

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

March 14, 1989

NRC INFORMATION NOTICE NO. 89-28: WEIGHT AND CENTER OF GRAVITY DISCREPANCIES
FOR COPES-VULCAN AIR-OPERATED VALVES

Addressees:

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

This information notice is being provided to alert addressees to potential problems resulting from incorrect weight and center of gravity information provided by Copes-Vulcan, Incorporated (CV) with air-operated valves which they supplied before 1980. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to evaluate the significance of any discovered discrepancies. However, the suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

During recent reverification of piping stress analyses at the Prairie Island Nuclear Station, significant discrepancies were discovered in valve weight and center of gravity information for air-operated valves supplied by CV. Copes-Vulcan, (formerly the Blaw Knox Company), is a division of White Consolidated Industries. Before 1980, the information listed on the valve drawings in many cases did not account for the air operator and, consequently, significantly understated the valve assembly weight and center of gravity. Some of these valves are located in various lines connected to the accumulator tanks of the safety injection system, and in the charging and letdown systems. The new piping stress analyses performed for Prairie Island with the corrected values have shown that, as a result of this discrepancy, the allowable code stresses have been exceeded in many cases. In several instances, the piping stress analyses brought into question the ability of the associated system to withstand a seismic event.

The NRC has also confirmed the existence of this discrepancy at the D. C. Cook and Zion stations at which a number of the same valves were identified in safety systems. Reanalyses at the D. C. Cook station using the appropriate values for valve weight and center of gravity resulted in piping stresses that exceeded the allowable code limits. In at least one instance, the stresses exceeded the allowable limits to the extent that the operability of the associated piping

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system was brought into question. At Zion, the extended valve operators were supported independently minimizing the impact of the discrepancies in the weight or center of gravity location on the stress analyses.

Discussion:

As far as the NRC is aware, the incorrect information supplied by CV has only affected small-bore piping systems having valves ranging in size from 3/4 inch to 3 inches with pressure ratings ranging from 150 psi to 1500 psi. Table 1 is a partial listing of the valves supplied with the incorrect information. NRC does not know if any larger valves are affected. The actual valve weights are as much as 40 percent greater than the values originally provided, although in a few cases the actual weights are less. All of the center of gravity values are significantly different from the original values provided. The original center of gravity locations were given as approximately 5 inches from the datum points, while the actual locations range from 15 to 20 inches from the datum points. The corrections of the center of gravity values typically have resulted in the most significant problems in meeting allowable code stress levels.

IE Bulletin 79-14, "Seismic Analyses for As-Built Safety-Related Piping Systems," which was issued July 2, 1979, required all power reactor owners to verify that their seismic analyses applied to the actual configuration of safety-related piping. That bulletin applied only to safety-related piping 2 1/2 inches in diameter and greater and to seismic Category I piping, regardless of size, that was dynamically analyzed by computer. The incorrect information supplied with the CV valves mainly affected small-bore piping systems and is generally outside of the scope of Bulletin 79-14. However, since the small-bore piping had been analyzed by computer, the licensee for Prairie Island included this piping in its verification program required by Bulletin 79-14. It was during a reverification of the Bulletin 79-14 program that the recent CV valve data was found to differ from the original data.

The discovery of the incorrect CV valve data at D. C. Cook and Zion was made as a result of NRC inquiries following the Prairie Island discovery. The original design criteria for small-bore piping at these plants was based on generic span and standardized support criteria and was not part of the Bulletin 79-14 scope. At Zion, the extended valve operators are independently supported, therefore, the incorrect valve information did not cause any significant problems. However, CV typically recommended that attachments be made no higher than the body-to-bonnet flange connection. If the valves are supported in a manner not recommended by the manufacturer, it is important that the utility ensure that the valves are requalified with appropriately induced loads from the piping system. Analyses of the valve assemblies at Zion showed that the valves are qualified with the installed support systems, even though they do not comply with the vendor recommendations for supports.

Additional information on this problem was obtained during an NRC inspection at CV. The incorrect valve weight and center of gravity information typically was supplied to the licensees' Nuclear Steam System Suppliers or Architect-Engineers before 1980, who supplied it along with the system designs to the licensees. In 1988, CV notified its purchasers of the incorrect valve weights and center of

gravity values. A copy of the CV letter to the purchasers is attached. However, as these purchasers were usually Nuclear Steam System Suppliers and Architect-Engineers, some licensees who were the final users may not have been notified of the problem in a timely fashion. Additional technical information and a partial list of licensees who may have received the incorrect information can be found in the NRC inspection report (99900080/88-01).

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact one of the technical contacts listed below or the Regional Administrator of the appropriate regional office.



Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contacts: J. A. Gavula, RIII
(312) 790-5761

J. J. Petrosino, NRR
(301) 492-0979

Attachments:

1. Table 1
2. Copes-Vulcan Letter
3. List of Recently Issued NRC Information Notices

TABLE 1

COPEES VULCAN DRAWING NO.

| <u>L PRINT</u> | <u>S PRINT</u> | <u>SIZE</u> | <u>PRESSURE RATING</u> |
|----------------|----------------|-------------|------------------------|
| L-137857 | S-129989 | 3/4 | 1500 |
| L-140209 | S-129989 | 3/4 | 1500 |
| L-137820 | S-133149 | 1 | 150 |
| L-137914 | S-133149 | 1 | 600 |
| L-138930 | S-133150 | 1 | 1500 |
| L-137918 | S-133150 | 1 | 600 |
| L-137919 | S-133150 | 1 | 600 |
| L-140975 | S-133149 | 1 | 1500 |
| L-137968 | S-133150 | 1 | 1500 |
| L-143864 | S-130032 | 2 | 1500 |
| L-138023 | S-133269 | 2 | 600 |
| L-144157 | S-130032 | 2 | 1500 |
| L-138049 | S-133269 | 2 | 1500 |
| L-141003 | S-133151 | 2 | 150 |
| L-143844 | S-131642 | 3 | 1500 |



Attachment 2
IN 89-28
March 14, 1989
Page 1 of 2

COPES-VULCAN, INC.

P.O. BOX 577 • LAKE CITY, PENNSYLVANIA 16423-0577 • PHONE (814) 774-3151 • FAX (814) 774-2646 TRT-199140

November 22, 1988

Office of Nuclear Reactor
USNRC
Mail Stop OWFN9D4
Washington, DC 20555

ATTENTION: Mr. Brian Grimes
Director, Division Inspection and Safe Guards

Mr. Grimes,

Enclosed for your records is a copy of the letter which Copes-Vulcan will issue to our customers regarding incorrect valve weight and center of gravity. This letter will be mailed to our customers over the next 30 days. If you receive any further data, please do not hesitate to contact me.

Cordially,


Dale R. Mays
Quality Control Manager

DRM/pjg

Enclosure
cc: Joe Petrosino, NRC



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November 22, 1988

Copes-Vulcan has determined that the valve weight and/or center of gravity referenced on some assembly drawings prior to 1980 may be incorrect. If the assembly drawings Copes-Vulcan provided your company includes this data and you require additional information, please contact Dale Mays, Quality Control Manager. Listed below are the job numbers on which Copes-Vulcan supplied valves to your company during the time frame in question.

Cordially,

Dale R. Mays
Quality Control Manager

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

| Information Notice No. | Subject | Date of Issuance | Issued to |
|------------------------|---|------------------|---|
| 89-27 | Limitations on the Use of Waste Forms and High Integrity Containers for the Disposal of Low-Level Radioactive Waste | 3/8/89 | All holders of OLs or CPs for nuclear power reactors, fuel cycle licenses and certain by-product materials licenses. |
| 89-26 | Instrument Air Supply to Safety-Related Equipment | 3/7/89 | All holders of OLs or CPs for nuclear power reactors. |
| 89-25 | Unauthorized Transfer of Ownership or Control of Licensed Activities | 3/7/89 | All U.S. NRC source, byproduct, and special nuclear material licensees. |
| 89-24 | Nuclear Criticality Safety | 3/6/89 | All fuel cycle licensees and other licensees possessing more than critical mass quantities of special nuclear material. |
| 89-23 | Environmental Qualification of Litton-Veam CIR Series Electrical Connectors | 3/3/89 | All holders of OLs or CPs for nuclear power reactors. |
| 89-22 | Questionable Certification of Fasteners | 3/3/89 | All holders of OLs or CPs for nuclear power reactors. |
| 89-21 | Changes in Performance Characteristics of Molded-Case Circuit Breakers | 2/27/89 | All holders of OLs or CPs for nuclear power reactors. |
| 88-73, Supplement 1 | Direction-Dependent Leak Characteristics of Containment Purge Valves | 2/27/89 | All holders of OLs or CPs for nuclear power reactors. |

OL = Operating License
CP = Construction Permit

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

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gravity values. A copy of the CV letter to the purchasers is attached. However, as these purchasers were usually Nuclear Steam System Suppliers and Architect-Engineers, some licensees who were the final users may not have been notified of the problem in a timely fashion. Additional technical information and a partial list of licensees who may have received the incorrect information can be found in the NRC inspection report (99900080/88-01).

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact one of the technical contacts listed below or the Regional Administrator of the appropriate regional office.

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(312) 790-5761


J. J. Petrosino, NRR
(301) 492-0979

Attachments:

1. Table 1
2. Copes-Vulcan Letter
3. List of Recently Issued NRC Information Notices

*SEE PREVIOUS CONCURRENCES

| | | | |
|----------------|---------------|----------|-----------|
| *OGCB:DOEA:NRR | RVIB:DRIS:NRR | *RIII | *PPMB:ARM |
| DCKirkpatrick | JJPetrosino | JAGavula | TechEd |
| 02/28/89 | 03/ /89 | 02/28/89 | 02/23/89 |


D/DOEA/NRR
CERossi
03/9/89
*C/OGCB:DOEA:NRR
CHBerlinger
03/7/89

CV letter to the purchasers is attached. However, as these purchasers were usually Nuclear Steam System Suppliers and Architect-Engineers, some licensees who were the final users may not have been notified of the problem in a timely fashion. Additional technical information and a partial list of licensees who may have received the incorrect information can be found in the NRC inspection report (99900080/88-01). The NRC is still reviewing this matter and additional action may be taken in the future.

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| 02/28/89 | 03/ /89 | 02/28/89 | 02/23/89 |

D/DOEA:NRR

CERossi

03/ /89

C/OGCB:DOEA:NRR

CHBerlinger

03/7/89

CB
as modified

some licensees who were the final users may may not have received the corrected values in a timely fashion. Additional technical information and a partial list of licensees who may have received the incorrect information can be found in the NRC report of the Copes-Vulcan inspection (IR 99900080/88-01).

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DCK
OGCB:DOEA:NRR
DCKirkpatrick
02/28/89

JJP
PVNB:DRIS:NRR
JJPetrosino
02/1/89
3/2/89

JAG
RIII
JAGavula
02/28/89

DCK for
PPMB:ARM
TechEd
02/23/89

D/DOEA:NRR
CERossi
02/ /89
C/OGCB:DOEA:NRR
CHBerlinger
02/ /89