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PLANT MATERIALS APPLICATION ENGINEERING

TITLE: FAILURE ANALYSIS, F010 AND F011 VALVES, CLINTON PROJECT

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Failure Analysis Report of F010 and F011
Valves From The Clinton Reactor

1. INTRODUCTION

1.1 Discovery of Cracked Valve Stem and Loose Parts in HPCS System

While the Clinton Site was operating the High Pressure Core Spray (HPCS) pump in system test (October-November, 1985) with suction from the condensate storage tank a noise was heard in the return line to the condensate storage tank. The noise sounded as if loose parts were rolling down the return line followed by a "thunk". Subsequently the flow rate dropped substantially. Disassembly of F010 and F011 valves revealed the following damage in the valves:

F010 Valve

a. Broken valve stem

b. Disc and stub of stem were jammed at an angle into the seat and guides resulting in the valve being locked open

c. Extruded back seat on stem. The valve stem at the back seat location was mushroomed indicating the stem had been pulled into the backseat with the motor

d. Bent Stem Clamp The stem clamp was bent.

F011 Valve

a. The disc and disc nut were unscrewed leaving the stem free to travel out of the disc. One retainer ring segment was found downstream of the valve just beyond the flow restricting orifice. The other ring segment was found in the condensate storage tank.

b. The stem was heavily galled and the back seat in the bonnet was badly cracked as a result of pulling the stem through the back seat with the motor operator.

1.2 Objectives of This Failure Analysis Report are to Document Findings and to Make Recommendations

The objectives of this report are to document the findings regarding F010 and F011 valves at the Clinton site, subsequent failure analysis work, to determine cause of failure and to make recommendations for further action.

1.3 Cause of Failure

1.3.1 E22F010 Valve Stem Failure

Metallographic studies showed that the crack started intergranularly (probably Intergranular Stress Corrosion Cracking) (IGSCC) and progressed to approximately 30° around the circumference to approximately ½ inch deep. The balance of the cross section shows a brittle cleavage failure indicting the shaft broke suddenly with a single application of overload. It is entirely possible that the intergranular cracking (IGC) started due to high tensile stresses resulting from backseating the stem with the motor actuator coupled with the residual stresses from heat treatment and high hardness of the stem (RC 40-42 in the failure area). When the IGC had grown to sufficient size, a loading of the stem from the motor operator could have been sufficient to cause a single brittle fracture to occur in the balance of the stem cross section.

1.3.2 E22F010 Valve Disc Jammed Open

Sometime after fracture of the stem the disc became cocked in the valve such that one edge was striking the seat and the opposite side was wedged in the guides, Figure 8. This effectively jammed the valve open with no possibility of closing. The broken top part of the stem was striking the lower part of the stem such that it wedged the disc tighter in the open position with each stroke. The cocking of the disc was most likely due either to use of the valve for throttling or from closing the valve while the pump was operating. It is not likely that the stem could have cocked with no flow in the valve.

1.3.3 E22F010 Valve Stem Back Seat Mushrooming and E22F011 Back Seat Damage

The damage to both valves in the back seat area was caused by pulling the stems into the back seat with the motor operator probably at full thrust. In the case of F010 valve the shaft seat was extruded; while in the case of the F011 valve the back seat was cracked and expanded and the shaft badly galled. It appears that the limit switches were inoperative and the motor operators pulled until the torque switch turned the motor off. This type of damage is typical where the limit switch is not set properly or where it is bypassed.

1.3.4 E22F011 Valve Disc and Nut Separation

The disc nut unscrewed from the disc and completely separated the stem and disc due to vibration.

It is not clear when the loosening of the nut occurred. The fact that there was no fretting on the shaft and no damage to the threads would suggest that the loosening and separation occurred very closely together. On the other hand the loosening of the stem clamp and other problems with the valve would suggest that the nut loosening took place over a longer period of time.

1.4 Recommended Corrective Action

1.4.1 Damaged Items

All damaged items should be replaced or repaired. The stems should be replaced with properly heat treated Type 410 stainless steel. General Electric's current standards require hardness of Type 410 not to exceed RC28 (See paragraph 2.4 for basis). 17-4 Ph stems may also be used providing the aging temperature is 1075°F or greater (material temperature).

1.4.2 Packing

As a product improvement GE recommends use of valve packing with high purity packing meeting the limits of GE SIL No 399 to control the pitting that can occur with high chloride packing material. A copy of SIL No 399 is attached.

1.4.3 Back Seating of Valve

Measures should be taken to assure that the valve stems do not remain backseated for long periods of time. This traps water in the back seat pocket which acts as a crevice and corrodes the shaft. The corrosion and pitting can be a nucleus for IGC as a nucleation site for IGSCC.

1.4.4 Proper Setting of Limit Switch

The cause for switches being inoperative should be determined. Corrections in both equipment and procedure to assure proper operation in the future should be made. The need for adjustment of position may be indicative of problems in the valve such as a broken stem or unscrewed disc nut.

1.4.5 Use of Valves for Throttling

These valves are not designed for intensive throttling service. They can be used to throttle for a limited amount of flow (down to 30% flow) for short periods of time. If it is desired that these valves be used for more throttling than this other alternatives can be developed.

1.4.6 Other Valves

Hardness

The hardness of other valve stems in the HPCS system was determined near the mid length of the stem as shown in Table 1. It is obvious that the F023 valve stem is too hard and it should either be retempered or replaced. For the other valves it is not as obvious since F010 shows RC35 at mid-length but RC40 at the hard end and RC30-31 at the soft end. For these other valves it is recommended that hardness be taken at midstem and at the top end. These two measurements will allow an estimate of the hardness at the lower end of the valve stem.

Other Valves should be disassembled and inspected unless there is evidence to show that the stems were not pulled into the back seat with the motor. The stems should be inspected visually and with liquid penetrant to assure freedom from damage. In addition for valves with stems harder than RC28 and which were backseated for an extended period of time (in excess of 500 hours), the stems should be inspected visually and with liquid penetrant to assure freedom from cracking. Alternately the stems may be examined with ultrasonics using a procedure qualified to detect such intergranular cracking.

Table 1

Hardness of Valve Stems in HPCS System

Valve	Hardness in Mid Stem Location (above the stem clamp)
F001	RC 29.4
F004	RC 32.7
F010	RC 35.0
F011	RC 37.3
F012	RC 32.4
F015	RC 28.6
F023	RC 40.5

2.0 DISCUSSION

2.1 Contributors to Damage

The main contributors to the damage found in the valves (see Section 3.0) are:

(1) Limit switch problems resulting in overtravel of stem into back seat.

(2) Vibrations (a) due to original positioning of the D004 orifice too close to the F011 valve and (b) due to extensive use of the valves for throttling.

(3) High stem hardness with resultant high residual stress caused by tempering at too low a temperature. (RC41 in region of failure)

2.2 Why Vibration Loosened Parts in F011 Valve and Not F010 Valve

For the F011 valve vibration caused the separation of stem, disc and stem nut and allowed the split rings to cascade down the pipe. Only the F011 valve had evidence of loosening of parts due to vibration. There are two possible explanations explain this as follows:

a) It is possible that the vibration resulting from the D004 orifice being too close caused the loosening of the stem nut on F011 and later throttling served to complete the separation. The F010 valve would not have experienced as severe a vibration from the orifice.

b) It is possible that the F010 valve stem fractured before it had experienced significant throttling and before the vibration from the D004 orifice.

If item (a) is correct it appears that the valves can withstand the amount of throttling use applied at Clinton. However if item (b) is correct and if such an amount of throttling is applied again of the disc nut and disc may again become disassembled. Further review of the test records or discussions with test personnel may shed more light on this. In any event throttling should be minimized.

2.3 Cracks and Fraccures in Stem, F010 Valve

The main fracture severing the valve stem was initiated intergranularly (IG) and then rapidly propagated by brittle fracture, Figure 12 through 14. Longitudinal cracks were also found emanating from the main fracture which were intergranular. There were also other cracks in the stem located at the bottom radius of the groove housing the split ring retainer, Figure 16 and 17. There are several notable attributes of this stem fracture and these cracks as follows:

a. It is unusual to see intergranular cracks this deep with so little apparent time exposed to water considering the low temperatures involved (ambient temperature)

b. There is corrosion on the stem just above the back seat suggesting that the valve was backseated with water present for a long period of time. F011 valve does not show this corrosion.

c. The valve stem shows a considerable gradient in hardness from one end to another. In the area of the fracture the hardness is RC40-41 while at the other end it is RC30-31. This suggests a tempering temperature of less than 950°F at the lower end and approximately 1050°F at the upper end.

d. The fracture exclusive of the IGC area is almost entirely a brittle cleavage failure. This would correspond to a notched tensile fracture of material heat treated in the 800-1000°F range, Figure 2.1

Considering the above items it appears likely that the IGC in the stem fracture occurred or at least initiated during the period of time when the stem was back seated. Other failures similar to this have started in the packing area and this break would be located in the packing only if the stem were back seated. The stem was probably under significant load from the motor operator which if not actually causing the crack to initiate would have accelerated, the initiation and the propagation of the cracks. The cracks in the retainer ring area show that cracking can start in Type 410 at this hardness level in an area which is creviced and which has a high stress concentration but has essentially no applied stress.

2.4 Basis for Current GE Hardness Limits on Type 410 S.S.

There are numerous accounts of failure of Type 410 and 416 stainless steels in the literature with hardness of 38-42 RC. On two occasions GE has found cracking of Type 410 stainless steel in the 31-32RC hardness range. There were several factors in common with these failures as follows:

Component	Operating Temperature	Material	Metallographic Structure	Stress Level	Other
(a) ½ inch Cap Screws	Estimated at 125-150°F	416(?)	Banded with heavy sulfide inclusions	Probably high since it was a fastener	
(b) 1 3/8" Dia studs	∿200°F	410	Banded with heavy sulfide inclusions	∿46,000 psi	IGSC started in area of intermittent wetting and drying

As a precautionary measure GE has since imposed a limit of RC28 for newly purchased Type 410SS stainless steel.

3.0 DESCRIPTION OF DAMAGED VALVE PARTS

3.1 The following damage was found for the F010 Valve:

a. Broken Valve Stem - As shown in Figures 1 and 2, the stem was broken above the back seat, 1 7/8 to 2 1/2 inches beyond the newly formed back seat area on the shaft.

b. Stem Upset in Area of Backseat. The upset was caused by the motor pulling the stem into the backseat, (Figure 3 and 4).

c. Gouged Area on Stem - See Figure 5. The heavily abraded area on both the upper and lower part of the stem were due to the bottom shaft (attached to disc) becoming cocked in the valve and the upper shaft scraping against the lower shaft when the valve was closed. See Figures 5,6, and 8.

d. Bent Stem Clamp The stem clamp fastens to the stem by a key and set screw and its purpose is to prevent stem rotation. The stem clamp was bent approximately 1 1/2 inches as shown in Figure 6. In addition the clamp had been shifted on the shaft approximately 1/2 inch. The clamp was bent when the shaft broke and cocked in the valve thus allowing the shaft to over travel approximately two inches. Figure 8 illustrates this travel.

e. Back Seat in Bonnet Deformed - While the back seat did not appear to be deformed from visual inspection, it was later found that the angle of the seat was not correct. This deformation most likely occurred when the motor pulled the stem into the back seat.

f. Disc and Stub Shaft Wedged in Valve at an Angle, Figure 7 and 8. The lower part of the stem and the disc were found tightly wedged in the valve at an angle. The disc had a circular shaped indentation on the lower edge where the disc was pressed into the stellite seat and the upper flanged part of the disc had two

impressions matching the guide ribs in the valve body. The disc was not seriously damaged but maintenance was unable to separate the nut from the disc and subsequently cut the lower part of the disc from the upper part (to avoid cutting the stellite and then saw cut the upper part of the disc to allow disassembly of the disc from the stem.

g. Seat Chipped - There was some deformation of the seat due to the pressure of the disc on the seat at a local area also resulting in a small chip of stellite flaking away. The chip was not in the seating plane and lapping should correct the small amount of deformation.

3.2 The following damage was found for the F011 Valve:

a. The disc nut was unscrewed from the disc and separated from the stem. There was no apparent damage to the threads or shaft.

b. The split ring retainer was separated from the assembly. One-half of the retainer was found just downstream of the D004 pressure reducing orifice and the other half was found in the condensate storage tank. The orifice was heavily marked by impact and bowed concave toward the downstream side.

c. The stem was badly galled due to the motor pulling the stem into the backseat, Figure 9.

d. The back seat in bonnet is badly cracked as a result of the stem being pulled into the back seat, Figure 10.

4.0 METALLURGICAL EVALUATIONS

The following metallurgical evaluations were performed on the F010 valve stem to aid in determining cause of failure:

4.1 Chemistry A chemical analysis yielded the following results and confirmed that the stem material was 410 stainless steel meeting requirements of ASTM A276.

Element	Weight %
Carbon	0.09
Chrome	12.35
Manganese	0.40
Silicon	0.35
Phosphorus	0.017
Sulfur	0.007
Nickel	0.37

4.2 Hardness

Hardness traverses are shown in Figure 11. There was a hardness gradient along the length of the shaft from RC41 at the disc side of the shaft to RC30 at the threaded end of the shaft. There was also a gradient through the thickness of the shaft and this varied from RC38.5 at the surface to a maximum of RC42.7 near the center.

4.3 Metallography

A metallographic section was taken near the failure point and it was found to be typical for Type 410 stainless steel microstructure.

4.4 SEM Examination of Fracture Face

Both fracture faces from the lower stub piece as well as the upper shaft were examined by scanning electron microscope (SEM). Both pieces were quite badly hammered but the upper one was in better shape and the origin of the crack was identified, Figure 12. A band of intergranular fracture was found approximately 30° in length and 1/2 inch in depth in from the circumference of the shaft. The balance of the fracture was cleavage indicating a rapid fracture, Figures 13 and 14.

4.5 Longitudinal Cracks Transverse to Main Fracture

There were several short longitudinal cracks extending from the main fracture the longest of which was approximately 3/8 inch long. This crack was broken open and examined by SEM and it was found to be completely intergranular. Figure 15 shows metallography of one of the longitudinal cracks.

4.6 PT Examination of Shaft Reveals Additional Cracking

When penetrant examination was performed on the shaft several other cracks were found in the groove where the stem retainer rings are located. The largest of these cracks were broken open and a crack approximately 1 1/2 inches long with a maximum depth of 1/8 inch was found. See figure 16. Examinations of the fracture surface with SEM showed it to be intergranular. This section was fractured at room temperature and less than 1% ductile shear was identified on the fracture surface.

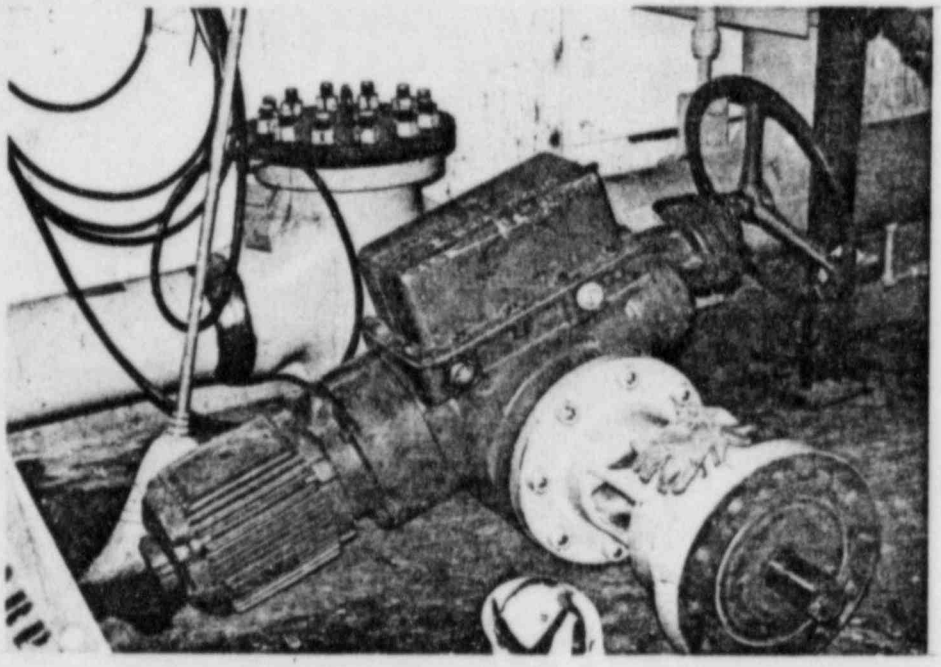


FIGURE 1. F010 VALVE DISASSEMBLED. BODY IS BLANKED OFF WITH A COVER PLATE

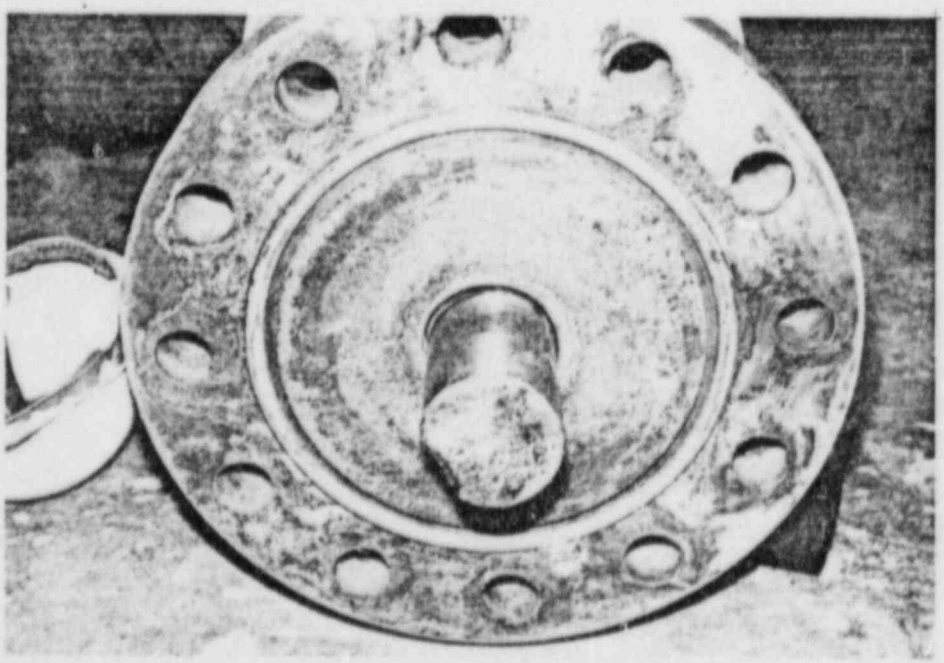


FIGURE 2. F010 VALVE DISASSEMBLED SHOWING BROKEN VALVE STEM

Effect of Tempering Temperature on Tensile Properties

Type 410

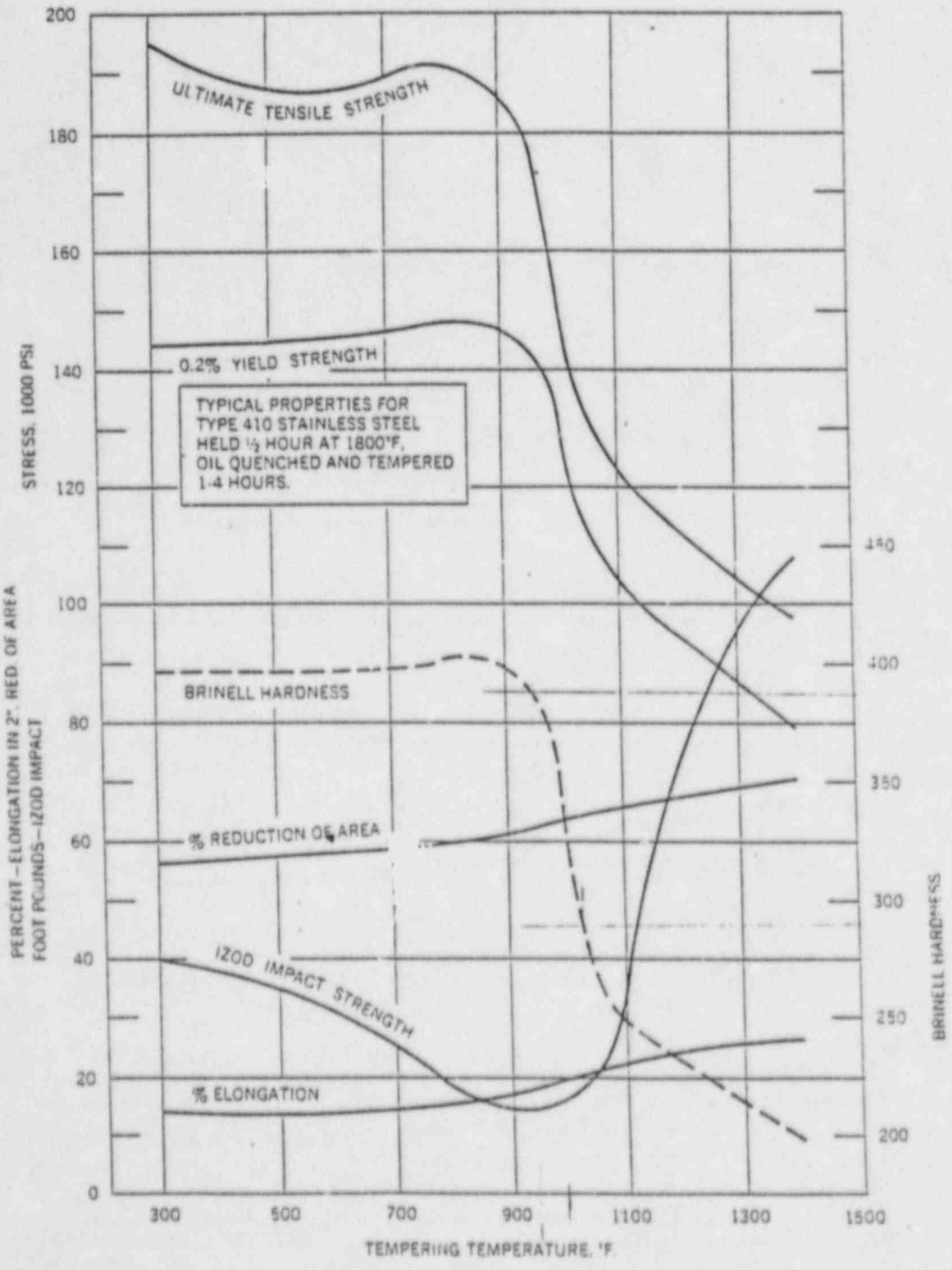


FIGURE 2.1 TYPICAL MECHANICAL PROPERTIES FOR TYPE 410 STAINLESS STEEL TEMPERED AT VARYING TEMPERATURES

SOURCE: Source Book on Industrial Alloy and Engineering Data, American Society for Metals, Metals Park Ohio, 1978, p229

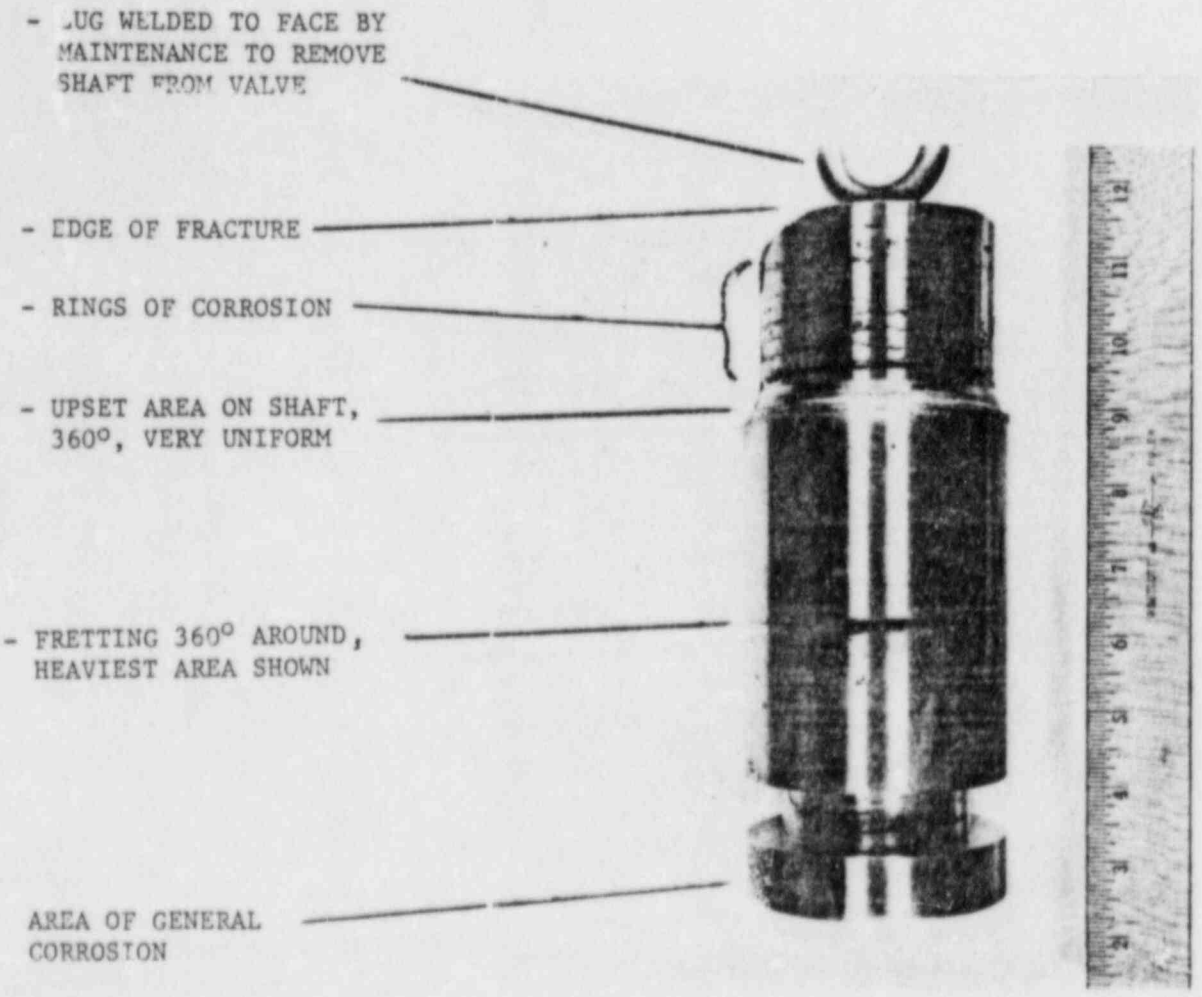


FIGURE 3. LOWER END OF BROKEN VALVE STEM (F010)

FIGURE 4. CLOSEUP VIEW OF UPSET AREA ON STEM (IN REGION OF THE BACK SEAT) (F010)

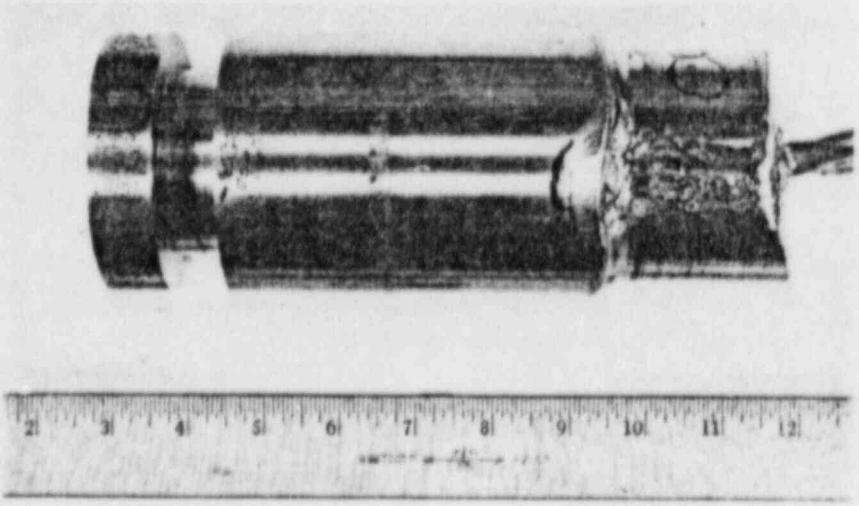


FIGURE 5. GOUGED AREAS IN UPPER PART OF STEM (ABOVE) AND LOWER PART OF STEM (BELOW). GOUGES CAUSED BY UPPER SHAFT MOVING AGAINST LOWER SHAFT WHEN LOWER SHAFT WAS COCKED IN VALVE. SEE ALSO FIGURE 8. (F010)

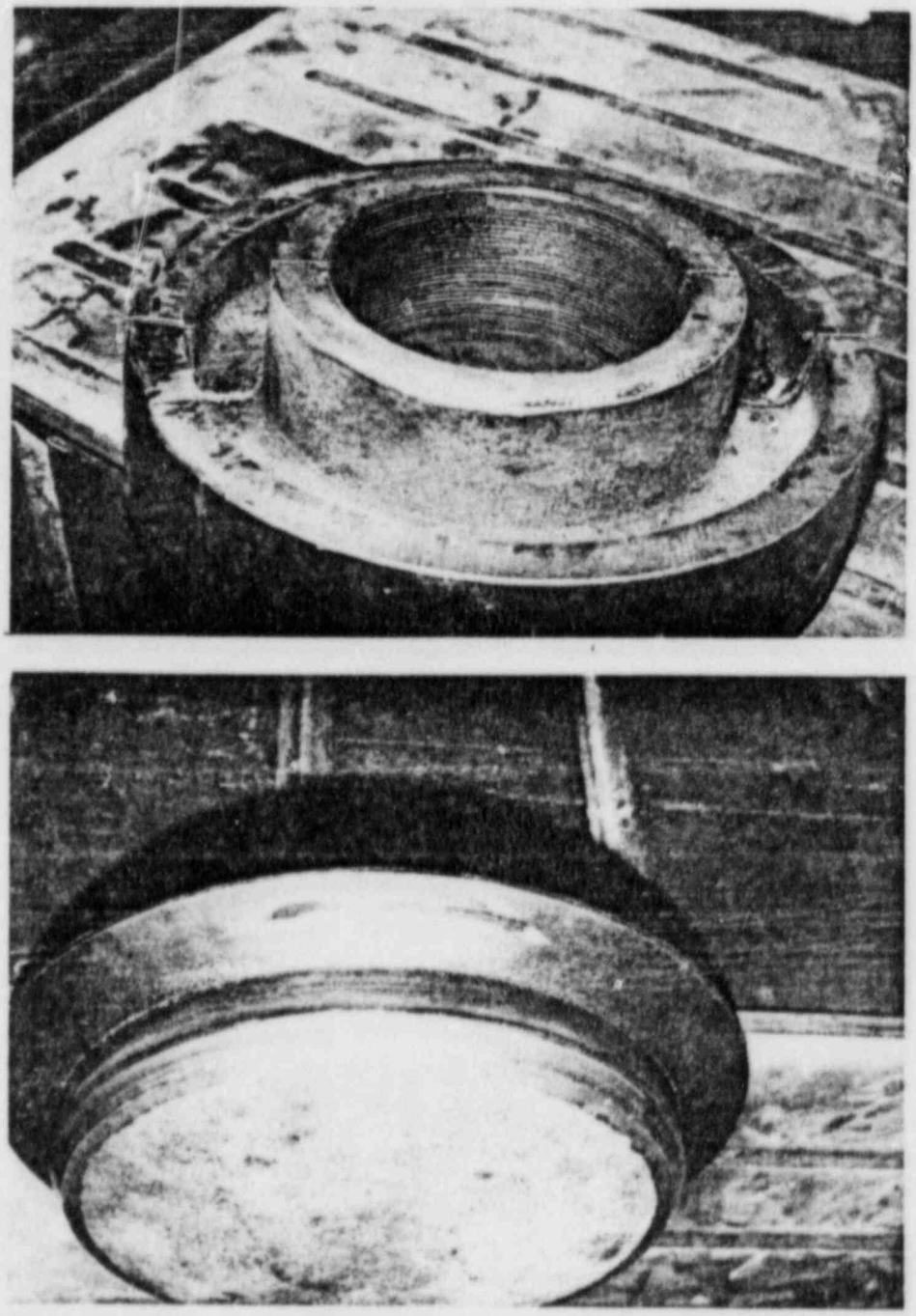


FIGURE 7. UPPER AND LOWER PARTS OF THE DISC (SAW CUT TO ASSIST IN DISASSEMBLY) SHOWING DEFORMATION WHERE THE DISC WAS PRESSED AGAINST THE GUIDE RIBS (UPPER PHOTO) AND THE SEAT (LOWER PHOTO) (F010)

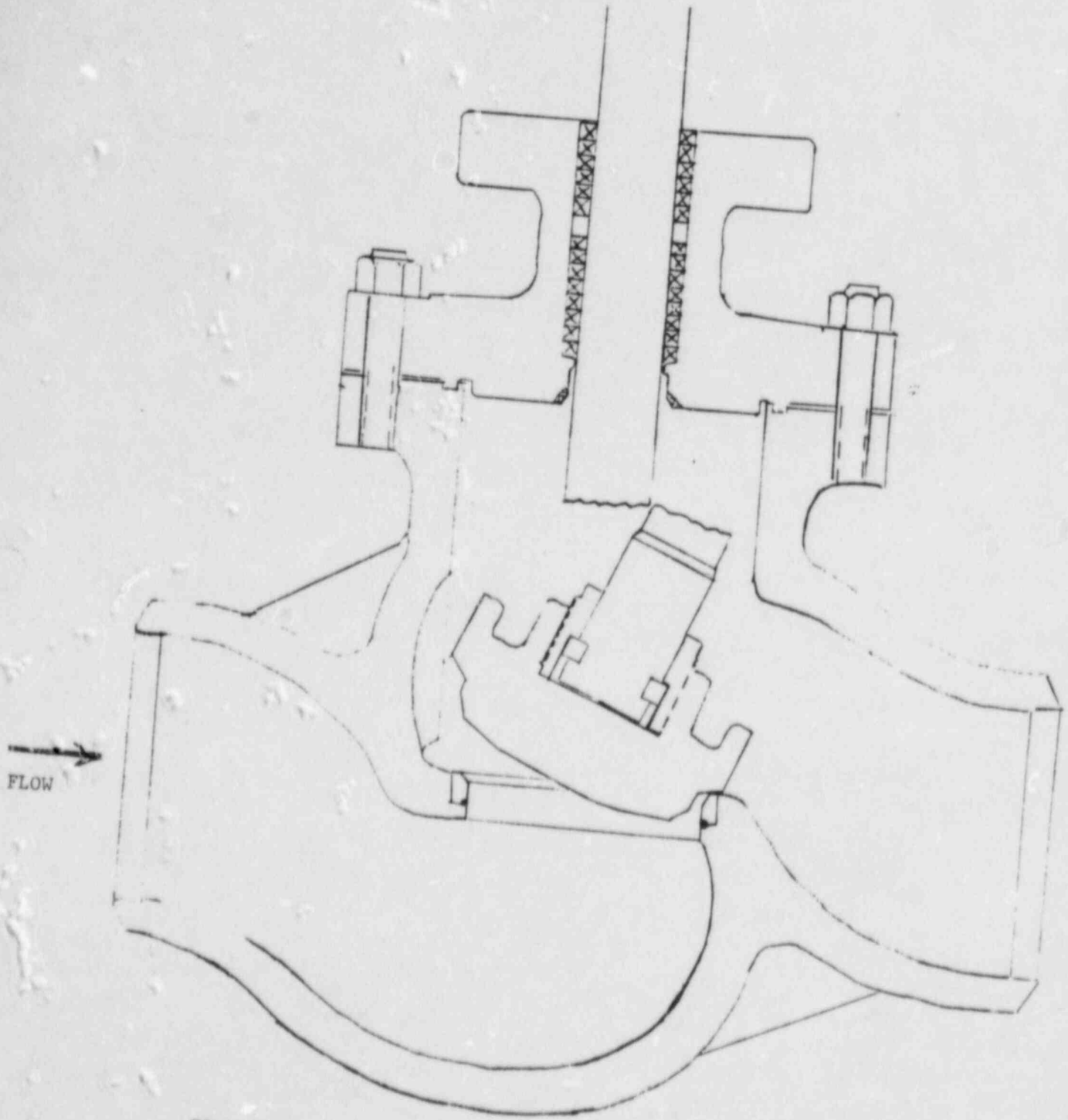


FIGURE 8. VIEW SHOWING F010 VALVE WITH CRACKED SHAFT AND APPROXIMATE ANGLE OF WEDGING FOR DISC, F010 VALVE

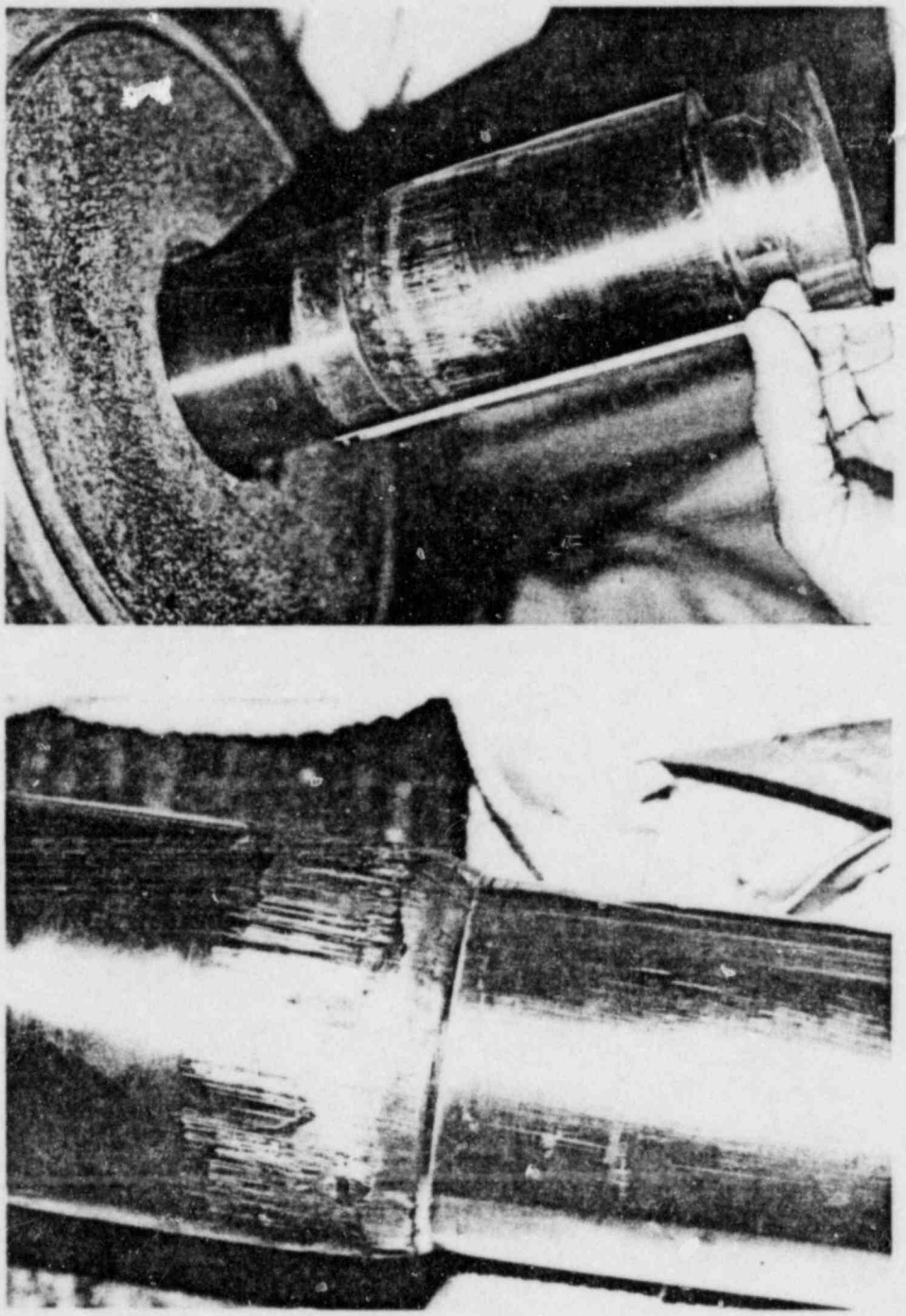


FIGURE 9. BADLY GALLED AREA ON STEM OF F011 VALVE. GALLING DUE TO PULLING STEM INTO BACKSEAT IN BONNET

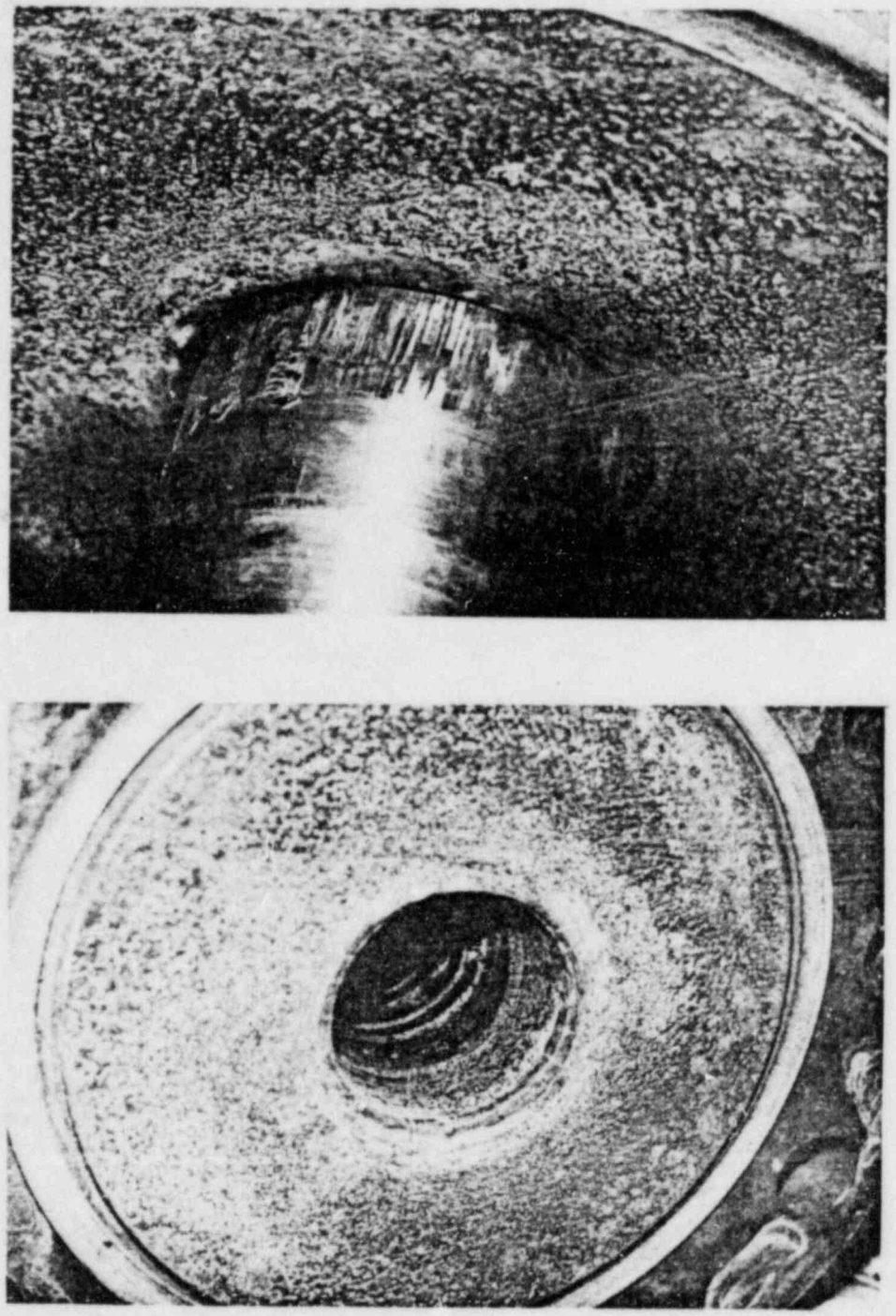


FIGURE 10. UPPER PHOTO SHOWS STEM PARTIALLY PULLED INTO BACK SEAT. LOWER PHOTO SHOWS CRACKED STELLITE RESULTING FROM PULLING STEM INTO BACK SEAT (F011 VALVE)

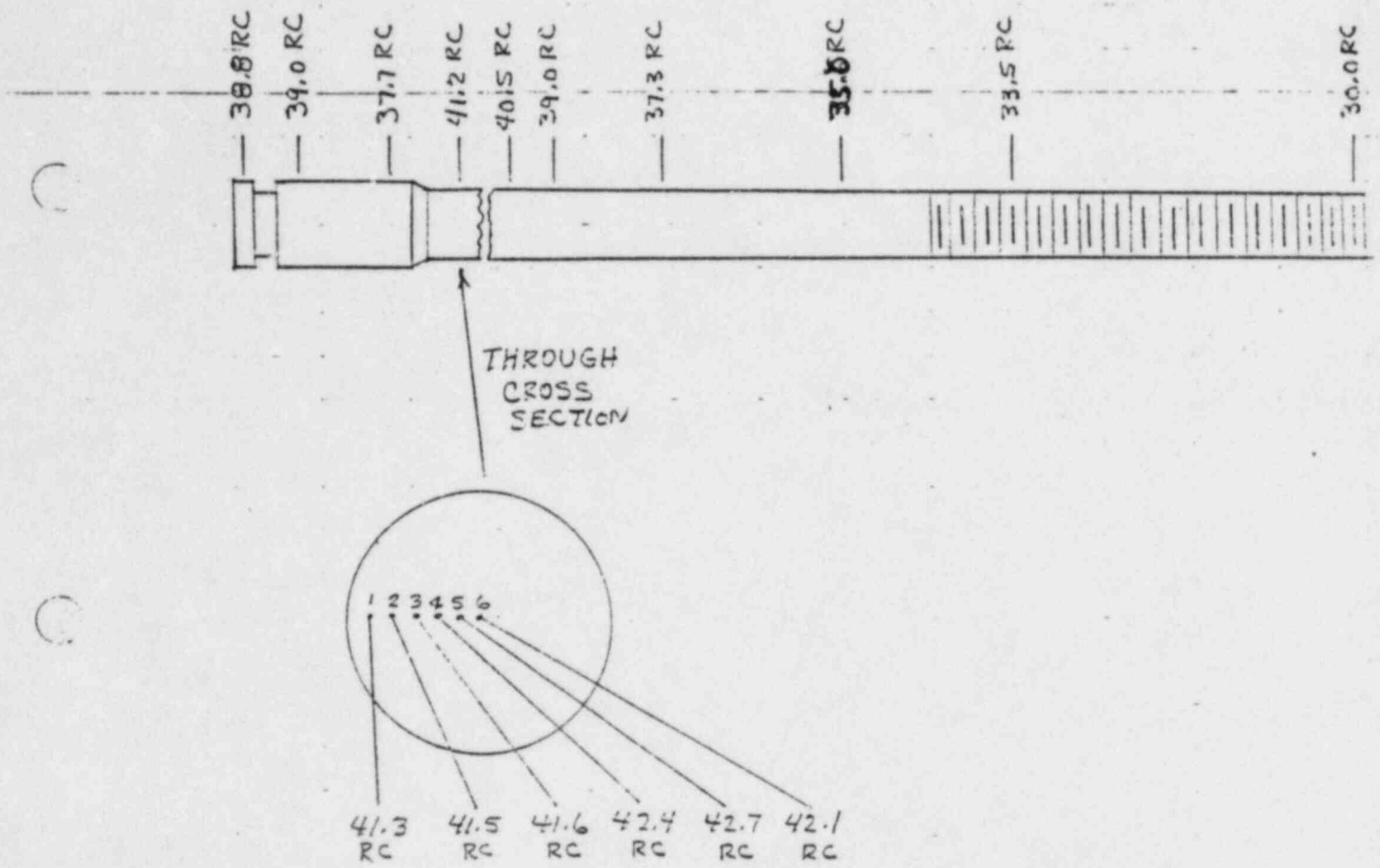


FIGURE 11. HARDNESS MEASUREMENTS ON F010 SHAFT SHOWING HARDNESS GRADIENTS. ALL HARDNESS MEASUREMENTS TAKEN WITH EQUOTIP TESTER AND CONVERTED TO RC

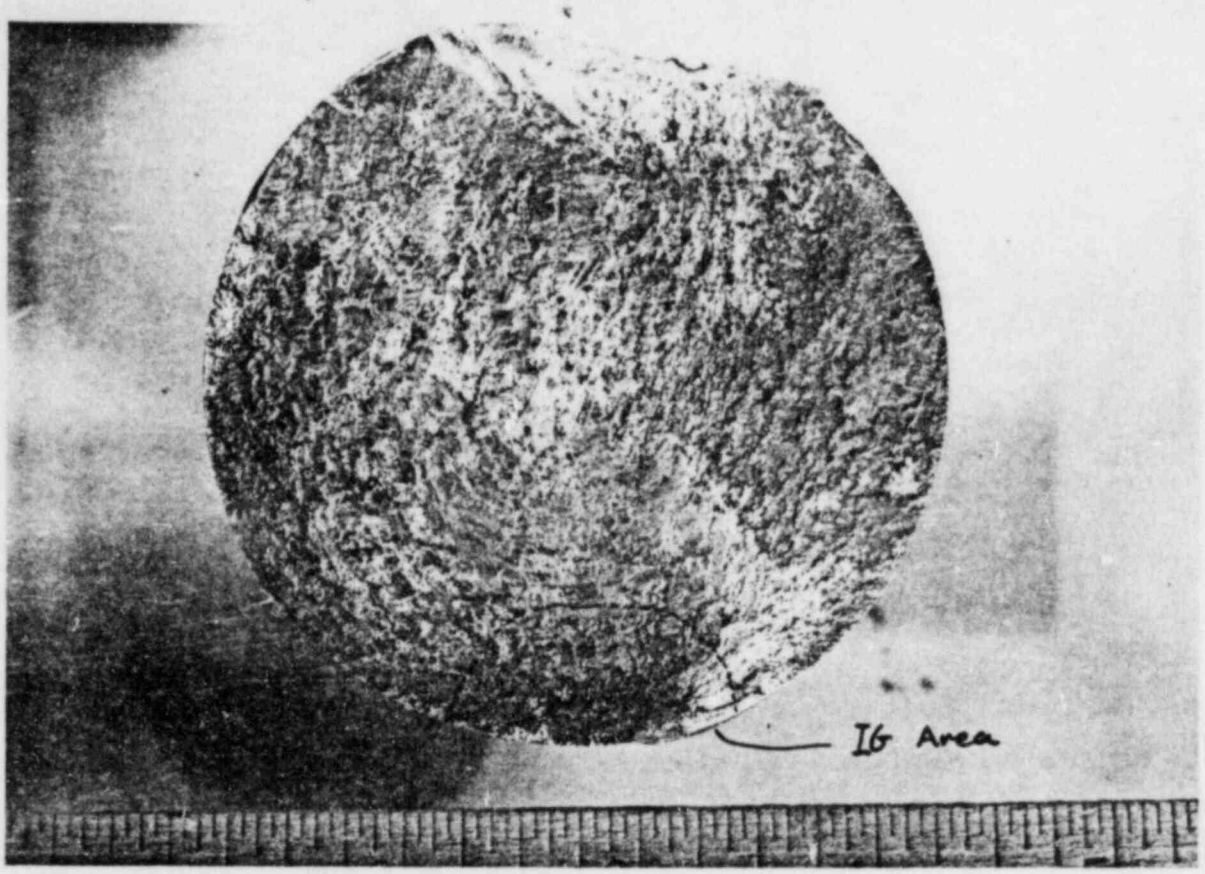


FIGURE 12. MACRO PHOTO OF CRACK FACE SHOWING POINT OF ORIGIN OF INTERGRANULAR CRACKING

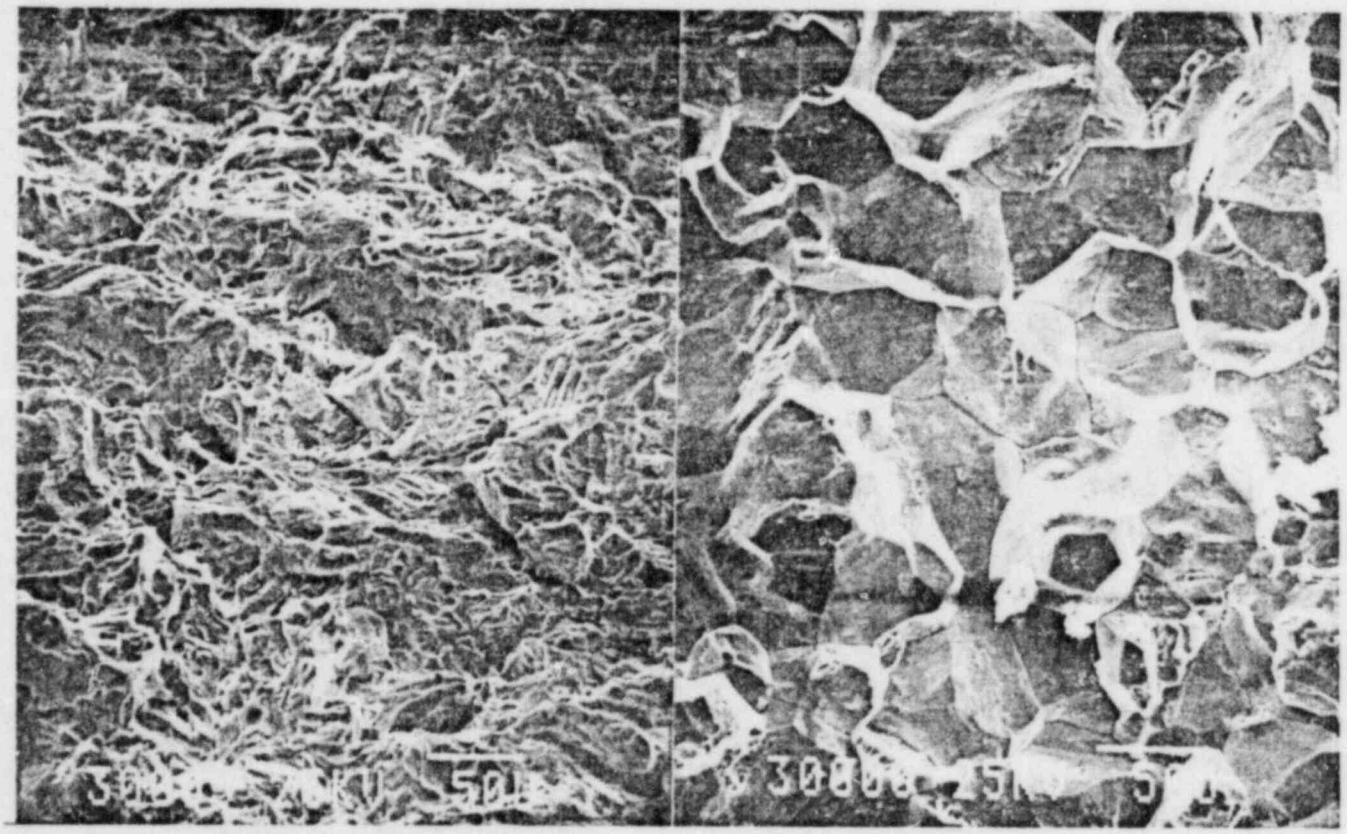


FIGURE 13. SEM PHOTO SHOWING CLEAVAGE FRACTURE TYPICAL OF AREA OUTSIDE IG AREA

FIGURE 14. SEM PHOTO SHOWING TYPICAL FRACTURE IN IG AREA

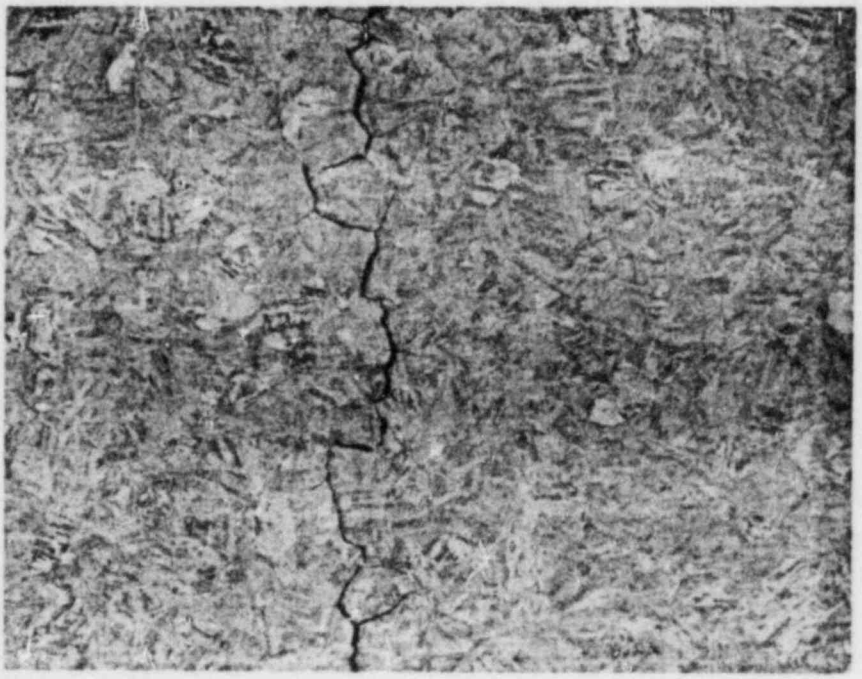


FIGURE 15. METALLOGRAPHY OF LONGITUDINAL CRACK COMING FROM MAIN FRACTURE. 100X, ETCHANT VILELLA'S REAGENT

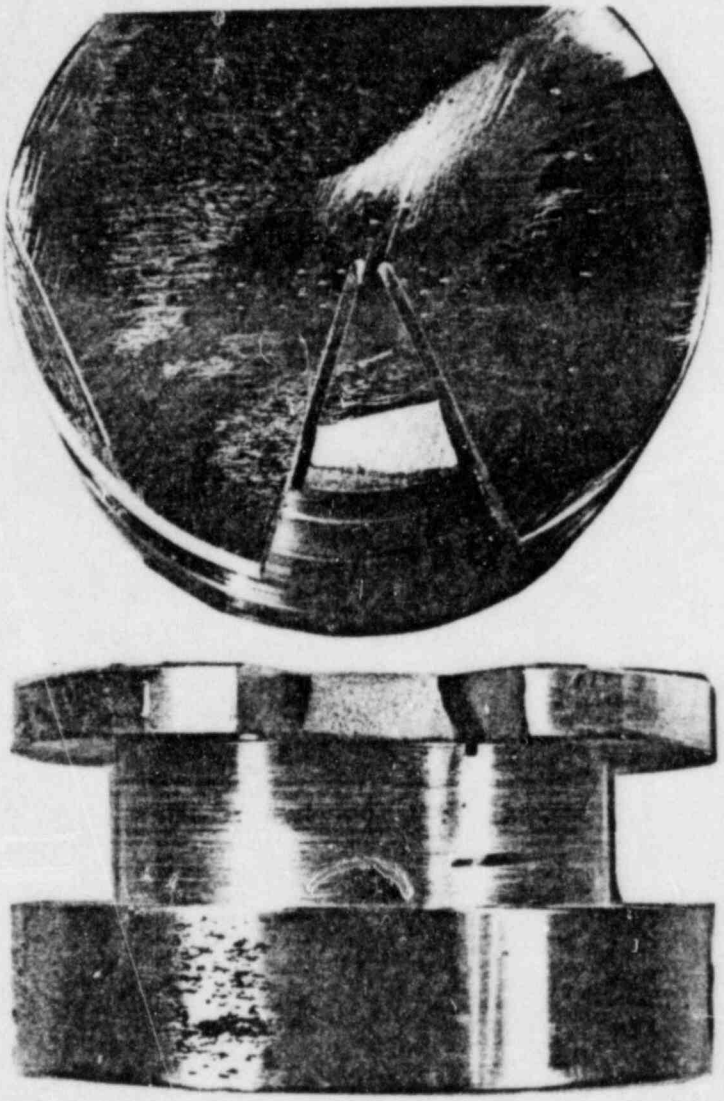


FIGURE 16. LOWER PORTION OF VALVE STEM WITH SECTION BROKEN AWAY SHOWING IG CRACK

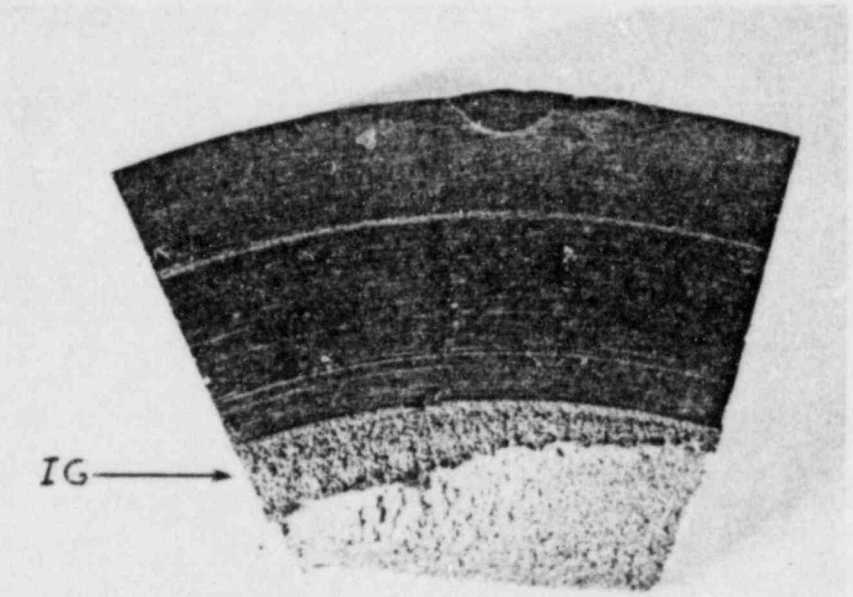


FIGURE 17. MACRO OF IG CRACK IN LOWER PORTION OF VALVE STEM, 3.4X

Appendix A

DESCRIPTION OF HPCS SYSTEM

A.1.0 High Pressure Core Spray System (HPCS)

The purpose of the high pressure core spray system (Figure A-1) is to depressurize the nuclear boiler system and to provide makeup water in the event of a loss of reactor coolant. In addition, the high pressure core spray system prevents fuel cladding damage in the event the core becomes uncovered due to loss of coolant by directing water down into the area of the fuel assemblies. The makeup water is jetted as a spray over the area of the fuel assemblies from nozzles mounted in a sparger ring located inside the reactor vessel above the fuel assemblies. The high pressure core spray system is an integral part of the total design for Emergency Core Cooling (ECC) which provides for adequate core cooling and depressurization for all rates of coolant loss from the nuclear boiler.

Cooling water for the operation and testing of the high pressure core spray system comes from the condensate storage tank. Upon depletion of this supply, the system automatically transfers to the water in the containment suppression pool. Water inventory lost from the nuclear boiler system drains to the drywell and then into the suppression pool thereby providing an inexhaustible supply of cooling water allowing continued operation of the high pressure core spray system until it is manually stopped by the operator from the control room. System piping and equipment are maintained full of condensate water to avoid time delays in filling the lines and to avoid hydraulic hammer.

Operation of the system is automatically initiated from independent redundant signals indicating low reactor vessel water level or high pressure in the primary containment. The system also provides for remote-manual startup, operating, and shutdown. A testable check valve in the discharge line prevents back flow from the reactor pressure vessel when the reactor vessel pressure exceeds the high pressure core spray system pressure as can occur during initial activation of the system. A low flow bypass system is placed into operation until pump head exceeds the nuclear system pressure and permits flow into the reactor vessel.

The high pressure core spray system can be tested during normal plant operation or when the plant is shut down. During normal plant operation, pump suction is from the condensate storage tank with a full flow return line to the condensate storage tank. During plant shutdown, pump suction is from the primary containment pressure suppression pool with a full flow return line to the suppression pool. The control system provides for the automatic transfer to the service mode upon the presence of ECC demand signal.

A.2 E22-F010 and E22-F011 Valves

Note in Figure A-1 that the F010 and F011 valves are located in the test return line running to the condensate storage tank. These valves only operate during the test mode; otherwise they are in the closed condition.

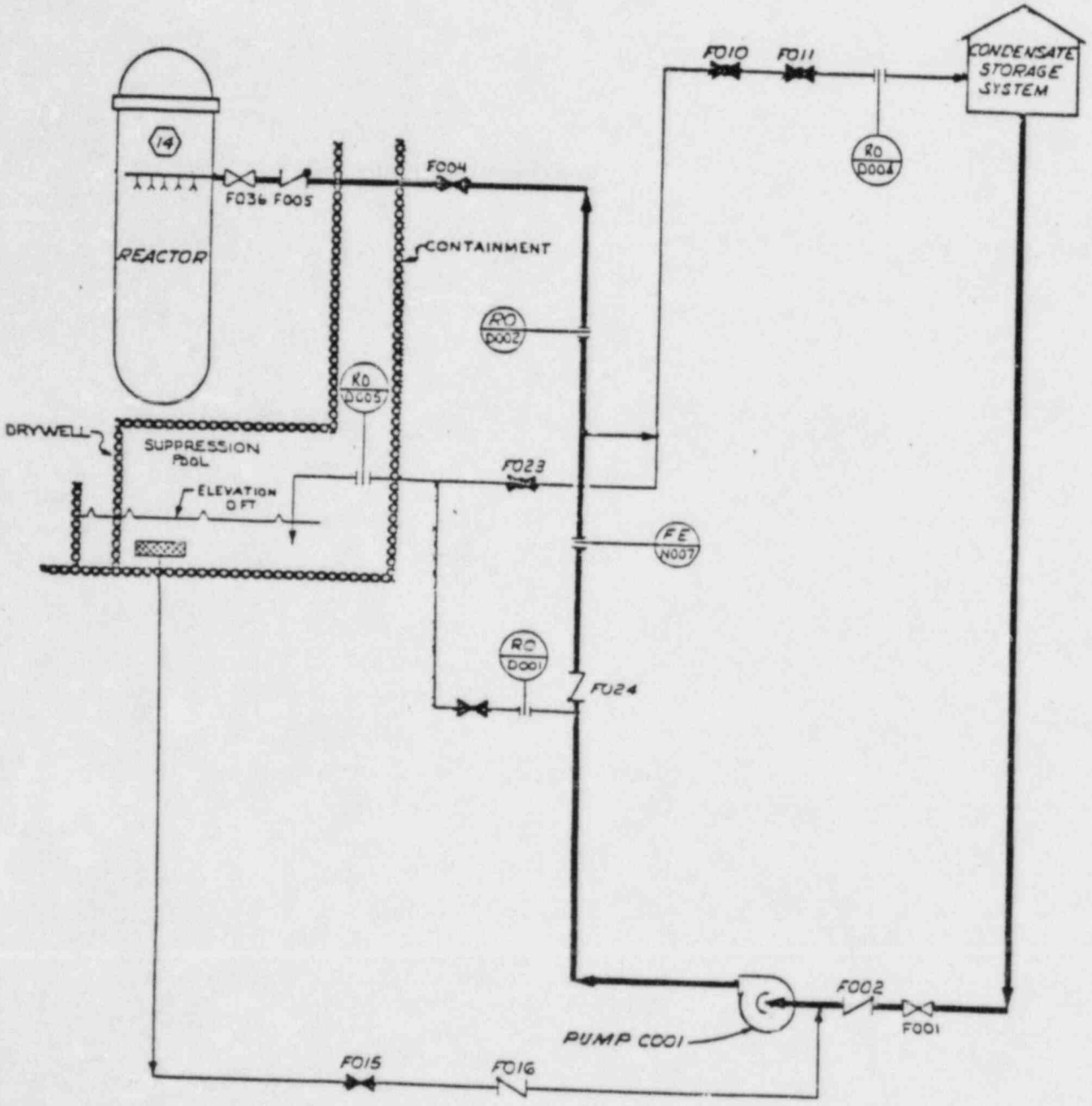


Figure A-1 High Pressure Core Spray System

Appendix B

DESCRIPTION OF F010 AND F011 VALVES

B1.0 Valves

The F010 and F011 valves are ten-inch 900 lb globe stop, bolted bonnet, rising stem, butt welded ends, cast carbon steel, stellite trim motor operated valves manufactured by the Anchor Darling Company, Figure B-1.

These valves are primarily designed for tight shut-off and limited throttling. All sections of the body are designed to provide absolute tightness ensuring minimum pressure drop. Their use, however, is limited to those systems where head losses are not critical as the internal flow passage creates a pressure drop across the valve. With the disc in the full open or any intermmediate position, the fluid is allowed to flow through the seat area at a rate determined by the position of the disc. With the disc in the closed position, the force of the stem provides a mechanical seal between the disc and seat and effects a shut-off at the valve.

B2.0 Motor Operators

B2.1 The motor operators are Philadelphia Gear Corporation (Limitorque) SMB4 units, Figure B-3.

Each operator is provided with a high starting torque motor, reduction gear, handwheel for manual operation, a handwheel de-clutching device, a double torque switch, 4-train geared limit switches and a hammer blow device.

The handwheel on each operator is automatically declutched whenever the drive motor is energized. A lever is provided to engage the clutch when manual operation is required. A hammer-blow device is furnished to permit motor to reach full speed before load is applied. The design is such that the operator can be removed from the valve for maintenance without dismantling the valve.

B2.2 Torque Limit Switches and Position Limit Switches

Adjustable torque switches assure power cut-off in the event motor is overloaded when valve disc or shaft movement is restricted. The switches operate in both opening and closing directions of travel and are separately adjustable for torque in either direction. See figure B-4.

Rotary geared type, 4-train limit switches are provided. Each motor operated valve actuator is provided with four mechanically independent position switch contacts that are indexed to monitor positions of valve travel during both motor and hand operations. Each switch has four electrically independent contacts.

There is a position indicator for remote indication of valve position.

B2.3 Motor Control Circuits

a. Valve Closure F010 and F011 valve motor control circuits, whose safety direction is close are designed such that either LS7 or TS17 will allow the valve to go fully closed. See figure B-2. Since full closure is imperative for all nuclear boiler isolation valves, TS17 is used to mechanically torque the valve tightly closed. In the event TS17 fails, LS7 will complete the closing cycle. LS7 must be set such that it opens just before TS17, thereby allowing TS17 to break the seal-in. This design feature prevents cycling of the valve in the event of torque switch relaxation. During testing, the valve motion being sealed-in through the torque switch provides valve protection from an overtorqued condition.

b. Valve Opening For opening the valve the limit switch must be set to shut off the motor before the stem enters the back seat. The torque switch should be set to as low a setting as is commensurate with proper opening of the valve and yet provide some protection against damage to the back seat in event the limit switch malfunctions.

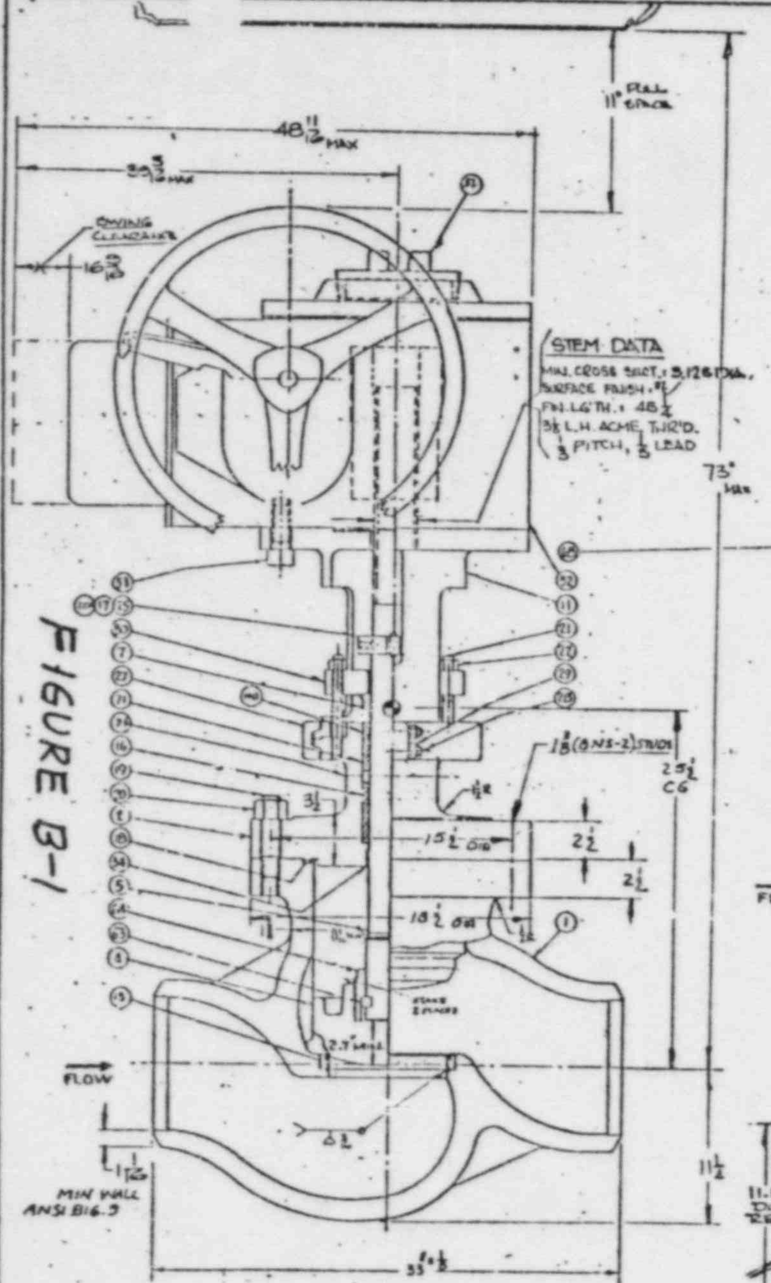
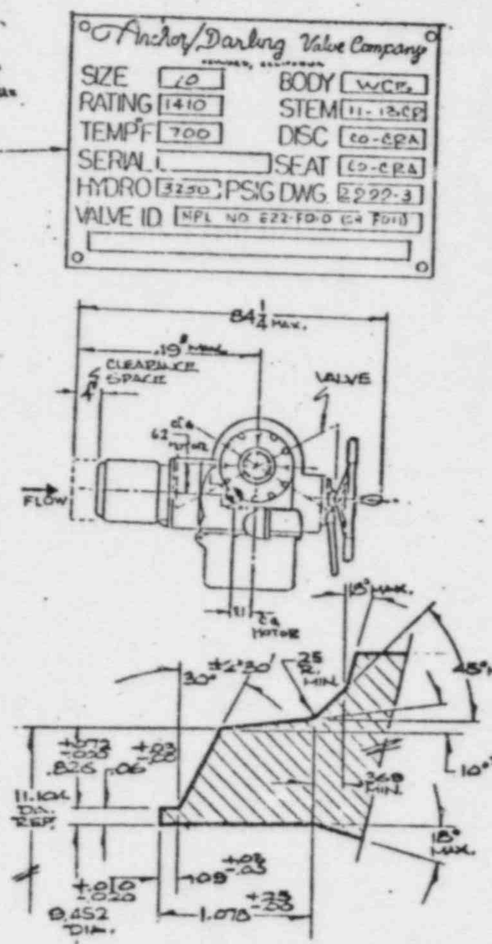


FIGURE B-1

1. DESIGN & MANUFACTURE IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE, SECTION III, CLASS 2, WINTER 1973 ADDENDA WITH CODE CASE 1637.
2. HYDROSTATIC TESTS:
   (A) SHELL TEST PRESSURE 3260 PSIG
   (B) SEAT TEST PRESSURE 1575 PSIG
3. ESTIMATED VALVE WT: 2100#; EST WET WT: W/MOTOR OPERATOR: 3260# 3410#
4. MAXIMUM TORQUE VALUE RECOMMENDED FOR ITEMS 19 & 20: 1200 FT-LBS



BUTT WELD END DETAIL
SCHED. 160 (.718 W.) PIPE IN ACCORDANCE WITH GENERAL ELECTRIC DWG. 131C6662, FIG. 2

QTY. PER UNIT		MANUF. DWG. NO.	ITEM NO.	DESCRIPTION	MATERIAL	MAT'L SPEC. ASME "SA" ASTM "A"
	1	5287-2-5	⊛1	BODY	CAST STL.	SA216 WCB
	1	5287-2-5	⊛2	BONNET	CAST STL.	SA216 WCB
(1)	1	5287-2-5	⊛4	DISC (STELL. FACED)	CAST STL.	SA216 WCB
	1	5287-2-2	5	STEM	STN. STL.	A479 T410
	1	7-312-1	7	GLAND (COND A)	STAN. STL.	A479 T410
	1	5287-2-3	11	YOKE	CAST STL.	A216 WCB
(1)	2	13-10F-3P	13	SEAT RING (STELL. FACED)	STL. PIPE	SA106 GR.C
	7		16	PACKING (LOWER)	ASBESTOS	
	5		16A	PACKING (UPPER)	ASBESTOS	
	1	—	17	SET SCREW (STEM CLAMP)	ALLOY STL.	AISI 4140
	1		18	GASKET	S.STL. / ASB.	FLEXITALLIC
	12		⊛19	STUD (BONN.)	ALLOY STL.	SA193 B7
	12		⊛20	NUT (BONN.)	STEEL	SA194 2H
	2		21	GLAND BOLT	ALLOY STL.	SA193 B7
	2		22	NUT (GLAND BOLT)	STEEL	SA194 2H
	1	5287-2-2	25	STEM CLAMP	STL. PL.	A36
	1	5287-2-3	27	YOKE CLAMP	STL. PL.	A36
	4		29	STUD (YOKE CLIP)	ALLOY STL.	A193 B7
	8		27	NUT (YOKE CLIP)	STEEL	A194 2H
	1	30-750-2	30	GLAND FLG.	STL. PL.	SA515/516 GR 70
	1		32	MOTOR OPERATOR	"LIMITORQUE"	SMB-4 200
	8		33	CAPSCREWS (MOT. OP.)	ALLOY STL.	AISI 4140
(1)	1	5287-2-5	34	BACKSEAT (INTEGRAL)	STELLITE	
	2		35	KEY (STEM CLIP)	STEEL	A108 GR 1018
	1	5287-2-2	63	RETAIN. RING (STEM)	STAN. STL.	A276 T410
	1	5287-2-2	64	DISC NUT	STAN. STL.	A276 T410
	1		68	NAMEPLATE	STAN. STL.	A240 T304
	1		82	PLUG (STEM PROTECTOR)	CAST IRON	"WALWORTH"
	1	71-312-2	71	LANTERN RING (COND A)	STAN. STL.	A276 T410
	1	5287-2-1	94	PIPE PLUG	FORG. STL.	A105

⊛ PRESSURE CONTAINING PARTS
(1) CHEM. RANGE Co Cr A

ANCHOR/DARLING VALVE CO.
Certified by [illegible]
Date 8-7-75
12-31-75

LTR	REVISION
D	DISC THICKNESS (WAS) 3.5 MIN.
C	CLEARANCE WAS [illegible]
B	CUST. COMMENTS
A	CHANGES PER CUSTOMER'S COMM.

GENERAL ELECTRIC CO.

ANCHOR/DARLING VALVE COMPANY
HAYWARD, CALIFORNIA

10" 900# GLOBE (STOP) B.B., R.S, B.W. ENDS, CAST CARB. STL., STELL TRIM, SMB-4 MOTOR OPER

DRAWN BY: E.W. DATE: 11-4-74 SCALE: NONE
2999-3 REV D

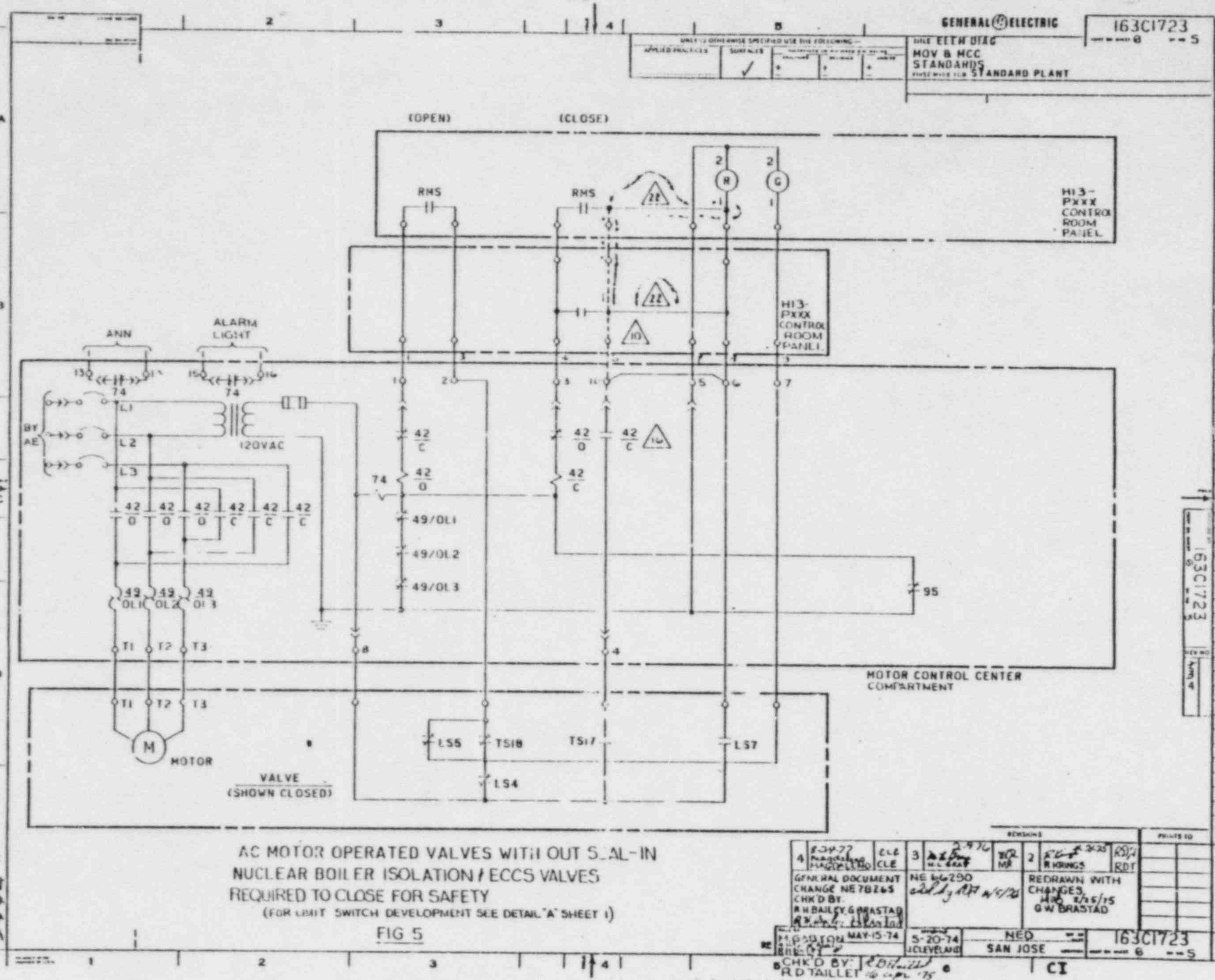

GENERAL ELECTRIC
163C1723
ELEM DIAG
MOV & MCC
STANDARDS
STANDARD PLANT
(OPEN)
(CLOSE)
RMS
RMS
H13-
PXXX
CONTROL
ROOM
PANEL
ANN
ALARM
LIGHT
74
BY
AE
L1
L2
L3
120VAC
42
C
O
74
49/OL1
49/OL2
49/OL3
95
T1
T2
T3
MOTOR CONTROL CENTER
COMPARTMENT
M
MOTOR
VALVE
(SHOWN CLOSED)
LS5
TS18
LS4
TS17
LS7
AC MOTOR OPERATED VALVES WITH OUT SEAL-IN
NUCLEAR BOILER ISOLATION / ECCS VALVES
REQUIRED TO CLOSE FOR SAFETY
(FOR LIMIT SWITCH DEVELOPMENT SEE DETAIL "A" SHEET 1)
FIG 5
GENERAL DOCUMENT CHANGE NE78265
NE 66290
REDRAWN WITH CHANGES
G.W. BRASTAD
MAY-15-74
5-20-74
CLEVELAND
NED
SAN JOSE
CHK'D BY:
R.D. TAILLET
CI
5004

FIGURE B-2

LIMITORQUE®
TYPE SMB
INSTRUCTION AND MAINTENANCE MANUAL

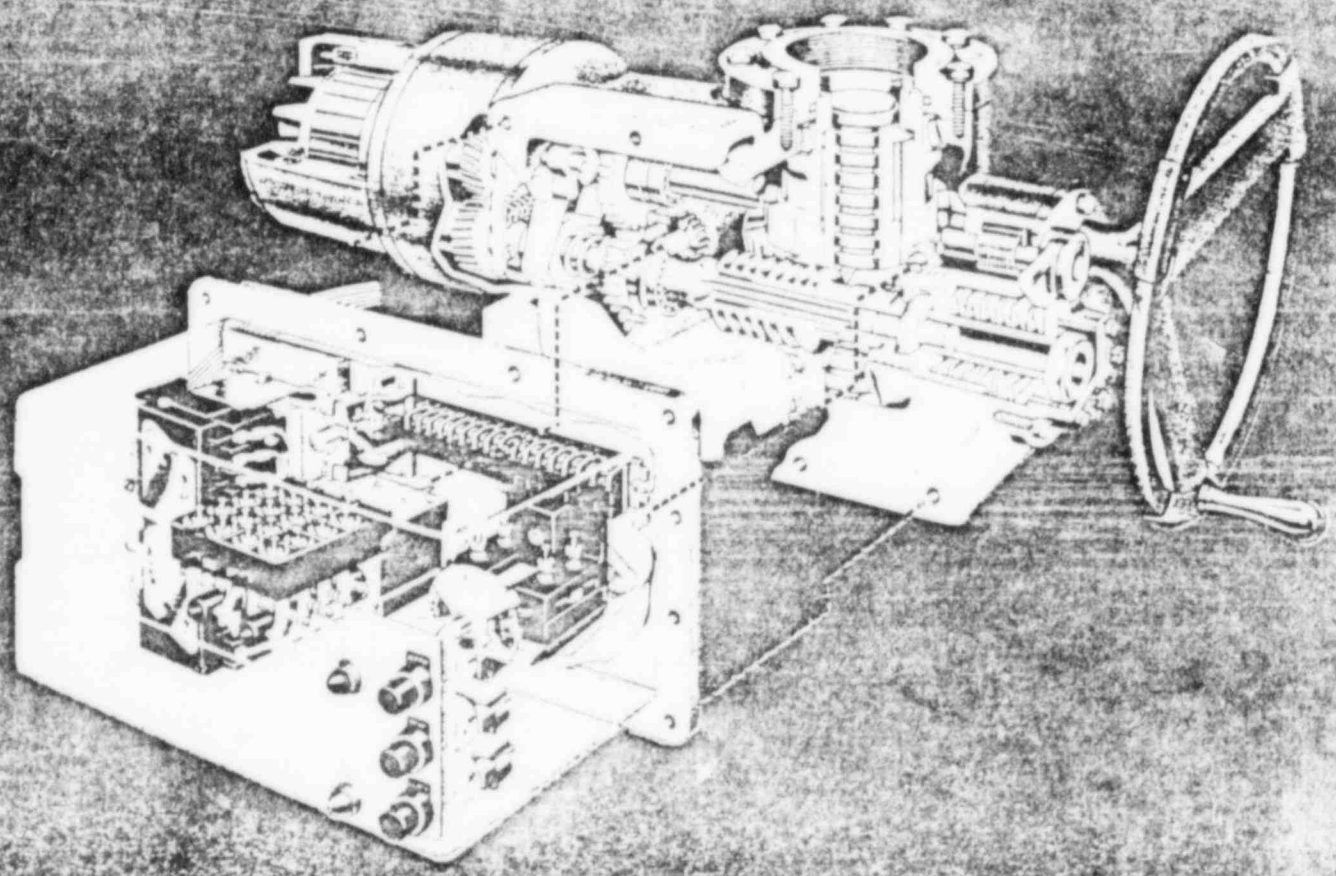


FIGURE B-3

A PRODUCT OF LIMITORQUE CORPORATION

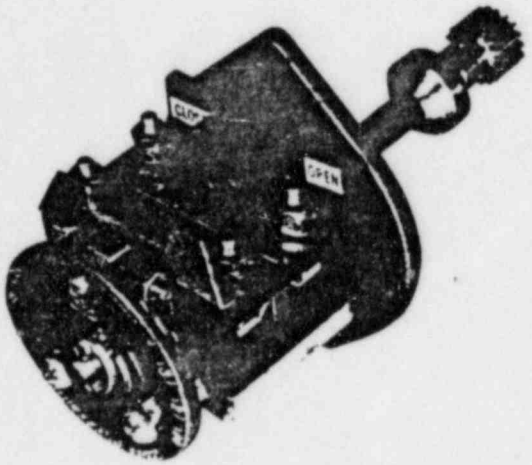
SMB-00 THRU SMB-5 DOUBLE TORQUE SWITCH*

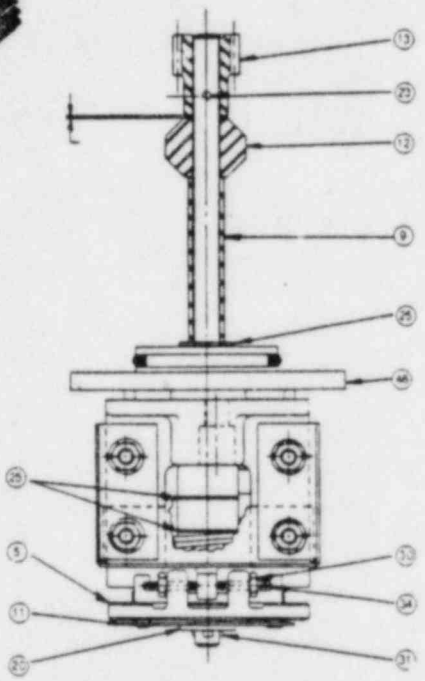
Procedure for Setting:

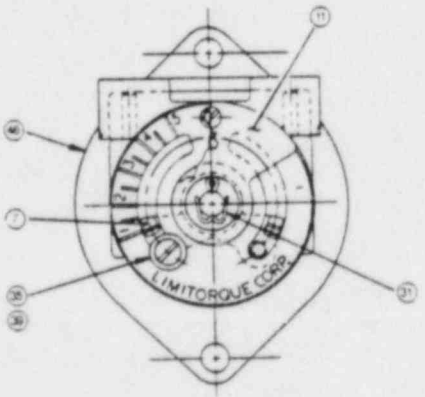
1. Torque settings must be made with switch mounted in Limitorque.
2. Make sure all electric power is off.
3. For the open direction torque switch or close direction torque switch loosen screw, pc. #35 and set pointer, pc. #7, at desired torque setting. The higher the number the higher the torque output of the unit.
4. Tighten pc. #35.
5. Operate valve electrically to seat valve insuring tight shut-off.
6. A maximum stop setting plate is furnished on all units. Do not exceed this setting without consulting factory.

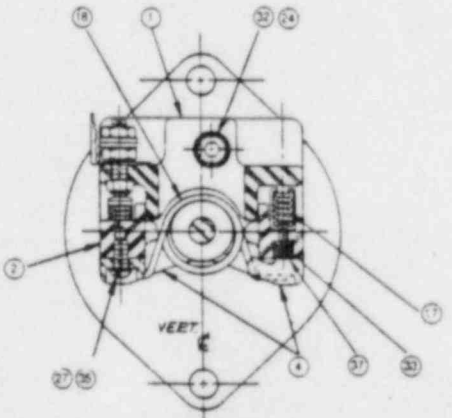
*Available in assembled form only.

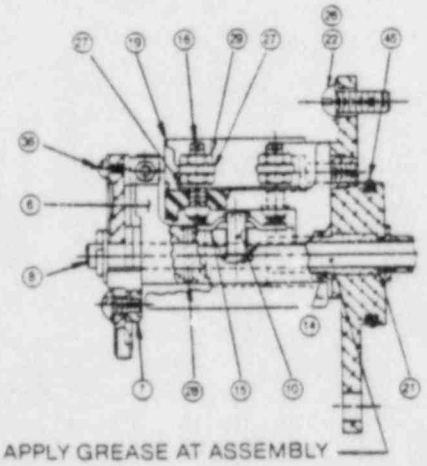
PC. NO.	NO. REQ.	DESCRIPTION
1	1	TERMINAL BLOCK
2	2	CONTACT BLOCK
4	2	ARM
5	1	DIAL
6	1	ACTUATING LINK
7	1	POINTER
8	1	SHAFT
9	2	SPACER
10	2	CONTACT SUPPORT
11	1	TORQUE LIMITER
12	1	BUSHING
13	1	T. SW. PINION
14	1	BEARING
15	2	CONTACT FINGER
16	4	TERMINAL STUD
17		COMPR. SPRING
18		TORSION SPRING
19	1	INSULATOR
20	1	FLAT WASHER
21	1	"O"-RING
22	2	SCREW-ROUND HD SLOTTED 5/16-18 x 3/8 LG.
23	1	ROLL-PIN 3/32 DIA. x 5/8 LG.
24	1	LOCKWASHER-1/4
25	3	THRUST WASHER
26	2	5/16 LOCKWASHER
27	12	LOCKWASHER #10
28	1	ROLL PIN 3/32 DIA. x 3/4 LG.
29	8	HEX. NUT #10-32
30	2	HEX. NUT #6-32
31	1	COTTER PIN 1/32 DIA. x 3/4 LG.
32	1	SCREW-SOC. HD. CAP 1/4-20 x 3/4 LG.
33	2	SCREW-PAN HD. SELF-TAPPING #4-40 x 1/4 LG.
34	2	SCREW-HEX. SOC. SET #6-32 x 5/8 LG.
35	6	SCREW-MACH. RD. HD. #10-32 x 3/8 LG.
36	1	SCREW-MACH. RD. HD. #5-40 x 3/16 LG.
37		WAX AS REQUIRED
39	2	LOCKWASHER
45	1	"O"-RING
46	1	MOUNTING BRACKET

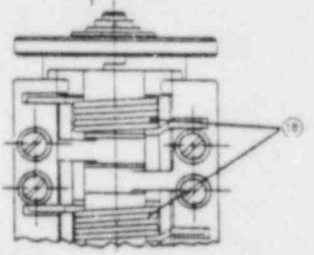












NOTE APPLY GREASE AT ASSEMBLY

FIGURE B-4

Appendix C

HISTORY OF F010 AND F011 VALVES

Following is a brief outline of the history of the F010 and F011 valves.

8/74 Valves were ordered from Anchor Darling, Hayward California by General Electric

8/77 Valves fabrication completed by Anchor Darling. Stems were heat treated by Oakland Heat Treating (Lindberg).

9/77 Valves shipped to Clinton Site and placed in storage

5/80 Valves installed at Clinton Site.

Dec 84 - Jan 85 System operated for Integrated FLush

C&IO Phase

4/29/85 F011 valve stem guide is found disconnected and wedged against base of bonnet. Valve fixed on 6/20/85 but breaker keeps tripping.

5/21/85 MUR-17593 written to fix breaker trips on F011. Cause - tripping due to residual MOV rotor/stator motion/field development. Breaker overload increased from position 4 to 5

6/5/85 FPR written to address F011 breaker trips

7/885 FPR #5489 written for all valve breakers

Preoperational Phase

8/23/85 Performed vibration measurement of RST line per XTP-VI-01. See attached sheets for actual data. FPR #6065 written to request relocation of orifice

8/28/85 Received engineering evaluation to relocate orifice temporarily. CWR 16712 performed the relocation.

9/13/85 Performed RST to RST flow test per PTP-HP-01.
Run time: 2 hours 18 min
Flow Regime: minimum flow (315 gpm) to 5600 gpm
Engineer noted apparent piping/valve resonance et = 3300 gpm

9/19/85 FECN's 22,103 and 60,336 were issued which approved the relocation of the orifice. CWR 17403 submitted to manufacture new orifice.

10/11/85 Found F010 stem clamp collar bound on the stem and bent. CR 1-85-10-040 written, noted that similar problem occurred on F011 4/29/85 (MWR B9425). Addressing possible damage to stem, NCMR 1-1918 says "damage due to improperly staked set screw. THis generic condition to be addressed by 10CFR 21-85-02/21-85-05.

11/02/85 During testing, it is reported that a loud noise like something moving down the inside of the pipe and coming to a resounding stop.

11/03/85 Reported that 1.P.Co. found 1/2 retainer ring downstream of orifice D004 and disassemble F010 and F011.

11/04/85 Received JK575 requesting help

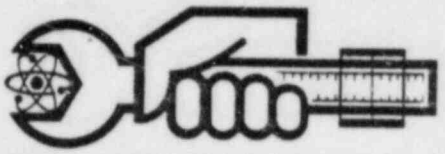
11/05/85 FDDR LH1-5466 R/O Issued

11/06/85 George Hanson at site

11/08/85 FDDR LHI-5466 R/1 issued

NUCLEAR SERVICES | INFORMATION LETTER

NUCLEAR SERVICES DEPARTMENT • SAN JOSE, CALIFORNIA 95125



November, 1983
File Tab A

SIL No. 399
Category 3

NONMETALLIC MATERIALS FOR NUCLEAR STEAM SUPPLY SYSTEMS

The following recommendations are for nonmetallic materials such as gaskets, valve stem packing and lubricants which are used in nuclear steam supply systems (NSSS) and which will remain in service as part of the operating system exposed to NSSS coolant. This information is the result of continual development, changing over the past several years to reflect latest available technology and operating experience. Therefore, all of these criteria might not have been applied in their present form to any one material in the past, but it would be prudent to follow these recommendations in the future.

DISCUSSION

Selection of nonmetallic materials such as gaskets, valve stem packing and lubricants is an important area of plant maintenance. The following recommendations may help in extending the life of metallic materials associated with them. General Electric does not endorse any particular nonmetallic materials or manufacturers, but the following limitations should be considered by BWR owner/operators who select and use such materials.

RECOMMENDATIONS

General Electric recommends that the following be considered by utilities when selecting nonmetallic material such as gaskets, valve stem packing and lubricants for the NSSS:

1. Vendor certification or alternate testing should be obtained to assure that contaminants do not exceed the following:

Total*	
Fluorine	300ppm
Chlorine	500ppm
Sulfur **	700ppm
Heavy Metals	500ppm ***

* - Quantities are based on total element contents, not leachables.

** - As active sulfur. Active sulfur is "low valent" sulfur or "reactive" sulfur with chemical valence less than +6 (i.e. sulfite, sulfide, etc.). If active sulfur analysis is not done, then all of the sulfur is assumed to be active sulfur.

*** - No single one of the heavy (low melting point) metals should constitute more than 200ppm. The eleven heavy metals of concern are zinc, cadmium, mercury, lead, tin, silver, arsenic, antimony bismuth, gallium and indium. Analysis of all or some of the heavy metals may be waived if the vendor certifies that there are no deliberate additions or reasons to expect significant

quantities of these metals to be present.

2. There should be no added constituents of nitrates or nitrites used in the manufacture or packaging of the product.

For additional information contact your local General Electric service representative.

Prepared by: G.R. Hanson/D.R. Heising

Approved by: D.L. Allred
D.L. Allred, Manager
Customer Service Information

Issued by: R.E. Bates
R.E. Bates, Specialist
Service Communications

Product Reference:
A71 - Plant Recommendations

ACKNOWLEDGEMENT

Appreciation is expressed to the following individuals for their significant contributions to the preparation of this document: Clyde Nieh for his technical input regarding valve and system details, John Cochran for his technical input from the Clinton site, Barry Gordon for his careful review of the document and to Alicia Ordonez for her patient retyping of the many corrections.

GENERAL ELECTRIC

DATE OF ISSUE ISSUED NOV 22 1985

FIELD DEVIATION DISPOSITION REQUEST

FDDR NO. LH1-5504
REVISION 0
SHEET 1 OF 4

PSE & SI

PROJECT Clinton UNIT 1
EQUIPMENT (MPL OR DESCRIPTION OR BOTH) E22-F010

FDDR ORIGINATOR J.T. Cochran DATE 11-21-85
J. Bruckler for

DOCUMENT NO.	SH NO.	REV	TITLE
VPF3238-682-2	Fig.4:		Instruction Manual Motor Operated Carbon Steel Valves

DEVIATION DESCRIPTION NCMK 01-1960

Valve E22-F010 has been damaged during test:

a) The valve stem is fractured approximately 1 3/4" above the back seat level.
b) The disk was cut apart during disassembly.
c) The disk nut was cut apart during disassembly.
d) There is a chip out of the hard face seat ring. 11/22/85
e) There are several gouges in the valve body disk guide ribs. W. Radford for

SITE QC CONCURRENCE K F Hanneman DATE 11/22/85 FIELD CONCURRENCE J C Logan DATE 11-22-85

X SUGGESTED DISPOSITION ___ EXPEDITED DISPOSITION

For part numbers refer to the Reference (Anchor Darling Dwg. 2999-3 Rev.D) Sheet 3 of this FDDR. The following steps may be performed out of order to effect repairs.

a) Penetrant test the bonnet back seat hard face part 34. If free of indications the bonnet is suitable for reuse.

(CONTINUED ON SHEET 2 OF THIS FDDR)

Cost: 8Y275 Material: 408-20122-910

DISPOSITION NEED DATE 11-21-85 EXPEDITED DISPOSITION APPROVAL BY DATE

FINAL DISPOSITION

Same as Suggested Disposition.

INFORMATION ONLY

QC - Verify the requirements of this FDDR are met. 11/22/85

ECA/ECN N/R FDI NO. N/R

JUSTIFICATION OF DISPOSITION DECISION (SAFETY, RELIABILITY)

Damage to valve parts have required substantial repairs. Replacing broken parts and performing repair of pressure boundary parts in accordance with the Code Section XI will restore the valve to design conditions resulting in safe reliable operation.

DESIGN VERIFICATION STATEMENT

The disposition will restore the valve E22-F010 to an acceptable configuration based on an independent review and engineering judgment.

J C Bland for

VERIFIED BY Clyde Nieh DATE 11-22-85

APPROVALS	DATE
K F Hanneman	11/22/85
QUALITY N/R	
MATL APPL ENGR N/R	
LEAD SYSTEM ENGR J Bruckler for L. Patterson	11-22-85
ENGRG MANAGER J.T. Cochran S.A. Bruckler for	11-22-85
RESPONSIBLE ENGR W. Radford for	11-22-85
PROJECT MANAGER	

DRF NO. IF APPLICABLE N/R

APPROVALS	DATE

DISTRIBUTION CODE

INTERNAL	EXTERNAL

THIS EQUIPMENT IS SAFETY RELATED
YES X NO ___

SAFETY FUNCTION IS AFFECTED
YES ___ NO X

COMPLETION RECORD REQUIRED BY R.E.	SUPPLIER ACTION REQUIRED
YES ___ NO X	YES ___ NO X

FIELD WORK ORDER NO.

DISPOSITION COMPLETE DATE

SITE QUALITY CONTROL

FIELD MANAGER

GENERAL ELECTRIC FIELD DEVIATION DISPOSITION REQUEST

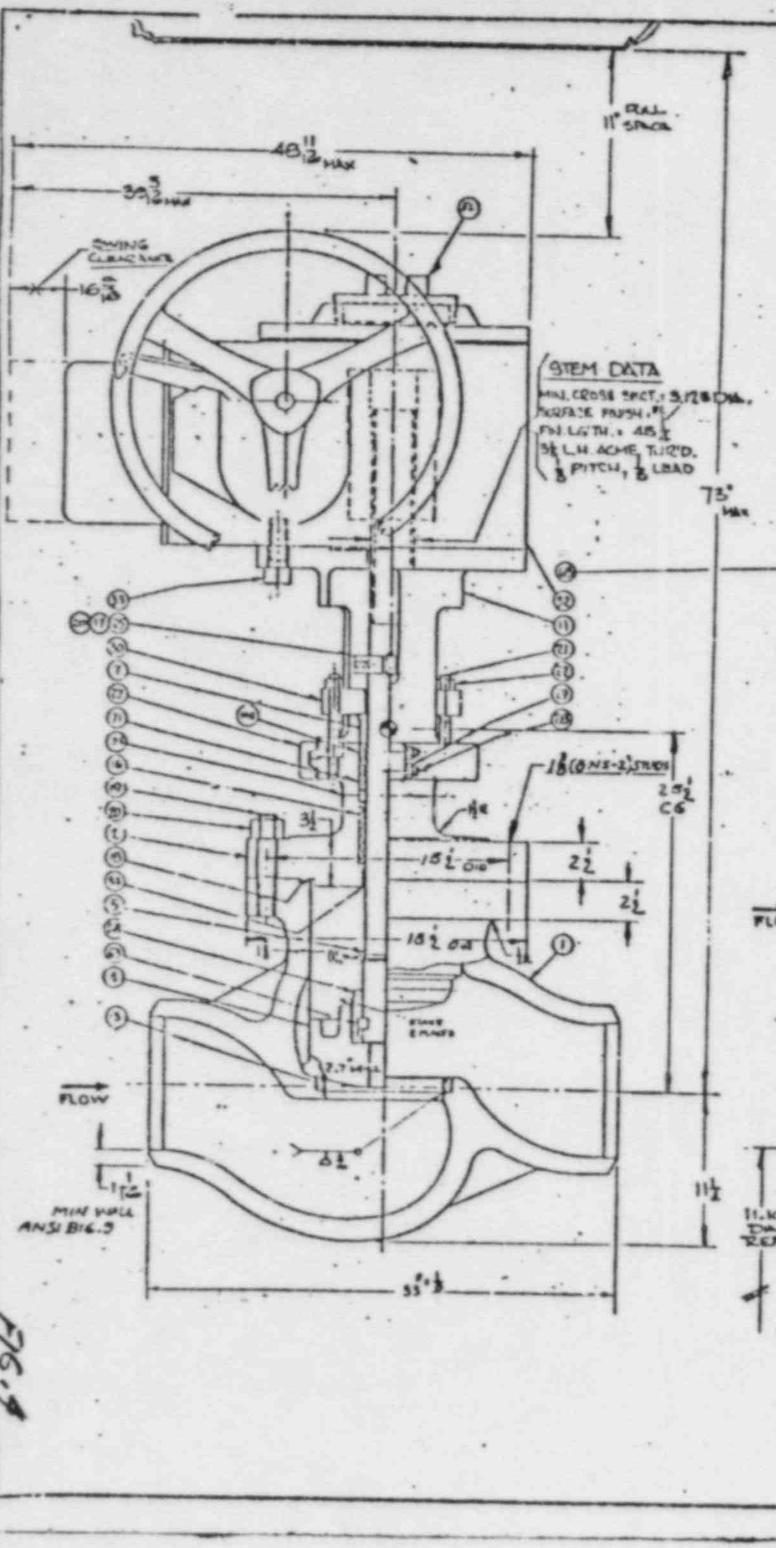
FDDR NO. LH1-5504 Rev.0 SHEET 2 OF 4
PROJECT Clinton I DATE 11-21-85

EXPEDITED APPROVAL

EQUIPMENT (DESCRIPTION AND/OR MPL) E22-F010

SUGGESTED DISPOSITION: (CONTINUED FROM SHEET 1)
Under the direction of an Anchor Darling field representative, perform the folloiwng work: Steps (b) through (l).

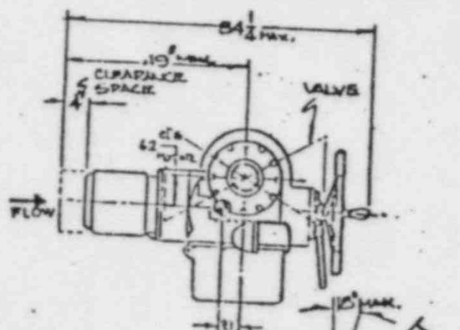
b) Inspect the bonnet back seat (Part 34) and dress as required to meet design requirements.
c) Break sharp corners and blend the chipped area in the valve seat so as to preserve the maximum valve seat width.
d) Blend the gouge marks in the valve body disk guide ribs. The work must be performed under Code Section XI since this is a pressure retaining part.
e) IPC is to supply the following replacement parts:
   1) Stem part (5) Anchor Darling Drawing 5287-2-2.
   2) Disk nut part (64) Anchor Darling Drawing 5287-2-2.
   3) Stem clamp, part (25) or straighten the bent stem clamp.
   4) Valve disk part (4) Anchor Darling Drawing 5287-2-5 or equivalent. A possible source is to remove a disk from the Black Fox valve without operator. OK 11/21/85
   5) Valve stem packings (parts 16 and 16A).
   6) Replacement gasket part (18)
f) Since the disk is a pressure retaining part, the use of a substitute disk must be resolved with the authorized code inspector.
g) Check shaft dimensions and bonnet back seat dimensions to assure that a proper back seat can be achieved.
h) Using the procedure on Sheets 4-2 and 4-3 of VPF 3238-682-2 (Anchor Darling Valve IOM Manual) lap the seat to the point where a seal line is established.
l) Reassemble the valve per VPF 3238-682-2 Sheets 5-4 and 5-5.
j) Reset limit and torque switches and manually operate the valve to assure that they are properly set. CAUTION: Operation of the valve by means of the motor, without having the switches properly set can lead to destruction of the back seat. Under close surveillance, operate the valve by means of the motor operator to assure that the limit stops are working properly.
k) Check bonnet and stem leakage, correct any observed leaks.
l) Assemble code data package to substantiate acceptable valve repairs.

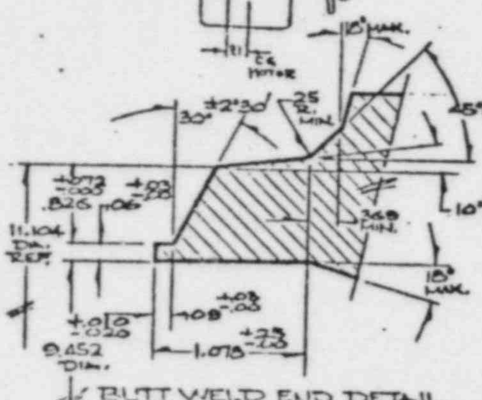


1. DESIGN & MANUFACTURE IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE, SECTION III, CLASS 2, WINTER 1973 ADDENDA WITH CODE CASE 1637.
2. HYDROSTATIC TESTS:
   (A) SHELL TEST PRESSURE 3250 PSIG
   (B) SEAT TEST PRESSURE 1875 PSIG
3. ESTIMATED VALVE WT: 2180# | EST WET WT: W/MOTOR OPERATOR: 3260# 3410#
4. MAXIMUM TORQUE VALUE RECOMMENDED FOR ITEMS 19 & 20: 1200 FT-LBS

Anchor/Darling Valve Company

SIZE	10	BODY	WCB
RATING	1410	STEM	11-13CR
TEMP°F	700	DISC	CO-CR-A
SERIAL		SEAT	CO-CR-A
HYDRO	3250 PSIG	DWG.	2999-3
VALVE ID	MPL NO E22-F010 (OR F011)		





BUTT WELD END DETAIL
SCHED. 120 (.718 W.) PIPE IN ACCORDANCE WITH GENERAL ELECTRIC DWG. 181C8662, PG. 2

QTY. PER UNIT	MANUF. DWG. NO.	ITEM NO.	DESCRIPTION	MATERIAL	MAT'L SPEC.
1	5287-2-5	ⓟ 1	BODY	CAST STL.	SA216 WCB
1	5287-2-5	ⓟ 2	BONNET	CAST STL.	SA216 WCB
(1) 1	5287-2-5	ⓟ 4	DISC (STELL. FACED)	CAST STL.	SA216 WCB
1	5287-2-2	5	STEM	STN. STL.	A479 T410
1	7-312-1	7	GLAND	STN. STL.	A479 T410
1	5287-2-3	11	YOKE	CAST STL.	A216 WCB
(1) 2	13-10M-3P	13	SEAT RING	STL. PIPE	SA106 Gr. B
7		16	PACKING (LOWER)	ASBESTOS	[illegible]
6		16	PACKING (UPPER)	ASBESTOS	[illegible]
1		17	SET SCREW	ALLOY STL.	AISI 4140
1		18	GASKET	[illegible]	FLEXITALLIC
12		ⓟ 19	STUD (BONN.)	ALLOY STL.	SA193 B7
12		ⓟ 20	NUT (BONN.)	STEEL	SA194 2H
2		21	GLAND BOLT	ALLOY STL.	SA193 B7
2		22	NUT (GLAND BOLT)	STEEL	SA194 2H
1	5287-2-2	23	STEM CLAMP	STL. R	A36
1	5287-2-3	27	YOKE CLAMP	STL. R	A36
4		28	STUD (YOKE CLIP)	ALLOY STL.	A193 B7
8		29	NUT (YOKE CLIP)	STEEL	A194 2H
1	20-750-2	30	GLAND FLG.	STL. R	[illegible]
1		32	MOTOR OPERATOR	[illegible]	[illegible]
8		33	CAPSCREWS (MOT. OP.)	ALLOY STL.	AISI 4140
(1) 1	5287-2-5	34	BACKSEAT (INTEGRAL)	STELLITE	
2		35	KEY (STEM CLIP)	STEEL	[illegible]
1	5287-2-2	63	RETAIN. RING (STEM)	STN. STL.	A276 T410
1	5287-2-2	64	DISC NUT	STN. STL.	A276 T410
1		65	NAMEPLATE	STN. STL.	A240 T304
1		82	PLUG (STEM INDICATOR)	[illegible]	WALWORTH
1	71-312-2	71	LANTERN RING	STN. STL.	A276 T410
1	5287-2-1	94	PIPE PLUG	FORG. STL.	A105

ⓟ PRESSURE CONTAINING PARTS
(1) CHEM. RANGE Co Cr A

DER LH1-5504 Rev. 0
SHEET 3 OF 4

ANCHOR/DARLING VALVE CO.
Certified by [signature]
Date 8-7-75 GL
12-31-75 [illegible]

D	[illegible]
C	[illegible]
B	[illegible]
A	[illegible] CUSTOMER'S COMM.
LTR	REVISION

GENERAL ELECTRIC CO.

ANCHOR/DARLING VALVE COMPANY
HAYWARD, CALIFORNIA

10" 900# GLOBE (STOP) B.B., R.S., B.W. ENDS, CAST CARB. STL., STELL TRIM, SMB-4 MOTOR OPER.

DRAWN BY [illegible] | DATE [illegible] | 2999-3 | D

FIG. 4

GENERAL ELECTRIC
FIELD DEVIATION DISPOSITION
AFFECTED DOCUMENTS LIST

FDDR No. LH1-5504
Revision 0
Sheet 4 of 4
Job No. 8Y275
WPSS ACTIVITY TYPE R

@ = Documents Transmitted to Document Control Center
* = Documents Transferred to S&L for Maintenance

SCHEDULE COMMITMENTS TO MEET ESTABLISHED SOP CYCLE DATES

DOCUMENT ID NO.	DOCUMENT TITLE/TYPE	MPL ITEM NO.	RESP COMP	RESP ENG'R	UPDATE WITH FDDR ISSUE YES	UPDATE WITH FDDR ISSUE NO
NO DOCUMENTS ARE AFFECTED.						

GENERAL ELECTRIC

DATE OF ISSUE ISSUED
NOV 27 1985

FDDR NO. LH1-5504
REVISION 1
SHEET 1 OF 5

FIELD DEVIATION DISPOSITION REQUEST

PROJECT Clinton
UNIT PSE & I SI
EQUIPMENT (MPL OR DESCRIPTION OR BOTH) E22-F010

FDDR ORIGINATOR J.T. Cochran DAT 11-21-
J.T. Cochran

DOCUMENT NO.	SH NO.:	REV	TITLE
VPF3238-682-2	Fig.4:		Instruction Manual Motor Operated Carbon Steel Valves

DEVIATION DESCRIPTION NCMR 01-1960
This FDDR LH1-5504 Rev.1 completely supersedes FDDR LH1-5504 Rev.0.
Valve E22-F010 has been damaged during test:
a) The valve stem is fractured approximately 1 3/4" above the back seat level.
b) The disk was cut apart during disassembly.
c) The disk nut was cut apart during disassembly.
d) There is a chip out of the hard face seat ring.
e) There are several gouges in the valve body dish guide ribs.

SITE QC CONCURRENCE Willis Eyler DATE FIELD CONCURRENCE T. Logue DATE 11-21-

X SUGGESTED DISPOSITION / EXPEDITED DISPOSITION

For part numbers refer to the Reference (Anchor Darling Dwg. 2999-3 Rev.D) Sheet 3 of this FDDR. The following steps may be performed out of order to effect repairs.
a) Penetrant test the bonnet back seat hard face part 34. If free of indications the bonnet is suitable for reuse.

(CONTINUED ON SHEET 2 OF THIS FDDR)

Cost: 8Y275 Material: 408-20122-910
DISPOSITION NEED DATE 11-21-85 EXPEDITED DISPOSITION APPROVAL BY DATE

FINAL DISPOSITION
Same as Suggested Disposition.

QC TO VERIFY(M) OF REVISION 1 11/27/85

ECA/ECN N/R FDI NO. N/R

JUSTIFICATION OF DISPOSITION DECISION (SAFETY, RELIABILITY)
Damage to valve parts have required substantial repairs. Replacing broken parts and performing repair of pressure boundary parts in accordance with the Code Section XI will restore the valve to design conditions resulting in safe reliable operation.

DESIGN VERIFICATION STATEMENT

Review of current design practice reveals that tack weld of disc to disc nut is the preferred method of locking disc to disc nut.

VERIFIED BY E.E. Smith Jr DATE 11/27/85 ~~11-22-85~~

APPROVALS	DATE
Willis Eyler	11/22/85
QUALITY N/R	
MATL APPL ENGR N/R	
LEAD SYSTEM ENGR E.E. Smith	11/27/85
ENGRG MANAGER J.T. Cochran	11-27-85
RESPONSIBLE ENGR T. Logue	11-27-85
PROJECT MANAGER	

DRF NO. IF APPLICABLE N/R

APPROVALS	DATE

DISTRIBUTION CODE

INTERNAL	EXTERNAL

THIS EQUIPMENT IS SAFETY RELATED
YES X NO
SAFETY FUNCTION IS AFFECTED
YES NO X

COMPLETION RECORD REQUIRED BY R.E.	SUPPLIER ACTIO REQUIRED
YES NO X	YES NO X

FIELD WORK ORDER NO.

DISPOSITION COMPLETE DATE

SITE QUALITY CONTROL

FIELD MANAGER

GENERAL ELECTRIC FIELD DEVIATION DISPOSITION REQUEST

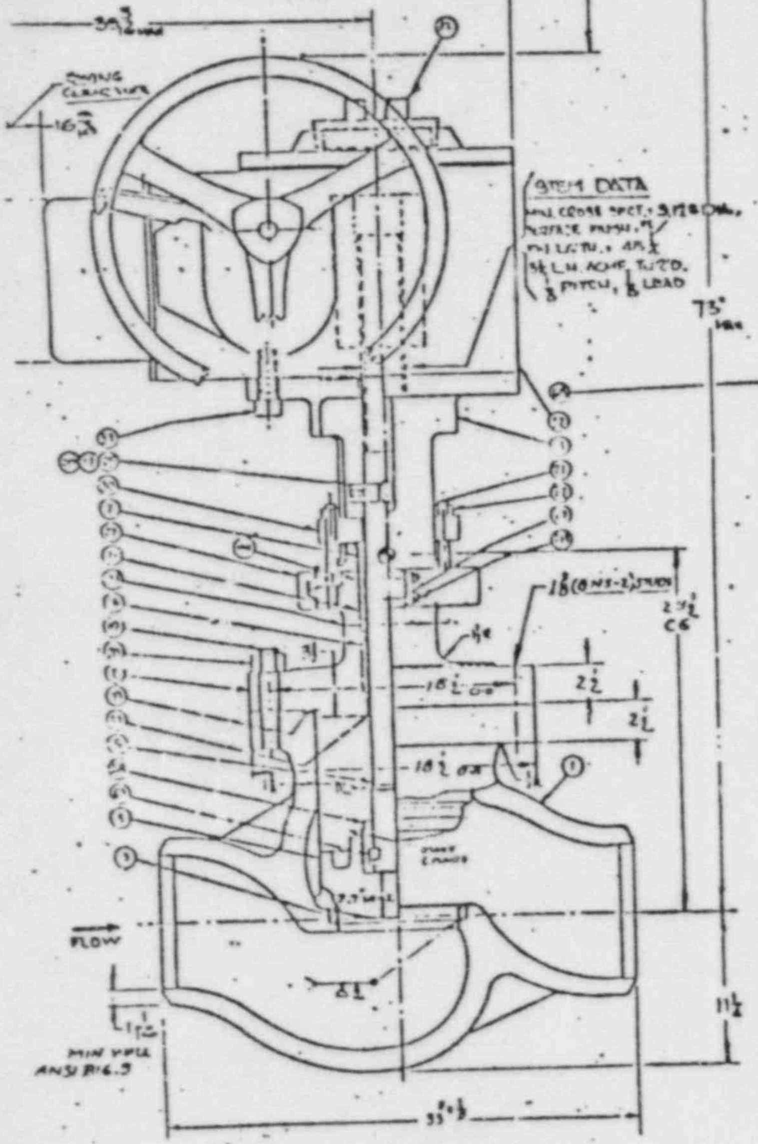
FDDR NO. LH1-5504 Rev.1
PROJECT Clinton I — SHEET 2 OF 5
EXPEDITED APPROVAL — DATE 11-21-85

EQUIPMENT (DESCRIPTION AND/OR MPL) E22-F010

SUGGESTED DISPOSITION: (CONTINUED FROM SHEET 1)
(Rev.0)
Under the direction of an Anchor Darling field representative, perform the following work: Steps (b) through (l).

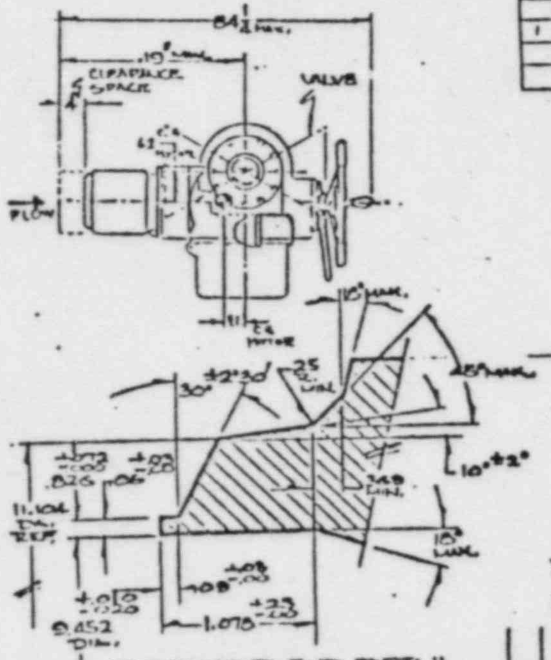
b) Inspect the bonnet back seat (Part 34) and dress as required to meet design requirements.
c) Break sharp corners and blend the chipped area in the valve seat so as to preserve the maximum valve seat width.
d) Blend the gouge marks in the valve body disk guide ribs. The work must be performed under Code Section XI since this is a pressure retaining part.
e) IPC is to supply the following replacement parts:
   1) Stem part (5) Anchor Darling Drawing 5287-2-2.
   2) Disk nut part (64) Anchor Darling Drawing 5287-2-2.
   3) Stem clamp, part (25) or straighten the bent stem clamp.
   4) Valve disk part (4) Anchor Darling Drawing 5287-2-5 or equivalent. A possible source is to remove a disk from the Black Fox valve without operator.
   5) Valve stem packings (parts 16 and 16A).
   6) Replacement gasket part (18)
f) Since the disk is a pressure retaining part, the use of a substitute disk must be resolved with the authorized code inspector.
g) Check shaft dimensions and bonnet back seat dimensions to assure that a proper back seat can be achieved.
h) Using the procedure on Sheets 4-2 and 4-3 of VPF 3238-682-2 (Anchor Darling Valve IOM Manual) lap the seat to the point where a seal line is established.
i) Reassemble the valve per VPF 3238-682-2 Sheets 5-4 and 5-5.
j) Reset limit and torque switches and manually operate the valve to assure that they are properly set. CAUTION: Operation of the valve by means of the motor, without having the switches properly set can lead to destruction of the back seat. Under close surveillance, operate the valve by means of the motor operator to assure that the limit stops are working properly.
k) Check bonnet and stem leakage, correct any observed leaks.
l) Assemble code data package to substantiate acceptable valve repairs.

(Rev.1)
(M) In reassembly of the disk to the stem, the disk nut threads Part 117 are to be tach welded to the disk, Part 11 with three one inch long tack welds at 120° to each other. Per Anchor Darling Drawing 93-14884 Rev.F (Sheet 4 of this FDDR) the nut material is A108 and the disk material is SA352. Use ~~GE approved~~ welding procedure for the welds and visually inspect for the absence of cracking in the welds. The Anchor Darling Field Representative is required for Steps (b) through (h) only.



1. DESIGN & MANUFACTURE IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE, SECTION III, CLASS 2, WINTER 1973 ADDENDA WITH CODE CASE 1637.
2. HYDROSTATIC TESTS:
   (a) SHELL TEST PRESSURE 3240 PSIG
   (b) SEAT TEST PRESSURE 1575 PSIG
3. ESTIMATED VALVE WT: 2180# | EST WT WITH OPERATOR: 3260# | 3410
4. MAXIMUM TORQUE VALUE RECOMMENDED FOR ITEMS 19 & 20: 1200 FT-LBS

Anchor/Darling Valve Company			
SIZE	10	BODY	WCB
RATING	1410	STEM	410 CPA
TEMP °F	700	DISC	CO-CRA
SERIAL		SEAT	CO-CRA
HYDRO	3220 PSIG	DWG.	2999-3
VALVE ID	HPL NO 222-1510 [illegible]		



BUTT WELD END DETAIL
SCHED. 130 (.718 W.) PIPE IN ACCORDANCE WITH GENERAL ELECTRIC DWG. 181C8662, [illegible]

QTY PER UNIT	MANUF. DWG. NO.	ITEM	DESCRIPTION	MATERIAL	ASME SPECIFICATION
1	5287-2-5	1	BODY	CAST STL.	SA216 WCB
1	5287-2-5	2	BONNET	CAST STL.	SA216 WCB
(1) 1	5287-2-5	4	DISC (FULL FACED)	CAST STL.	SA216 WCB
1	5287-2-2	5	STEM [illegible]	STN. STL.	A479 [illegible]
1	7-312-1	7	GLAND (COND A)	STN. STL.	A479 [illegible]
1	5287-2-3	11	YOKE	CAST STL.	A216 WCB
(1) 2	13-10M-3P	13	SEAT RING [illegible]	STL. [illegible]	SA105 [illegible]
7		16	PACKING (LOWER)	[illegible]	[illegible]
5		16	PACKING (UPPER)	[illegible]	[illegible]
1		17	SET SCREW [illegible]	ALLOY STL.	[illegible]
1		18	GASKET	[illegible]	[illegible]
12		19	STUD (BONN.)	ALLOY STL.	SA193 B7
12		20	NUT (BONN.)	STEEL	SA194 2H
2		21	GLAND BOLT	ALLOY STL.	SA193 B7
2		22	NUT (GLAND BOLT)	STEEL	SA194 2H
1	5287-2-2	23	STEM CLAMP	STL. PL.	A36
1	5287-2-3	24	YOKE CLAMP	STL. PL.	A36
4		25	STUD (YOKE CLP)	ALLOY STL.	A193 B7
8		27	NUT (YOKE CLP)	STEEL	A194 2H
1	30-750-2	30	GLAND FLG.	STL. PL.	[illegible]
1		32	MOTOR OPERATOR	[illegible]	[illegible]
8		33	CAPSCREWS (MOT. OP)	ALLOY STL.	A193 [illegible]
(1) 1	5287-2-5	34	BACKSEAT [illegible]	STELLITE	
2		35	KEY (STEM CLP)	STEEL	[illegible]
1	5287-2-2	63	RETAIN. RING (STEM)	STAN. STL.	A276 [illegible]
1	5287-2-2	64	DISC NUT	STAN. STL.	A276 [illegible]
1		53	NAMEPLATE	STAN. STL.	A240 [illegible]
1		52	PLUG [illegible]	[illegible]	[illegible]
1	71-312-2	71	LANTERN RING [illegible]	STAN. STL.	A276 [illegible]
1	5287-2-1	94	PIPE PLUG	[illegible] STL.	A105

⊕ PRESSURE CONTAINING PARTS
(1) CHEM. RANGE Co Cr A

LH1-5504 Rev. 01
3 OF 459 TC
11-27-85

Certified by C.Abrahams
Date 8-7-75 [illegible]
12-31-75 [illegible]

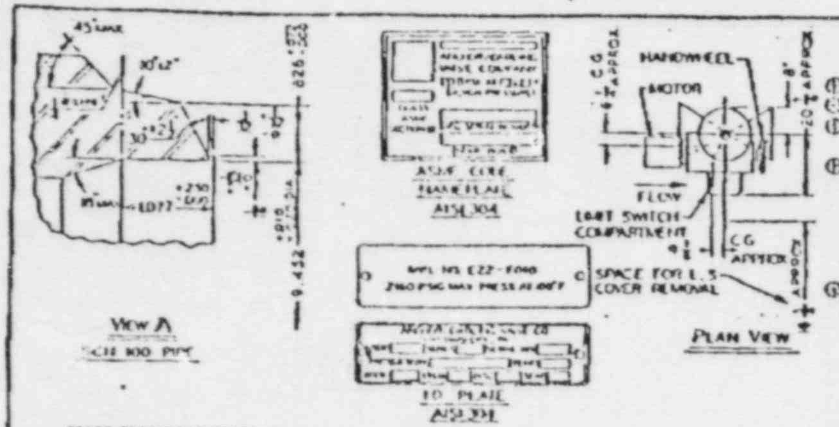
GENERAL ELECTRIC CO.

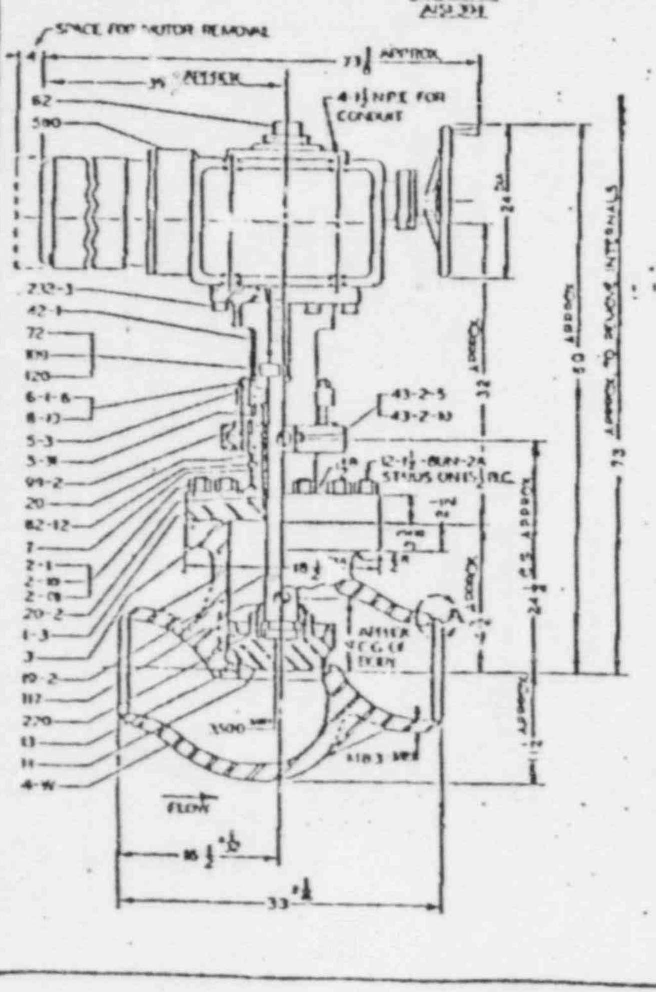
ANCHOR/DARLING VALVE COMPANY
HAYWARD, CALIFORNIA

10" 900# GLOBE (STOP) B.B., S.S., BW. ENDS, CAST CARB. STL., STEEL TRIM, SMB-4 MOTOR OPER.

2999-3 D

FIG. 4





PART NO	NO REQ'D	PART NAME	MATERIAL
1-3	1	BONNET	SA352-LCB
2-1	12	BONNET STUDS	SA 193 - B7 1¾ - 8X7½
2-10	12	BONNET NUTS	SA 194 - GR7 1¾ - 8
3	1	BONNET GASKET	304 SS WITH ASBESTOS
4-W	1	WELD ENDS BODY	SA352-LCB
5-3	1	FOLLOWER FLANGE	A 36
5-31	1	FOLLOWER GLAND	A 276 - TY304A
6-1-6	2	FOLLOWER STUDS	SA 193 - B7
6-10	2	FOLLOWER NUTS	SA 194 - 2H ¾ - 10
7	1	LANTERN GLAND	A 276 - TY304A
11	1	DISC	SA352-LCB WITH COCR-A
13	1	SEAT RING	SA515 - 70 WITH COCR-A
19-2	1	STEM	A 276 - 410 COND T
20	1 SET	UPPER PACKING	CRANE B25G/GRAFOIL
20-2	1 SET	LOWER PACKING	CRANE B25G/GRAFOIL
42-1	1	YOKE	A 216 - WCB
43-2-5	2	YOKE CLAMP STUDS	A 193 - B7 1⅛ - 8 X5
43-2-10	4	YOKE CLAMP NUTS	A 194 - 2H 1⅛ - 8
62	1	PIPE PLUG	COMMERCIAL IRON
62-12	1	PIPE PLUG	COMMERCIAL STEEL
72	1	SET SCREW	COMMERCIAL STEEL
99-2	1	YOKE CLAMP	A 216 - WCB
109	2	KEYS	COMMERCIAL STEEL
117	1	DISC NUT	A 108
120	1	STEM RETAINER CLAMP	A 36
220	1	STEM RETAINING RING	A 108
232-3	8	OPERATOR CAP SCREWS	A 574 ⅝ - 9X3
500	1	OPERATOR	COMMERCIAL
2-01	12	BONNET STUD WASHERS	COMMERCIAL STEEL
500	1	OPERATOR	COMMERCIAL
2-01	16	BONNET STUD WASHERS	COMMERCIAL STEEL

Ⓟ PRESSURE CONTAINING PARTS

LTR	REVISIONS	BY	DATE
A	REVISED TO CUST. COMMENTS.	[illegible]	[illegible]
B	DELETED PARTS 399-1 & 399-3 & NOTE 5	[illegible]	[illegible]
C	1-3 WAS 2-1/4, 3500 WAS 2-317, NOTE 1 #27 WAS NP, NOTE 4: 42-1/8 WAS 43, 1/2 PITCH WAS 1/3, 1/2 LEAD WAS 1/3, NOTE 6: 80 WAS 60	[illegible]	[illegible]
D	1313 WAS 1042, ADDED NOTE 5, PT NO 2-1 MAT'L, 2-3 WAS 6-1/2, PT NO 43-2-5 WAS 4, MAT'L WAS SA-193, PT NO 43-2-10 WAS 4, MAT'L WAS SA-194	[illegible]	CDS 8-15-78
E	PT NO 2-1 LENGTH WAS 7-3/4, PT NO 13 MAT'L WAS SA516-70, PT NO 99-2 MAT'L WAS A36	[illegible]	CDS 10-11-78
E1	CHANGED DRAWING TO SHOW RIGHT YOKE CLAMP	[illegible]	[illegible]
E2	STEM THDS WERE 1/2 ACME	[illegible]	[illegible]
F	NOTE 2: 3250 PSIG & 2200 PSIG WERE 3375 & 1575	[illegible]	CDS

FDDR No. LH1-5504 Rev. 1
SHEET 4 OF 5

NOTES

1. VALVE IS ASME CLASS 2 IN ACCORDANCE WITH ASME SECTION III, SUMMER 1976 ADDENDA WITH CODE CASES 1516-2, 1567, 1617, 1635-2 & 1773.
2. HYDROSTATIC SHELL TEST PRESSURE = 3250 PSIG. HYDROSTATIC SEAT TEST PRESSURE = 2200 PSIG.
3. MAXIMUM TORQUE VALUE RECOMMENDED FOR PARTS 2-1 & 2-10 IS 1200 FT. LBS.
4. STEM DATA:
   - MIN. CROSS SECTION = 2.731 DIA.
   - SURFACE FINISH = 32 RMS
   - FINISHED LENGTH = 42½ INCHES
   - THREADING = 3⅛ - 2 STUB ACME L.H. THREAD WITH ½ PITCH AND ½ LEAD
5. MIN. WALL THICKNESS SHOWN INCLUDES CORROSION ALLOWANCE.
6. OPERATOR IS A SMB-3 LIMITORQUE WITH A 80 FT. LB. MOTOR
   - CLASS OF INSULATION = B
   - OPENING OR CLOSING TIME = 50 SECONDS
   - VOLTAGE = 3 PHASE, 60 HERTZ, 460 VOLTS
   - MOTOR SPEED = 1800 RPM
7. VALVE DRY WEIGHT = 2840 LBS. APPROX.
   - VALVE WET WEIGHT = 3060 LBS. APPROX.
   - VALVE DRY WT. WITH BONNET LEAKAGE = 1060 LBS APPROX. EXTENDED MASS 4475 LBS APPROX.
8. STEM, PART NO 19-2, IS A 276-410 COND T, QUENCHED AND TEMPERED.

BLACKFOLIAS?
GENERAL ELECTRIC
ORDER NO. 205-AJ-750
A/OV ORDER NO. L6530-5

ANCHOR/DARLING VALVE COMPANY
WILLIAMSPORT, PA. U.S.A. 17701

10"-900 WELDING ENDS, CARBON STEEL GLOBE VALVE WITH SMB-3 LIMITORQUE OPERATOR

DRAWN	CHECKED	APPROVED	DRAWING NO.	REV.
JS 4-15-77	CJD 4-15-77	RSD 4-15-77	93-14884	F

FIGURE 3

GENERAL ELECTRIC
FIELD DEVIATION DISPOSITION
AFFECTED DOCUMENTS LIST

FDDR No. LH1-5504
Revision 1
Sheet 5 of 5
Job No. 8Y275
WPSS ACTIVITY TYPE R

@ = Documents Transmitted to Document Control Center
* = Documents Transferred to S&L for Maintenance

SCHEDULE COMMITMENTS TO MEET ESTABLISHED SOP CYCLE DATES

DOCUMENT ID NO.	DOCUMENT TITLE/TYPE	MPL ITEM NO.	RESP COMP	RESP ENG'R	UPDATE WITH FDDR ISSUE YES	UPDATE WITH FDDR ISSUE NO
NO DOCUMENTS ARE AFFECTED.						

RECEIVED NOV 2 5 1985

X-146629
EK 11/24/85

GENERAL ELECTRIC	DATE OF ISSUED NOV 24 1985	FDDR NO. LH1-5503
FIELD DEVIATION DISPOSITION REQUEST		REVISION 0
		SHEET 1 OF 4
PROJECT Clinton	PSE&G SI I	FDDR ORIGINATOR DATE
EQUIPMENT (MPL OR DESCRIPTION OR BOTH) E22-F011		J. T. Cochran for 11-21-85

DOCUMENT NO.	SH NO.	REV	TITLE
VPF 3238-682-2:Fig.4			Instruction Manual Motor Operated Carbon Steel Valve

DEVIATION DESCRIPTION NCMR 02-0563

Valve E22-F011 has been damaged during test:

a) The integral Stellite back seat in the bonnet is cracked radially and circumferentially, there is evidence of separation from the substrate.

(CONTINUED ON SHEET 2)

SITE QC CONCURRENCE W. Eckhardt DATE 11/24/85 FIELD CONCURRENCE D. Hendershot DATE 11-24-85

X SUGGESTED DISPOSITION ___ EXPEDITED DISPOSITION

For part numbers refer to the reference, (Anchor Darling Dwg. 2999-3 Rev. D), Sheet 3 of this FDDR. The following steps may be performed out of order to effect repairs.

a) IPC to confirm with Anchor Darling that the Bonnet can be repaired in conformance with Code requirements within ~~a six week period~~. site scheduling needs.

b) IPC to ship the valve Bonnet (part 2) to Anchor Darling for replacement. NEY 11/24

(CONTINUED ON SHEET 2)

Cost: 8Y275 Material: 408-20122-910

DISPOSITION NEED DATE 11-21-85 EXPEDITED DISPOSITION APPROVAL BY ___ DATE ___

FINAL DISPOSITION

Same as Suggested Disposition.

FOR REFERENCE ONLY

Quality Control is to verify that field work is in compliance with this FDD

ECA/ECN EIS FDI NO. N/R

JUSTIFICATION OF DISPOSITION DECISION (SAFETY, RELIABILITY)

Damage to the valve back seat prevents continued operation without repair. Actions required by this FDDR will return the valve to full code compliance condition which will assure safe reliable operation.

DESIGN VERIFICATION STATEMENT

Ths disposition will restore valve E22-F011 to an acceptable configuration based on an independent review and engineering judgement.

VERIFIED BY F.F. Smith, Jr. DATE 11/24/85

APPROVALS	DATE	DRF NO. IF APPLICABLE	THIS EQUIPMENT IS SAFETY RELATED
W. Eckhardt	11/24/85	N/R	YES X NO
QUALITY N/R		APPROVALS DATE	SAFETY FUNCTION IS AFFECTED
			YES ___ NO X
MATL APPL ENGR N/R			COMPLETION RECORD REQUIRED BY R.E. YES ___ NO X / SUPPLIER ACTIVITY REQUIRED YES ___ NO X
LEAD SYSTEM ENGR		DISTRIBUTION CODE	
D'Arcy for L.PATTERSON 11/24/85		INTERNAL EXTERNAL	
ENGRG MANAGER J. T. Cochran	11/24/85		FIELD WORK ORDER NO.
RESPONSIBLE ENGR	11-24-85	___ ___	DISPOSITION COMPLETE HP DATE

GENERAL ELECTRIC FIELD DEVIATION DISPOSITION REQUEST

FDDR NO. LH1-5503 Rev. 0 SHEET 2 OF 4
PROJECT Clinton I DATE 11-21-85

EXPEDITED APPROVAL

EQUIPMENT (DESCRIPTION AND/OR MPL) E22-F011

DEVIATION DESCRIPTION: (CONTINUED FROM SHEET 1)

b.) The stem is galled for a length of approximately 1¼ inches below the back seat bevel surface.

c.) Field stem hardness measurements of RC 372, Brinell 333 exceed the desired maxiumum value of Brinell 300.

d.) The disc separated from the stem and the stem retaining rings are lost.

e.) There are scratch marks on the body disc guide surfaces.

SUGGESTED DISPOSITION: (CONTINUED FROM SHEET 1)

of the back seat. Replacement by use of a seal welded insert is acceptable if Code requirements are maintained.

c) Replace the valve stem (part 5) with a stem having a Brinell hardness less than 300. (IP Co. to supply)

d) Provide replacement Retaining Ring stem (part 63) (IP CO. to supply)

e) Provide replacement valve stem packings parts 16 and 16A (IP Co. to supply)

f) Provide replacement gasket (part 18). (IP Co. to supply)

g) Anchor-Darling to provide a Code Package update for the repairs which will maintain the code status of the of the repaired valve.
Under the direction of an Anchor Darling field representative perform steps h, i and j.

h) Refurbish the valve body disc guides to blend scratch marks.

i) Check the disc seat mating surface and refinish if required.

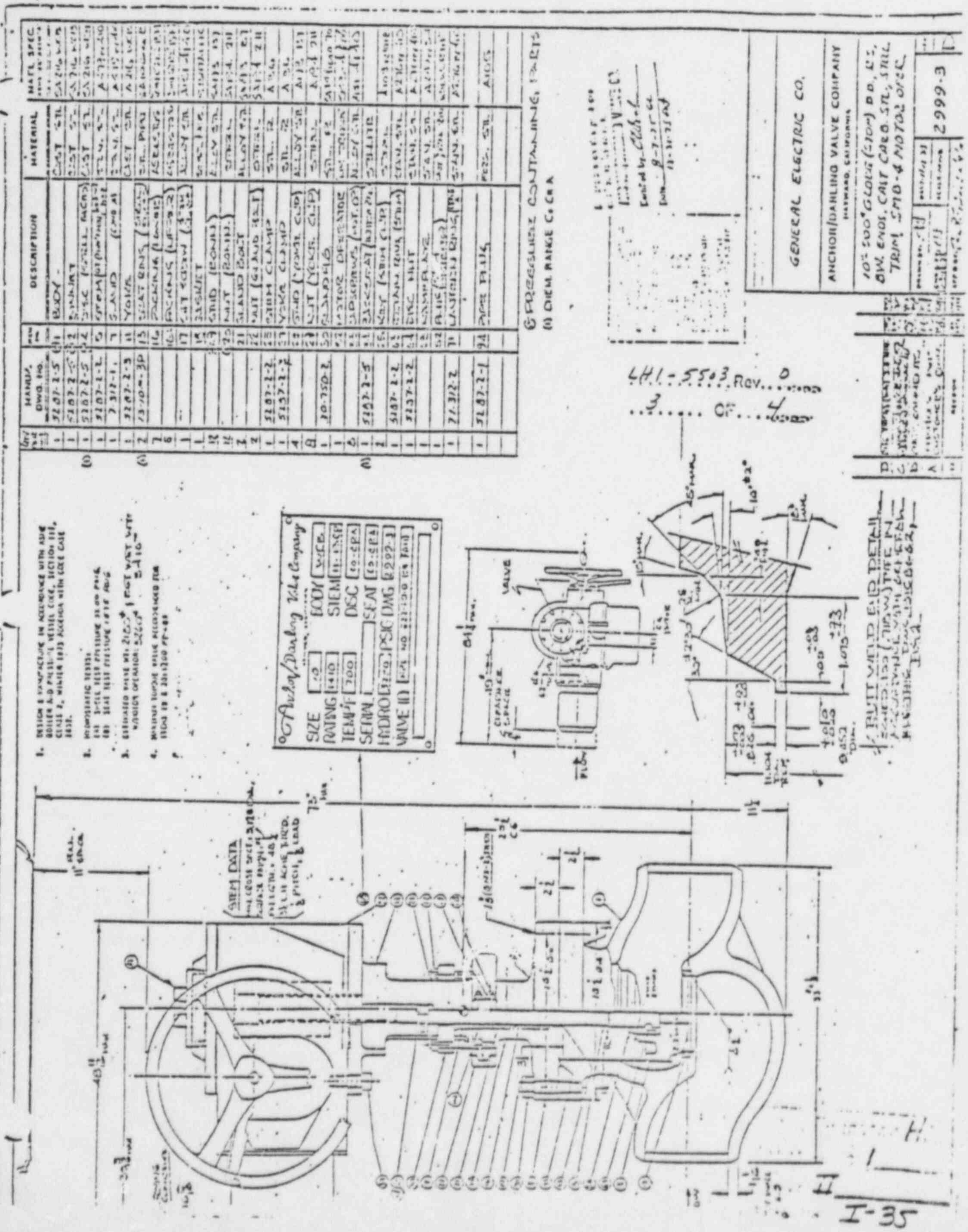
j) Reassemble the valve using the existing disc (Part 4) disc nut (Part 64), and parts from item b, c, d, e and f above.

k) Reset limit switches and manually operate the valve to assure that they are properly set. CAUTION: Operation of the valve by means of the motor, without having the switches properly set can lead to destruction of the back seat.
Under close surveillance, operate the valve by means of the motor operator to assure that the switches are working properly.

l) Check bonnet and seat leakage, correct any observed leaks.

m) Assemble code data package to substantiate acceptability of valve repairs.

HP
I
II
I-34


DESCRIPTION
MATERIAL
MAT'L SPEC
GENERAL ELECTRIC CO.
ANCHOR/DARLING VALVE COMPANY
2999-3
LH1-5503 Rev. 0
3 OF 4
STEM DATA
VALVE
BUTT WELD END DETAIL
Anchor/Darling Valve Company
SIZE
RATING
TEMP °F
SERIAL
HYDRO
VALVE ID
BODY
STEM
DISC
SEAT

GENERAL ELECTRIC
FIELD DEVIATION DISPOSITION
AFFECTED DOCUMENTS LIST

FDDR No. LH1-3503
Revision 0
Sheet 4 of 4
Job No. 8Y275
WPSS ACTIVITY TYPE R

@ = Documents Transmitted to Document Control Center
* = Documents Transferred to S&L for Maintenance
SCHEDULE COMMITMENTS TO MEET ESTABLISHED SOP CYCLE DATES

DOCUMENT ID NO.	DOCUMENT TITLE/TYPE	MPL ITEM NO.	RESP COMP	RESP ENG'R	UPDATE WITH FDDR ISSUE YES	UPDATE WITH FDDR ISSUE NO
@VFF 3238-682-2 Fig. 4	Anchor Darling Dwg. 2999-3 Rev. D	E22-F011	753	CN		X

HP

II

I-26

ATTACHMENT #5C
PAGE 1 of 27

GENERAL ELECTRIC

FIELD DEVIATION DISPOSITION REQUEST

DATE OF ISSUED: DEC 19 1985

FDDR NO. LH1-5503
REVISION 1
SHEET 1 OF 5

PROJECT Clinton
EQUIPMENT (MPL OR DESCRIPTION OR BOTH) PSF & SI UNIT I E22-F011

FDDR ORIGINATOR J. T. Cochran DATE 12-18-8
J. T. Cochran

DOCUMENT NO. :SH NO.: REV : TITLE
VPF 3238-682-2:Fig.4 : : Instruction Manual Motor Operated Carbon Steel Valve

DEVIATION DESCRIPTION NCMR 02-0563 DTF 1K684
This FDDR completely supersedes LH1-5503 Rev.0.
(Rev.0)
Valve E22-F011 has been damaged during test:
a) The integral Stellite back seat in the bonnet is cracked radially and circumferentially, there is evidence of separation from the substrate.

(CONTINUED ON SHEET 2 OF THIS FDDR)

SITE QC CONCURRENCE K E Hamman DATE 12/19/85 FIELD CONCURRENCE D Lindsey FOR J R Lowe DATE 12-19-8

X SUGGESTED DISPOSITION ___ EXPEDITED DISPOSITION

There is no technical change to (Rev.0) therefore only this revision requires justification and verification.
(Rev.0)
For part numbers refer to the reference, (Anchor Darling Dwg. 2999-3 Rev. D), Sheet 3 of this FDDR. The following steps may be performed out of order to effect repairs.
a) IPC to confirm with Anchor Darling that the Bonnet can be repaired in conformance with Code requirements within site scheduling needs.
b) IPC to ship the valve Bonnet (part 2) to Anchor Darling for replacement of the back seat.

(CONTINUED ON SHEET 2 OF THIS FDDR.)

Cost: 8Y275 Material: 408-20122-910
DISPOSITION NEED DATE 11-21-85 EXPEDITED DISPOSITION APPROVAL BY DATE

FINAL DISPOSITION
Same as Suggested Disposition.
Quality Control is to verify that field work is in compliance with this FDDR.

ECA/ECN EIS FDI NO. N/R

JUSTIFICATION OF DISPOSITION DECISION (SAFETY, RELIABILITY)
Anchor/Darling has designed a recessed drop-in brackseat which will be seal welded to the bonnet replacing the damaged integral backseat. The bonet to insert weld is recessed and will be finished to permit either MT or PT acceptance inspection. Safety and reliability are not affected.

DESIGN VERIFICATION STATEMENT
Verified by an independent review of the submitted data and based on engineering judgement.

VERIFIED BY J.T. Cochran for C. Nieh DATE 12-19-85

APPROVALS	DATE
K E Hamman	12/19/85
QUALITY N/R	
MATL APPL ENGR N/R	
LEAD SYSTEM ENGR	12/19/85
ENGR MANAGER J.T. Cochran	12-19-85
RESPONSIBLE ENGR D Lindsey FOR	12-19-85
PROJECT MANAGER	

DRF NO. IF APPLICABLE N/R

APPROVALS	DATE

DISTRIBUTION CODE

INTERNAL	EXTERNAL

THIS EQUIPMENT IS SAFETY RELATED
YES X NO ___
SAFETY FUNCTION IS AFFECTED
YES ___ NO X

COMPLETION RECORD REQUIRED BY R.E.	SUPPLIER ACTION REQUIRED
YES ___ NO X	YES ___ NO X

FIELD WORK ORDER NO.

DISPOSITION COMPLETE DATE

SITE QUALITY CONTROL

FIELD MANAGER

GENERAL ELECTRIC FIELD DEVIATION DISPOSITION REQUEST

FDDR NO. LH1-5503 Rev. 1 SHEET 2 OF 5
PROJECT Clinton I DATE 12-18-85

EXPEDITED APPROVAL

EQUIPMENT (DESCRIPTION AND/OR MPL) E22-F011

DEVIATION DESCRIPTION: (CONTINUED FROM SHEET 1)

b.) The stem is galled for a length of approximately 1½ inches below the back seat bevel surface.
c.) Field stem hardness measurements of RC 372, Brinell 333 exceed the desired maxiumum value of Brinell 300.
d.) The disc separated from the stem and the stem retaining rings are lost.
e.) There are scratch marks on the body disc guide surfaces.

(Rev.1)
Review and approval is requested of Anchor/Darling Drawing 2999-3 Rev.(J) for application to Clinton valve E22-F011.

SUGGESTED DISPOSITION: (CONTINUED FROM SHEET 1)

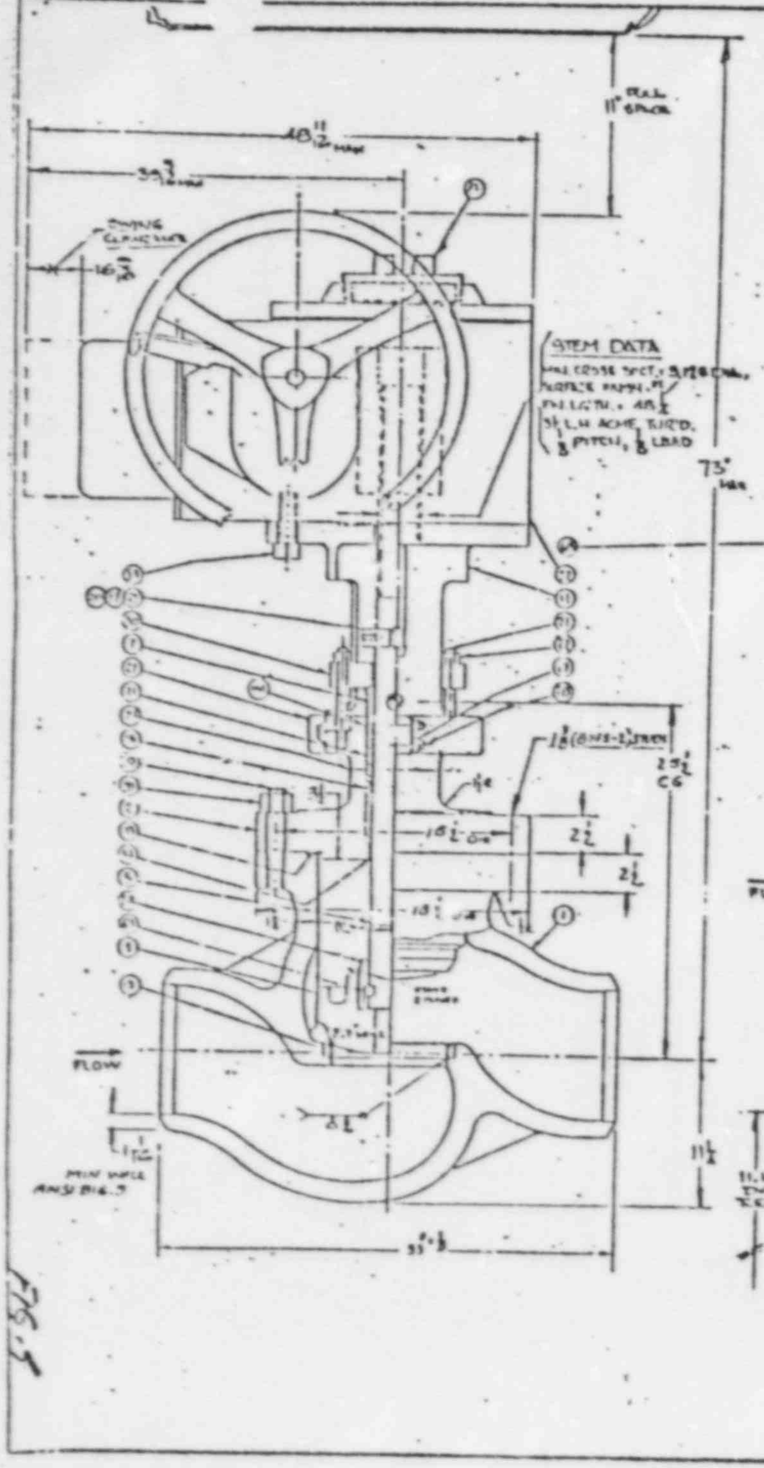
Replacement by use of a seal welded insert is acceptable if Code requirements are maintained.

c) Replace the valve stem (part 5) with a stem having a Brinell hardness less than 300. (IP Co. to supply)
d) Provide replacement Retaining Ring stem (part 63) (IP CO. to supply)
e) Provide replacement valve stem packings parts 16 and 16A (IP Co. to supply)
f) Provide replacement gasket (part 18). (IP Co. to supply)
g) Anchor-Darling to provide a Code Package update for the repairs which will maintain the code status of the of the repaired valve.
Under the direction of an Anchor Darling field representative perform steps h, i and j.
h) Refurbish the valve body disc guides to blend scratch marks.
i) Check the disc seat mating surface and refinish if required.
j) Reassemble the valve using the existing disc (Part 4) disc nut (Part 64), and parts from item b, c, d, e and f above.
k) Reset limit switches and manually operate the valve to assure that they are properly set. CAUTION: Operation of the valve by means of the motor, without having the switches properly set can lead to destruction of the back seat.
Under close surveillance, operate the valve by means of the motor operator to assure that the switches are working properly.
l) Check bonnet and seat leakage, correct any observed leaks.
m) Assemble code data package to substantiate acceptability of valve repairs.

(Rev.1)

Anchor/Darling Drawing 2999-3 Rev. (J) depicting a modified bonnet to accept a dropin backseat is approved for valve E22-F011 at Clinton Station, Sheet 4 of this FDDR. 12/18/85

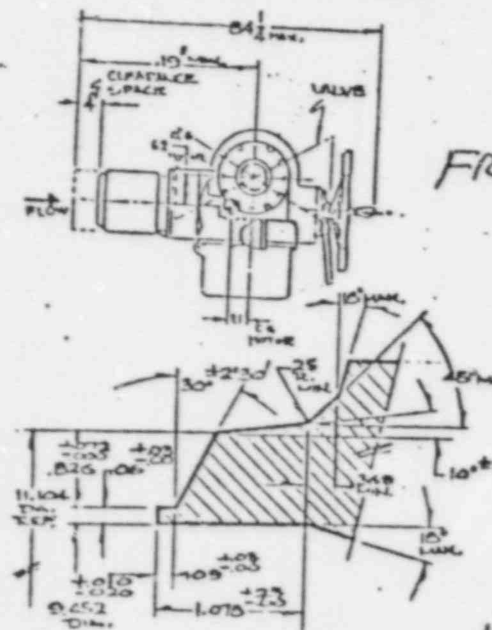
General Electric to incorporate Anchor/Darling Drawing 2999-3 Rev. (J) into the vendor print file for valve E22-F011 at Clinton Station.



1. DESIGN & MANUFACTURE IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE, SECTION III, CLASS 2, WINTER 1973 ADDENDA WITH CODE CASE 1637.
2. HYDROSTATIC TESTS:
(A) SHELL TEST PRESSURE 3[illegible] PSIG
(B) SEAT TEST PRESSURE [illegible] PSIG
3. ESTIMATED VALVE WT: 2180# ; W/MOTOR OPERATOR: 5260# ; ACT WT WITH 5410#
4. MAXIMUM TORQUE VALUE RECOMMENDED FOR ITEMS 19 & 20: 1200 FT-LBS

Anchor/Darling Valve Company

SIZE	10	BODY	WCB
RATING	1410	STEM	[illegible]
TEMP°F	700	DISC	[illegible]
SERIAL		SEAT	[illegible]
HYDRO	[illegible] PSIG	DWG	2999-3
VALVE ID	[illegible]		



BUTT WELD END DETAIL
SCHED. 120 (.718 W.) PIPE IN ACCORDANCE WITH GENERAL ELECTRIC DWG. [illegible]

QTY	MANUF. DWG. NO.	ITEM	DESCRIPTION	MATERIAL	MATL SPEC.
1	5287-2-5	1	BODY	CAST STL.	SA216 WCB
1	5287-2-5	2	BONNET	CAST STL.	SA216 WCB
1	5287-2-5	4	DISC [illegible]	CAST STL.	SA216 WCB
1	5287-2-2	5	STEM [illegible]	STN. STL.	A479 [illegible]
1	7-317-1	7	GLAND [illegible]	STN. STL.	A479 [illegible]
1	5287-2-3	11	YOKE	CAST STL.	A216 WCB
2	13-10-3P	13	SEAT RING [illegible]	STL. [illegible]	SA105 [illegible]
7		16	PACKING (LOWER)	[illegible]	[illegible]
6		16	PACKING (UPPER)	[illegible]	[illegible]
1		17	SET SCREW [illegible]	ALLOY STL.	[illegible]
1		18	GASKET	[illegible]	[illegible]
12		19	STUD (BONN.)	ALLOY STL.	SA193 B7
12		20	NUT (BONN.)	STEEL	SA194 2H
2		21	GLAND BOLT	ALLOY STL.	SA193 B7
2		22	NUT (GLAND BOLT)	STEEL	SA194 2H
1	5287-2-2	23	STEM CLAMP	STL. PL.	A36
1	5287-2-3	27	YOKE CLAMP	STL. PL.	A36
4		28	STUD (YOKE CLP)	ALLOY STL.	A193 B7
8		27	NUT (YOKE CLP)	STEEL	A194 2H
1	30-750-2	32	GLAND FLG.	STL. PL.	[illegible]
1		42	MOTOR OPERATOR	[illegible]	[illegible]
8		43	CAPSCREWS (MOT. OP)	ALLOY STL.	[illegible]
1	5287-2-5	45	BACKSEAT [illegible]	STELLITE	
2		55	KEY (STEM CLP)	STEEL	[illegible]
1	5287-2-2	63	RETAINING RING (STEM)	STAN. STL.	A276 [illegible]
1	5287-2-2	64	DISC NUT	STAN. STL.	A276 [illegible]
1		65	NAMEPLATE	STAN. STL.	A240 [illegible]
1		82	PLUG [illegible]	[illegible]	[illegible]
1	71-312-2	71	LANTERN RING [illegible]	STAN. STL.	A276 [illegible]
1	5287-2-1	94	PIPE PLUG	FRG. STL.	A105

⊕ PRESSURE CONTAINING PARTS
(1) CHEM. RANGE C & Cr A

FROM:
LH1-5503 REV. [illegible] 12-18-85
3 OF 5

Certified by [illegible]
Date 8-7-75

GENERAL ELECTRIC CO.

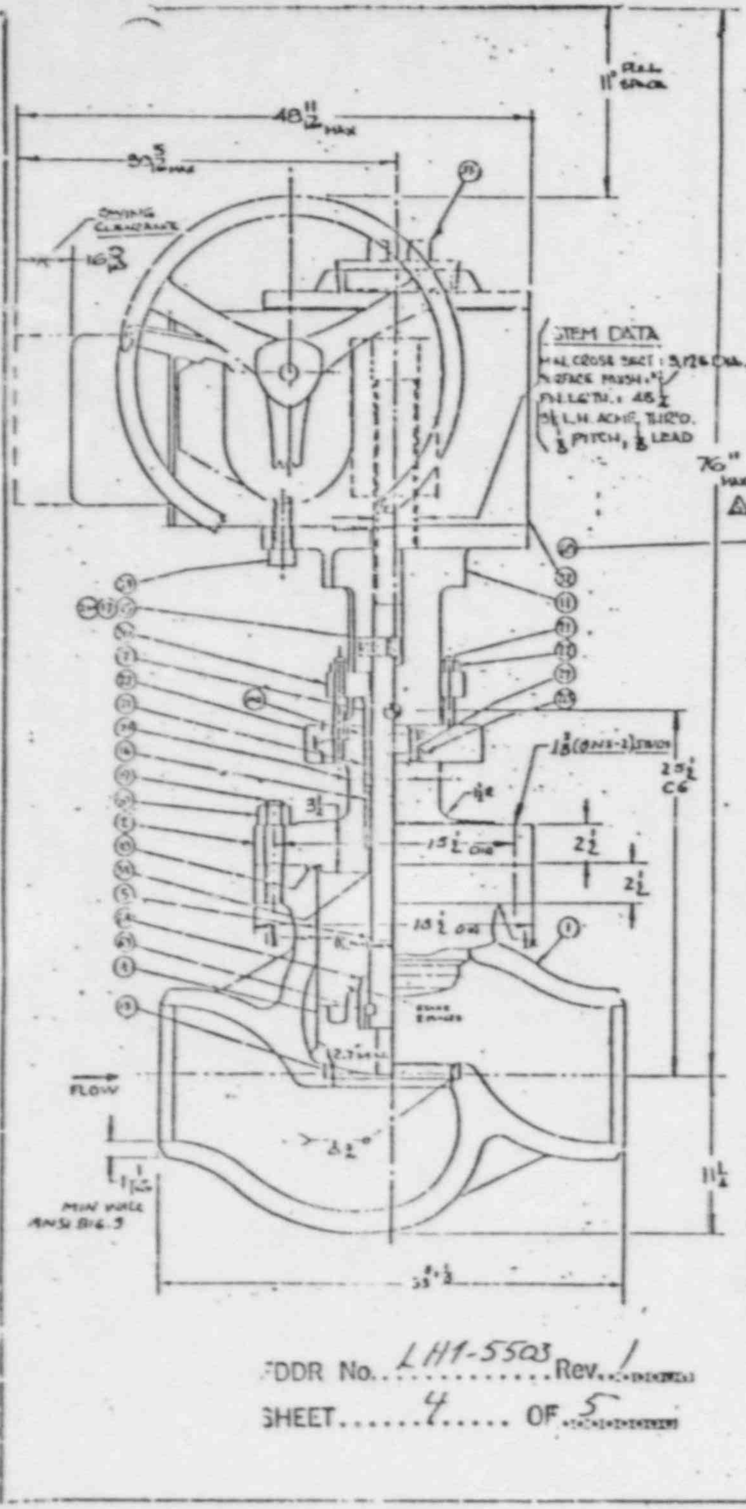
ANCHOR/DARLING VALVE COMPANY
HAYWARD, CALIFORNIA

10" 900# GLOBE (STOP) B.B., R.S., BW. ENDS, CAST CARB. STL., STEL. TRIM, SMB-4 MOTOR OPER.

2999-3 D

FIG. 5

ATTACHMENT 5C
PAGE 17 OF 27

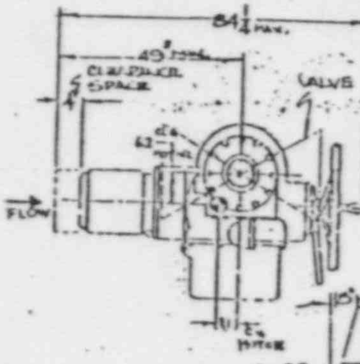


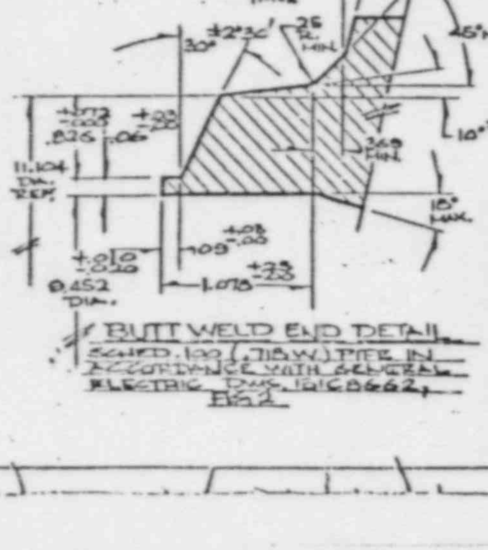
1. DESIGN & MANUFACTURE IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE, SECTION III, CLASS 2, WITH ... ADDENDA WITH 1007 CASE 1437.
2. HYDROSTATIC TESTS:
   (A) SHELL TEST PRESSURE 3300 PSIG
   (B) SEAT TEST PRESSURE 1475 PSIG
3. ESTIMATED VALVE WT - 2100# ; EST WET WT - 5240# 5410#
   WITHOUT OPERATOR:
4. MAXIMUM TORQUE VALUE RECOMMENDED FOR ITEMS 19 & 20: 1200 FT-LBS
5. REPLACEMENT MOTORS ARE CLASS IE WITH - RH - INSULATION FURNISHED VIA A/DV S.O. E6214-300 (CLINTON ONLY).
6. BONNET (ITEM 95) MODIFIED TO ACCEPT DROP-IN BACKSEAT (ITEM 96) ONLY ON VALVE NO. E22-F011 (CLINTON STATION) VIA A/DV S.O. RG746-1 (REF DETAIL A).

76" MAX

Anchor/Darling Valve Company

SIZE	10	BODY	WCB
RATING	1410	STEM	11-13CR
TEMP °F	700	DISC	CO-CR A
SERIAL		SEAT	CO-CR A
HYDRO	3300 PSIG	DWG.	2292-3
VALVE ID	MPL NO. E22-F010 (OR F011)		

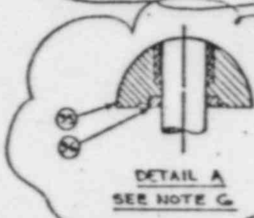




BUTT WELD END DETAIL
SCHED. 100 (.718 W.) PIPE IN ACCORDANCE WITH GENERAL ELECTRIC DWG. 161C8662, FIG. 2

1	5287-2-5	1	BODY	C. STL.	SA216 WCB
1	5287-2-5	2	BONNET	CA. STL.	SA216 WCB
1	5287-2-5	4	DISC (STELL. FACED)	CAST STL.	SA216 WCB
1	5287-2-2	5	STEM (STELLITED)	STAIN. STL.	A479 TY 410
1	7-312-1	7	GLAND (COND A)	STAIN. STL.	A479 TY 410
1	5287-2-3	11	YOKE	CAST STL.	A216 WCB
2	13-10M-3P	13	SEAT RING	STL.	[illegible]
7		16	PACKING (LOWER)	[illegible]	[illegible]
6		16A	PACKING (UPPER)	[illegible]	[illegible]
1	--	17	SET SCREW (STEM CLAMP)	ALLOY STL.	AISI 4140
1		18	GASKET	[illegible]	[illegible]
12		19	STUD (BONN.)	ALLOY STL.	SA193 B7
12	--	20	NUT (BONN.)	STEEL	SA194 2H
2	--	21	GLAND BOLT	ALLOY STL.	SA193 B7
2		22	NUT (GLAND BOLT)	STEEL	SA194 2H
1	5287-2-2	25	STEM CLAMP	STL. PL.	A36
1	5287-2-3	27	YOKE CLAMP	STL. PL.	A36
4		28	STUD (YOKE CLP)	ALLOY STL.	A193 B7
8		29	NUT (YOKE CLP)	STEEL	A194 2H
1	30-750-2	30	GLAND FLG.	STL. PL.	[illegible]
1		32	MOTOR OPERATOR	LIMITORQUE	SMB-4 [illegible]
8		33	CAPSCREWS (MOT. OP.)	ALLOY STL.	AISI 4140
1	5287-2-5	34	BACKSEAT (INTEGRAL)	STELLITE	
2		35	KEY (STEM CLP)	STEEL	[illegible]
1	5287-2-2	63	RETAIN. RING (STEM)	STAIN. STL.	A276 TY 410
1	5287-2-2	64	DISC NUT	STAIN. STL.	A276 TY 410
1		65	NAMEPLATE	STAIN. STL.	A240 TY 304
1		52	PLUG (STEM PROTECTOR)	[illegible]	"WILWORTH"
1	71-312-2	71	LANTERN RING	STAIN. STL.	A276 TY 410
1	5287-2-1	94	PIPE PLUG	FORG. STL.	A105
1	012417	95	BONNET (ALTERED)	CAST STL.	SA216 WCB
1	C30294	96	BACKSEAT (STELL FACED)	FORG. STL.	SA105

Ⓟ PRESSURE CONTAINING PARTS
(1) CHEM. RANGE Co-Cr A



DETAIL A
SEE NOTE 6

Certified by [signature] Date 6/23/77

TO:

REV	DESCRIPTION
J	ADDED NOTE 6, DETAIL A, ITEMS NO. 95 & 96 ADDED (CLINTON ONLY) TO NOTE 5
H	ADDED NOTE 5
G	REVISED - 73" WAS CHANGED TO 76" MAX
F	ITEM 13 (ADD) SA351-71
E	ITEM 20 (ADD) G97
D	[illegible]
C	[illegible]
B	CUST. COMMENTS
A	CHANGES PER CUSTOMER'S COMM.

GENERAL ELECTRIC CO.

ANCHOR/DARLING VALVE COMPANY
HAYWARD, CALIFORNIA

10" 900# GLOBE (STOP) B.B., R.S. B.W. ENDS, CAST CARB. STL., STELL. TRIM, SMB-4 MOTOR OPER.

DRAWN BY: E.V.I.

2999-3 REV J

FDDR No. LH1-5503 Rev. 1
SHEET 4 OF 5

RT 5/4

GENERAL ELECTRIC
FIELD DEVIATION DISPOSITION
AFFECTED DOCUMENTS LIST

FDDR No. LH1-5503
Revision 0
Sheet 5 of 5
Job No. 8Y275
WPSS ACTIVITY TYPE R

@ = Documents Transmitted to Document Control Center
* = Documents Transferred to S&L for Maintenance
SCHEDULE COMMITMENTS TO MEET ESTABLISHED SOP CYCLE DATES

DOCUMENT ID NO.	DOCUMENT TITLE/TYPE	MPL ITEM NO.	RESP COMP	RESP ENG'R	UPDATE WITH FDDR ISSUE YES	UPDATE WITH FDDR ISSUE NO
VPF 3238-682-2 @ Fig. 4	Anchor Darling Dwg. 2999-3	E22-F011	753	CN		X

ISSUED

GENERAL ELECTRIC

FIELD DEVIATION DISPOSITION REQUEST

DATE OF ISSUE: FEB 06 1986

PSE & SI

FDDR NO. LH1-5503
REVISION 2
SHEET 1 OF 2

PROJECT Clinton UNIT I
EQUIPMENT (MPL OR DESCRIPTION OR BOTH) E22-F011

FDDR ORIGINATOR: G. L. Moore DATE 2/6/86
G. L. Moore 2/6/86

DOCUMENT NO.	SH NO.	REV	TITLE
VPF 3238-682-2: Fig.4:			Instruction Manual, Motor Operated Carbon Steel Valve

DEVIATION DESCRIPTION JK-793
This FDDR supplements LH1-5503 Rev. 1.
I.P. Co. has requested that the Anchor Darling Valve Company representative presence be made non-mandatory.

SITE QC CONCURRENCE K F Hamann DATE 2/6/86 FIELD CONCURRENCE W. Rolfe for J R LOGAN DATE 2-6-86

X SUGGESTED DISPOSITION ___ EXPEDITED DISPOSITION

Change "Under the direction of an Anchor Darling Field representative perform steps h, i, and j" to "when performing steps h, i, and j, seek the guidance of the Anchor Darling Field representative as his availability permits"

Cost: 8Y275 Material: None
DISPOSITION NEED DATE 2/7/86 EXPEDITED DISPOSITION APPROVAL BY DATE

FINAL DISPOSITION
Same as suggested.

QC-None. HH 2/6/86

ECA/ECN N/R FDI NO. N/R

JUSTIFICATION OF DISPOSITION DECISION (SAFETY, RELIABILITY)
I.P. Co. has accomplished this same task previously and nothing to be done is irreversible.

DESIGN VERIFICATION STATEMENT
The disposition is verified to be adequate by reviewing LH1-5503 Rev. 1, VPF 3238-682-2, and by engineering judgment.

VERIFIED BY J. R. Glazier J R Glazier DATE 2/6/86

APPROVALS	DATE
K F Hamann	2/6/86
QUALITY N/R	
MATL APPL ENGR N/R	
LEAD SYSTEM ENGR R.C. Haber for F.F.Smith	2/6/86
ENGRG MANAGER G. L. Moore G. L. Moore	2/6/86
RESPONSIBLE ENGR W Rolfe	2-6-86
PROJECT MANAGER	

DRF NO. IF APPLICABLE N/R

APPROVALS	DATE

DISTRIBUTION CODE

INTERNAL	EXTERNAL

THIS EQUIPMENT IS SAFETY RELATED
YES X NO ___
SAFETY FUNCTION IS AFFECTED
YES ___ NO X

COMPLETION RECORD REQUIRED BY R.E.	SUPPLIER ACTION REQUIRED
YES ___ NO X	YES ___ NO X

FIELD WORK ORDER NO.

DISPOSITION COMPLETE DATE

SITE QUALITY CONTROL

FIELD MANAGER

GENERAL ELECTRIC
FIELD DEVIATION DISPOSITION
AFFECTED DOCUMENTS LIST

FDDR No. LH1-5503
Revision 5/12/86 2
Sheet 2 of 2
Job No. 8Y275
WPSS ACTIVITY TYPE R

@ = Documents Transmitted to Document Control Center
* = Documents Transferred to S&L for Maintenance
SCHEDULE COMMITMENTS TO MEET ESTABLISHED SOP CYCLE DATES

DOCUMENT ID NO.	DOCUMENT TITLE/TYPE	MPL ITEM NO.	RESP COMP	RESP ENG'R	UPDATE WITH FDDR ISSUE YES	NO
No Documents Affected						

GENERAL ELECTRIC

FIELD DEVIATION DISPOSITION REQUEST

DATE OF ISSUE ISSUED FEB 07 1986

PSE & SI

FDDR NO. LH1-5503
REVISION 3
SHEET 1 OF 7

PROJECT Clinton UNIT 1
EQUIPMENT (MPL OR DESCRIPTION OR BOTH) E22-F011

FDDR ORIGINATOR J. T. Cochran DATE 2/7/86
J R Elgin for

DOCUMENT NO.	SH NO.	REV	TITLE
VPF 3238-682-2: Fig.4:			Instruction Manual, Motor Operated Carbon Steel Valve

DEVIATION DESCRIPTION DTFJK-797 NCMR 02-0563 DTF JK684 DTF CR 322 NCMR 2-0673
This FDDR supplements LH1-5503 Rev. 0 Rev. 1 and Rev. 2.
(Rev. 0)
Valve E22-F011 has been damaged during test:
a) The integral Stellite back seat in the bonnet is cracked radially and circumferentially, there is evidence of separation from the substrate.
(CONTINUED ON SHEET 2)

SITE QC CONCURRENCE K Hausman DATE 2/7/86 FIELD CONCURRENCE W. Rolfe for J R Elgin DATE 2-7-86

X SUGGESTED DISPOSITION ___ EXPEDITED DISPOSITION 5 JRG 2-7-86

For part numbers refer to the reference, (Anchor Darling Dwg. 2999-3 Rev. D), Sheet → of this FDDR. The following steps may be performed out of order to effect repairs.
a) IPC to confirm with Anchor Darling that the Bonnet can be repaired in conformance with Code requirements within site scheduling needs.
b) IPC to ship the valve Bonnet (part 2) to Anchor Darling for replacement of the back seat.
Cost: 8Y274 Material: IP Co. to supply (CONTINUED ON SHEET 2)
DISPOSITION NEED DATE 2/7/86 EXPEDITED DISPOSITION APPROVAL BY DATE

FINAL DISPOSITION
Same as suggested disposition.
Quality control is to verify that field work is in compliance with this FDDR.

ECA/ECN EIS FDI NO. N/R

JUSTIFICATION OF DISPOSITION DECISION (SAFETY, RELIABILITY)
Anchor/Darling has designed a recessed drop-in back seat which will be seal welded to the bonnet replacing the damaged integral backseat. The bonnet to insert weld is recessed and will be finished to permit either MT or PT acceptance inspection. Safety and reliability are not affected. The presence of an Anchor Darling representative is non-mandatory, since I.P. has accomplished this same task previously and nothing to be done is irreversible. Use of equivalent parts from the spare Black Fox valve is justified because the valves were made to equivalent purchase specification. (CONTINUED ON SHEET 3)

DESIGN VERIFICATION STATEMENT
Rev. 1 Verified based on submitted data as reviewed by C. T. Nieh.
Rev. 2 Verified based on independent review of the disposition described in Rev. 1.
(CONTINUED ON SHEET 3)
VERIFIED BY L. I. Moore DATE 2-7-86

APPROVALS	DATE
K Hausman	2/7/86
QUALITY N/R	
MATL APPL ENGR N/R	
LEAD SYSTEM ENGR Peter Kokolis for F.F. Smith	2/7/86
ENGRG MANAGER J R Elgin for ~~G. L. Moore~~ J. T. Cochran	2/7/86
RESPONSIBLE ENGR W. Rolfe	2-7-86
PROJECT MANAGER	

DRF NO. IF APPLICABLE: N/R

APPROVALS	DATE

DISTRIBUTION CODE

INTERNAL	EXTERNAL

THIS EQUIPMENT IS SAFETY RELATED
YES X NO ___
SAFETY FUNCTION IS AFFECTED
YES ___ NO X

COMPLETION RECORD REQUIRED BY R.E.: YES ___ NO X
SUPPLIER ACTION REQUIRED: YES ___ NO X

FIELD WORK ORDER NO.

DISPOSITION COMPLETE DATE

SITE QUALITY CONTROL FIELD MANAGER

GENERAL ELECTRIC FIELD DEVIATION DISPOSITION REQUEST

FDDR NO. LH1-5503 Rev. 3 SHEET 2 OF 7
PROJECT Clinton I DATE 2/7/86

EXPEDITED APPROVAL

EQUIPMENT (DESCRIPTION AND/OR MPL) E22-F011

DEVIATION DESCRIPTION: (CONTINUED FROM SHEET 1)

b) The stem is galled for a length of approximately 1 1/2 inches below the back seat bevel surface.
c) Field stem hardness measurements of RC 372, Brinell 333 exceed the desired maximum value of Brinell 300.
d) The disc separated from the stem and the stem retaining rings are lost.
e) There are scratch marks on the body disc guide surfaces.

(Rev. 1)
Review and approval is requested of Anchor/Darling Drawing 2999-3 Rev. (J) for application to Clinton valve E22-F011.
(Rev. 2)
I.P. Co. has requested that the Anchor Darling Valve Company representative presence be made non-mandatory.
(Rev. 3)
a) I.P. Co. has requested approval to use packing gland parts and stem clamp parts from the spare "Black Fox" valve, and to install new disc and disc nut.
b) Actual hardness test data of the new valve stem supplied by I.P. Co. is documented on sheet 4 of this FDDR. Hardness exceeds Brinell 300 in some places.

SUGGESTED DISPOSITION: (CONTINUED FROM SHEET 1)

Replacement by use of a seal welded insert is acceptable if Code requirements are maintained.
c) Replace the valve stem (part 5) with a stem having a Brinell hardness less than 300. (IP Co. to supply)
d) Provide replacement Retaining Ring stem (part 63) (IP Co. to supply)
e) Provide replacement valve stem packings parts 16 and 16A (IP Co. to supply)
f) Provide replacement gasket (part 18). (IP Co. to supply)
g) The following items from the spare "Black Fox:" valve are approved for incorporation in the reassembly of E22-F011; stem clamp (Part 25), as modified by FDDR LH1-5570 Rev. 0, gland flange (Part 30), gland (Part 7), gland nuts (part 22), gland bolts (part 21), two keys (stem clamp) (part 25a), and set screws (part 17)
h) Anchor-Darling to provide a Code Package update for the repairs which will maintain the code status of the repaired valve. When performing steps h, i, and j seek the guidance of the Anchor Darling Field representative as his availability permits.
i) Refurbish the valve body disc guides to blend scratch marks.
j) Check the disc seat mating surface and refinish if required in accordance with sheets 4-2 and 4-3 of VPF 3238-682-2.
k) Accept the IP Co. - supplied stem as-is. Reassemble the valve using IP Co. supplied disc (Part 4), disc nut (Part 64), and parts from item b, c, d, e, f and g above. Perform reassembly per VPF 3238-682-2 sheets 5-4 and 5-5.

GENERAL ELECTRIC FIELD DEVIATION DISPOSITION REQUEST

FDDR NO. LH1-5503 Rev. 3 SHEET 3 OF 7
PROJECT Clinton I DATE 2/7/86

EXPEDITED APPROVAL

EQUIPMENT (DESCRIPTION AND/OR MPL) E22-F011

SUGGESTED DISPOSITION: (CONTINUED FROM SHEET 2)

1) Reset limit switches and manually operate the valve to assure that they are properly set. CAUTION: Operation of the valve by means of the motor, without having the switches properly set, can lead to destruction of the back seat. Under close surveillance, operate the valve of the motor operator to assure that the switches are working properly.

m) Check bonnet and seat leakage, correct any observed leaks.

n) Assembly code data package to substantiate acceptability of valve repairs.

Anchor/Darling Drawing 2999-3 Rev. (J) depicting a modified bonnet to accept a drop in back seat is approved for valve E22-F011 at Clinton Station, Sheet 6 of this FDDR.

General Electric to incorporate Anchor/Darling Drawing 2999-3 Rev. (J) into the vendor print file for valve E22-F011 at Clinton Station.

JUSTIFICATION: (CONTINUED FROM SHEET 1)

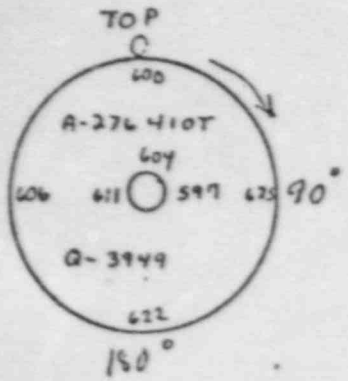
The water-wetted surfaces of the IP Co. - supplied valve stem have hardness less than or just slightly above Brinell 300; this indicates an acceptable condition of heat treat of the stem in the area of concern.

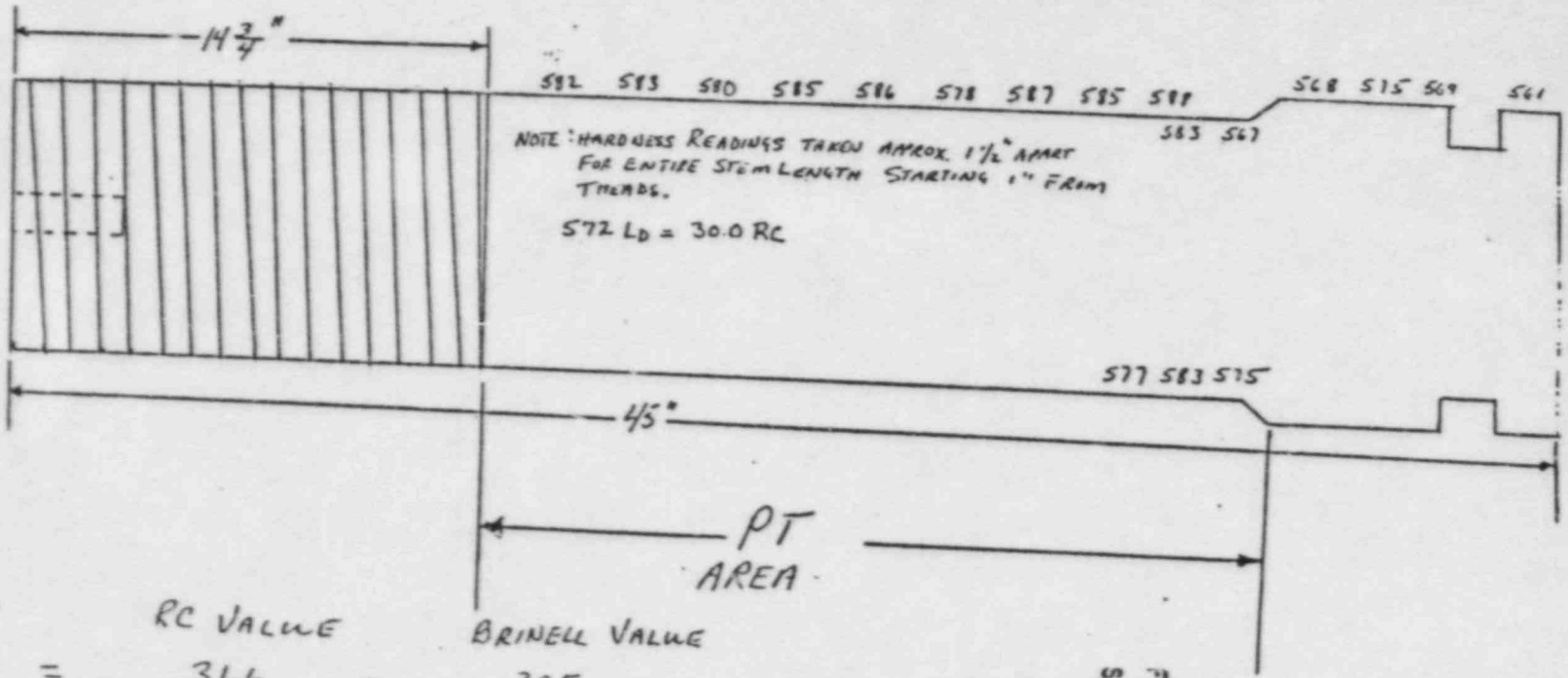
DESIGN VERIFICATION STATEMENT (CONTINUED FROM SHEET 1)

Rev. 3 Verified by review of data submitted by IP Co. (Sheet 4) and by comparison of parts descriptions of VPF 3238-682-2, Fig. 4, with the descriptions of the replacement parts from the Black Fox valve drawing. o ZLM (2-7-86)
The disposition restores the valve to the condition intended by the original design.

VERIFIED BY G.L. Moore Date 2/7/86

STEM C-19868 P.O.# X-27375-



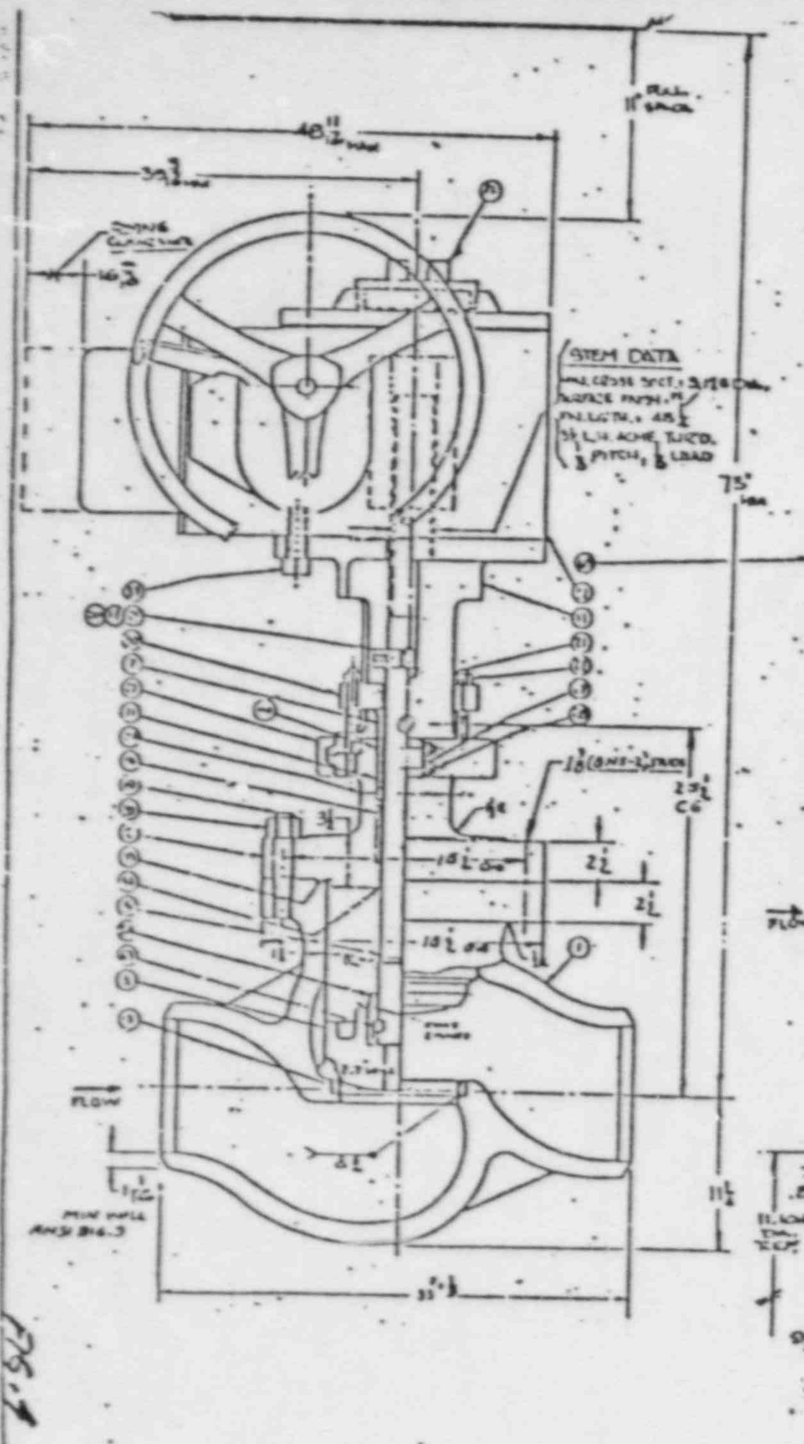


LD VALUE		RC VALUE		BRINELL VALUE
582	=	31.6	=	305
580	=	31.3	=	302
586	=	32.1	=	309
588	=	32.4	=	312
568	=	29.7	=	289
604	=	34.8	=	331
600	=	34.2	=	326
625	=	37.7	=	357
622	=	37.3	=	353

FDDR No. LHI-5503, Rev 3
SHEET 4 OF 7

ATTACHMENT 5C
PAGE 24 OF 27
IR # 01734
DATE 2-4-86

Page 2 of 2



1. DESIGN & MANUFACTURE IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE, SECTION III, CLASS 2, WINTER 1973 ADDENDA WITH CODE CASE 1628.
2. HYDROSTATIC TESTS:
   (A) SHELL TEST PRESSURE 3,600 PSIG
   (B) SEAT TEST PRESSURE [illegible] PSIG
3. ESTIMATED VALVE WT: 2150# | FACT WGT WITH MOTOR OPERATOR: 3260# 5-4-10
4. MAXIMUM TORQUE VALUE RECOMMENDED FOR ITEMS 19 & 20: 1200 FT-LBS

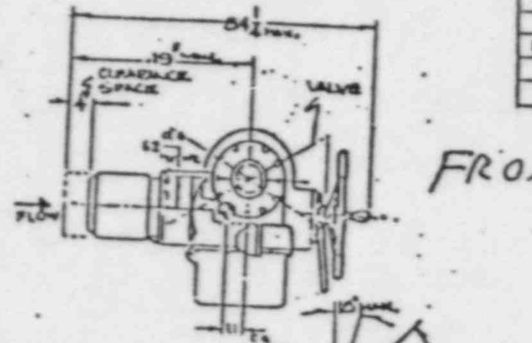
Anchor/Darling Valve Company

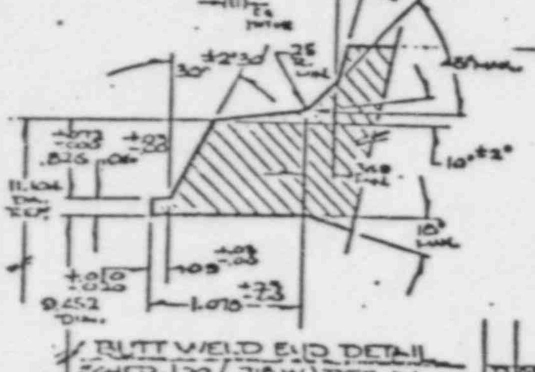
SIZE	10	BODY	WCB
RATING	1410	STEM	[illegible]
TEMP°F	700	DISC	[illegible]
SERIAL		SEAT	[illegible]
HYDRO	3120 PSIG	DWG.	2999-3
VALVE ID	[illegible]		

QTY	MANUF. DWG. NO.	PC NO.	DESCRIPTION	MATERIAL	MAT'L SPEC
1	5287-2-5	1	BODY	CAST STL	SA216 WCB
1	5287-2-5	2	BONNET	CAST STL	SA216 WCB
(1) 1	5287-2-5	4	DISC (STELL. FACED)	CAST STL	SA216 WCB
1	5287-2-2	5	STEM [illegible]	[illegible]	A479 [illegible]
1	7-312-1	7	GLAND	[illegible]	[illegible]
1	5287-2-3	11	YOKE	CAST STL	A216 WCB
(1) 2	13-10P-3P	15	SEAT RING	[illegible]	[illegible]
7		16	PACKING (LOWER)	[illegible]	[illegible]
6		16	PACKING (UPPER)	[illegible]	[illegible]
1		17	[illegible]	ALLOY STL	[illegible]
1		18	GASKET	[illegible]	[illegible]
12		19	STUD (BONN.)	ALLOY STL	SA193 B7
12		20	NUT (BONN.)	STEEL	SA194 2H
2		21	GLAND BOLT	ALLOY STL	SA193 B7
2		22	NUT (GLAND BOLT)	STEEL	SA194 2H
1	5287-2-2	23	STEM CLAMP	STL	A36
1	5287-2-3	27	YOKE CLAMP	STL	A36
4		28	STUD (YOKE CLP)	ALLOY STL	A193 B7
8		29	NUT (YOKE CLP)	STEEL	A194 2H
1	20-750-2	30	GLAND FLG.	STL	[illegible]
1		[illegible]	MOTOR OPERATOR	[illegible]	[illegible]
8		[illegible]	CAPSCREWS (MOT. OP)	ALLOY STL	[illegible]
(1) 1	5287-2-5	[illegible]	BACKSEAT (BUTTON)	STELLITE	
2		[illegible]	KEY (STEM CLP)	STEEL	[illegible]
1	5287-2-2	63	RETAIN. RING (STEM)	STAIN. STL	A276 [illegible]
1	5287-2-2	64	DISC NUT	STAIN. STL	A276 [illegible]
1		65	NAMEPLATE	STAIN. STL	[illegible]
1		52	PLUG ([illegible])	[illegible]	[illegible]
1	71-312-2	71	LANTERN RING	STAIN. STL	A276 [illegible]
1	5287-2-1	94	PIPE PLUG	[illegible]	A105

§ PRESSURE CONTAINING PARTS
(1) CHEM. RANGE Co Cr A

FROM:





BUTT WELD END DETAIL
SCHED. 120 (.718 W.) PIPE IN ACCORDANCE WITH GENERAL ELECTRIC DWG. [illegible]

LH1-5503 Rev. 3
15 OF 27

Certified by [illegible]
Date 8-7-75

GENERAL ELECTRIC CO.

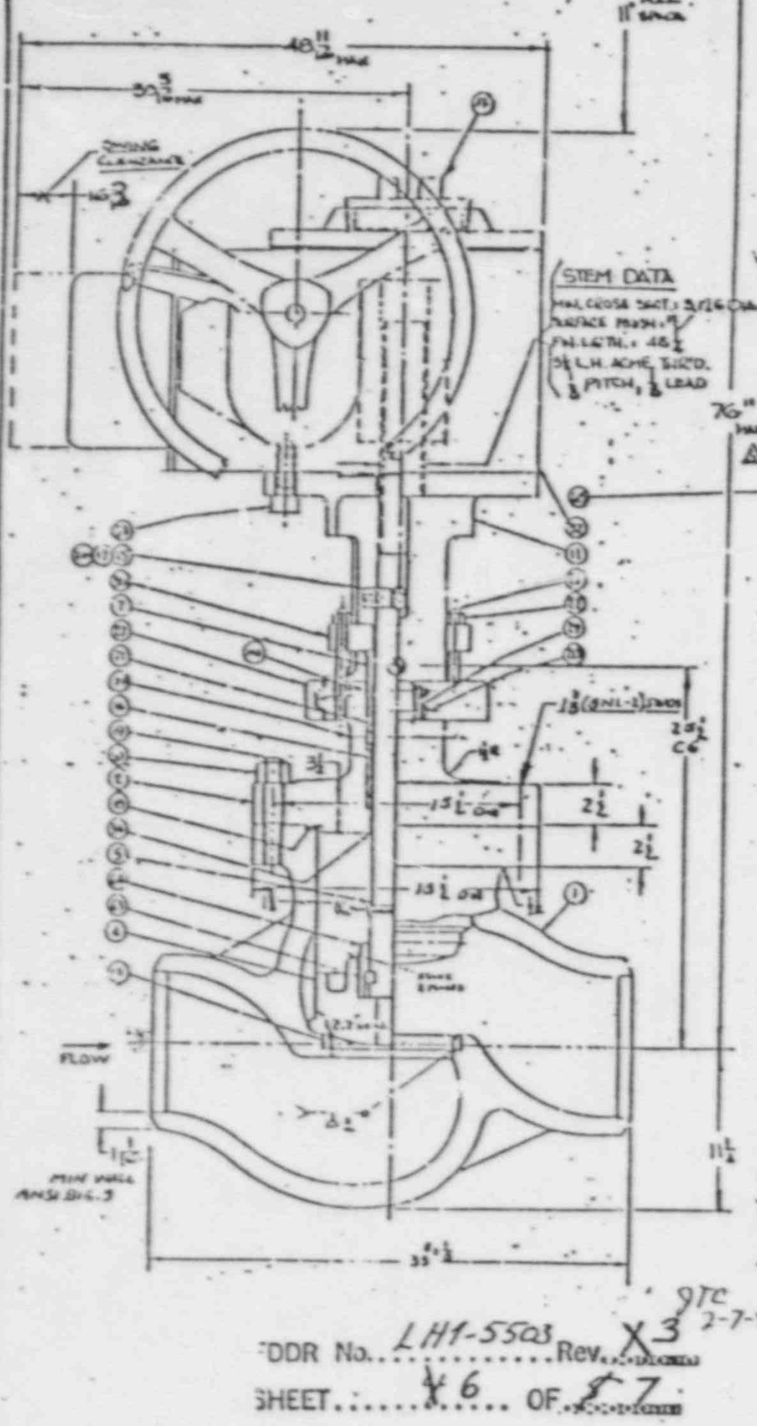
ANCHOR/DARLING VALVE COMPANY
HAYWARD, CALIFORNIA

10" 900# GLOBE (S.C.) B.B., B.S., B.W. ENDS, CAST CARB. STL, STELL TRIM, SMB-4 MOTOR OPER.

2999-3 D

FIG. 1

ATTACHMENT 5C
PAGE 26 OF 27



CLASS 2, WINTER 1973 ADDENDA WITH CODE CASE 1632.

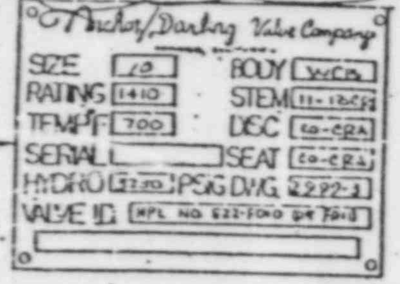
2. HYDROSTATIC TESTS:
(A) SHELL TEST PRESSURE 2300 PSIG
(B) SEAT TEST PRESSURE 1575 PSIG

3. ESTIMATED VALVE WT - 2100# | EST WET WT. W/MOTOR OPERATOR: 5260# . 5410#

4. MAXIMUM TORQUE VALUE RECOMMENDED FOR ITEMS 19 & 20: 1200 FT-LBS

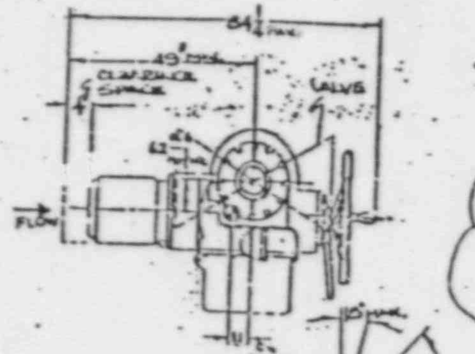
5. REPLACEMENT MOTORS ARE CLASS 1E WITH RH INSULATION FURNISHED VIA A/DV SO. E6214-300 (CLINTON ONLY).

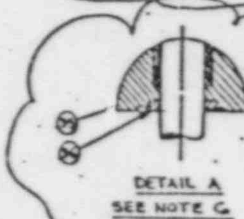
6. BONNET (ITEM 55) MODIFIED TO ACCEPT DROP-IN BACKSEAT (ITEM 56) ONLY ON VALVE NO. E22-F011 (CLINTON STATION) VIA A/DV S.O. RG746-1 (REF DETAIL A).

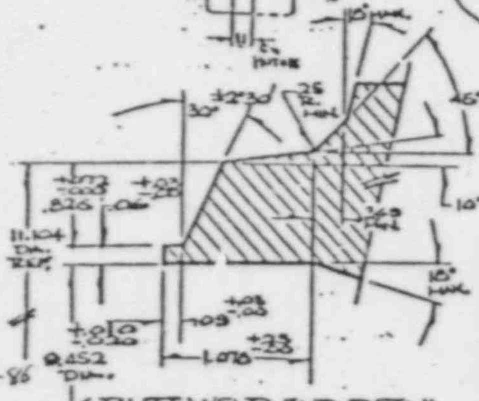


	1	5287-2-5	⊗2	BONNET	CAST STL.	SA216 WCB
(1)	1	5287-2-5	⊗4	DISC (STELL. FACED)	CAST STL.	SA216 WCB
	1	5287-2-2	5	STEM	STAIN. STL.	A479 TY 410
	1	7-312-1	7	GLAND (CAM A)	STAIN. STL.	A479 TY 410
	1	5287-2-3	11	YOKE	CAST STL.	A216 WCB
(1)	2	13404-3P	13	SEAT RING	STL.	[illegible]
	7		16L	PACKING (LOWER)	[illegible]	[illegible]
	6		16U	PACKING (UPPER)	[illegible]	[illegible]
	1	—	17	SET SCREW	ALLOY STL.	AISI 4140
	1		19	GASKET	[illegible]	[illegible]
	12		⊗19	STUD (BONN.)	ALLOY STL.	SA193 B7
	12		⊗20	NUT (BONN.)	STEEL	SA194 2H
	2		21	GLAND BOLT	ALLOY STL.	SA193 B7
	2		22	NUT (GLAND BOLT)	STEEL	SA194 2H
	1	5287-2-2	25	STEM CLAMP	STL. PL.	A36
	1	5287-2-3	27	YOKE CLAMP	STL. PL.	A36
	4		28	STUD (YOKE CLIP)	ALLOY STL.	A193 B7
	8		29	NUT (YOKE CLIP)	STEEL	A194 2H
	1	30-750-2	30	GLAND FLG	STL. PL.	[illegible]
	1		52	MOTOR OPERATOR	[illegible]	[illegible]
	8		53	CAPSCREWS (MOT. OP.)	ALLOY STL.	AISI 4140
(1)	1	5287-2-5	54	BACKSEAT (INTEGRAL)	STELLITE	
	2		55	KEY (STEM CLIP)	STEEL	[illegible]
	1	5287-2-2	63	RETAINING RING (STEM)	STAIN. STL.	A276 TY 410
	1	5287-2-2	64	DISC NUT	STAIN. STL.	A276 TY 410
	1		65	NAMEPLATE	STAIN. STL.	[illegible]
	1		52	PLUG (STEM PROTECTOR)	[illegible]	"WALWORTH"
	1	71-312-2	71	LANTERN RING	STAIN. STL.	A276 TY 410
	1	2287-2-1	74	PIPE PLUG	[illegible]	[illegible]
	1	D12417	55	BONNET (ALTERED)	CAST STL.	SA216 WCB
	1	C30234	56	BACKSEAT (STELL FACED)	FORG. STL.	SA105

⊗ PRESSURE CONTAINING PARTS
(1) DICK RANGE Co-Cr-A







BUTT WELD END DETAIL
SCHED. 100 (.719 W) PIPE IN ACCORDANCE WITH GENERAL ELECTRIC DWG. 181C6462, PG 2

Distribution of this print and classified ... VALVE CO.
Certified by: [signature] 6/23/77

TO:

J	ADDED NOTE 6, DETAIL A, ITEMS NO. 55 & 56 ADDED (CLINTON ONLY) TO NOTE 5		
H	ADDED NOTE 5		
G	REVISED - 73" WAS CHANGED TO 76" MAX		
F	ITEM 13 ADD SA351-W		
E	ITEM 20 (ADD) GR7		
D	[illegible]		
C	[illegible]		
B	CUST. COMMENTS		
A	CHANGE PER CUSTOMER'S COMM.		
LTR	REVISION		

GENERAL ELECTRIC CO.

ANCHOR/DARLING VALVE COMPANY
HAYWARD, CALIFORNIA

10" 900# GLOBE (STOP) B.B., R.S. BW. ENDS, CAST CARB. STL., STEEL TRIM, SMB-4 MOTOR OPER

DRAWN BY: EW | CHECKED BY: [illegible] | APPROVED: [illegible]

2999-3 | REV. J

DDR No. LH1-5503 Rev. X 3 (9TC 2-7-86)
SHEET X 6 OF 8 7

OT 5%

GENERAL ELECTRIC
FIELD DEVIATION DISPOSITION
AFFECTED DOCUMENTS LIST

@ = Documents Transmitted to Document Control Center
* = Documents Transferred to S&L for Maintenance

SCHEDULE COMMITMENTS TO MEET ESTABLISHED SOP CYCLE DATES

FDDR No. LH1-5503
Revision 3
Sheet 7 of 7
Job No. 8Y27~~4~~ JRL
WPSS ACTIVITY TYPE R 2-7-84

DOCUMENT ID NO.	DOCUMENT TITLE/TYPE	MPL ITEM NO.	RESP COMP	RESP ENG'R	UPDATE WITH FDDR ISSUE YES	UPDATE WITH FDDR ISSUE NO
VPF 3238-682-2 Fig. 4	Anchor Darling Dwg. 2999-3	E22-F011	753	CN		X