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

March 8, 1990

NRC INFORMATION NOTICE NO. 90-17: WEIGHT AND CENTER OF GRAVITY DISCREPANCIES FOR COPES-VULCAN VALVES

Addressees:

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

Purpose:

This information notice provides additional information which was compiled by a joint Westinghouse and Copes-Vulcan effort in mid-late 1989 regarding the incorrect weight and center of gravity data provided on Copes-Vulcan valve assembly drawings that could have been provided to licensees by any NSSS supplier or AE firm in the 1970 - 1980 time period. It is expected that recipients will review this information for applicability to their facilities and consider actions, as appropriate. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

As discussed in Information Notice 89-28, "Weight and Center of Gravity Discrepancies for Copes-Vulcan Air-Operated Valves," significant discrepancies were discovered in valve weight and center of gravity information for small bore air-operated valves supplied by Copes-Vulcan. Recent information obtained during NRC staff inspections at Westinghouse and Copes-Vulcan also identified additional weight and center of gravity discrepancies in large bore valves ranging in size up to 16-inches which include air-operated valves, motor-operated valves and check valves.

Westinghouse Electric Corporation and Copes-Vulcan prepared an extensive set of revised valve drawings showing the corrected weights and centers of gravity. Westinghouse compiled these drawings into two valve lists, dated July 17 and August 14, 1989, that represented a complete set of correct weights and centers of gravity as was then currently known to them. However, these valves represented only a portion of the total population of valves that Westinghouse had supplied to various licensees. Consequently, pending an in-depth review of all Copes-Vulcan valve drawings and the confirmation of their applicability to Westinghouse-supplied valves, these lists cannot be considered final. We have condensed the information provided by Westinghouse into Tables 1 and 2,

Concurrence

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which are attached. These tables provide a brief description of the type and class of the valves most significantly affected by these corrections; grouped by weight increases and center of gravity increases, respectively.

In the information provided by Westinghouse and Copes-Vulcan approximately 16 models of Copes-Vulcan valves were noted as having weight increases greater than 25 percent. The largest individual increase was 1710 pounds on a 16-inch, Class 900, air-operated feedwater valve. This represented an increase of 83 percent in the weight originally given for the valve. Other notable weight increases included a 515-pound weight increase for a 10-inch, Class 600, air-operated modulating valve; a 180-pound weight increase for an 8-inch, Class 150, motor-operated gate valve; and a 107-pound weight increase for a 2-inch, Class 1500, air-operated modulating valve.

The center of gravity discrepancies appear to be far more extensive than the weight discrepancies. Approximately 32 models of Copes-Vulcan valves were noted as having potentially significant discrepancies of this type. In some cases, the center of gravity information was not originally supplied along with the valve. In those instances piping design analyses were typically performed using conservative estimates. However, in a large number of cases the original information provided with the valves was nonconservative by more than 20 percent. In the worst case, the center of gravity on a 1-inch, Class 600, air-operated isolation valve changed by 15 inches. Other notable center of gravity changes included a 16-inch change (from 7-inches to 23-inches relative to the original datum point) on a 3-inch, Class 150, air-operated isolation valve; a 6-inch change on a 10-inch, Class 150, manual gate valve; and a 5½-inch change on a 2-inch, Class 1500, motor-operated modulating valve.

The staff has no reason to believe that these weight and center of gravity discrepancies are unique to Westinghouse plants. On the contrary, an NRC inspection of Copes-Vulcan on November 7 - 11, 1988 (NRC Report 99900080/88-01 with discussion in IN 89-28) identified 29 non-Westinghouse nuclear power plants in addition to Westinghouse plants that were supplied the incorrect valve weight and center of gravity information. A list of these plants is given in Table 3.

Discussion:

Several licensees have reanalyzed the associated piping systems using the corrected small bore valve weight and center of gravity information. These piping systems had originally been designed using either detailed finite element analyses or "cookbook" span criteria. The initial reanalysis work was typically based on the standard response-spectrum-type methodology consistent with the normal analytical methods used during the original design. The results of these initial reanalyses disclosed instances where the calculated stress would exceed 100,000 psi during a design-basis earthquake. In all cases the acceptability of the installation was confirmed, but in several cases this required the use of more sophisticated time history type analyses with NRC-approved increases in allowable stresses. In addition, some modifications to the seismic support configurations were required in order to bring the installations within the allowable FSAR stress criteria.

It is important to note that previous revisions to the weight and center of gravity information have been provided. Therefore, in deciding if a reanalysis of a valve and piping configuration would be appropriate, a comparison of the latest corrected information to the information either originally supplied with the subject valves or assumed in the original design analysis or analyses performed in response to IE Bulletin 79-14 ("Seismic Analyses for As-Built Safety-Related Piping Systems,") would be appropriate. Also, it is important to note that many of the Copes-Vulcan applications identified in Table 3 are located in safety-related systems.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate NRR project manager.

Charles E. Rossi

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

Technical Contacts: J. A. Gavula, RIII
(708) 790-5761

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

Attachments:
1. Table 1 - C-V Valves with Weight Increases Greater than 25%
2. Table 2 - C-V Valves with Center of Gravity Increases Greater than 20%
3. Table 3 - List of Plants Supplied with Copes-Vulcan Valves with Type of Valve and System Application.
4. List of Recently Issued NRC Information Notices

TABLE 1

C-V Valves With Weight Increases Greater Than 25%

Size	Class	Description
3/8"	1500 lb	air-operated globe valve
3/4"	1500 lb	air-operated isolation valve
1"	1500 lb	air-operated isolation valve
2"	1500 lb	motor-operated modulating valve
2"	1500 lb	air-operated isolation valve
2"	600 lb	air-operated isolation valve
2"	300 lb	motor-operated modulating valve
3"	1500 lb	air-operated isolation valve
3"	300 lb	air-operated modulating valve
3"	150 lb	air-operated isolation valve
3"	150 lb	air-operated modulating valve
8"	150 lb	motor-operated gate valve
12"	(N/A)	flow control valve
14"	900 lb	air-operated feedwater valve
16"	600 lb	air-operated feedwater valve
16"	900 lb	air-operated feedwater valve

TABLE 2

C-V Valves With Center of Gravity Increases Greater Than 20%

Size	Class	Description
3/8"	1500 lb	air-operated globe valve
3/4"	1500 lb	air-operated isolation valve
3/4"	600 lb	air-operated isolation valve
3/4"	150 lb	air-operated 3-way valve
1"	1500 lb	air-operated isolation valve
1"	600 lb	air-operated isolation valve
1"	150 lb	air-operated 3-way valve
2"	1500 lb	air-operated modulating valve
2"	600 lb	air-operated modulating valve
2"	150 lb	air-operated modulating valve
2"	150 lb	air-operated 3-way valve
3"	1500 lb	air-operated modulating valve
3"	600 lb	air-operated isolation valve
3"	300 lb	air-operated isolation valve
3"	300 lb	air-operated 3-way valve
3"	300 lb	check valve
3"	150 lb	air-operated 3-way valve
3"	150 lb	check valve
4"	300 lb	air-operated 3-way valve
4"	150 lb	check valve
4"	150 lb	gate valve
4"	150 lb	air-operated isolation valve
6"	150 lb	gate valve
8"	150 lb	check valve
10"	150 lb	gate valve
10"	150 lb	check valve
10"	300 lb	gate valve
10"	300 lb	check valve
12"	300 lb	check valve
12"	150 lb	check valve
14"	300 lb	check valve
16"	150 lb	check valve

TABLE 3

List of plants supplied with Copes-Vulcan valves with type of valve and system application. This table is based on information obtained from CV's "valve user list".

Plant	Known Valve Application
Beaver Valley 1	FW, AO, MO, SV, BOP
Beaver Valley 2	FW, AO, SV, BOP
Bellefonte	FW
Braidwood 1 & 2	AO, MO, SV, MT, SD, BOP
Browns Ferry 1	BOP
Byron 1 & 2	AO, MO, SV, MT, BOP
Callaway	FW, AO, FWB, BOP
Calvert Cliffs 1 & 2	SD, BOP
Comanche Peak 1 & 2	FW, AO, SV, BOP
Cook 1 & 2	AO, BOP
Crystal River 3	BOP
Davis-Besse	BOP
Diablo Canyon 1 & 2	FW, AO, SD, BOP
Dresden 2 & 3	FW, BOP
Farley 1 & 2	AO, BOP
Fort Calhoun	BOP
Ginna	FW, AO, BOP
Harris	FW, AO, SV, BOP
Indian Point 2 & 3	FW, AO, BOP
Kewaunee	FW, SD
Limerick 1 & 2	BOP
Maine Yankee	FW, BOP
McGuire 1 & 2	Specific Application Unknown
Millstone 1, 2 & 3	FW, BOP
Monticello	FW
Nine Mile Point 1	FW, BOP
Nine Mile Point 2	FW, BOP
North Anna 1 & 2	FW, AO, SD, BOP
Palisades	FW, BOP
Perry	FW, BOP
Pilgrim	FW
Point Beach 1 & 2	FW, AO, BOP, FWB

TABLE 3 (continued)

Plant	Known Valve Application
Prairie Island 1 & 2	FW, AO, BOP
Quad Cities 1 & 2	FW, BOP
River Bend 1	FW, BOP
Robinson 2	FW, AO, FWB, BOP
Salem 1 & 2	FW, AO, BOP
San Onofre 2 & 3	FW
Seabrook	FW, AO, SV, BOP
Sequoyah 1 & 2	FW, AO, BOP
Shoreham	BOP
South Texas 1 & 2	FW, AO, FWB
St. Lucie 1	FW, BOP
St. Lucie 2	Specific Application Unknown
Summer 1	AO, BOP
Surry 1 & 2	FW, AO, SD, BOP
Susquehanna	BOP
Trojan	AO, SD, BOP
Turkey Point 3 & 4	FW, AO, FWB, BOP
Vogtle 1 & 2	MO, AO, SV, BOP
Watts Bar	SV, AO, SD, BOP
Wolf Creek	FW, AO, FWB, BOP
Zion 1 & 2	AO, BOP

Acronyms

FW - Feedwater Valve
AO - Air-Operated Valve
MO - Motor-Operated Valve
FWB - Feedwater Bypass Valve
SV - Sampling Valve
MT - Manual Throttling
SD - Steam Dump
BOP - Balance of Plant

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
89-59, Supp. 2	Suppliers of Potentially Misrepresented Fasteners	3/7/90	All holders of OLs or CPs for nuclear power reactors.
90-16	Compliance with New Decommissioning Rule	3/7/90	All materials licensees.
90-15	Reciprocity: Notification of Agreement State Radiation Control Directors Before Beginning Work in Agreement States	3/7/90	All holders of NRC materials licenses which authorize use of radioactive material at temporary job sites.
90-14	Accidental Disposal of Radioactive Materials	3/6/90	All U.S. NRC byproduct material licensees.
90-13	Importance of Review and Analysis of Safeguards Event Logs	3/5/90	All holders of OLs or CPs for nuclear power reactors.
90-12	Monitoring or Interruption of Plant Communications	2/28/90	All holders of OLs or CPs for nuclear power reactors.
90-11	Maintenance Deficiency Associated with Solenoid-Operated Valves	2/28/90	All holders of OLs or CPs for nuclear power reactors.
90-10	Primary Water Stress Corrosion Cracking (PWSCC) of Inconel 600	2/23/90	All holders of OLs or CPs for PWRs.
90-09	Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Materials Licensees	2/5/90	All holders of NRC materials licenses.
88-30, Supp. 1	Target Rock Two-Stage SRV Setpoint Drift Update	2/2/90	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

It is important to note that previous revisions to the weight and center of gravity information have been provided. Therefore, in deciding if a reanalysis of a valve and piping configuration would be appropriate, a comparison of the latest corrected information to the information either originally supplied with the subject valves or assumed in the original design analysis or analyses performed in response to IE Bulletin 79-14 ("Seismic Analyses for As-Built Safety-Related Piping Systems,") would be appropriate. Also, it is important to note that many of the Copes-Vulcan applications identified in Table 3 are located in safety-related systems.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate NRR project manager.

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Document Name: IN 89-28 SUPP - GAVULA, DON

*SEE PREVIOUS CONCURRENCES

*OGCB:DOEA:NRR	*RVIB:DRIS:NRR	*RIII	*RPB:ARM	D/DOEA:NRR	*C/OGCB:DOEA:NRR
DCKirkpatrick	JJPetrosino	JAGavula	TechEd	CERossi	CHBerlinger
02/13/90	02/13/90	02/14/90	01/29/90	02/ 5 90	02/28/90

It is important to note that previous revisions to the weight and center of gravity information have been provided. Therefore, in deciding if a reanalysis of a valve and piping configuration would be appropriate, a comparison of the latest corrected information to the information either originally supplied with the subject valves or assumed in the original design analysis or analyses performed in response to IE Bulletin 79-14 ("Seismic Analyses for As-Built Safety-Related Piping Systems,") would be appropriate. Also, it is important to note that many of the Copes-Vulcan applications identified in Table 3 are located in safety-related systems.

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It should be noted that for the lists provided by Westinghouse, the "old" weight and center of gravity information is based on the information from the previous revisions to the drawing. As such, this information may not have been the information originally supplied for the valve and therefore, may not have been used in the original design process. By comparing this "new" versus "old" information alone, an inappropriate decision to not evaluate a specific valve may be made. The more appropriate method is to compare the new information with the actual data used in the original or in the IE Bulletin 79-14 analyses.

We do not know if the non-Westinghouse plants are affected to the extent that the Westinghouse plants are. However, Table 3 indicates that many of the Copes-Vulcan applications are located in safety-related systems.

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		by phone		

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