



Refer to: E-16612

June 7, 1983

Mr. Richard C. DeYoung, Director  
Office of Inspection and Enforcement  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Subject: 10 CFR 21 Report by Combustion Engineering on  
Target Rock Solenoid Activated Valves,  
Models 77C-001 and 77C-003 dated November 8, 1982,  
#LD-82-087

Enclosure: A) Report of Combustion Engineering and Target Rock  
Review of Valves at Palo Verde Site  
B) Service Bulletin S. B. 8302

Dear Mr. DeYoung:

This letter is being written to provide a response to the 10 CFR  
Part 21 disclosure by Combustion Engineering of problems found with  
Target Rock Corporation supplied valves. The charges made are:

- a) incorrect valve assembly,
- b) significant missing parts,
- c) limited switch valve position indicator failures,
- d) valve failed to open,
- e) valve failed to close.

Items a and b were experienced on valves supplied for qualification  
test from the site. Since the valves had been shipped to the plant  
site in the 1978-1979 period and records of disassembly and reassem-  
bly are nonexistent or vague, the charges are unsubstantiated. The  
valves examined during a random inspection at the plant site exhib-  
ited conditions indicative of undocumented maintenance including  
assembly, disassembly and cannibalization of parts. The concern  
associated with potential coil loosening has been addressed in a  
Target Rock service bulletin which has been transmitted to owners  
of valves where this problem may exist.

A copy of the plant site inspection report and the Target Rock ser-  
vice bulletin are enclosed for your information. Further details  
or information on the inspection or design of Target Rock valves  
will be supplied upon request.

**TARGET ROCK CORPORATION**

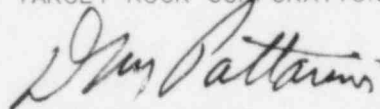
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Items c, d and e were anomalies experienced during a NUREG 0588 qualification test undertaken by Combustion Engineering and, as such, should not have been included in a Part 21 disclosure. This position is supported by an NRC response to a direct question reported in the "Environmental Qualification Newsletter", Volume One, Number 12, April 1982, regarding qualification test failures. The NRC stated that qualification test failures need not be reported unless conducted on operating installed equipment where such failures could result in significant safety hazards. Since the Palo Verde plant is not in operation, the valves could have been modified without a Part 21 disclosure. In addition, it should be noted that these valves had been previously qualified to their specific order requirements and the Combustion Engineering tests were an attempt to upgrade the qualification to later requirements.

We would be pleased to discuss this further with you at your convenience.

Very truly yours,

TARGET ROCK CORPORATION



D. M. Pattarini  
Vice President, Engineering

DMP/jm  
Enclosures

**TARGET ROCK CORPORATION**

January 21, 1983  
Project 82Z-107

REPORT OF  
COMBUSTION ENGINEERING AND TARGET ROCK  
REVIEW OF VALVES AT PALO VERDE SITE

Background

Engineering representatives of Combustion Engineering(C.E.) and Target Rock (TRC) visited the Palo Verde Nuclear Power Plant site to examine solenoid valves in the warehouse and in pipelines. This visit was requested by C.E. to ascertain the validity of charges made in a 10 CFR Part 21 disclosure of problems found with TRC supplied valves. The charges made are:

- a - Incorrect valve assembly
- b - Significant missing parts
- c - Limit switch valve position indicator failures
- d - Valve failed to open
- e - Valve failed to close.

Items c, d and e were anomalies experienced during qualification testing to NUREG 0588 and as such should not have been included in a Part 21 disclosure. This position has precedence by an NRC response to a direct question reported in the "Equipment Qualification Newsletter", Volume I, NO. 12, April 1982, regarding qualification test failures. The NRC stated that qualification test failures need not be reported unless on operating installed equipment where such failures could result in a significant safety hazard. Since the Palo Verde plant is not in operation, the valves could have been modified without a Part 21 disclosure.

Items a and b were experienced on valves supplied for qualification test from the site. Since the valves had been shipped to the plant in the 1978-79 period and records of disassembly and reassembly are non-existent or vague, the charges are, for the most part, unsubstantiated. The valves examined, therefore, were viewed specifically to ascertain if the assembly was correct (a) and if there were significant missing parts (b).

Examination

Five valve samples were examined. These included two 77L-001 model valves (one in the as-shipped condition, and one in the pipeline); one 77L-003 model valve (in pipeline); and two 76HH model valves (both valves were in the pipeline). The 77L valves were sold to C.E. (77L-001 is a 1" and -003 is a 2") and the 76HH valves to Bechtel (76HH-002 is a 1" valve). The Bechtel supplied valves were being reviewed because they are also safety related active valves. Furthermore, fixes needed to have 77L valves meet NUREG 0588 could have application to the Bechtel valves.

The examination of the valves was conducted by representatives of C.E. and TRC and viewed by quality control representatives of Bechtel (BPC) and Arizona Power (APS). The examination followed a disassembly and inspection procedure prepared by TRC. The two 77L-001 valves were inspected to TR Procedure 3709, the 77L-003 valve to TR Procedure 3710 and the two 76HH-002 valves to TR Procedure 3711. Each procedure contained a check list. The results of the examination are included in the appendix.

The significant areas of discrepancy are as follows:

- 1 - No rubber bushing in the solenoid coil housing of both 77L-001 valves (only)
- 2 - Broken switch bracket in the line-mounted 77L-001 valve
- 3 - Solenoid coil insulation washer found offset in the line-mounted 77L-001 valve
- 4 - Two screws (power lead terminal screws) found loose in the coil housing of the line-mounted 77L-001 valve
- 5 - Loose Coil - Solenoid coil insulation washers below the step on the bonnet tube, leaving the coil free to move in the 77L-001 valves and the 77L-002 valve
- 6 - No 'O' ring below the solenoid assembly of the 77L-002 valve (only).

#### Discussion of Observations

##### 1 - Missing Bushing

At the time of processing the 77L and 76HH valve programs, Target Rock was pursuing the incorporation of a rubber bushing into the solenoid coil housing. The bushing, to be located at the conduit connection, would reduce the care and handling necessary to prevent wire insulation damage on installation of the coil into the housing. An earlier change had eliminated the pipe threads on the inside corner surface of the pipe boss, which had caused some wire damage on installation. The cast housing incorporated a radius on the inside corner of the conduit connecting boss and was designed to eliminate threads in this area. The 77L valves inspected included the cast solenoid housing design and had no threads on the inside corner of the boss. These should not have caused a problem of wire damage on installation.

A review of the TRC drawings and drawing releases indicate that the solenoid assembly specified on the 77L-001 valves did not require a rubber bushing. The valve assembly drawing, 1-SWS-3-4, depicts a bushing in the solenoid coil assembly but the P/N 300151 assembly released on the Target Rock release sheet for this program specifies Revision G without a bushing, where Revision H incorporated the bushing.

2 - Broken Switch Bracket

Line-mounted 77L-001 valve.

3 - Coil Insulation Washer Found Offset

Line-mounted 77L-001 valve.

4 - Two Screws Found Loose in Coil Housing

Line-mounted 77L-001 valve.

With all these conditions found in the one assembly, it is obvious that this valve's electrical works had been disassembled and not properly reassembled. With two screws found loose in the coil housing and the switch bracket broken, the valve could not be properly tested and, therefore, could not be accepted by C.E. inspectors. The valve would have to have been disassembled after shipment from TRC.

5 - Loose Coil

It has always been the intention of Target Rock engineering that the coil be clamped by the use of additional insulating washers as required. Since the Target Rock drawings indicate two washers only are to be supplied, the assembly does not provide the clamping action desired. Earlier model valve assemblies called for supplying washers as required (A/R) to insure clamping and the valves supplied to Bechtel indicate the clamping action was present. It is also concluded that the qualification test valve, used in the program conducted for Bechtel, incorporated a clamped coil since the two valves examined (76HH-002) exhibited a properly clamped coil. It is Target Rock's intention, therefore, to circulate a service bulletin to advise owners of valves where this problem may exist.

Note also that the jam nut, holding the coil assembly in place, was found to have loosened during C.E.'s testing to NUREG 0588. Therefore, to insure retaining the clamping action afforded by the added insulating washers, a lock nut, in place of the jam nut, will be offered.

6 - No 'O' Ring Below Solenoid Coil Assembly

This valve had obviously been disassembled without paperwork (probably for welding the valve into the line). This does not constitute evidence that TRC shipped the valves in this manner. All 77L-003 solenoid valves should be examined for the 'O' ring.

Conclusions

- 1 - No validity to claim of incorrect assembly (as compared to TRC drawings).
- 2 - No validity to significant missing parts (as compared to TRC drawings). It has been shown, however, that 77L valves have a loose coil (permitted by TRC drawing and not desired by TRC engineering). Corrective action is required.
- 3 - No requirement to announce limit switch bracket failures, valve failure to open or to close unless the power plant was operational.

Action Required

- 1 - TRC to issue a service bulletin to all customers of previously supplied valves to incorporate:
  - a) Additional washers as required to insure coil clamping
  - b) Lock nut in place of jam nut to insure coil clamping.
- 2 - C.E. to withdraw or amend the 10 CFR Part 21 to reflect the conclusions and findings of this investigation.

V. Liantonio  
V. Liantonio

VL/jm

**TARGET ROCK CORPORATION**

APPENDIX

TR Procedure 3709 - January 6, 1983

TR Procedure 3710 - January 6, 1983

TR Procedure 3711 - January 7, 1983

TR Procedure 3709 Data Sheets (2) - 77L-001 (S/N 21) Valve -  
As shipped

TR Procedure 3709 Data Sheets (2) - 77L-001 (S/N 9) Valve -  
In pipeline

TR Procedure 3710 Data Sheets (2) - 77L-003 (S/N 4) Valve -  
In pipeline

TR Procedure 3711 Data Sheets (2) - 76HH-002 (S/N 7) Valve -  
In pipeline

TR Procedure 3711 Data Sheets (2) - 76HH-002 (S/N 5) Valve -  
In pipeline



February 2, 1983  
82Z-107

ADDENDUM NO. 1  
TO  
REPORT OF  
COMBUSTION ENGINEERING & TARGET ROCK  
REVIEW OF VALVES AT PALO VERDE SITE  
(DATED JANUARY 21, 1983)

1.0 SCOPE

This addendum adds the following information concerning relays to the report listed above.

2.0 ADDITIONAL INFORMATION

2.1 Add Item No. 7 to the "EXAMINATION" Section:

7. The 77L-003 valve had KR11DG 110 VDC relays instead of the KAl1DG 110 VDC relays as called out on the valve assembly drawing. The two 77L-001 valves had the KAl1DG 110VDC relays as required and the 76HH-002 valves did not require relays.

2.2 Add Item No. 7 to the "DISCUSSION OF OBSERVATIONS" Section:

7. The KR11DG 110VDC relay is equivalent to the KAl1DG 110VDC relay in form, fit and function. The only difference is that the KAl1DG 110VDC relay uses molded phenolic as the insulating material (initial resistance to ground is 100 megaohms minimum), while the KR11DG 110VDC relay uses laminated phenolic (initial resistance to ground is 1000 megaohms minimum).

2.3 Add Item No. 1 (c) to "ACTION REQUIRED" Section:

- 1c. The KR11DG 110VDC relay shall be identified as being an acceptable alternate to KAl1DG 110VDC relay. The two relays are equivalent in form, fit and function.

*Vito Liantonio*  
Vito Liantonio



S. B. 8302

Date: 4-6-83

PRODUCT IMPROVEMENT

SOLENOID OPERATED VALVES  
ALL MODELS  
WITH UNPOTTED SOLENOIDS

ADDING SOLENOID ASSEMBLY  
INSULATING WASHERS

1. GENERAL INFORMATION.

- A. Description. This Service Bulletin provides a method for checking axial travel of the solenoid assembly and, if found, to obtain the parts necessary to eliminate it.
- B. Effectivity. The work called for by this Service Bulletin is applicable to all Solenoid Operated Valves with unpotted solenoids.
- C. Reason. To eliminate the possibility of axial travel of the solenoid coil inside the solenoid housing on unpotted solenoid assemblies.
- D. Compliance. It is recommended that the work outlined herein be accomplished while the Solenoid Operated Valve is in storage or when the system is off-line as between fuel loadings.
- E. Material. A modification kit is needed to perform the requirements of this Service Bulletin. This kit will contain the parts and instructions necessary to perform this procedure. Contact the Field Service Department, Target Rock, for kit information and detailed instructions.

Written by: S. H. Schulman Date: 4-12-83  
G. H. Schulman, Technical Writer

Approved by: D. M. Pattarini Date: 4-13-83  
D. M. Pattarini, Vice Pres., Engineering

2-1MTCB MC-VBMS

PREPARED BY _____	<b>TARGET ROCK CORPORATION</b> EAST FARMINGDALE LONG ISLAND, N. Y.	PAGE 2 OF 2
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APPROVED BY _____		S.B. 8302
DATE _____		PROJECT

F. Special Tools. None required.

G. References. Engineering investigations and field service recommendations.

H. Publications Affected. This Service Bulletin shall become a part of and be filed with the applicable Technical Manual(s). Reference to this Service Bulletin shall be made when ordering spares.

2. INSTRUCTIONS.

A. Inspect the Solenoid Operated Valve for axial travel as follows:

- (1) Provide an axial lifting force of 50 to 100 pounds to the solenoid housing. Check to see if the solenoid housing moves. Movement of the solenoid housing indicates axial travel of the solenoid coil inside the housing.
- (2) If axial travel is evident, obtain a modification kit and perform the procedure contained in the instructions included with the kit.

B. It is recommended that a modification kit be kept on hand. Additional modification kits can be obtained, as required, from the Target Rock Corporation, Field Service Department. Field service assistance may be obtained from the Target Rock Corporation at current rates.