to the same valve body from which the parts were removed.

The TRT reviewed drawings 2323-MI-0241 and 0242 (demineralized and reactor water make-up flow diagrams) to determine the locations of the type of valves referred to by the alleger. They were 3-inch butt weld, hand-operated diaphragm valves installed in systems such as the spent fuel cooling, boron recycle, and chemical and volume control systems.

The TRT found that installation of these butt-welded valves required disassembly and removal of internals to protect temperature-sensitive parts. Interviews with engineering and QC personnel, as well as review of documented deficiencies, verified that during installation the valve parts were stored in uncontrolled areas, which resulted in lost, damaged, and sometimes interchanged parts. Interviews with site personnel also indicated that although the generic traveler used for original installation of these valves contained a requirement to package and identify loose parts (traceable to the valve) in accordance with CP-CPM-6.9, it was not adequate to prevent lost or interchanged parts because these conditions continued. Subsequent revisions of this generic traveler added a requirement to record the heat numbers of the valve body and bonnet prior to disassembly to provide further assurance that the part (bonnet) would be reassembled to the valve body from which it was removed.

A TRT walkdown field inspection identified similar 3-inch ITT-Grinnell (ITT-G) diaphragm valves rated at different pressures. The TRT determined that if the valve bonnets on these valve bodies were interchanged, a potential problem of safety significance would exist. Conversations with ITT-G and TUEC engineering personnel identified a concern that if a valve bonnet rated below 275 psig was assembled with a valve body installed in a system with pressure greater than 275 psig, galling could occur in valve stem components. However, both ITT-G and TUEC personnel indicated that valves parts of identical design temperature and pressure could be interchanged with no effect on valve function. The TRT learned that this type of interchange occurred on valves of the same pressure rating and was documented on 51 permanent equipment transfers (PET) which involved valves reassembled between July 1981 and October 1984. The TRT assessed this interchange of parts as a noncompliance with CP-CPM-6.9, the operation traveler, and/or CP-CPM-9.18.

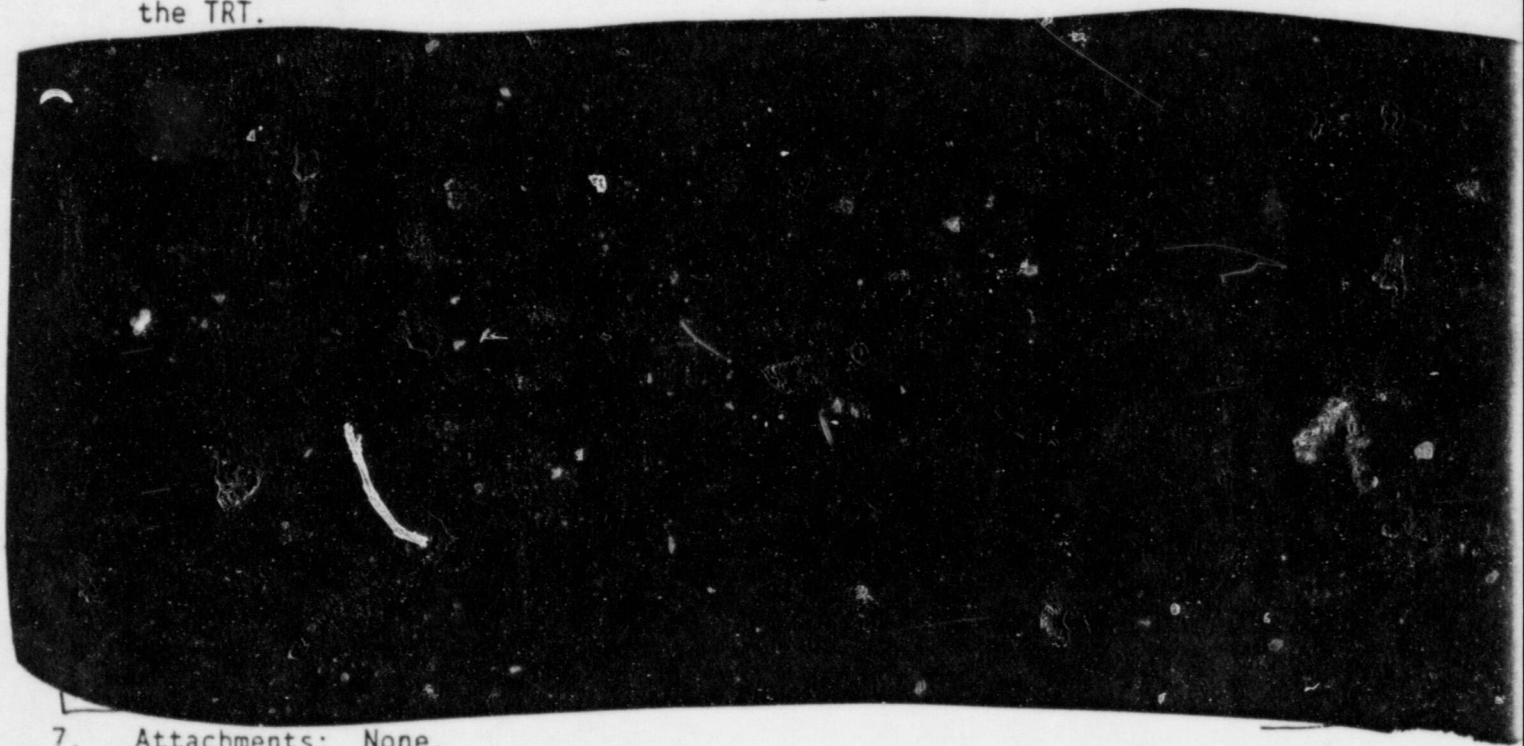
The TRT obtained the receipt and inspection reports which documented the matching body and bonnet heat numbers of 136 valves arriving onsite in May 1976. The TRT conducted a field inspection of 32 of these valves to ensure traceability of the heat numbers from receipt to installation. Three valves (Tag Numbers 1-7014B, 2-8475, and 1-8683) were found with a mismatch between body and bonnet heat numbers from those identified by receipt inspection. Further review by the TRT found that the mismatch was documented on PET numbers 139, 183, and 219. A review of the pressure and temperature ratings of the interchanged valve components indicated that they were equivalent. The TRT found no examples of a mismatch between valves of differing pressure ratings, although the potential for this existed due to the site practice of mass disassembly of valves using potentially ineffective or poorly implemented procedures.

The TRT interviewed QC inspectors who knew of recent incidents involving lost, misplaced or interchanged valve bonnets. The QC inspectors stated that when these valves were disassembled for system flush under the direction of startup test engineers, one bonnet was lost and a mismatch between valve body and bonnet occurred. Although these incidents were documented in nonconformance reports, see e.g., NCR M-11645 (May 8, 1984), the problems associated with maintaining control of valve parts during installation, system flush, and startup indicated to the TRT that in spite of the issuance of the revised traveler and CP-CPM-9.18 in June 1983, loss, damage, and interchange of valve parts continued to occur. The TRT did not find any evidence that B&R addressed the problem on a programmatic basis, e.g., by use of a formal corrective action request (CAR).

5. Conclusion and Staff Position: After reviewing drawings, procedures, and a typical construction operation traveler, the TRT was unable to substantiate allegation AW-37, a finding in accord with that expressed by RIV in IR79-22. The TRT further agrees with the RIV conclusion that there is no evidence to suggest that the procedural discrepancy would have a detrimental impact on the health and safety of the public.

The TRT concludes that the allegation concerning interchanged valve parts (AQ-52) was substantiated. The TRT also concludes that this condition has potential quality significance due to the generic implications. The generic implications are based on documented evidence that the interchange of valve parts did occur and effective programmatic corrective action was not implemented to identify the problem and to prevent the loss, damage and interchange of valve parts.

The TRT attempted to contact the alleger to discuss the findings and conclusions of this assessment, but the alleger declined further contact with the TRT.



7. Attachments: None.

Reference Documents:

1. CP-EP-9.2, Rev. 0, "Control of ASME Related Materials and Items."

2. ACP-3 (replaced by CP-CPM-8.1 Rev. 1), "Receipt, Storage and Issuance Items."

3. MCP-10, Rev. 7, "Storage and Storage Maintenance of Mechanical and Electrical Equipment."

4. CP-CPM-6.9E, Rev. 0, "Pipe Fabrication and Installation."

5. QI-QAP-11.1.39A, Rev. 0 (issued June 8, 1983), "Valve Disassembly/ Reassembly."

6. CP-CPM-9.1E, Rev. 0 (issued June 8, 1983), "Valve Disassembly/ Reassembly."

7. Flow diagrams X2323-MI-0241 and 0242 of the demineralized and reactor makeup water.

8. Valve tag numbers XSF-083 and XSF-089 per SD-C-105686; 8616A and 8615B per SD-C-100551.

9. Permanent equipment transfer forms 139, 183 and 219.

10. Operation travelers MW 80-673-4700, MW 80-673A-4700, and MW 79-107-5600.

11. ITT-Grinnell Corp., "3" Nuclear Diaghragm Valve H.W.O.," drawings SD-C-105686, Rev. B and SD-C-100551, Rev. H.

12. AQ-52: A-7 testimony, March 7, 1984, pp. 12-14.

13. Drawing MI-0225 (Valve Tag Nos. 1-8440, 1-8481A, and 1-8481B).

14. Drawing MI-0263 (Valve Tag Nos 1-8949A thru D).

15. RIV IR 50-445/79-22; 50-446/79-21.

16. QI-QAP-11.1-26, "ASME Pipe Fabrication and Installation Inspection."

17. CP-CPM-6.9, Rev. 0, "General Piping and Inspection Procedure" and Rev. 1, "General Piping Procedure."

8. This statement prepared by:

J. H. Malonson, TRT
Technical Review Team — Date: 6/6/85

Reviewed by:

H. Livermore, Group Leader — Date: 6-7-85

Approved by:

V. Noonan,
Project Director — Date