

# Control Components, Inc.

2567 S.E. Main Street  
Irvine, California 92714

TITLE

JUSTIFICATION REPORT - POWER OPERATED RELIEF VALVE

Specification No. : N/A

Date Effective : 7/9/81

PREPARED BY

*E. J. Villalva*

DATE

*10/2/81*

E.J. VILLALVA, PROJECT ENGINEER

REVIEWED BY

*D. Koo*

DATE

*10/2/81*

D. KOO, SUPERVISOR, ENGINEERING PRODUCT SUPPORT

APPROVED BY

*V. K. Nagpal*

DATE

*10/5/81*

V.K. NAGPAL, MANAGER, TECHNICAL SUPPORT

## JUSTIFICATION REPORT

### POWER OPERATED RELIEF VALVE

#### 1.0 INTRODUCTION

Control Components International will supply a total of twelve power operated relief valves (PORV's) to the Duke Power Company. All of the valves supplied are Self Drag models. These valves will be used in two Duke Power PWR plants: McGuire Nuclear Station and Catawba Nuclear Station. There are two units at each of these plants and each unit uses three CCI PORV valves. The table below lists these plants and the corresponding PORV's.

<u>Utility</u>	<u>Plant</u>	<u>Valve Model</u>	<u>Drawing Number</u>
Duke Power Co.	McGuire 1&2	Self Drag	118760
" " "	Catawba 1&2	" "	921101010

#### 2.0 DESCRIPTION OF BASIC VALVE MODEL

The CCI PORV is a 3x4 globe style body, with interpolated pressure class rating of 1,534 pounds. The valve operator is a double-acting piston air-operated cylinder. A pair of springs are above the operator piston to close the valve in the failed air mode. The operator is, in turn, controlled by two 3-way solenoid valves which are provided by the Duke Power Company. The main internal components in the valve are the plug, seat ring, and disk stack. The plug is 2½ inches in diameter, and the material is ASME SA 637-GR-688-2. The seat ring is 316 with Stellite inlay on the seating surface. The disk stack consists of many disks, brazed together, and made of 410 Cres. Flow through the valve is restricted by the disk stack by varying the number of turns and the area of the flow passages on the individual disks. As the valve opens, the plug comes off the hard seat and travels very quickly up the disk stack bore (opening time for the 5½ inch stroke is less than two seconds). Fluid enters the valve body, flows from the outside of the disk stack into the disk stack bore area, past the seat ring and out of the valve. Drawings and parts lists of the valve assembly, the body assembly, and the actuator assembly are included at the end of this report (Attachment 1).

#### 3.0 SELECTED TEST VALVES

The valve selected for the EPRI tests is identical (see Section 4.0) to the PORV's supplied at the Catawba Nuclear Station. It is valve serial number 18789-1-1 and part number 921101010. Drawings for this valve may be found in Attachment 1.

#### 4.0 DESIGN VARIATION BETWEEN TEST VALVE AND PWR PLANT VALVES

All valves supplied are identical in fit, form, and function with the following exceptions or clarifications:

- 4.1 There were two methods of bonnet manufacture employed: One machined of solid bar material and one of welded construction.
- 4.2 Each valve has a custom fit trim to account for variations in manufacturing tolerances.

- 4.3 Buttweld details are different between orders supplied to date. This effects stress relief methods in welding into plant piping.
- 4.4 Each order was designed and manufactured to different code requirements. The first order was ASME Section 3, 1971. The second order was ASME Section 3, 1974.

In the opinion of the CCI Engineering Department none of the above differences will have any effect on the performance of the valve tested compared to those valves in PWR plants.

5.0 CONCLUSION

The test valve selected is virtually identical to those supplied by CCI for use in the PWR plants. The PORV valve listed in Section 3.0 of this report is an excellent representation of all CCI valves supplied for this application.

EJV/js

A T T A C H M E N T 1

TOP ASSEMBLY PART NUMBER: 921101010  
BODY ASSEMBLY PART NUMBER: 921201009  
ACTUATOR ASSEMBLY PART NUMBER: \*930101099

\*The discrepancy in the Acutator Assembly number and the Bill of Material Number is intentional and used for internal identification purposes. The parts are identical.



**NUCLEAR**  
 SPECIAL HANDLING  
 921101010  
 ASSEMBLY NUMBER:

**BILL OF MATERIAL**  
 CONTROL COMPONENTS, INC.

STEAM

W. O./CONTRACT NUMBER  
 18789-1  
 18789-2  
 RELEASE STATUS  
 ISSUE NUMBER DATE

LATEST ASS'Y START DATE

REV. U

ASSEMBLY NAME SELF DRAG ELEMENT, 3x4 GUB, 1534, 2.5 PLG

I L L M	ITEM DESCRIPTION	PART NUMBER	QUANTITY		I S S U E	SOURCE: P.O.# S.O.#	DATE DUE		LOCATION		MATERIAL LIST - ITEM REFER. NUMBER
			EA	TOTAL			MONTH	DAY	STOCK AREA		
	SELF DRAG ELEMENT	921101010									
1	BODY ASSY	921201009	1								
2	ACTUATOR ASSY	930101099	1								
3	N/R										
4	LIMIT SWITCH ASSY. NAMCO EA-180-21302	930404010	1								
5	LIMIT SWITCH ASSY. NAMCO EA-180-21302	930403010	1								
6	SCREW, FLAT HD (3/8-16x1) (18-8 CRES)	250320066	6								
7	STUD, (3/4-10x3") (ASTM A 193 B7)	123702002	4								
8	WASHER, LOCK (18-8 CRES)	251130032	4								

SEE TOP DWG. REV. BLK. FOR CHGS.

STANDARD

SPECIAL

# BILL OF MATERIAL CONTROL COMPONENTS, INC.

PAGE 2 3

STEAM

ASSEMBLY NUMBER: 921101010

W. O./CONTRACT NUMBER	
18789-1	
18789-2	
RELEASE STATUS	
ISSUE	NUMBER
	DATE

LATEST ASS'Y START DATE

REV. U

ASSEMBLY NAME SELF DRAG ELEMENT, 3/4 GLB, 1534", 2.5PIG

ASS'Y PULL  
ASS'Y START

I T E M	ITEM DESCRIPTION	PART NUMBER	QUANTITY		I S S U E	SOURCE: P.O.# S.O.#	DATE DUE		LOCATION		MATERIAL LIST - ITEM REFER. NUMBER
			EA	TOTAL			MONTH	DAY	STOCK AREA		
			9	NUT, HEX HD (18-8 CRES)			25044003B	4			
10	ARM, STRIKER (CRES)	330801020	2								
11	N/R										
12	N/R										
13	N/R										
14	N/R										
15	N/R										
16	N/R										
17	N/R										

**NUCLEAR**  
SPECIAL HANDLING  
REQUIRED

SEE TOP DWG. REV BLK. FOR CHGS.

STANDARD

SPECIAL

# BILL OF MATERIAL CONTROL COMPONENTS, INC.

PAGE 3 OF 3

W. O./CONTRACT NUMBER

ASSEMBLY NUMBER: 921101010

STEAM

1878-1  
18789-2

LATEST ASS'Y START DATE

REV. U

RELEASE STATUS

ASSEMBLY NAME

SELF DRAG ELEMENT 3X4 GLB 1534 2.5 PLG

ASS'Y PULL  
ASS'Y START

ISSUE

NUMBER  
DATE

I T E M	ITEM DESCRIPTION	PART NUMBER	QUANTITY		I S S U E	SOURCE P.O. # S.O. #	DATE DUE		LOCATION		MATERIAL LIST - ITEM REFER. NUMBER
			FA	TOTAL			MONTH	DAY	STOCK AREA		
18	N/R										
19	N/R										
20	N/R										
21	O-RING (ETHYLENE PROPYLENE)	255520370	2								
22	LABEL, IDENTIFICATION (302 CRES)	332701008	1								
23	SCREW, DRIVE (#2 x 1/4) (18-8 CRES)	250040002	14								
24	LABEL IDENTIFICATION 302 CRES	332701001	1								
25	NAMEPLATE ID. 302 CRES	131301035	1								
26	LABEL, FLOW	132701007	1								

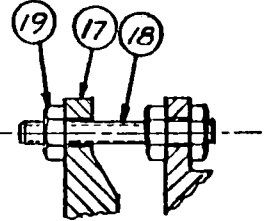
**NUCLEAR**  
SPECIAL HANDLING  
REQUIRED

SEE TOP DWG. REV BLK. FOR CHGS.

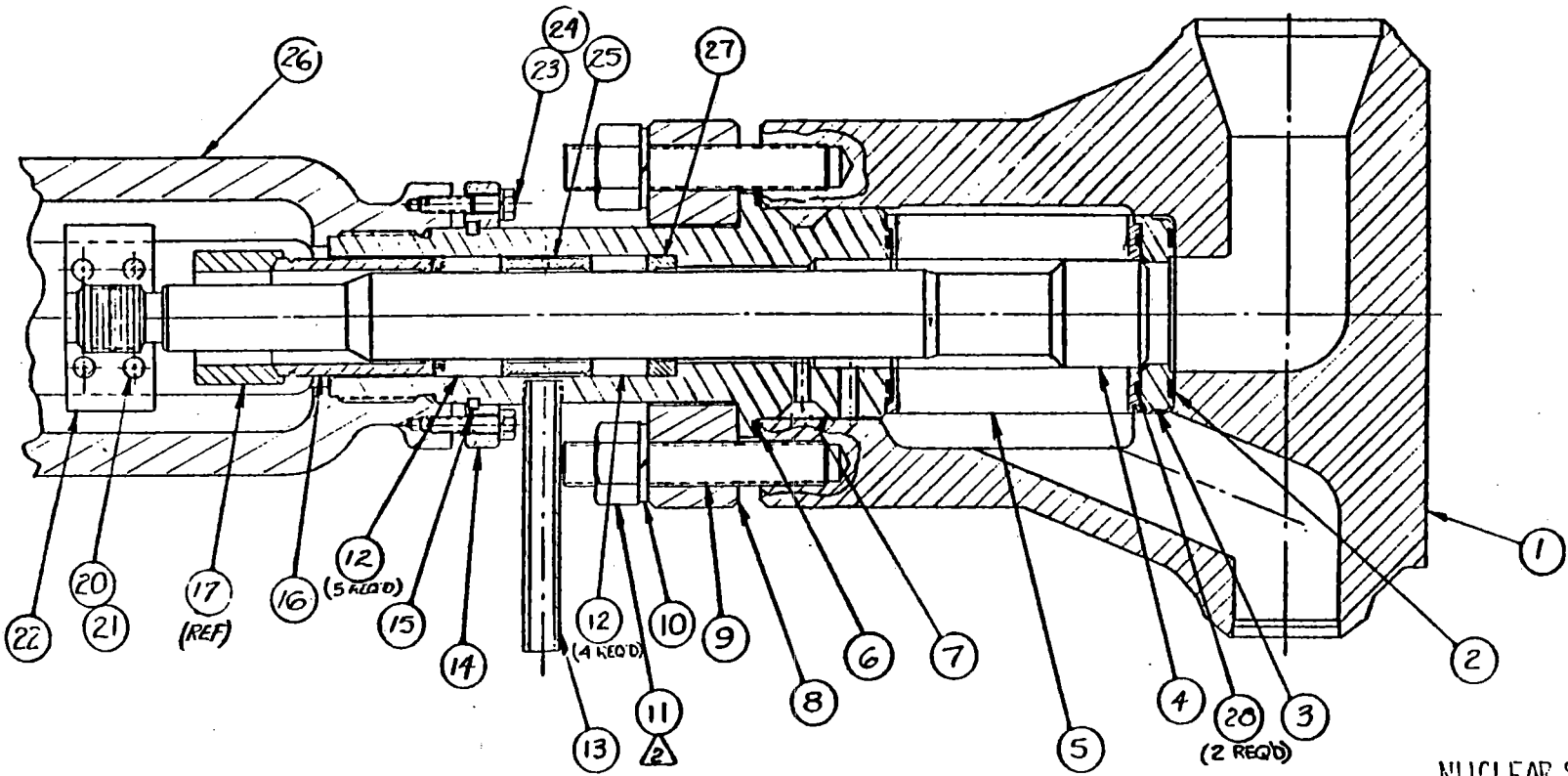


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REVISIONS				
ECO NO	LTR	DESCRIPTION	DATE	APPROVED
0175	L	REVISE SEAT RING MAT'L	1/16/60	[Signature]



(ROTATED VIEW OF PACKING FLANGE)



**NUCLEAR**  
SPECIAL HANDLING  
REQUIRED

NUCLEAR SAFETY RELATED

**CCI CONTROL COMPONENTS INC.**  
A SUBSIDIARY OF BABCOCK & WILCOX  
IRVINE CALIFORNIA

**BODY ASSY**

3X4 GLCEE, 1534#, 2.5 PLUG

SIZE	CODE	IDENT NO	DWG NO
C	19562	.9212	0100
SCALE	1:1	UNIT WT	SHEET

DO NOT SCALE DRAWING		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NO	
MUST CONFORM TO ES 100		TOLERANCES ANGLES ± 1°		PREP [Signature]	
GEOMETRIC SYMBOLS PER ANSI V14.5		(Ø) ± .1 (ØØ) ± .03 (ØØØ) ± .010		CHK [Signature]	
MACHINED SURFACES 12.5 PER ASA B46.1		MATERIAL (SEE BILL OF MAT'L)		DSGN [Signature]	
WELDING SYMBOLS PER ANSI Y 32.3		FINISH		PROJ [Signature]	
OR ASW A2.0		HEAT TR [Signature]		APVD [Signature]	
ABBREVIATIONS PER MIL-STD-12		APPLICATION		15789-1	
REVISION	USED ON				
NEXT ASSY	APPLICATION				

⚠ TORQUE HEX NUTS EVENLY, 350-355 FT/LBS

DUKE POWER CO ITEM NO CNS-1205-10-1  
MPS CO ORDER NO 27

NOTES:

600102126

STANDARD  
SPECIAL

SPRC

ASSEMBLY NUMBER: 26

921201009

**BILL OF MATERIAL**  
CONTROL COMPONENTS, INC.

STEAND *hwy*  
5-14-76

PAGE 1 OF 4

W. O./CONTRACT NUMBER

18782

REV.

L

RELEASE STATUS

ISSUE

NUMBER  
DATE

LATEST ASS'Y START DATE

ASS'Y PULL  
ASS'Y START

ASSEMBLY NAME

BODY ASSY, 3X4 GLB, 1534<sup>2</sup>, 2.5 PLUG

ITEM	ITEM DESCRIPTION	PART NUMBER	QUANTITY		ISSUE	SOURCE: P.O.# S.O.#	DATE DUE		LOCATION		MATERIAL LIST ITEM REF. NUMBER
			EA	TOTAL			MONTH	DAY	STOCK AREA		
	BODY ASSY	921201009									
1	BODY (ASME SA182-GR-316)	320101236	1								
2	GASKET FLEXITALLIC (ASB & 347, LOW CHLORIDE)	324501061	1								
3	RING, SEAT SA 240 GR 316 / SA-182 F316	320301161	1								
4	PLUG (ASME SA1637-GR-688-2)	320601125	1								
5	DISK STACK ASSY (410 CRES)	923701343	1								
6	GASKET, FLEXITALLIC (ASB & 347, LOW CHLORIDE)	324501066	1								
7	BONNET ASME - SA182 - F316 OR ASME - SA479 - 316	321401616	1								
8	FLANGE, BONNET (ASME SA182-GR-316)	321501038	1								

THE BODY ASSY DWG REV. FOR CHGS.

STANDARD

SPECIAL

BILL CONTROL MATERIAL CONTROL COMPONENTS, INC.

921201009

ASSEMBLY NUMBER:

STEAM 24us 5-14-76

W. O./CONTRACT NUMBER		
18789-		
RELEASE STATUS		
ISSUE	NUMBER	
	DATE	

LATEST ASS'Y START DATE

REV.

L

ASSEMBLY NAME BODY ASSY, 3X4 GLB, 1534#, 2.5 PLUG

ASS'Y PULL ASS'Y START

ITEM	ITEM DESCRIPTION	PART NUMBER	QUANTITY		ISSUE	SOURCE: P.O.# S.O.#	DATE DUE		LOCATION		MATERIAL LIST - ITEM REFER. NUMBER
			EA	TOTAL			MONTH	DAY	STOCK AREA		
			9	STUD 1-8 x 5 3/4 (ASME - SA 193-B7)			323707019	9			
10	WASHER, LOCK, 1" HVY (STEEL)	251130042	9								
11	NUT, HEX, 1"-8UNC HVY (ASME-SA-194-GR7)	250440116	9								
12	PACKING (GRAFOIL GTN-70)	120809002	9								
13	EXTENSION, LEAK-OFF (ASME SA 479-316)	323101309	1								
14	FLANGE, RETAINER (ASTM A240-316)	324401047	1								
15	RING, RETAINER (18-8 CRES)	324201044	1								
16	FOLLOWER, PACKING (316 CRES)	322401073	1								
17	FLANGE, PACKING (ASTM-A479-316)	322501013	1								

NUCLEAR SPECIAL HANDLING REQUIRED

STANDARD

SPECIAL

# BILL OF MATERIAL

CONTROL COMPONENTS, INC.

PAGE 3 OF 4

W. O./CONTRACT NUMBER

921201009

ASSEMBLY NUMBER:

STEAM *2 hrs*  
5-14-76

18789-

LATEST ASS'Y START DATE

REV.

RELEASE STATUS

ASS'Y PULL  
ASS'Y START

L

ISSUE

NUMBER  
DATE

ASSEMBLY NAME

BODY ASSY, 3X4 GLB, 1534<sup>1/2</sup>, 2.5 PLG

ITEM	ITEM DESCRIPTION	PART NUMBER	QUANTITY		ISSUE	SOURCE P.O.# S.O.#	DATE DUE		LOCATION		MATERIAL LIST - ITEM REFER. NUMBER
			EA	TOTAL			MONTH	DAY	STOCK AREA		
18	STUD, ALL THD, (3/4-10x6) (ASTM-A193-B7)	323723015	2								
19	NUT, HEX 3/4-10 (ASTM-A194-2H)	250440088	6								
20	SCREW, HEX HD (1/2-13 x 3) (18-8 CRES)	250310035	4								
21	NUT, HEX (1/2-13) (18-8 CRES)	250440035	4								
22	CONNECTOR, STEM (18-8 CRES)	322701005	2								
23	SCREW, HEX HD (3/8-16x1 1/2) (18-8 CRES)	250310043	6								
24	WASHER, LOCK, 3/8 (18-8 CRES)	251130033	6								
25	RING, LANTERN (17-4 PH CRES)	323301017	1								
26	YOKE M/F 330201019 (ASTM A351-CFS)	333601003	1								

**NUCLEAR**  
SPECIAL HANDLING  
REQUIRED

BODY ASSY DWG. REV BLY FOR CHGS.

STANDARD  
SPECIAL

# BILL MATERIAL

CONTROL COMPONENTS, INC.

W. O./CONTRACT NUMBER		
18789		

ASSEMBLY NUMBER: 921201009

LATEST ASS'Y START DATE

REV. L

RELEASE STATUS	
ISSUE	NUMBER DATE

ASSEMBLY NAME BODY ASSY, 3X4 GLB, 1534#, 2.5 PLUG

ASS'Y PULL  
ASS'Y START

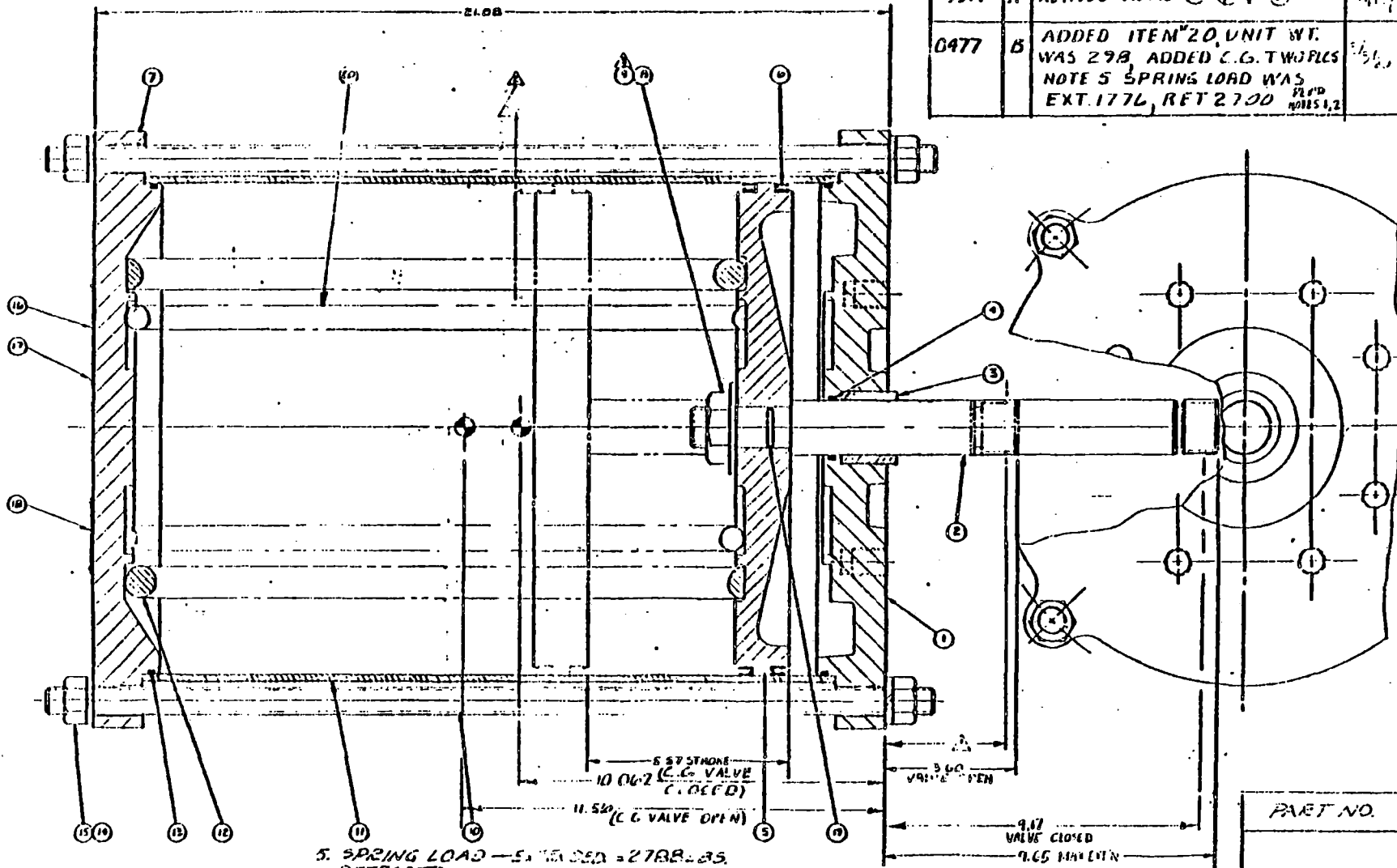
I T E M	ITEM DESCRIPTION	PART NUMBER	QUANTITY		I S S U E	SOURCE P.O.# S.O.#	DATE DUE		LOCATION		MATERIAL LIST - ITEM REFER. NUMBER
			EA	TOTAL			MONTH	DAY	STOCK AREA		
27	SPACER, PACKING 400 SERIES S.S.	320401407	1								
28	GASKET, FLEXITALLIC (ASB # 347, LOW CHLORIDE)	324501065	2								

**NUCLEAR**  
SPECIAL HANDLING  
REQUIRED

SEE BODY ASSY DWG REV BLK. FOR CHGS.

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ECO NO		REVISIONS		DATE	APPROVED
02464		RELEASED			CGS
02317	A	REVISED ITEMS ③ ④ ⑤ ⑥		1/1/77	CGS
0477	B	ADDED ITEM 20, UNIT WT. WAS 298, ADDED C.G. TWIPLES NOTE 5 SPRING LOAD WAS EXT. 1776, RET 2700		1/1/77	CGS



**NOTES**

▲ THIS IS POSITION OF SHAFT ITEM 2, IF SPRING ITEM 20, WENT TO SOLID HEIGHT DIMENSION FROM END CAP ITEM 7 IS 2.68 ± .03

▲ THIS IS POSITION OF PISTON ITEM 3, IF SPRING ITEM 20, WENT TO SOLID HEIGHT

▲ 19 SET SCREWS TO ITEM FOUR PLACES EQUALLY SPACED AROUND NUT TO RETAIN NUT

▲ MAX OPERATING PRESS = 100 PSI.

5. SPRING LOAD - EXTENDED = 2788 LBS,  
RETRACTED = 4149 LBS,

E 3 NOT SCALE DRAWING	
MIL-STD-100 TO ES 100	
DESIGN TO SPECIFICATIONS V14.5	
DRAWING DIMENSIONS IN INCHES PER ASA B46.1	
MATERIAL PER MIL-STD-100	
FINISH PER MIL-STD-100	
HEAT TREAT PER MIL-STD-100	
APPLICATION	USED ON
HEAT ASSY	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ANGLES ± 2° (0) = 1 (00) = 02 (000) = 010
MATERIAL (SEE D/W)
FINISH
HEAT TREAT

CONTRACT NO	
PREP	7-12-77
CHK	7-12-77
DSGN	
PROJ	
APVD	CGS 7/13/77

CONTROL COMPONENTS INC. A SUBSIDIARY OF BARCOCK & WILCOX IRVINE CALIFORNIA	
ACTUATOR ASSY 1.45 IN <sup>2</sup> , 5.57 STROKE	
SIZE	CODE IDENT NO
C	19562
SCALE	UNIT WT
NONE	30.5 LBS
SHEET 1 OF 1	

66001066

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	E.C.O. NO.	LTR	DESCRIPTION	DATE	APPROVAL
		92464	-	RELEASED	7/16/79	CGS
		92728	A	ITEM 11 WAS 30055 #15 WAS 25044003B.	8/17/79	CGS
		93008	B	ITEM 8 P/N WAS 251120003	9.6.79	CGS
		93291	C	#13 WAS 255590539 HALAL SEAL	10/11/79	CGS
		93764	D	#13 WAS 655590002	11/12/79	CGS
		0478	E	ADDED ITEM #20	3/3/80	CB

UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES  
TOLERANCE ON ANGLES  $\pm 2^\circ$   
DECIMALS (.000)  $\pm .010$   
(.001)  $\pm .03$   
(.0)  $\pm .1$

	SIGNATURES	DATE
DR BY	<i>J. H. [Signature]</i>	7-11-79
CHK BY	<i>D. McLaughlin</i>	7-12-79
APPO BY	CGS	7/13/79

CONTROL COMPONENTS INC.  
IRVINE CA A SUBSIDIARY OF BABCOCK & WILCOX

ACTUATOR ASSY  
145 IN<sup>2</sup>  
5.57 STROKE B/M

SIZE	CODE IDENT NO.	DOCUMENT NO.
A	19562	930101099
SCALE <i>NONE</i>		SHEET 1 OF 1





STANDARD  
 SPECIAL

**BILL MATERIAL**  
 Control Components International

PAGE 2 3  
 W. O./CONTRACT NUMBER

ASSEMBLY NUMBER: 930101099

*109m*  
 7-12-79

LATEST ASS'Y START DATE

REV.

RELEASE STATUS

ASS'Y PULL  
 ASS'Y START

**E**

ISSUE NUMBER  
 DATE

ASSEMBLY NAME: ACTUATOR ASSY 145 IN<sup>2</sup>

ITEM	ITEM DESCRIPTION	PART NUMBER	QUANTITY		ISSUE	SOURCE: P.O.# S.O.#	MATERIAL STATUS		LOCATION	STOCK AREA	MATERIAL LIST -- ITEM REFER. NUMBER
			EA	TOTAL			DATE DUE				
							MONTH	DAY			
9	NUT, HEX JAM 300 SERIES SS 1/8-12UNF	250440245	1								
10	STUD 3/4-10X24.62 300 SERIES SS	333101017	4								
11	CYLINDER 4130	330101017	1								
12	SPRING CARBON STEEL	330701032	1								
13	O RING ETHYLENE PROPYLENE EDM	255520513	2								
14	WASHER, LOCK, SPRING 300 SERIES SS	251130032	8								
15	NUT HEX 3/4-10UNC A194-2H /CAD PLT	250440088	8								
16	LABEL WARNING 300 SERIES SS	132701001	1								
17	SCREW DRIVE 300 SERIES SS	250040004	8								



B2 - COPES-VULCAN