

U S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT  
REGION IV

Report No. 99900289/80-03

Program No. 51300

Company: Borg Warner  
Nuclear Valve Division  
7500 Tyron Avenue  
Van Nuys, California

Inspection Conducted: August 13, 1980

Inspectors: *D. E. Whitesell* 9/2/80  
D. E. Whitesell, Chief Date  
Component Section I  
Vendor Inspection Branch

Approved by: *D. E. Whitesell* 9/2/80  
D. E. Whitesell, Chief Date  
Component Section I  
Vendor Inspection Branch

Summary

Inspection on August 13, 1980 (99900289/80-03)

Areas Inspected: Review of representative documents, procedures, and interviews with cognizant personnel, concerning potential deficiencies reported by the vendor to NRC.

The inspection involved eight (8) hours inspection time by one (1) inspector.

Results: In the area inspected, no deviations or unresolved items were identified.

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DETAILS SECTIONA. Persons ContactedNuclear Valve Division

\*W. R. Wheaton, Director, QA  
C. Braley, Manager Design Engineering  
Carol Clark, Records Department Clerk

\*Denotes the personnel in attendance at the exit interview.

B. General Activities

Approximately 70% of the work load at BW-NVD is for the production of nuclear valves.

C. Potential Part 21 Report1. Background Information

On July 22, 1980, Borg Warner Nuclear Valve Division (BW-NVD) notified NRC Region V by letter, concerning the possibility that in the worst tolerance buildup condition, the gate could disengage from its guide when the valve is in the back seat position, on certain low pressure gate valves.

2. Objectives

The objectives of this area of the inspection were to ascertain whether the potential part 21 report was processed within BW-NVD in accordance with its procedures for implementing part 10 CFR 21. Also to verify that the implementation of corrective action and actions to prevent recurrence, had been accomplished.

3. Method of Accomplishment

The foregoing objectives were accomplished as follows:

- a. Review of the minutes of 10 CFR 21 Evaluation Committee Meeting dated July 21, 1980, as reported by the Director of Quality Assurance and Chief Engineer, to the President of BW-NVD. The report identified the analysis which had been made to verify that the reported problem existed, and the determination of the Committee that an operational problem could occur, and therefore the problem was reportable to the Commission.

- b. Review of BW-NVD letter to NRC Region V, dated July 22, 1980. The attachments to this letter of transmittal included Notification Report number 0003, dated July 21, 1980, and an addenda to the Report which identified the fourteen valves involved and the customer and nuclear facility to which the valves had been shipped.
- c. Review of BW-NVD letter to Duke Power Company, dated July 22, 1980, which identified Mill Power PO number, the part and serial numbers of the suspected twelve valves which had been shipped to Catawba Units 1 and 2.
- d. Review of BW-NVD letter to TVA dated July 22, 1980, which identified TVA PO number, the part and S/N of the two (2) suspected valves which had been shipped to Hartsville Unit 1.
- e. Review of a TVA Nonconformance report, signed by BW-NVD, dated 8/1/80, which described the problem, and recommended disposition.
- f. Review of an unnumber Procedure dated 7/16/80, which had been developed by BW-NVD engineering, to control the field modification of suspected valves which had been delivered.
- g. Review of BW-NVD "Nuclear Practice Bulletin" (NPB) number 11-8, Revision B, dated 20 May 1980, to ascertain whether the BW-NVD system for reporting defects is consistent with the law and NRC rules and regulations.
- h. Discussions with vendor personnel who were familiar with the problem.

#### 4. Findings

- a. The inspector was informed that the problem was initially identified at Krsko, a Yugoslavia nuclear facility, presumably on, or about, July 9, 1980. Krsko is a Westinghouse design.
- b. The 10 CFR 21, Evaluation Committee was convened, to evaluate the stacked tolerance problem on July 17, 1980. It was verified that the committee was duly convened, and the attendees were in compliance with NPB 11-8, Revision B.

The committee reviewed the analysis of the 6 inch, 150 and 300 pound gate valves. The analysis confirmed the report, that when the worst case of tolerance buildup existed, it was possible for the gate to disengage from the guides.

The committee also determined that should the gate become disengaged from its guide, that an operational problem would exist and that the problem was reportable. The committee further recommended that the responsible officer, or his designee, should prepare a Notification Report for transmittal to NRC Region V.

- (1) NPB-11-8, Revision B also requires that three copies of the report to be sent to Director of IE Headquarters. However, this documentation was not reviewed.

5. Corrective Action

- a. To correct the problem, BW-NVD designed a bushing for installation on the stem to restrict the stem travel to prevent possible disengagement from the gate guides.
- b. They also have developed a procedure and sketches to control the field modification of those valves that have been shipped to nuclear customers.

6. Action to Prevent Recurrence

- a. In August of 1978, the guides on these valves were modified for another reason. Analysis of the modified design, confirms that the gate cannot disengage from the guides under the worst case tolerance stacked conditions. It was further determined that any valve manufactured to the design prior to the guide modification in August of 1978, would have been shipped prior to January 1, 1979.

7. Generic Impact

- a. BW-NVD reviewed its nuclear orders for 6 inch, low pressure rated valves. Any valve identified as having been shipped to a nuclear customer prior to January 1, 1979, was considered to be suspect.
- b. The results of the review identified fourteen (14) suspected 6 inch, 150 pound and 300 pound valves had been shipped to sites within the continental limits of the United States, prior to the cut-off date of January 1, 1979. Of these fourteen valves, twelve had been purchased by Duke Power Corporation for Catawba Units 1 and 2, and two (2) had been purchased by TVA for Hartsville Unit 1.
- c. It was verified that both Duke and TVA received written notice concerning the potential problem. The notices identified the customer's numbers, PO quantity of valves shipped, together with the Serial Numbers of each valve.

## 8. Safety Evaluation

There was no evidence that BW-NVD had made a safety evaluation of the reported problem, since they could not determine the final application of the valves procured. However, they did report all pertinent facts regarding the problem to the customers receiving the suspected valves.

## D. Potential Construction Deficiency Report

### 1. Background Information

- a. On or about May 9, 1980, BW-NVD were performing cycling tests of a globe valve equipped with a Series SCM Limitorque motor operator, to verify that the opening and closing times would meet the time specified by the customer. During the opening cycle, the nut which secures the stem to the operator sleeve was loosened. The nut was tightened and torqued and the test was rerun. The nut was again loosened during the operation cycle. Other globe valves which were actuated by the same series motor operators, had been tested successfully and shipped. Whether this first of a kind event was an isolated case, or generic, had to be determined. Engineering was requested to evaluate the problem, and determine the cause, and whether the problem was an isolated case.

### 2. Objectives

The objectives of this area of the inspection were to obtain information relative to the problem, and to ascertain the following:

- a. Was the problem processed and evaluated by BW-NVD, in a manner consistent with NRC rules and regulations.
- b. Was appropriate corrective action initiated.
- c. The Action implemented to prevent recurrence.
- d. The generic impact.

### 3. Methods of Accomplishment:

The foregoing objectives were accomplished as follows:

- a. Review of Nuclear Practice Bulletin (NPB) number 11-8, Revision B, dated 20 May 1980. To verify that the document establishes procedures for evaluating defects and, when required, notifying the Commission, in a manner consistent with 10 CFR 21 and the additional information provided in NUREG 0302, Revision 1, dated July 12, 26, 1977.
- b. Review of 10 CFR 21 Evaluation Committee's report to BW-NVD President, dated 5-22-80, concerning the committee's review of the engineering analysis of the problem, and whether the Committee

had determined that operational problems could occur on certain motor operated valves. The committee had determined that a preliminary notification report should be prepared and mailed to NRC.

- c. Review of BW-NVD letter to Combustion Engineering, Inc. dated May 29, 1980, notifying them of the problem and identifying CE's PO numbers covering forty-seven (47) valves identified by part and tag numbers that were suspected.
- d. Review of BW-NVD letter to Bechtel Power Corporation, dated May 30, 1980 notifying them concerning the problem and identifying for Bechtel the PO item numbers, part numbers and tag numbers of the ninety-three (93) valves suspected.
- e. Review of BW-NVD letter to WSH/Boecon/GERI, dated May 30, 1980, notifying them of the problem and identifying sixteen of the twenty-seven suspected valves by P/N, S/N and shipping date, the second letter dated June 6, 1980 identified the seventeenth (17) of the twenty-six (26) valves, and a letter dated July 10, 1980, identifying the remaining 9 of the 26 suspected valves. Also a letter dated July 18, 1980 which was sent to correct the part number identified for 5 valves covered in BWNVO letter dated July 10, 1980.
- f. Review of Notification Report (NR) number 0002, dated 5/23/80 which were attached to all of the letters notifying the customers of the potential problem and which also identified Grand Gulf, WPPS-2, and Palo Verde, as being the probable facilities receiving the suspected valves purchased by CE, Bechtel and WSH/Boecon/GERI.
- g. Review of Drawing number 77620, Revision E, dated 6-4-80, delineating the valve assembly of the 2 inch Y type globe valve with Limitorque model no. SMC-04-5 mounting using a stem extension to connect the valve stem to the sleeve of the operator.
- h. Review of Drawing number 76407, Revision C, dated 6-7-80, delineating the stem extension and the modification to prevent it from being loosened during the cycling operation.
- i. Discussions with engineering personnel cognizant with the problem.

#### 4. Findings

- a. The engineering evaluation of this problem, attributed the cause to the relatively small amount of motion between the drive sleeve and the stem permitted the friction between the nut and the drive sleeve to become sufficient to loosen the retaining nut after repeated cycling.

- b. On some valves, a stem extension, which serves as a position indicator is used to retain the drive sleeve. Testing of these valves, showed that the stem extension could also be loosened from the stem with repeated cycling.
- c. It was verified that the 10 CFR 21 Evaluation Committee was convened on the 22 May 1980 to evaluate the test findings and the engineering analysis of the problem. The results of the committee's evaluation is documented in its report to BW-NVD president dated 22 May, 1980 and signed by the Director, Quality Assurance and Chief Engineer, Nuclear; as stipulated in BW-NVD Nuclear Practice Bulletin number 11-8, Revision B.
- d. The 10 CFR 21 Evaluation Committee determined that an operational problem could occur with certain motor operated globe valves and therefore considered the problem to be reportable under 10 CFR 21.
- e. BW-NVD could not perform an evaluation of the safety significance of the problem, since they had no knowledge as to the application of the globe valves with the specific model motor operators. It was verified however, that they performed a survey at their procurement documents to identify the customers that had purchased such valves with operators.
- f. It was also verified that each of these customers were transmitted a copy of the Notification Report number 0002, dated 5/23/80, together with the customer's PO number, Part number and the Tag and/or Serial number, of each valve shipped to the customer.

5. Corrective Action

- a. BW-NVD corrective action, included staking the retaining nut to the stem with three pins placed in the threads of the nut and stem, to prevent rotation of the nut.  
  
For those valves using a stem extension retainer. A hole was drilled in the extension and threaded to accept a setscrew.
- b. A procedure had been prepared for documenting the field modification of each valve in the field. The document identifies the customer, project, valve part number, valve description, in addition to the valve serial number, and the customer's ID number. The type of modification (stake nut or install new stem extension and set screw) is identified, and the modification is attested by the signature and date of the technician performing the work, the signature and date of the customer's representative, and the NVD Director of QA, signature and date.

6. Action to Prevent Recurrence

It was verified that the pertinent parts and assembly drawings had been revised to incorporate the appropriate corrective action described above.

7. Generic Impact

BW-NVD determined from the review of its nuclear contracts that this problem was generic in certain globe valves with the identified model of motor operators as follows:

- a. Combustion Engineering - forty-seven (47) valves
- b. WSH/Boecon/GERI - twenty-six (26) valves
- c. Bechtel Power Division - ninety-three (93) valves

The facilities are presumed to be Grand Gulf, WPPSS 2, and Palo Verde.

8. BW-NVD Processing 10 CFR 21 Reports

From the documents reviewed it was determined that BW-NVD has implemented and are following its procedures for processing, and reporting, defects in a manner which is consistent with NRC rules and regulations.

In one instance, it appeared that the time between identifying a defect and reporting it, may not have been in compliance with the time established by 10 CFR 21. However, it was determined that the interim time was the results of performing additional tests, and engineering analysis, to ascertain whether the defect was an isolated case or generic, before the evaluating committee could perform a meaningful evaluation of the problem, and determine its reportability.