Public Service
Electric and Gas
Company

Corbin A. McNeill, Jr.
Vice President
Nuclear

Public Service Electric and Gas Company P.O. Box 236, Hancocks Bridge, NJ 08038 609 339-4800

January 7, 1986

Director of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, Maryland 20814

Attention: Ms. Elinor Adensam, Director
Project Directorate 3
Division of BWR Licensing

Dear Ms. Adensam:

ENVIRONMENTAL QUALIFICATION PROGRAM
HOPE CREEK GENERATING STATION
DOCKET NO. 50-354

This letter provides responses to NRC Equipment Qualification audit open items, and follow-up questions as discussed with Mr. D. Wagner and Mr. H. Garg on December 10, 1985.

1. Completion of the mechanical equipment qualification program - The mechanical equipment qualification program as described in the FSAR, is now complete. Attached is supporting identification documents for non-metallic materials for RCIC turbine (Attachment 1) and E-System snubbers (Attachment 2).

2. Examine audit findings for applicability to other files - A comprehensive review has been completed of all Equipment Environmental Summary (EES) sheets to verify the correctness of room and tag numbers listed. All purchase orders have also been reviewed to address the affect of using maximum normal service temperature instead of average normal temperature. Changes identified during this review have been factored into the applicable qualification files and did not affect the qualified status of the equipment.

3. Correction of hardware discrepancies - The NRC requested confirmation that the minor hardware discrepancies identified during the July audit were corrected.

A045
1/1

A0D. EB (L[AW)

The missing tag on SLC explosive valves 008 & 009 has been replaced. The tag for sensor BD-LSH-4151-1 has been replaced, and the missing bolt on Rotork valve operator BC-HCV-F048A has also been replaced.

4. Field inspection and verification - The NRC requested confirmation that the field inspection of a representative sample of the Class 1E components was complete. The field inspection was committed to during the July 18, 1985, EQ audit and was identified as Action Item No. 8. Prior to initiating the inspection, a review was completed of all issued Equipment Environmental Summary Sheets (EESS) to confirm that tag and room number were consistent with their design documents. Minor inconsistencies were corrected by PSE&G.

   Field verification was initiated on October 25, 1985, in accordance with Attachment No. 3, Equipment Qualification Inspection Plan, approved on October 25, 1985. The inspection plan identifies the scope and method for the verification which required a checklist for each of the sixty (60) components inspected. A list of the components inspected is included with the plan.

   All components, except one transmitter, were verified to be consistent with the qualification documents. The inspection found that a Rosemount 1152 transmitter was installed in place of the proper 1151 transmitter. Rosemount 1151 transmitters are only used for passive applications (pressure boundary and/or alarm/annuciation application). As a result of this finding, PSE&G inspected all other 1151 transmitters listed on the program and identified one other 1152 transmitter installed in place of a 1151 transmitter. During 1984, and early 1985, all Rosemount 1151 and 1152 transmitters with an active safety related application were replaced with Rosemount 1153 transmitters. Those transmitters with no active application were specified to remain as 1151s. In discussions with General Electric following these findings, GE acknowledged that a document discrepancy between the local panel device list and the elementary device list exists. GE has taken the following action as a result: the two (2) 1152 transmitters will be replaced with qualified 1151 transmitters and GE will perform a physical review of all Rosemount transmitters supplied by them to confirm the equipment matches their design documents. This review will be completed by January 10, 1986.

With the exception of the components noted above, all other components were found to be installed in conformity with their respective qualification documents.

5. Confirm that maximum normal service temperature in lieu of average temperature has been factored into program - The NRC requested confirmation that maximum normal service temperature instead of average temperature was factored into the qualification program. We have reviewed all purchase orders where average normal temperature was used as the basis for qualification. Where qualified life has been affected, we have revised the applicable documents to reflect this change. This information will also be included in the maintenance program in accordance with the existing procedure for equipment qualification maintenance and surveillance requirements. The only exception is Purchase Order M-48 (Primary Containment Instrument Gas Compressor) which will require the installation of a temperature recorder to monitor temperatures where two control panels are located.

6. Confirm that Class 1E qualification is complete - The NRC requested written confirmation when the harsh (10 CFR50.49) Class 1E environmental qualification is complete. All equipment is now qualified with the exception of several components associated with the General Atomics radiation monitoring system. The two reports covering these components have been reviewed and require resolution of our comments. We anticipate closure by January 20, 1986.

7. Instrument accuracy/Beta qualification (update EES sheets) and all comments provided by Mr. H. Garg regarding corrections, clarifications, or completion of (later) information on the Equipment Environmental Summary Sheets (EESS) are now being addressed and will be included in Revision 4 of the Equipment Qualification Summary Report. Revision 4 will be issued approximately January 31, 1986, following completion of the remaining qualification packages.

8. Maintenance and surveillance program - confirmation that all maintenance and surveillance procedures include equipment qualification requirements, and that training of technicians in the use of these procedures has been completed, will be provided prior to fuel load.

We trust this information satisfactorily resolves the remaining equipment qualification audit items. Should you have any questions in this regard, please contact us.

Sincerely,

Attachment

C D.H. Wagner
USNRC Licensing Project Manager

R.W. Borchardt
USNRC Senior Resident Inspector

H. Garg
USNRC EQ Branch

ATTACHMENT 1

RCIC TURBINE
BILL OF MATERIAL INFORMATION

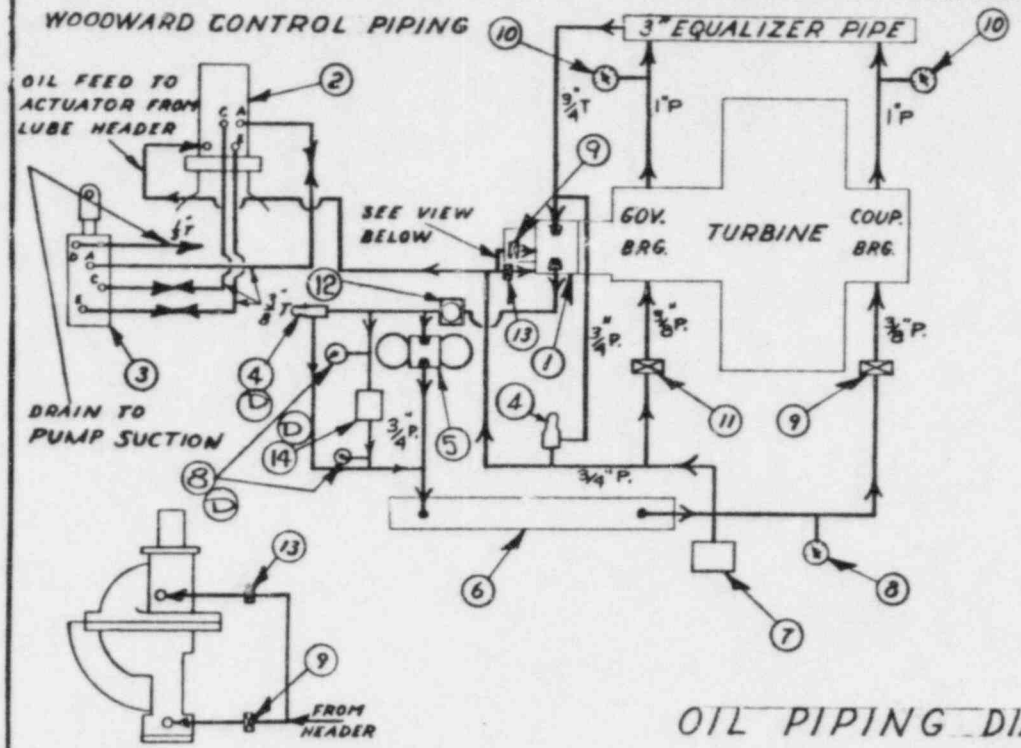
GE VPF#	TITLE-VENDOR DRAWING NO.	COMMENTS
2757-12	Turbine Oil Piping, 65976B	Lubrication Syst. Acc. List
2757-68	Turbine Section, 67062E	
2757-69	T&T Valve Assembly, 69-XE-42 T&T Valve Section, 69-XC-113 T&T Parts List, 69-S-241	Stop Valve
2757-70	Turbine Parts List, 67327A	To Be Used With VPE#2757-68
2757-118	Overspeed Trip Assembly, 65638B	
2757-128	Governor Valve Section, 67063D	
2757-129	Governor Valve Parts List, 66726A	To Be Used With VPF# 2757128
2763-308	HPCI Turbine Qual. Test Spec.	Used To Define Materials
2763-309	HPCI Turbine Qual. Plan	Used To Define Materials
3622-527	RCIC Turbine Qual. Report	Used To Define Materials
	Drawings From 2757-211	
	Tuthill Pump Co. - S1183-D	Item 43 of VPF #2757-70
	Cuno Engineering - CT.31-36	Duplex Oil Filter - Items 5 of VPF#2757-12
	Whitlock Manufacturing-Ref. #SN-8049	Oil Cooler - Item 6 of VPF#2757-12
	Ashcraft Gauge-Engineering Data	Pressure Gauge-Item 8 of VPF#2757-12
	Ashcraft Thermometer-Form #250-1089B	Dial Thermometer-Item 10 of VPF#2757-12

SL:smh

NOTES:
1. CONTROL PIPING TO BE STN. STL. TUBING WITH CARBON STEEL FITTINGS.
2. DRAIN PIPING THREADED (STL. PIPE, MAL. IRON FITTINGS, SEAMLESS STEEL TUBING WITH STL. FITTINGS)
3. PRESSURE PIPING - FLANGED & WELDED.
4. REFER TO ACCESSORY LIST FOR DETAILED DESCRIPTION OF ITEMS.
(A) 5. STL. PIPE UP TO 1½" SCH 80 — 2" OR LARGER SCH 40
(C) 6. PIPING SUPPORTS TO BE IN ACCORDANCE WITH T.S.T. SPEC. SP-18 PIPE SUPPORT GUIDELINE.

ITEM	QNTY	DESCRIPTION
1	1	MAIN OIL PUMP
2	1	WOODWARD GOV. HYDRAULIC ACT
3	1	WOODWARD SERVO
(D) 4	2	RELIEF VALVE
5	1	DUPLEX STRAINER
6	1	OIL COOLER
7	1	LOW OIL PRESSURE SWITCH -ALARM-
(D) 8	3	OIL PRESSURE GUAGE 0-30#
9	2	3/32 ORIFICE
10	2	DIAL THERMOMETERS WITH ELECTRICAL CONTACTS.
11	1	1/16 ORIFICE
12	1	SIGHT FLOW INDICATOR
13	1	#51 DRILL ORIFICE
(D) 14	1	DIFFERENTIAL PRESS. SWITCH

WOODWARD CONTROL PIPING



OIL PIPING DIAGRAM

VIEW SHOWING GOV. DRIVE GEAR AND BUSHING LUBE

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
TOLERANCE ON FRACTIONS FOR MACHINED SURFACES
0 TO 1/4 ..... ± .005
OVER 1/4 TO 24 ..... ± 1/64
OVER 24 TO 72 ..... ± 1/32
OVER 72 ..... ± 1/16
REAMED HOLE TOLERANCE .10 ± .001
INSIDE MACHINED CORNERS TO HAVE A RADIUS OF 1/64 +0 -1/32
OUT OF ROUNDNESS, ECCENTRICITY OR LONGITUDINAL TAPER TO BE WITHIN THE DIAMETRAL TOLERANCES SPECIFIED.

FILE RCIC

TYPE- GS

OIL PIPING DIAGRAM

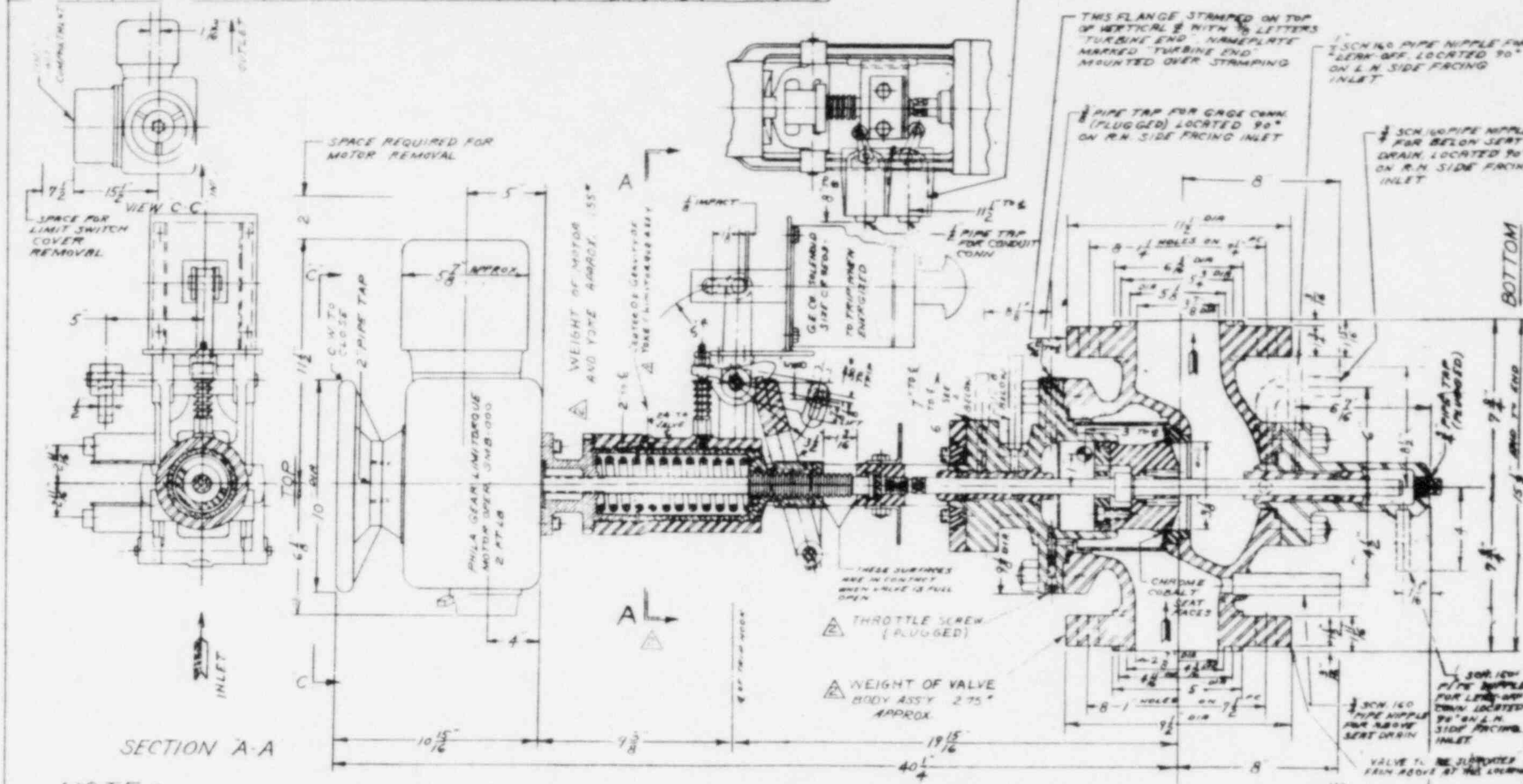
SCALE NONE DATE 8-28-69

THE TERRY STEAM TURBINE CO.
WINDSOR, CONN., U. S. A.

DRAWN Ken S.
TRACED
CHECKED
APPROVED

65976B	A	ADDED PIPE SCH. & TUBING & PIPE SIZES EJD 11-11-69	B	SIMPLIFIED VIEWS OF ITEMS "2" & 3 AND SPRAY CONN'S. PER CUST. REQ. 1-23-70	C	ADDED NOTE "6" 4-10-70 Ken S.	D	DIFF. PRESS. SWITCH ADDED (1) RELIEF VALVE (1) OIL LINES, GAUGES ADDED. KCM 8-24-70	E	SERVO DRAIN WAS TO EQUALIZER PIPE 10-22-70			65976B

DATE	QUAN	S-K FULL	S-K P.O.	CUSTOMER'S ORDER	CUSTOMER	PRESS	TEMP	MATERIAL	BODY	B-M
[illegible]	5	—	SEF63-AS-5	3697	TERRY STEAM TURBINE	1120 PSIA	557°F	CAST STEEL A216 GR WCB	69-C-122	69-264
2-[illegible]-71	3	—	[illegible]00698 V	8723	TERRY STEAM TURBINE	1120 PSIA	557°F	CAST STEEL A216 GR WCB	70-C-109	70-241
11-[illegible]-71	6	—	M7100766-V	55002	TERRY STEAM TURBINE	1120 PSIA		CAST STEEL A216 GR WCB	71-C-49	71-128



NOTE:
THREADS ON DRAINS AND LEAK-OFFS NOT TO BE CUT OFF. THEY WILL BE USED BY TERRY FOR THEIR TEST AND CUT OFF IN FIELD

NOTE:
ASSEMBLE AS PER SECTION "A-A"

"A" - 1/2" SCH 160 PIPE NIPPLE FOR LEAK-OFF CONN LOCATED 90° ON L.H. SIDE FACING INLET
"B" - 1/2" SCH 160 PIPE NIPPLE FOR LEAK-OFF CONN.

INSTRUCTIONS - 70-S-252
PARTS LIST - 69-XC-113
IDENTITY LIST - 69-S-261

COMPLETE WEIGHT 430# APPROX

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES BOLT HOLES STRADDLE ℄

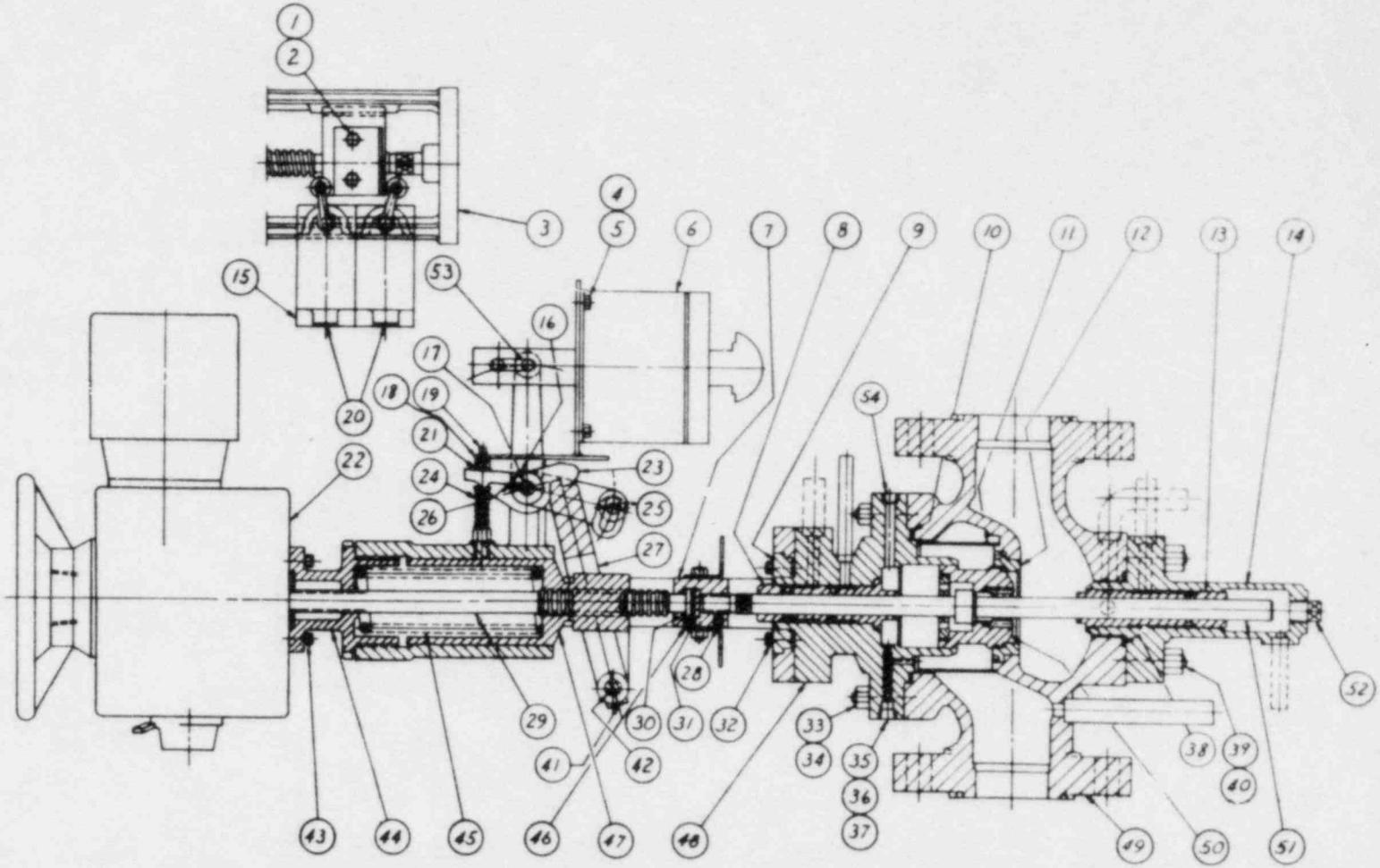
CERTIFIED FOR TERRY STEAM TURBINE
ORDER NO. 55002
S-K ORDER NO. M7100766-V
DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED FOR A SPECIFIC ORDER

ASSEMBLY DRAWING
3 X 4 TOP MECH. THR. TRIP VALVE
3" INLET & 4" OUTLET
USA '68 STD FLGS & DRLG FOR 900# W.S.P.

8990
69-264
M6901239V
70-13-69
NTS
69-XE-41

SCHUTTE & KOERTING CO.
MANUFACTURING ENGINEERS
CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

69-XE-42 | 2



FOR PARTS IDENTITY
SEE DWG 69-5-241

PIECE LIST
OF
3" TOP MECH. THR. TRIP VALVE

SCHUTTE & KOERTING CO

69-XC-113

IDENTITY LIST FOR
3" TOP MECH. THROTTLE TRIP VALVE

Part No.	Description	Part No.	Description
1	Capscrews	28	Hdl. Capscrew
2	Hex Nuts	29	Screw Spindle
3	Yoke	30	Split Washer
4	Capscrews	31	Friction Washer
5	Hex Nuts	32	Soc. Hd. Capscrew
6	Solenoid Assembly	33	Studs
7	Half Coupling (Two)	34	Hex Nuts
8	Leak Off Bushing	35	Flat Setscrew
9	Yoke Flange	36	Hollow Lockscrew
10	Flexitallic Gasket	37	Soc. Pipe Plug
11	Strainer Basket	38	Flexitallic Gasket
12	Seat	39	Studs
13	Leak Off Bushing	40	Hex Nuts
14	Bottom Stuffing Box	41	Hdl. Setscrew
15	Switch Mounting Plate	42	Latching Pin
16	Soc. Hdl. setscrew(cone point)	43	Soc. Hd. Capscrews
17	Trip Hook Pin	44	Yoke Nut
18	Hex Nuts	45	Compression Spring
19	Spring Pin	46	Alemite Fitting
20	Switch Assembly	47	Sliding Nut
21	Washers	48	Cover with Cylinder
22	Limitorque Motor Operator	49	Body
23	Trip Hook	50	Disc
24	Compression Spring	51	Pilot Valve with Stem
25	Radius Lever	52	Std. Pipe Plug
26	Hdl. Setscrew	53	Link Pin/Cotters
27	Latching up Lever	54	Std. Pipe Plug

Microfilmed
6 197

ckb

	IDENTITY LIST FOR 3" TOP MECH. THROTTLE TRIP VALVE	SCHUTTE & KOERTING CO. MANUFACTURING ENGINEERS CORNWELLS HEIGHTS BUCKS COUNTY, PA.
12-9-69	PARTS LIST 69-XC-113	69-S-241

PARTS LIST - 67327A

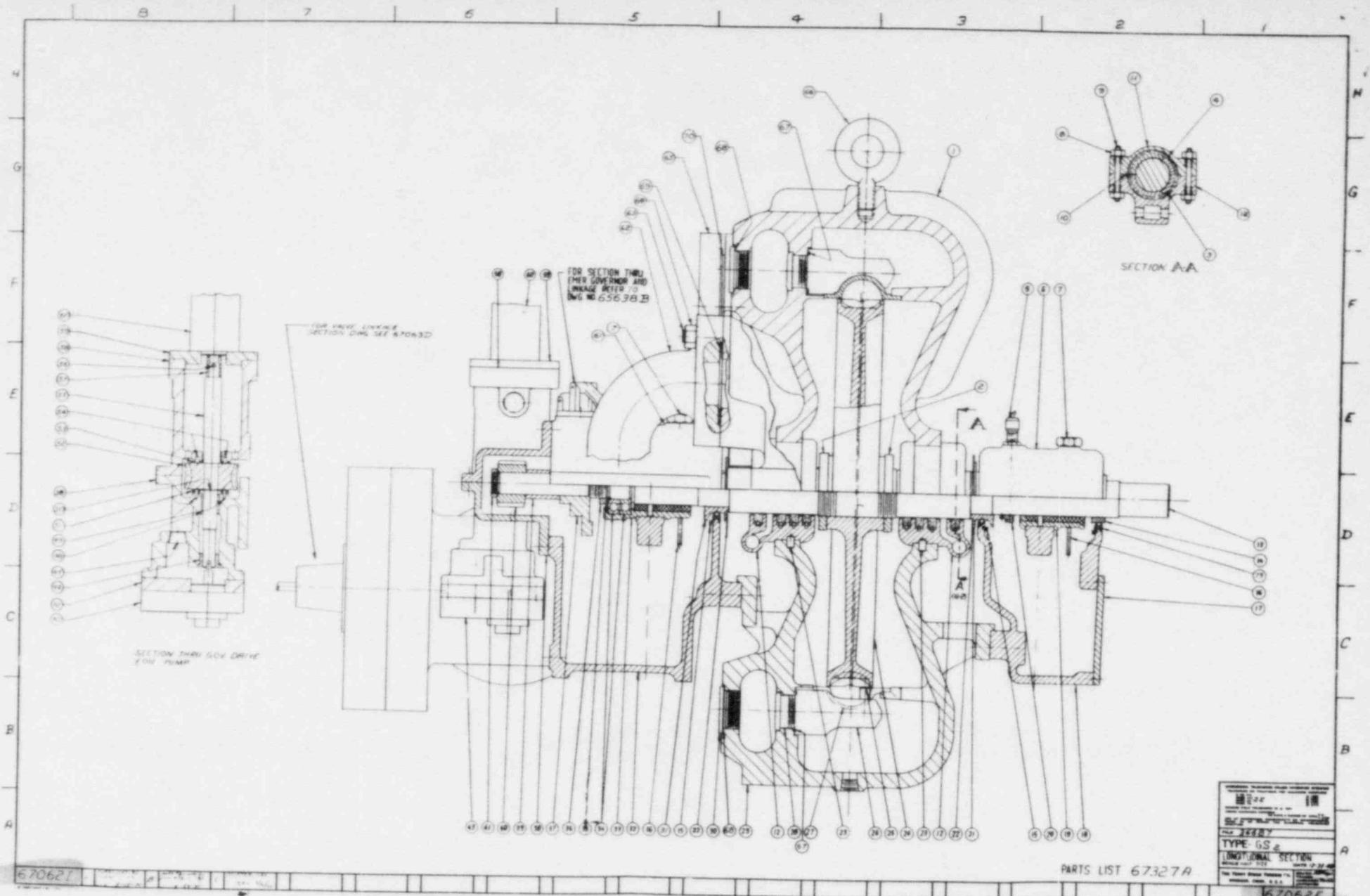
Reference Dwg. 67062E

Type GS-2 Longitudinal Section

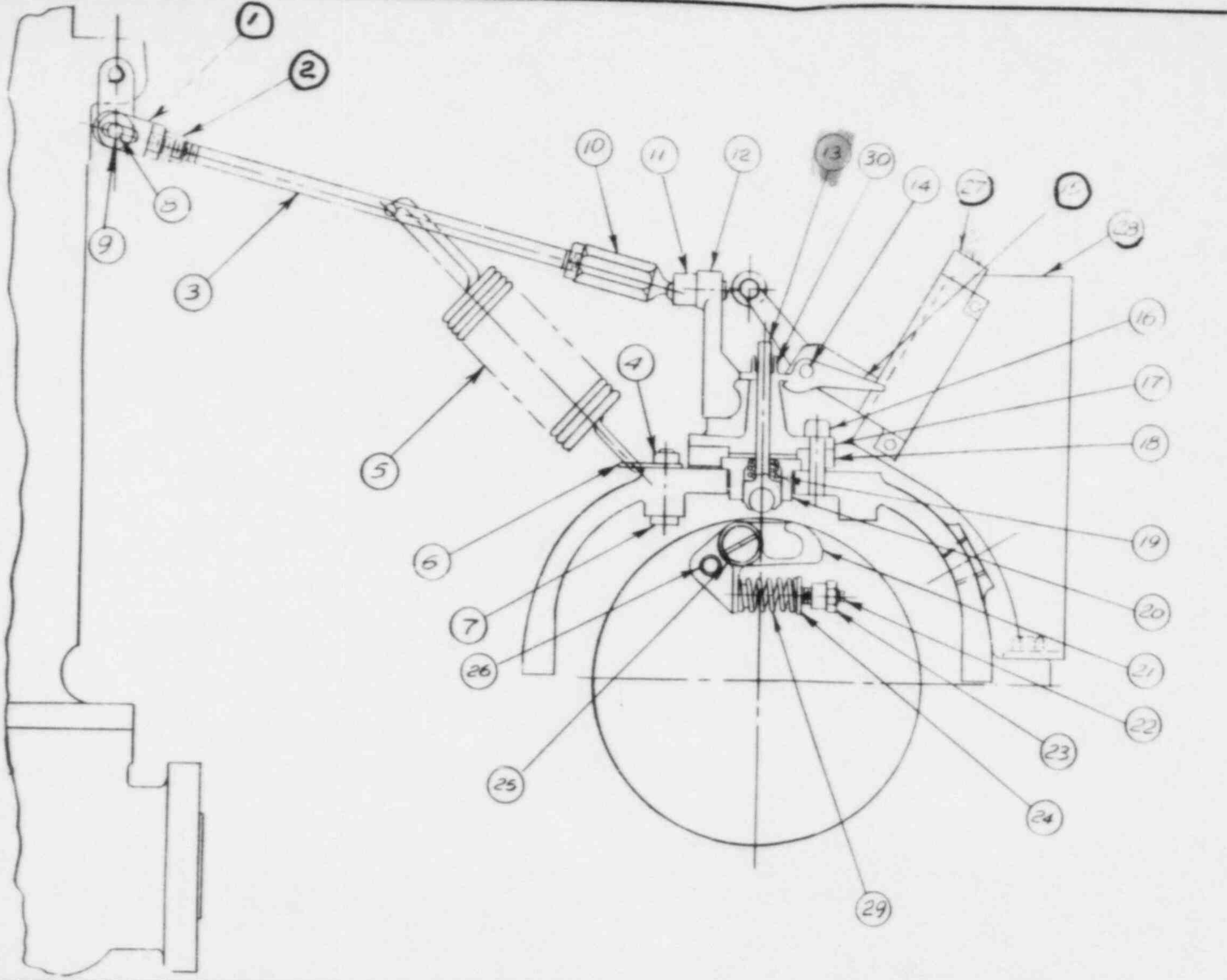
Part No.	Name of Parts	Piece No.	Dwg. No.
1	Case - U.H.-T.S.T. Co. Spec 01-69	59917	E-4941
2	Shaft Nut	4318	A-811
3	Packing Ring - carbon	6894	A-1618
4	Packing Ring Spring - inconel	26838	A-966X
5	Electromagnetic Pick Up Airpax #11-0003	-	Std.
6	Bearing Pedestal Cap	57872	B-12313
7	Inspection Plug	22185	A-8822
8	Hex Nut - 3/8"	-	Std.
9	Studs Bolts	7018	A-1644
10	Packing Ring Stop	12887	F-1881
11	Gland Case - upper half	28701	C-3245
12	Gland Case - lower half	28702	C-3245
13	Shaft - alloy steel T.X.T. Spec 15-69	65678C	65678C
14	Oil Deflector	10618	F-903
15	Dust Collar	46337	A-8692
16	Oil Ring	56394	A-10489
17	Oil Well Cover	11679	A-2528
18	Bearing Pedestal-cast iron, ASTM-A-48, Class 30	33911	D-3326
19	Bearing-cast iron & babbitt ASTM-A-48 babbitt-ASTM-B-23-46T, grade 15	47551, 47552	C-8212
20	Pick-Up Gear	46927	A-8807
21	Thrust Collar	46372	A-8703
22	Oil Deflector	46344	A-8694
23	Pin	3834	F-240
24	Wheel-SAE-alloy st. T.S.T. Spec 17-69	65680B	65680B
25	Steam Jet	49737	A-9369
26	Steam Jet Body	57862	B-12310
27	Rev. Chamber	56578	A-6870
28	Jet Body Holder	57865	A-10745
29	Case-L.H.-T.S.T. CO. Spec 01-69	67594	E-4956
30	Jet Plug	57864	A-10744
31	Thrust Collar	46372	A-8703
32	Bearing Pedestal-Gov. End - C.I. ASTM-A-48, Class #30	56422	D-5946
33	Governor Bearing-cast iron & babbitt ASTM-A-48 Babbitt ASTM-B-23-46T, grade 15	31204, 31203	C-4782
34	N.D. Bearing - Q 30208 DFL #3666	-	Std.
35	Lockwasher W-08	-	Std.

PARTS LIST - 67327A (Continued)

Part No.	Name of Parts	Piece No.	Dwg. No.
36	Locknut N-08	-	Std.
37	Emerg. Governor Disc	29592	B-6102
38	Pump Bracket	58143	C-10718
39	Gear Space Collar	43193	A-7983
40	Pump Driving Gear - driver	46471	A-8717
41	Gear Nut	4339	A-822
42	Oil Pump Cover	46738	B-10087
43	Tuthill Pump Model ORFD-1	— Attached —	Std.
44	Lower Shaft Bushing	16064	F-3088
45	1" Pipe Plug	-	Std.
46			
47			
48	Upper Shaft Bushing	17569	F-3692
49	Lower Thrust Washer Dowel	10386	F-813
50	NAS-51 Truarc Retainer Ring	-	Std.
51	Lower Thrust Washer	41601	A-7705
52	Pump Driving Gear - driven	46472	A-8717
53	Upper Thrust Washer	38909	A-7259
54	Upper Thrust Washer Dowel	16632	F-3223
55	Oil Pump Shaft-driving	57851	B-12308
56	Coupling Pin 18 x 1-$\frac{1}{2}$"	-	-
57	Coupling	51353	A-9636
58	Pump Bracket Cap	46757	C-8014
59	Wood	57860	B-12309
60	Woodward Governor - Type EGR	-	Std.
61	Governor End-Bearing Pedestal Cap	16086	D-5946
62	By-Pass ASTM:A216, WCB	66494B	66494B
63	Stud	30319	A-891X
64	Nut 7/8-9	-	Std.
65	Blank Flange - Ladish #64	-	Std.
66	Eye Bolt	21662	A-942X
67	Body Gasket R 4 - 9F	-	Std.
68	Jet Plug Gasket - stn. stl.	67974	A-933X
69	Flexitallic Gasket #RI - 9J	-	Std.
70	Flexitallic Gasket #CG - 6K	-	Std.
71			
72	Jet Dummy (not shown)	67889B	67889B
73	Dust Collar	3322	A-577
74	Electromagnetic Pickup Woodward #1680-622. Not shown on cross-section drawing location is in same plane as Part No. 5.		


SECTION A-A
SECTION THRU GOV DRIVE FOR PUMP
FOR SECTION THRU OTHER GOVERNOR AND LINKAGE REFER TO DWG NO 65638B
FOR VALVE LINKAGE SECTION DWG SEE 67063D
A
A
TYPE GS-2
LONGITUDINAL SECTION
670621
670622
PARTS LIST 67327A

65638 B



65638 B

No.	NAME OF PARTS
1	ROD END
2	3/8 NUT
3	EMERG. CONN. ROD
4	3/8 NUT
5	SPRING
6	EMERG SPRING HOLDER
7	3/8 HEX HEAD BOLT
8	ROD END PIN
9	ROD END WASHER
10	BALL ROD END
11	BALL SOCKET
12	EMERG HEAD LEVER
13	TAPPET & BALL
14	TRIP LEVER PIN
15	TRIP LEVER
16	5/16 x 1" CAP SCR. SOC. HEAD
17	HEAD BRACKET
18	SPACE COLLAR
19	COMP. SPRING
20	EMERG. TAPPET GUIDE
21	EMERG. GOV. WEIGHT
22	EMERG. SPRING ADJ. STUD
23	JAM NUT
24	EMERG. SPRING SEAT
25	EMERG. GOV. WEIGHT SCREW
26	EMERG. GOV. WEIGHT STOP PIN
27	MICRO SWITCH
28	BRACKET
29	EMERG. WEIGHT SPRING
30	EMERG. TAPPET NUT

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
TOLERANCE ON FRACTIONS FOR MACHINED SURFACES
0 TO 1/4 .... ± .000
OVER 1/4 TO 24 .... ± 1/64
OVER 24 TO 72 .... ± 1/32
OVER 72 .... ± 1/16
REAMED HOLE TOLERANCE IS ± .001
INSIDE MACHINED CORNERS TO HAVE A RADIUS OF 5/64 $^{+0}_{-1/32}$
OUT OF ROUNDNESS, ECCENTRICITY OR UNINTENTIONAL TAPER TO BE WITHIN THE DIAMETRAL TOLERANCE SPECIFIED.

FILE R.C.I.C.

TYPE- GS

OVER SPEED TRIP

SCALE NONE DATE 9-16-69

THE TERRY STEAM TURBINE CO.
WINDSOR, CONN., U.S.A.

DRAWN R... X.
TRACED
CHECKED
APPROVED

65638 B	A	BOSS & TAPPED HOLE ADDED INTO BRG. CAP. FOR EMERG. WT. ADJ. KCM 10-26-70								

65638 B

PARTS LIST 66726A

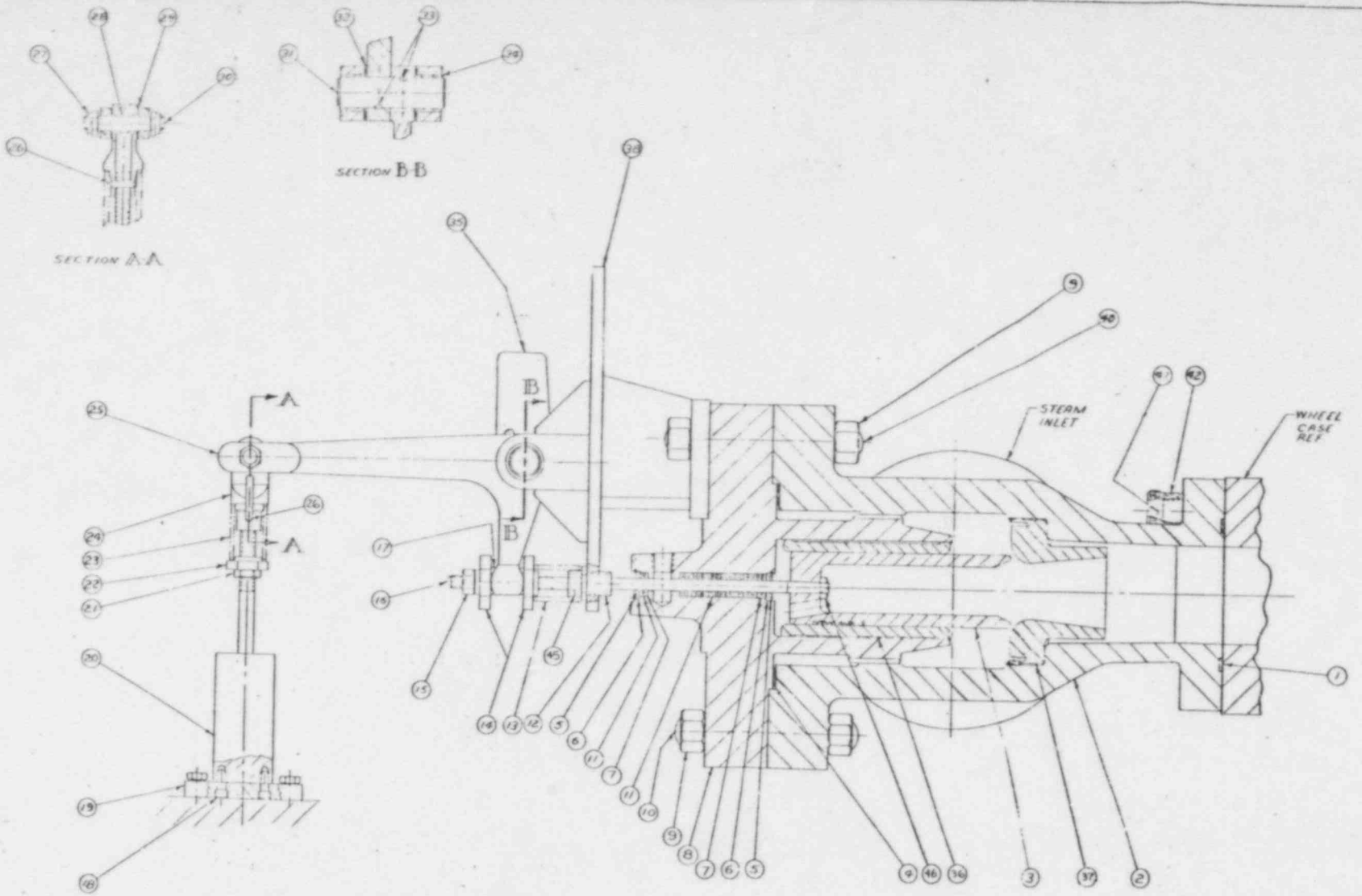
Reference Drawing 67063D - Type GS-2

Governor Valve and Linkage Section

Part No.	Name of Parts	Piece No.	Dwg. No.
1	Flexitallic Gasket RI-15L	-	Std.
2	4" Governor Valve Body Material: Steel per T.S.T. Spec 01-69	79177D	79177D
3	Governor Valve Plug 3"; Material: stn. stl. ASTM A 276 Grade 440C (Hardened-tempered)	90076D	90076D
4	Flexitallic Gasket RI-15P	-	Std.
5	Truarc Retaining Ring N-5000-112	-	Std.
6	Guide Bushing	79344A01	79344A
7	Carbon Spacer	54843	A-10231
8	Valve Bonnet - Stl. per T.S.T. Spec 01-69	90579D	90579D
9	Hex Nut 1-1/8-7	-	Std.
10	1-1/8-7 Bolt Stud	66605	A-899X
11	Flat Washer	54846	A-10233
12	Valve Spring Seat	90212A	90212A
13	Governor Valve Spring	6869	F-1608
14	Spring Seat	44176	A-6177
15	Hex Nut 1/2-13	-	Std.
16	Valve Stem Assembly	90124B	90124B
17	Governor Lever Block	59284	A-10920
18	Socket head cap screw 5/16-24	-	Std.
19	Adapter Plate	52644	B-11314

PARTS LIST 66726A (Continued)

Part No.	Name of Parts	Piece No.	Dwg. No.
20	Woodward Governor Remote Servo	-	B-1016X
21	Hex Jam Nut 5/8-11	-	Std.
22	Spring Seat	58506	A-10823
23	Governor Valve Spring	40385	A-7498
24	Slip Link	67855	B-12622
25	Governor Lever	67165C	67165C
26	Dowel 1/4 x 1" long	-	Std.
27	Flexloc Locknut 31 FK 813	-	Std.
28	Garlock Bushing 10 DU 14	-	Std.
29	Garlock Thrust Washer DU 08	-	Std.
30	Pin	44530	A-861X
31	Pin	67300	A-1024X
32	Garlock Thrust Washer DU 18	-	Std.
33	#6 P&W Taper Pin 2-1/4" long	-	Std.
34	Garlock Bushing #20 DU 16	-	Std.
35	Micro-Switch Lever	73103B	73103B
36	Valve Sleeve ASTM; A276, Grade 403 (Hardened-Tempered-Malcolmized)	79080C01	79180C
37	Venturi Seat ASTM: A276, Grade 403 (Hardened-Tempered-Malcolmized)	79181C	79181C
38	Fulcrum Support	67158D	67158D
40	1-1/8-7 Bolt Stud	66606	A-899X
41	1"-8 Stud	13472	A-892X
42	1"-8 Allenut	-	Std.
45	Guide, Upper Valve Stem	90326A	90326A
46	3/8" - 16 UNC-Stn. Stl. Nut	-	Std.



PARTS LIST 66726A

FILE 36687

TYPE- GSe

GSE VALVE & CONTROL SECTION

SCALE 1/2 DATE 1-5-70

THE TERRY STEAM TURBINE CO. MYSTIC CONN. U.S.A.

67063D

67063D A

L-385 L-9797 L-1376

EL-20474

REV. 1 7/24/81

REV. 2 8/28/81

REV. 3 9/23/81

REV. 4 11/4/81

REV. 5 3/2/82

ENVIRONMENTAL QUALIFICATION TEST SPECIFICATION

FOR CCS/HPCI TURBINE

AND

ELECTRICAL AND MECHANICAL ACCESSORIES

GENERAL ELECTRIC
NUCLEAR ENERGY BUSINESS GROUP
APPROVED 6/30/82 DATE
2763-203-2
VPF NO.
D820506
TRANSMITTAL NO.

TERRY CORPORATION

WINDSOR, CT.

DATE 7/17/81

PRINTS TO	
126	A

PREPARED BY

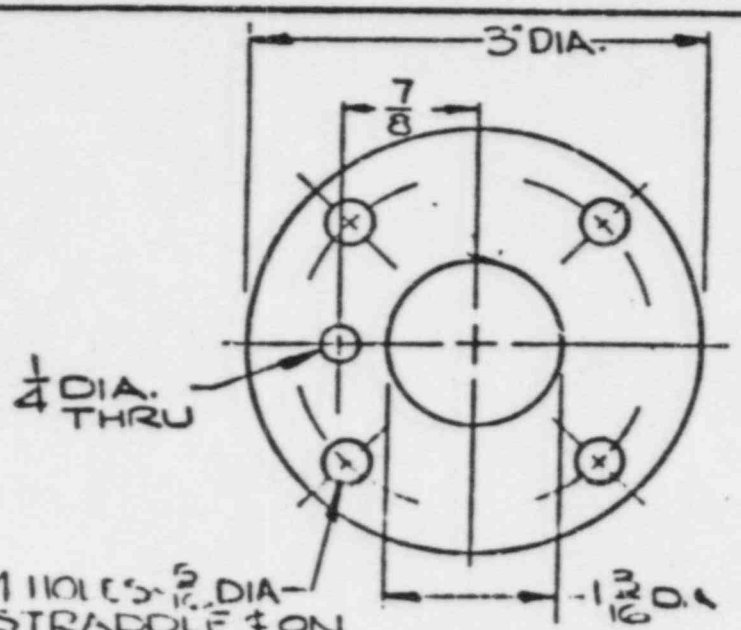
W. KENEFICK
STAFF ENGINEER

APPROVED BY

H. MCNEILL
MGR-NUCLEAR ENGINEERING

76013 A

76015A



GASKET
PC 76015A .005 PAPER
GASKET MATERIAL

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
TOLERANCES ON FRACTIONS FOR MACHINED SURFACES
0 TO 1/2 ..... ± 1/64
OVER 1/2 TO 24 ..... ± 1/32
OVER 24 TO 72 ..... ± 1/16
OVER 72 ..... ± 1/8
REAMED HOLE TOLERANCE +.002 -.001
INSIDE MACHINED CORNERS TO HAVE A RADIUS OF 1/32 +1/32 -1/32
OUT OF ROUNDNESS ECCENTRICITY OR UNINTENTIONAL TAPER TO BE WITHIN THE DIAMETRAL TOLERANCE SPECIFIED.

FILE 3-13-30

TYPE- CCS & CS

GASKET

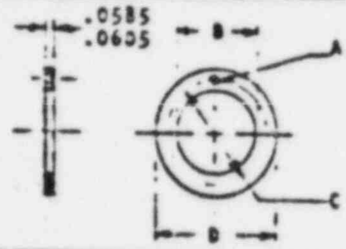
SCALE FULL DATE 8-14-31

THE TERRY STEAM TURBINE CO.
WINDSOR, CONN., U.S.A.

DRAWN FAC
TRACED
CHECKED EK
APPROVED

76015A	A						76015A

NOTE: All DU Type Bushings & Washers are of the same material. The only difference is size.



NOMINAL BUSHING BORE DIA.	TERRY PC. NO.	GARLOCK PART NO.	I.D. B	O.D. D	DOWEL HOLE DIA. A	DOWEL HOLE P.C. DIA. C	HOUSING RECESS DEPTH
.250	75201A50	DU 04					
.312	75201A51	DU 05					
.375	75201A52	DU 06	.510 .500	.875 .865	.077 .067	.692 .682	.050 .040
.437	75201A53	DU 07	.572 .562	1.000 .990	.077 .067	[illegible] .776	.050 .040
.500	75201A54	DU 08	.635 .625	1.125 1.115	.109 .099	[illegible] .870	.050 .040
.562	75201A55	DU 09	.697 .687	1.187 1.177	.109 .099	.942 .932	.050 .040
.625	75201A56	DU 10	[illegible] .750	1.250 1.240	.109 .099	1.005 .995	.050 .040
.687	75201A57	DU 11	.822 .812	1.375 1.365	.109 .099	1.099 1.089	.050 .040
.750	75201A58	DU 12	.885 .875	1.500 1.490	.140 .130	1.192 1.182	.050 .040
.812	75201A59	DU 13	.947 .937	1.625 1.615	.140 .130	1.286 1.276	.050 .040
.875	75201A60	DU 14	1.010 1.000	1.750 1.740	.140 .130	1.380 1.370	.050 .040
1.000	75201A61	DU 16	1.135 1.125	2.000 1.990	.171 .161	1.567 1.557	.050 .040
1.125	75201A62	DU 18	1.260 1.250	2.125 2.115	.171 .161	1.692 1.682	.050 .040
1.250	75201A63	DU 20	1.385 1.375	2.250 2.240	.171 .161	1.817 1.807	.050 .040
1.375	75201A64	DU 22	1.510 1.500	2.500 2.490	.202 .192	2.005 1.995	.050 .040
1.500	75201A65	DU 24	1.635 1.625	2.625 2.615	.202 .192	2.130 2.120	.050 .040
1.625	75201A66	DU 26	1.760 1.750	2.750 2.740	.202 .192	2.255 2.245	.050 .040
1.750	75201A67	DU 28	2.010 2.000	3.000 2.990	.202 .192	2.505 2.495	.080 .070
1.875	75201A68	DU 30	2.135 2.125	3.125 3.115	.202 .192	2.630 2.620	.080 .070
2.000	75201A69	DU 32	2.260 2.250	3.250 3.240	.202 .192	2.755 2.745	.080 .070

REVISED (A) APRIL 21, 1975 (B) 5/30/75 (D) 9/10/76 CEA(E) 1/14/77 H-77-546 (F) 6/30/81-24

DRAWN	GG NOV. 74	THE TERRY STEAM TURBINE COMPANY	801-01-03-01-G — LATEST CHG F
CHECK	[illegible] 12-11-74	STANDARD PART NAME: BUSHING & WASHER GARLOCK TYPE DU	BASIC PART NUMBER 75201A
APPD	[illegible] 12-17-74		SHEET 2 OF 2

NON-METALLIC COMPONENTS

1. Component — Urethane Ball (Dwg #86908B)

2. Terry I.D. No. — Dwg.# A10948 (Part of tappet and holder ass'y.)
Pc. #59180

3. Manufacturer — Product Comp. Corp.
Mr. Vernon, N.Y.

4. Manufacturer P/N — N/A

5. Subsystem — Overspeed Trip
Ref. Dwg.# 66685C-13
Section # 66258C

6. Description of Function — The overspeed trip pin contacts the urethane ball causing trip. Note: Emergency tappet and holder come as a unit.

7. Acceptance Criteria — Annually inspect the tappet ball for chipping, scuffing, discoloration (brownish) and free to rotate in its housing after test.

8. Operation Conditions — Operates in a turbine oil atmosphere approximately 15°F above ambient condition.

9. Safety Classification — Essential for turbine protection, but does not affect normal turbine operation.

NON-METALLIC COMPONENTS

1. Component — Carbon End Glands (Carbon Rings)

2. Terry I.D. No. — PC# 53821
DWG# A10074

3. Manufacturer — Graphitar Grade 2, U.S. Graphite Div., Wickes Corp., 1621 Holland Ave., Saginaw, MICH. | Purebon Grade P-9D, Pure Carbon Co., Inc., St.Mary's, PA. | Electro-Nite Grade E407, Electro-Nite Carbon Div., 2000 Gaylord St., Long Beach, CA.

4. Manufacturer P/N — See Item 3 Above.

5. Subsystem — Turbine
Ref. DWG.# 663597-8

6. Description of Function — Prevent leakage of steam to atmosphere from around shaft ends when gland containment equipment is in operation. Without gland containment operation, leakage at rated operating pressure (50 psig) will be less than (400) #/hr.

7. Acceptance Criteria — See leakage definition above. The carbon glands should be replaced when the clearance exceeds .010". This should be checked at least every 5 years.

8. Operating Conditions — 298°F/50 PSIG Steam

9. Safety Classification — Essential

NON-METALLIC COMPONENTS

Vellumoid is paper, Cellulose

1.	Component	Gasket Vellumoid
2.	Terry I.D. No.	Oil well cover (cut & fit @ assembly) Pc.# 105883A02, A08, A09, A10 & A11 Dwg.# 105883A Pc.# 76015A & Dwg. 76015A
3.	Manufacturer	Industrial Gasket & Shim Co., Inc. P.O. Box 368 Meadowlands, Pa 15347
4.	Manufacturer P/N	N/A
5.	Subsystem	GE-AED-HPCI Gaskets in Oil System Ref. Dwg.# 8001230
6.	Description of Function	Prevent oil leakage at joints.
7.	Acceptance Criteria	No visible leakage
8.	Operation Conditions	Oil at ambient conditions, per Section 3.1.
9.	Safety Classification	Essential.

WYLE LABORATORIES
SCIENTIFIC SERVICES & SYSTEMS GROUP
WESTERN OPERATIONS, NORCO FACILITY
1841 Hillside Avenue, Norco, California 91760
Area Code 714 737-0871
TWX 910-332-1204 Telecopy (714) 737-0871

QUALIFICATION PLAN

QUALIFICATION PLAN 57508

DATE December 14, 1981

GENERAL ELECTRIC
NUCLEAR ENERGY BUSINESS GROUP
[signature] 6/30/82
APPROVED DATE
2763-309-2
VPF NO.
D820506
TRANSMITTAL NO.

PRINTS TO
726 A

56 Page Report

Revision A
February 10, 1982

Revision B
April 20, 1982

FINAL QUALIFICATION PLAN

FOR

CCS/HPCI SYSTEM

AND

ELECTRICAL AND MECHANICAL ACCESSORIES

FOR

TERRY CORPORATION

WINDSOR, CONNECTICUT

APPROVED BY:
FOR:

APPROVED BY:
FOR:

APPROVED BY: T. Foglietta [signature]
FOR: Wyle Technical Review

APPROVED BY Manager [signature] Charlie Richardson

APPROVED BY Q/A Manager [signature] Larry Housteau

PREPARED BY PROJECT ENGINEER: [signature] Thach Nguyen

REVISIONS

REV NO	DATE	PAGES AFFECTED	BY	APPL	DESCRIPTION OF CHANGES
A	2/10/82	3,8,10,15,16,21,22,	TN	[signature]	Requested by customer per telecon
		23,24			2/5/82 and letter 2/8/82.
					All references in Matrix Table had
					been renumbered
B	4/20/82	3,21,36,39,44,47,54	TN	[signature]	Requested by customer per letter
				4-20-82	3/22/1982

TABLE 1

AGING MATRIX

ITEM NO.	ITEM MANUFACTURER AND MODEL NUMBER	MANUFACTURER'S RATINGS	AMBIENT ENVIRONMENT CONDITIONS	NONMETALLIC MATERIALS AND ACTIVATION ENERGIES (eV)	THRESHOLD LEVEL FOR RADIATION DAMAGE (RADS)	AGING MECHANISMS			QUALIFIED LIFE GOAL* (YEARS)
						RADIATION (RADS)	TIME/ TEMPERATURE	ELECTRO-MECHANICAL CYCLING	
A	*TURBINE								
A.1	Ball, Product Comp. Corp. Terry Dwg. #A10948	-65 to 240F	60-122F 1.0E 6 rads 20% to 90% R.H.	Polyurethane/0.89 (Ref. 5)	3.0E 8 (Ref. 6)				
A.1.1	Ball and Tappet Assembly (Pacing Consideration)	"	60-122F 1.0E6 rads 20% to 90%	"	"	Yes 1.1E6 rads	25 hrs. at 110°C	N/A	1
A.1.2	Ball and Tappet Assembly (Pacing Consideration)	"	60-122F 8.9E3 rads 20% to 90%	"	"	Yes 1.0E4 rads	45 hrs. at 110°C	N/A	2
A.1.3	Ball and Tappet Assembly (Pacing Consideration)	"	"	"	"	Yes 1.0E4 rads	65 hrs. at 110°C	N/A	3
A.1.4	Ball and Tappet Assembly (Pacing Consideration)	"	"	"	"	Yes 1.0E4 rads	90 hrs. at 110°C	N/A	4
A.1.5	Ball and Tappet Assembly (Pacing Consideration)	"	"	"	"	Yes 1.0E4 rads	110 hrs. at 110°C	N/A	5

* For Pacing Consideration

TABLE 1

AGING MATRIX

ITEM NO.	ITEM MANUFACTURER AND MODEL NUMBER	MANUFACTURER'S RATINGS	AMBIENT ENVIRONMENT CONDITIONS	NONMETALLIC MATERIALS AND ACTIVATION ENERGIES (eV)	THRESHOLD LEVEL FOR RADIATION DAMAGE (RADS)	AGING MECHANISMS			QUALIFIED LIFE (OUGHT/GOAL (YEARS)
						RADIATION (RADS)	TIME / TEMPERATURE	ELECTRO-MECHANICAL CYCLING	
A.6	DU Bushing Garlock #16DU12, 16DU20 Terry P/N: 75201A46, A33	-200°C - 280°C -328°F - 536°F	"	PTFE/1.69eV (Ref. 9)	1.7E4 (Ref. 10)	Yes, 1.1E6	100 hrs. at 110C	N/A	40/40
A.7	Gasket Vellumoid Industrial Gaskets and Shim Co. Terry P/N 103883A02,A08,A09,A10, & All			Vellumoid/0.9 (Assume Cellulose Fiberboard) (Ref. 11)	1.0E3 (Ref. 11)	Yes, 1.1E6 rads	790 hrs. at 110°C	N/A	40/40
A.8	Gasket Flexatallic Co. # R1-3C Terry P/N 75150A25	850C	60-122F 1.0E6 Rads 20% to 90%	See Item A.2		Exempt	Exempt	N/A	40/40
A.9	Rulon Tape Dixon Corporation Terry P/N 75129A	500F 2000 psi (max)	"	Teflon/1.69 (Ref. 9)	1.7E4 (Ref. 10)	Yes 1.1E6	100 hrs. at 110C	2650	10/40
B	LUBRICATING OIL SYSTEM								
B.1	Thermostatic Valve Amot #2WEC-190-11 Terry #839096A02	130°F	60-122F, 20% to 90% RH 1.0E6 rads 300 cycles in 5 years			Exempt	100 hours at 110C	330 cycles at 125°F ± 10, & 140±10°F	5/20
B.1.1	Plug, Seals and Diaphragm	"	"	*Buna-N/0.92 (Ref. 12)	2.0E6 (Ref. 13)	Exempt	100 hrs. at 110°C	"	5/20
B.1.2	Temperature Element	"	"	*Expanding wax (0.8 assumed)	Unknown	Yes 1.1E6 rads	1060 hrs at 85C	"	5/20

57598

TABLE 1

Qualification Plan 19

AGING MATRIX

Page No.

REVISION A,B

ITEM No.	ITEM MANUFACTURER AND MODEL NUMBER	MANUFACTURER'S RATINGS	AMBIENT ENVIRONMENT CONDITIONS	NONMETALLIC MATERIALS AND ACTIVATION ENERGIES (eV)	THRESHOLD LEVEL FOR RADIATION DAMAGE (RADS)	AGING MECHANISMS			QUALIFIED LIFE GOAL (YEARS)
						RADIATION (RADS)	TIME / TEMPERATURE	CYCLIC MECHANICAL CYCLING	
B.9.1.1	Filter	100 psi,250F	60 122F 1.0E6 rads 20% to 90% RH	Metal (NAS)	N/A	NAS		N/A	
B.9.1.2	Seals FILTER ELEMENT	"	"	Buna-N 0.92 (Ref. 12)	2.0E6 (Ref. 13)	Exempt			
B.9.2	Filter Elements Wm. W. Nugent Co #91-102-001 Ferry P/N 899158A01	"	"			Yes 1.1E6	100 hrs. at 110C	N/A	5/20
B.9.2.1		"	"	*Cellulose Fiber (assumed 100% Kraft Paper) 0.9 (Ref. 11)	1.0E5 (Ref. 11)				
B.9.2.2		"	"	Buna-N Gaskets 0.92 (Ref. 12)	2.0E6 (Ref. 13)				
B.10	Auxiliary Oil Pump and Coupling TUTHILL PUMP GASKET & SEAL		"			Yes 1.1E6	100 hrs at 110C	660 cycles	5/20
B.10.1	Auxiliary Oil Pump Tuthill Pump Co. 3CEN Ferry P/N 108079A01	100 psi,225F	Number of cycles in 5 years is 600						
B.10.1.1	Gaskets	"	"	*Gasket Vellumoid (assumed Cellulose Fiberboard) 0.9 (Ref. 11)	1.0E5 (Ref. 11)				

TABLE 1

AGING MATRIX

ITEM NO.	ITEM MANUFACTURER AND MODEL NUMBER	MANUFACTURER'S RATINGS	AMBIENT ENVIRONMENT CONDITIONS	NONMETALLIC MATERIALS AND ACTIVATION ENERGIES (eV)	THRESHOLD LEVEL FOR RADIATION DAMAGE (RADS)	AGING MECHANISMS: RADIATION (RADS)	AGING MECHANISMS: TIME / TEMPERATURE	AGING MECHANISMS: CYCLIC MECHANICAL CYCLING	QUALIFIED LIFE SHORT-TERM/LOCA (YEARS)
B.10.1.2	Seals	100 psi,225F	60 to 122F 1.0E6 rads 20% to 90% RH Number of cycles in 5 years is 600	Buna-N 0.92 (Ref. 12)	2.0E6 (Ref. 13)				5/20
B.10.1.3	Plastic Gasket	"	"	Cellulose Triacetate (Assume Cellulose Fiber) 0.9 (Ref. 11)	1.75E6 (Ref 7)				
B.10.2	Coupling Tuthill Pump co. #G-1000-1					Exempt	100 hrs. at 110C	N/A	5/20
B.10.2.1	Tuthill #G-1000-1.62-.0375	"	"	Metal (NAS)	N/A				
B.10.2.2	Tuthill #G-1000-1.00-.0250	"	"	Metal (NAS)	N/A				
B.10.2.3	Tuthill #G-1000-SP	"	"	Buna-N 0.92 (Ref. 12)	2.0E6 (Ref. 13)				5/20
B.11	Shaft-Driven Oil Pump and Coupling								
B.11.1	Shaft-Driven Oil Pump DeLaval IMO #A 90W-187 Terry P/N 107279A	500 psi	Number of cycles in 5 years is 600			Yes 1.1E6	100 hrs. at 110C	660 cycles	5/20
B.11.1.1		"	"	*Cellulose Fiber 0.9 (Ref. 11)	1.0E3 (Ref. 11)				20/20

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Page No.

REVISION A

TABLE I

AGING MATRIX

ITEM NO.	ITEM MANUFACTURER AND MODEL NUMBER	MANUFACTURER'S RATINGS	AMBIENT ENVIRONMENT CONDITIONS	NONMETALLIC MATERIALS AND ACTIVATION ENERGIES (eV)	THRESHOLD LEVEL FOR RADIATION DAMAGE (RADS)	AGING MECHANISMS			QUALIFIED LIFE SOUGHT/GOAL (YEARS)
						RADIATION (RADS)	TIME/TEMPERATURE	ELECTRO MECHANICAL CYCLING	
E.10	Terminal Strips Square D # Class 9080 Type C B/C 9/C 18 Terry P/N 105282A05,A010,A09	Amb. 257F	60-122F 1.0E6 Rads 20% to 90% RH	Phenolic-Mineral 1.38 (Ref. 20)	3.9E9 (Ref. 13)	Exempt	120 hrs. at 110C	N/A	40/40
E.11	Electrical Cable E.J. Steven #3002-1B Terry #890020A07		"	Qualified by Manufacturer, Per Terry Corporation					
E.12	Electrical Conduit Anaconda #NWC Terry #890093A41	Meets IEEE 323	"	Meets IEEE 323 (Ref. 33)	50.E6 (Ref. 33)	Exempt	Exempt	N/A	40/40
E.13	Hookup Wire E.J. Steven #55007-3 Terry P/N 890159A01	125C	"	Qualified by Manufacturer, Per Terry Corporation					
F	GOVERNOR HYDRAULIC CONT.								
F.1	EGP Hydraulic Actuator Woodward Co. #DR9903-039 Terry #890041A17		"			Yes 1.1E6	145 hrs. at 110C	N/A	20/20
F.1.1	Seal and "O" Ring		"	*Viton 1.26 (Ref. 22)	5.0E6 (Ref. 23)				
	WOODWARD (WW) REMOTE SERVO								

TABLE 1

AGING MATRIX

ITEM NO.	ITEM MANUFACTURER AND MODEL NUMBER	MANUFACTURER'S RATINGS	AMBIENT ENVIRONMENT CONDITIONS	NONMETALLIC MATERIALS AND ACTIVATION ENERGIES (eV)	THRESHOLD LEVEL FOR RADIATION DAMAGE (RADS)	AGING MECHANISMS			QUALIFIED LIFE SOUGHT/GOAL (YEARS)
						RADIATION (RADS)	TIME / TEMPERATURE	ELECTRO-MECHANICAL CYCLING	
F.3	DU Thrust Washer Garlock #DU-08, DU-06 Terry P/N 75201A32 & A34	-40F to 536F	"	PTFE 1.69 (Ref. 9)	1.7E4 (Ref. 13)	Yes 1.1E6 rads	100 hrs. at 110C	N/A	40/20
F.4	DU Bushing Garlock #20DU28, 20DU20 10DU08, 08DU06, 05DU08 Terry P/N 75201A10, A11, A18 A47, A48	-40F to 535F 7000 hours (operating)	60-122F 1.0E6 Rads 20% to 90% RH	PTFE 1.69 (Ref. 9)	1.7E4 (Ref. 13)	Yes 1.1E6 rads	100 hrs. at 110C	Exempt	40/20
F.5	Oil Seal Klozure Garlock #63X424, 63X1042 Terry #75198A10 & A17	300F	"	Buna-N 0.92 (Ref. 12)	2.0E6 (Ref. 13)	Exempt	100 hrs. 110C	N/A	5/20

ENGINEERING LIBRARY NO. 20458

REV. 0 3/27/80

REV. 1 4/21/80

ENVIRONMENTAL QUALIFICATION REPORT

FOR

GS-2N RCIC TURBINE

ELECTRICAL ACCESSORIES

AND

ELECTRONIC CONTROL SYSTEM

PREPARED BY: H. J. Sirois 3/27/80
H. J. Sirois
Manager, Nuclear Products

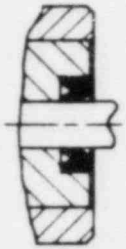
REVIEWED BY & APPROVED BY: E. Lichtsteiner 3/27/80
E. Lichtsteiner
Chief Engineer

SUPPLEMENT TO WYLE QUALIFICATION PLAN NO. 7P1098-2

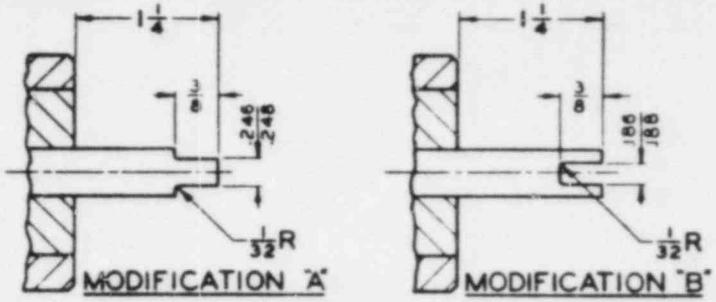
THERMAL AGING DATA

ITEM NO. AND DESCRIPTION	SUPPLIER	SUPPLIER PART NO. (TERRY CORP. PART NO.)	AGING SUSCEPTIBLE MATERIALS	WEAK LINK AND WEAK LINK ACTIVATION ENERGY	QUALIFIED LIFE SOUGHT	AGING REQUIRED	AGING PERFORMED	LIFE QUALIFIED TO AND CONFIRMED
1a. EGM Panel 20a.	Woodward	8271-236 (75850A03)	Polyurethane PVC Diallyl-pthalate	Polyurethane (.85 eV)	5 years	16 days at 85°C	50 days at 85°C	15 years
1b. RG/SC	Woodward	8271-083 (75925A01)	Nylon Diallyl-pthalate Fibreglass epoxy Vulcanized Fibre	Vulcanized Fibre (.93 eV)	5 years	10 days at 85°C	50 days at 85°C	20 years
20b. RG/SC	Woodward	8271-590 (75925AC2)	Same as 1b.	Vulcanized Fibre (.93 eV)	5 years	10 days at 85°C	50 days at 85°C	20 years
1c,20c. Dropping Resistor	Woodward	8271-281 (75863A01)	Same as 1b.	Vulcanized Fibre (.93 eV)	5 years	10 days at 85°C	50 days at 85°C	20 years
1d,20d. 0.5Test Controller	N/A	(101894C)	Teflon Silicone Rubber, Phenolic.	Silicone Rubber (1.73 eV)	5 years	0.2 days at 85°C	50 days at 85°C	40 years
2. Servo	Woodward	8250-190 (75854A06)	Viton A	Viton A (1.26 eV)	20 years	0.6 days at 107°C	50 days at 107°C	40 years
3. EGR	Woodward	8250-133 (75862A02)	Viton A Epoxy Formvar Teflon Asbestos Neoprene	Formvar (0.94 eV)	20 years	7 days at 107°C	50 days at 107°C	40 years

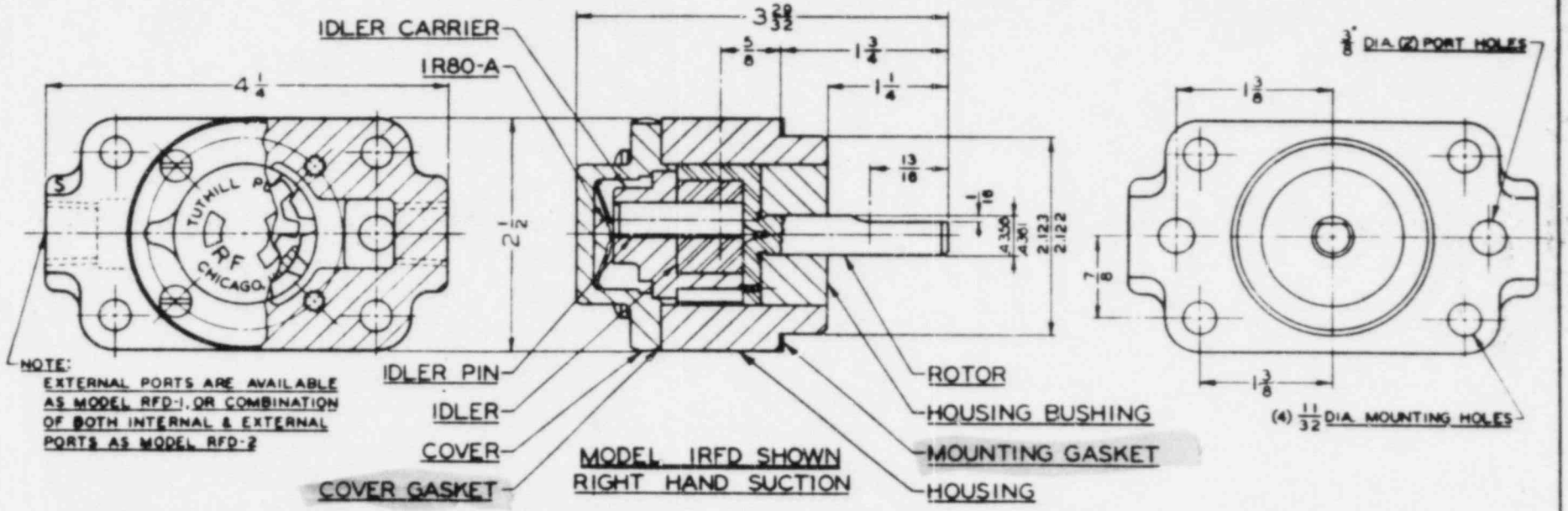
PORT MARKED "S" DESIGNATES SUCTION SIDE OF PUMP
PORT POSITION MAY BE REVERSED BY ROTATING ENTIRE PUMP 180°



RFDB MODEL



ALTERNATE SHAFT DRIVE ENDS



NOTE:
EXTERNAL PORTS ARE AVAILABLE AS MODEL RFD-1, OR COMBINATION OF BOTH INTERNAL & EXTERNAL PORTS AS MODEL RFD-2

MODEL IRFD SHOWN
RIGHT HAND SUCTION

PUMP MODEL	ROTOR	IDLER PIN	IDLER	IDLER CARRIER	NOMINAL CAPACITY @ 1800 RPM
OORFD	OORF24	OORF31	OOB32-1	OORF29	58 G.P.H.
ORFD	ORF24	ORF31	OB32-1	ORF29	105 G.P.H.
IRFD	IRF24	IRF31	IL32-1	IRF29	180 G.P.H.

PUMP ASSEMBLY
TUTHILL PUMP COMPANY
RFD

THE CUNO ENGINEERING CORPORATION
Subsidiary of AMERICAN MACHINE & FOUNDRY COMPANY
MERIDEN, CONNECTICUT, U.S.A.

Export Sales Office - AMF INTERNATIONAL - Division of American Machine & Foundry Company - 261 Madison Ave. New York 16, N.Y., U.S.A. - Cable AMMAFOCO, N.Y.

Issued 4-27-65
Cancels CT 31.30
7-1-63

TYPE 1BD

ADAPTOR TYPE FILTER HOUSING

DESCRIPTION

Two all-metal sumps in a duplex arrangement with a common head and special changeover valve. The valve allows flow through both housings at once or separately through either unit for cartridge change without interrupting flow. Central inlet and outlet connections allow the unit to be mounted for either right or left hand flow. Lugs cast into head provide mounting pads. Housings are furnished complete as shown with cartridges included.

HOW TO ORDER :

When ordering specify 1) Nature and quantity of contaminant to be removed. 2) Fluid to be filtered. 3) Flow rate. 4) Line pressure. 5) Operating temperature. 6) Cartridge type and degree of filtration. 7) Filter model. On flow, pressure, and temperature figures, indicate normal and maximum conditions.

SPECIAL ADAPTATION

The model 1BD can be supplied without changeover valve as a model 1BB if so desired. Flow is through both housings at once.

SPECIFICATIONS	MODEL 1BD1	MODEL 1BD2
MATERIALS and CONSTRUCTION		
head and base	cast iron or cast bronze	
shell	steel or brass	
gaskets: shell	rubber bonded asbestos fiber	
cap nut	steel or brass	
centerpost	½" FIPT	
inlet and outlet	¼" FIPT	
drain plugs	steel or brass	
centering clips		
OPERATING DATA		
max. working pressure for liquids	125 psi at 250°F	
flow rate, G.P.M.	refer to appropriate cartridge specification sheet below	
approx. liquid capacity	7 gals.	1.4 gals.
DIMENSIONS - WEIGHTS		
length overall	12⅞"	22⅜"
inlet to outlet	1⅜" centers	
other dimensions	see reverse side	
approx. shipping weight, lbs.		
disposable fiber cartridges	30	35
cleanable metal cartridges	31	37

CARTRIDGES

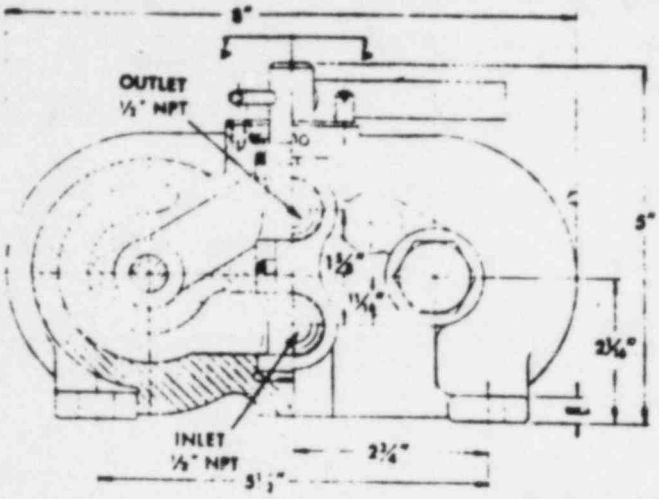
Cartridges listed below are used in this type filter housing. Refer to cartridge specification sheets for materials, micron rating, operating temperatures, and other cartridge data.

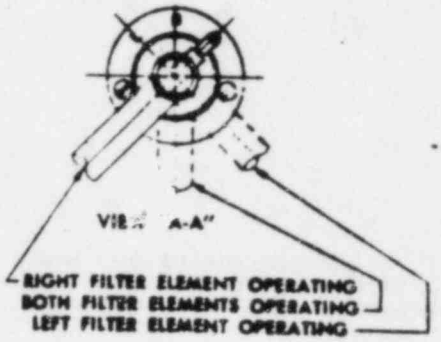
Type	Cartridge Series No.	Quantity Required 1BD1	Quantity Required 1BD2	Specification Sheet No.
MICRO-KLEAN	2278	2	4	MK.21.1
MICRO-WYND	*	2	4	MW.21.1
MICRO-SCREEN	52043-1	2	—	MS.21.1
	52043-2	—	2	MS.21.1
PORO-KLEAN	50155-1	2	—	PK.21.1
	50155-2	—	2	PK.21.1

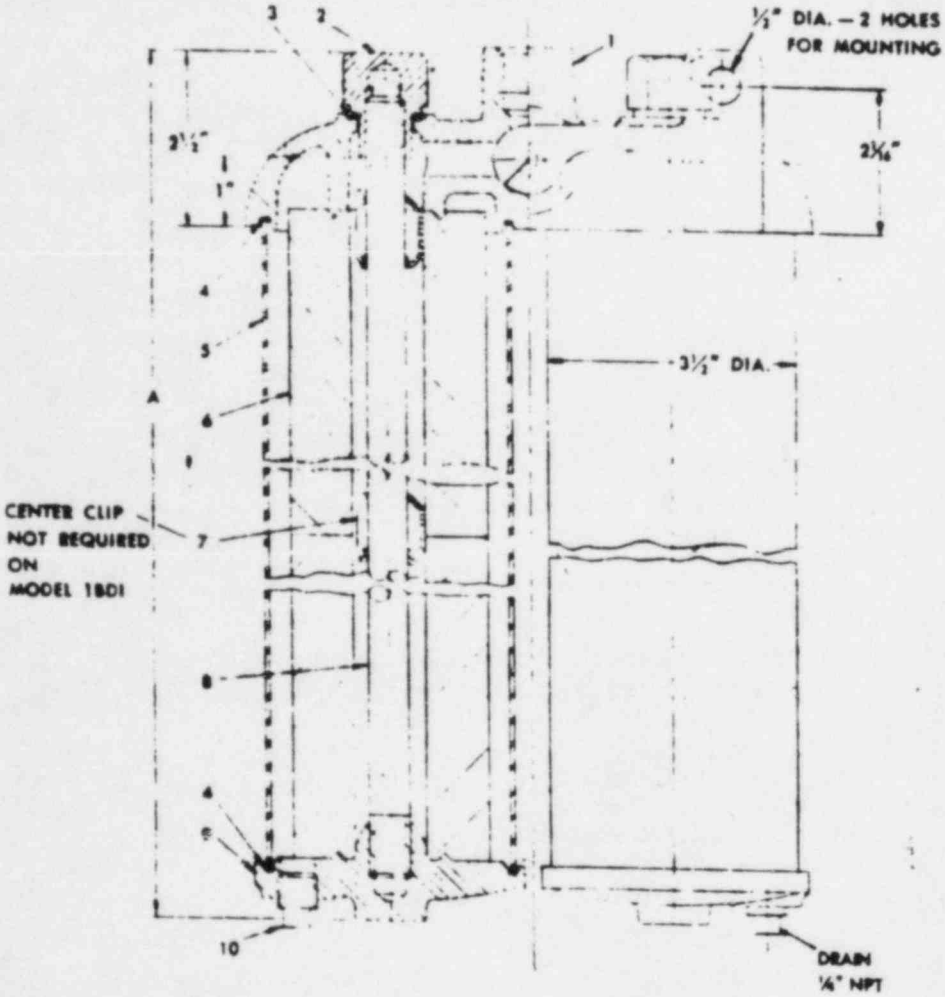
* Identified by letter code. Use 2½" O.D. x 1" i.D. x 9⅞" long Micro-Wynd cartridges in this housing

CUNO

eet No. CT.31.30







MODEL	A
1BD1	12⅝"
1BD2	22⅝"

WHEN ORDERING PARTS SPECIFY:
1. FILTER MODEL
2. THIS SPECIFICATION SHEET NUMBER
3. ITEM NO. AND DESCRIPTION OF PART
4. MATERIAL
5. QUANTITY REQUIRED

DESCRIPTION OF PART	ITEM NO.
HEAD & PETCOCK ASSEM.	1
NUTS	2
GASKETS*	3
GASKETS*	4
SHELL	5
CARTRIDGES*	6
CENTERING CLIP(S)	7
CENTERPOST	8
BASE	9
DRAIN PLUGS	10

* RECOMMENDED SPARE PARTS

CARTRIDGE TYPE FILTER HOUSING

Type 1BD

THE CUNO ENGINEERING CORPORATION
Subsidiary of AMERICAN MACHINE AND FOUNDRY COMPANY
MERIDEN, CONNECTICUT, U.S.A.

CERTIFICATION FOR THIS ORDER ONLY

CUST. _____ CUST. P.O. _____

FILTER TYPE _____

CUNO NO. _____

CARTRIDGE NO. _____ CARTRIDGE MTL. _____

HOUSING MTL. _____

CERT. BY _____ DATE _____ CUNO S.O. _____

This Sheet Subject to Change Without Notice.

THE WHITLOCK MANUFACTURING CO.

EXCHANGER SPECIFICATION SHEET

CUSTOMER	The Terry Steam Turbine Company	JOB No	
ADDRESS	Windsor, Connecticut	REFERENCE No	SN-8049
PLANT LOCATION		INQUIRY No	
		DATE	March 12, 1970
SERVICE OF UNIT	Oil Cooler - for Type GS Turbines	ITEM No	
SIZE	4-Y-42	TYPE	MHT-4-S(2-1/2)-CB
SURFACE PER UNIT	17.8	SHELLS PER UNIT	1
		CONNECTED IN	
		SURFACE PER SHELL	17.8

PERFORMANCE OF ONE UNIT

	SHELL SIDE		TUBE SIDE	
FLUID CIRCULATED	Oil		Water	
TOTAL FLUID ENTERING	3 GPM		16 GPM	
VAPOR				
LIQUID	3 GPM		16 GPM	
STEAM				
NON-CONDENSABLES				
FLUID VAPORIZED OR CONDENSED				
STEAM CONDENSED				
GRAVITY - LIQUID	0.88 @ 60°F		1.0	
VISCOSITY - LIQUID SSV	150 @ 100°F			
MOLECULAR WEIGHT - VAPORS				
SPECIFIC HEAT - LIQUIDS AVE	0.488	BTU/#	1.0	BTU/#
LATENT HEAT - VAPORS		BTU/#		BTU/#
TEMPERATURE IN	151.94	°F	140	°F
TEMPERATURE OUT	150	°F	141.5	°F
OPERATING PRESSURE		#/SQ IN		#/SQ IN
NUMBER OF PASSES	1		4	
VELOCITY		FT/SEC	4.75	FT/SEC
PRESSURE DROP	1.0	#/SQ IN	4.2	#/SQ IN
Fouling Total .001				

HEAT EXCHANGED - BTU/HR 12000 (200 BTU/MIN) M.T.D. (CORRECTED) 10.2°F

TRANSFER RATE - SERVICE 66 CLEAN 70.7

CONSTRUCTION

DESIGN PRESSURE	150	#/SQ IN	150	#/SQ IN
TEST PRESSURE	225	#/SQ IN	225	#/SQ IN
DESIGN TEMPERATURE	250	°F	250	°F

TUBES Admiralty SB-111 NO 52 OD 3/8 BWG 23 LENGTH 3'-6" PITCH 29/64" TRI

SHELL Red Brass SB-111 XX OD 4.125 THICKNESS .058"

SHELL ~~XXXXX~~ Hubs, Cast Bronze SB-62 FLOATING HEAD COVER

~~XXXXX~~ Bonnets - Cast Bronze, SB-62 CHANNEL COVER

TUBE SHEETS STATIONARY Cast Bronze SB-62 FLOATING

BAFFLES - CROSS Brass TYPE Segmental THICKNESS .020"

BAFFLE - LONG THICKNESS

TUBE SUPPORTS THICKNESS

GASKETS Comp. Asbestos USR #4899

CONNECTIONS - SHELL - IN 1½" OUT 1½" SERIES Screwed, NPT

CHANNEL - IN 1" OUT 1" SERIES Screwed, NPT

CORROSION ALLOWANCE - SHELL SIDE TUBE SIDE

CODE REQUIREMENTS ASME III-C - Tubeside & ASME VIII, Div. I - shellside - stamped.

WEIGHTS - EACH SHELL Empty 59# BUNDLE FULL ~~XXXXXX~~ 80#

NOTE INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (R.)

REMARKS -

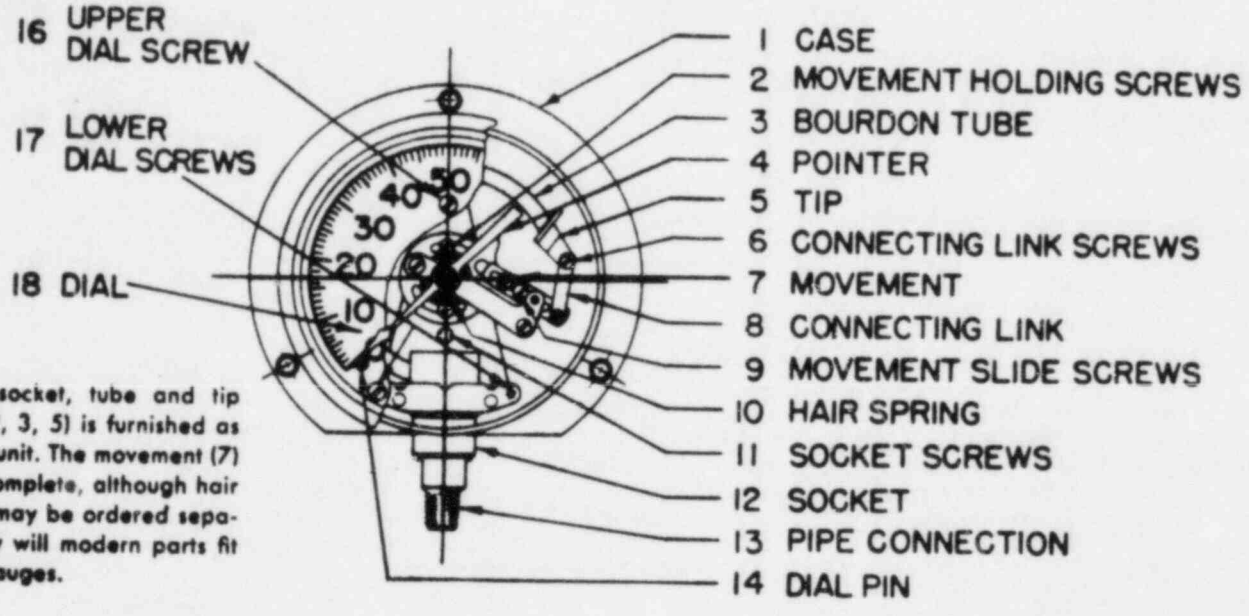
Welding & Welding qualifications to ASME Section IX

(41) Intergral with hub

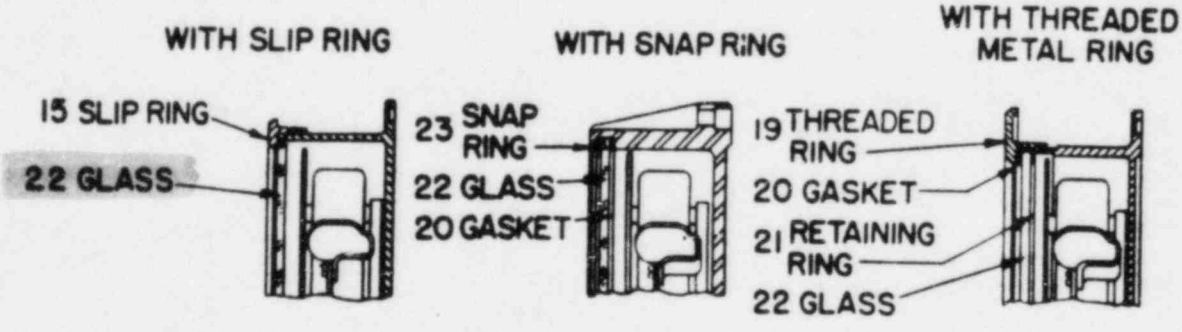
The drawing below shows a typical lower connection gauge with all of the parts designated by their standard names. The use of these names will facilitate the ordering of parts and eliminate any misunderstanding in describing gauge construction.

When ordering parts—specify as much of the following data as possible:

Size (dial diameter)—Case Material (Iron, Alumalife or Phenol)—Ring Design (Slip, Threaded, Snap or Hinged)—Connection Location (Lower or Back) — Connection Size (¼" or ½") — Bourdon Tube (Material)—Dial Range—Class of Gauge. Specify Catalog Number if possible; otherwise, mention whether parts are for Duragauge, Quality Gauge or Special Application Gauge.



NOTE: The socket, tube and tip assembly (12, 3, 5) is furnished as one integral unit. The movement (7) is supplied complete, although hair springs (10) may be ordered separately. Rarely will modern parts fit in old style gauges.



HOW TO MAKE YOUR PRESSURE GAUGES LAST LONGER, STAY ACCURATE, AND REDUCE GAUGE MAINTENANCE TO A MINIMUM

GAUGES ARE INSTRUMENTS. HANDLE THEM AS CAREFULLY AS YOU WOULD A FINE WATCH.

SELECTION

Gauges should be graduated to about double the average working pressure, selecting the nearest standard range. This will make the gauge last longer and pointer will be easier to read at about the top center of the dial.

Get the right gauge for the job. Use gauges of the proper Bourdon tube material and joints for the service.

INSTALLATION

Always use a wrench on the square shank on the gauge socket to screw the gauge in place. When a fitting is being screwed to the gauge, hold a wrench on the socket flats instead of twisting against the gauge socket screws which are intended to hold the gauge mechanism in the case.

When gauges are mounted on a wall or panel, make sure they are connected free from piping strains. Also see to it that the mounting surface is flat or insert washers under the flange of the gauge case to obtain three-point suspension. Preferably, the last length of piping leading up to the gauge should be flexible tubing. This will insure that the gauge is free from strain.

Install gauges where they will be free from the effects of mechanical vibration as this will wear out any gauge quickly. Try to mount the gauge on a wall nearby and connect the gauge to the machine which vibrates badly by means of flexible tubing.

Protect gauges from frequent pressure pulsations by using throttle screws in the socket of the gauge, needle valves, pulsation dampeners, or Ashcroft Gauge Savers.

When any gauge is used for steam pressures, a siphon filled with water must be installed between the gauge and the line. When the system is subject to occasional vacuum, provide a leg of piping which cannot be emptied by the vacuum effect. A drain cock or plug should be installed at the bottom of this leg to enable occasional cleaning out of the sediment. The head effect of this piping leg should be compensated for by resetting the pointer of the gauge.

Locate gauges where they will not be subject to high heat which will weaken soldered tube joints. Also, high temperatures make gauges inaccurate. See chart on this page. Install gauges where they will be free from moisture and corrosive fumes, if possible. If these conditions are unavoidable, ask for special recommendations and, in general, use phenol plastic cases which are resistant to most corrosive fumes and cannot rust.

PROPER USE

Apply pressure slowly. Do not open the gauge cock or valve too quickly – this imparts a severe strain on the Bourdon tube which may rupture it, or result in shortened life. When the service itself is subject to sudden pressure applications, use a needle valve, or the Ashcroft Gauge Saver.

Avoid over-pressure. See that the apparatus is provided with a relief valve and that the range of the gauge is higher than the set pressure of the relief valve.

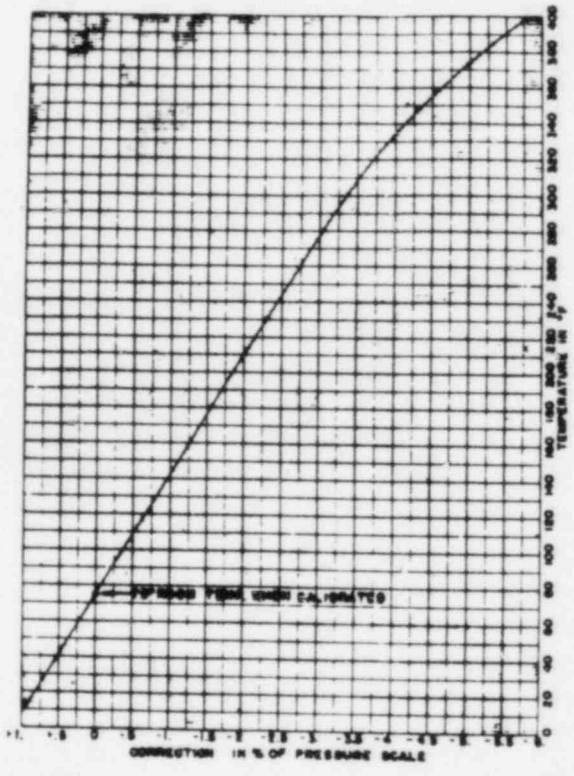
Sudden pressure release has the same detrimental effect and should be compensated for in the same manner as for pressure applications mentioned above. On hydraulic presses, Catalog Number 1056 Ashcroft Quality Gauge with slotted link should be specified. See page 48.

MAINTENANCE

Replace broken glasses and thus keep dirt out of the working bearings and teeth of the movement mechanism.

Never oil gauge movements or linkages. Oil attracts dirt and becomes gummy, thus causing the gauge to act sluggish and inaccurate.

Approximate Error or Change in Calibration of a Bourdon Tube Type Pressure Gauge Caused by Changes in Temperature



Example: Gauge working at 500 p.s.i. pressure and at 280° F. temperature would have a −3% correction and would read 3% or 15 p.s.i. fast.

INSTRUCTIONS FOR THE INSTALLATION AND USE OF THE ASHCROFT® "EVERY-ANGLE" MERCURY ACTUATED DIAL THERMOMETER

This thermometer was designed to be positioned to face the direction of easiest reading.

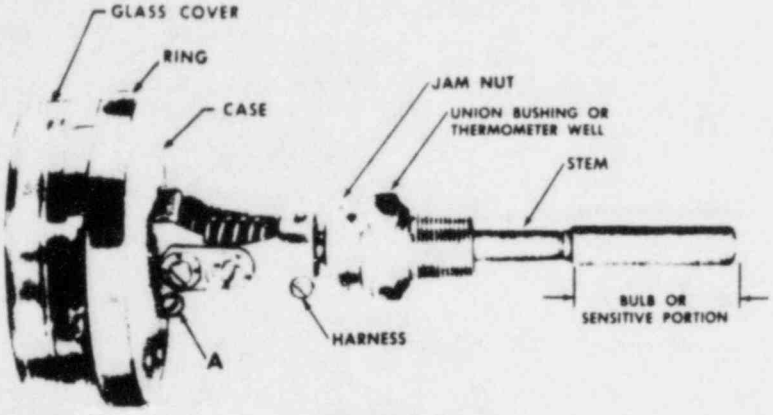


FIGURE 1

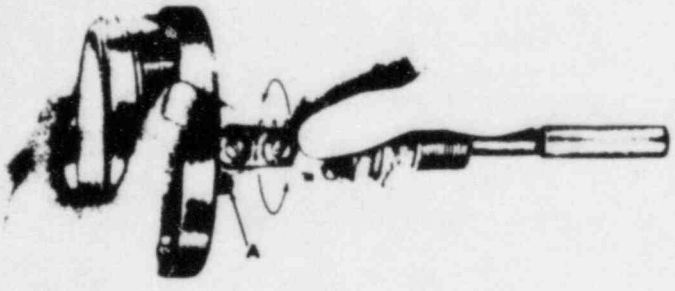


FIGURE 2

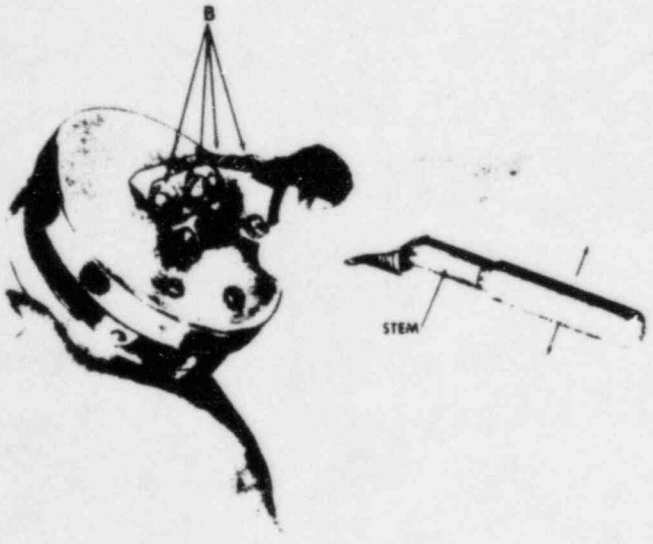


FIGURE 3

CAUTION

To assure longest life the "EVERY-ANGLE" joint should be operated only when necessary during installation or removal of the thermometer.

POSITIONING THE STEM

Before installation the stem and case should be set to the desired angle as follows:

Figure 1: Loosen the screw labeled "A" in Figure 1, until the harness and stem revolves freely through an angle of 180° with reference to the case.

Figure 2. While holding the case revolve the harness and stem clockwise or counterclockwise as indicated by arrows in Figure 2 to place the harness in a position that will permit flexing the stem in the desired direction with respect to the case. Lock screw "A".

Figure 3: Loosen the four screws labeled "B" in Figure 3, then flex the stem to the desired angle with respect to the case. Lock the four screws "B".

INSTALLATION

The lower part of the stem is the sensitive portion. Be sure this part is exposed to the temperature to be measured.

Remove the union bushing or thermometer well (see Figure 1) from the stem by releasing the jam nut.

Attach the union bushing or thermometer well tightly to the equipment.

When a thermometer well is used be sure the bulb is coated with a heat conducting medium such as a mixture of graphite and glycerine. This improves the speed of response of the thermometer.

If the operating temperature does not exceed 350°F. Vaseline or any heavy lubricant may be used as a substitute for the glycerine and graphite mixture.

If the operating temperature exceeds 350°F. the glycerine and graphite mixture may smoke when first subjected to the high temperature. This is caused by

"OVER"

the glycerine vaporizing, leaving the dry graphite behind and should not be cause for alarm. The dry graphite will act equally well as a heat conducting medium for temperatures up to 1000°F.

When the union bushing or thermometer well is secured to the equipment, insert the thermometer bulb into it and lock the jam nut in place.

MAINTENANCE

Aside from occasional testing, little or no maintenance is required.

Keep the gasketed glass cover on the case at all times. If the glass becomes broken, replace it immediately, as moisture and dirt inside the case will eventually cause the instrument to lose accuracy.

To remove the ring make sure that all screws "A" and "B" are locked tight, then while holding the harness directly in back of the case, unscrew the ring.

TESTING

All Ashcroft® dial thermometers are carefully calibrated at the factory and under ordinary conditions will remain accurate indefinitely.

It is a good practice, however, to test all dial thermometers periodically.

To test a dial thermometer immerse the bulb side by side with an accurate test thermometer in a liquid which is being stirred vigorously.

The entire sensitive part of the bulb must be immersed in the liquid.

When a constant temperature has been maintained for several minutes, compare the readings of the two thermometers. Repeat the test at several temperatures over the range of the thermometer and make a note if there are any discrepancies in the readings.

The following test baths are suggested:

From −40°F to 0°F	Mixture of alcohol and dry ice
From 0°F to 32°F	Mixture of crushed ice and salt
32°F	Mixture of ice and water
From 32°F to 212°F	Water, cooled or heated as required
212°F*	Boiling water
From 212°F to 350°F	Oil with a high flash point
From 350°F to 1150°F	Tempering salts

* Water will boil at different temperatures depending on elevation above sea level and barometric pressure, therefore check the actual boiling temperatures with an accurate thermometer.

ADJUSTMENT

If it is necessary to make any adjustment to the instrument, such adjustment is made on the pointer. Remove the ring, glass cover and gasket from the case.

Adjustment is made by means of the adjustable feature on the pointer. Hold the tail end of the pointer, close to the center knurled disc, with one hand, and turn the knurled disc with the other hand until the pointer is brought to the proper point on the scale.

Be sure to replace the glass cover, gasket and ring after the adjustment has been made.

SPARE PARTS LIST

Name of Part	*Part Number*
Glass Cover	RG302
Ring gasket	NW121
Ring	ND1748A
Pointer Assembly	RA1807

MANNING, MAXWELL & MOORE
A DIVISION OF DRESSER INDUSTRIES INC.
STRATFORD CONNECTICUT

Form Number 250-1089-B

Printed in U. S. A.

ATTACHMENT 2

E-SYSTEM SNUBBER BILL OF MATERIAL INFORMATION

DOCUMENT NO.	TITLE	COMMENTS
P401D-VARS-001, REV. 1 P401D-VARS-002, REV. 1 P401D-VARS-003, REV. 1 P401D-VARS-004, REV. 1 P401D-VARS-005, REV. 1 P401D-VARS-006, REV. 1	E.Q.MSIS FOR E-SYSTEM SNUBBER	
DWG NO. 157507, REV. B (P401D(Q)-18(1)-2, 18 SHEETS) (P401D(Q)-18(2)-2, 2 PARTS) (P401D(Q)-18(3)-2, 1 SHEET)	SNUBBER ASSEMBLY 70KIP	NON-METALLIC MATERIAL INFORMATION MARKED
DWG NO. 152055, REV. F	VALVE ASSEMBLY	
P401D(Q)-1(1)-1, REV. A	TEST REPORT ON NON-METALLIC SEAL MATERIAL FOR USE IN SNUBBERS	
P401D(Q)-1(9)-1	PRODUCT QUALIFICATION REPORT, VOLUME 9 OF 9, REVISION STATUS OF SNUBBER DRAWINGS	MATERIAL LIST PROVIDED ON PAGE 13 & 14

EQMS NO.: P401D-VARS-001
REF. NO.: MS-P401D -BB -H-VARS -001
REV. NO.: 1
SHEET 1 of 3

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Safety Related System Nuclear Boiler & Recirc. Environment: Harsh [X] Mild [ ]
Component Tag No. 1BB 013 H06, 1BB 013 H07, 1BB 013 H08, 1BB 013 H09, 1BB 014 H06, 1BB 014 H07, 1BB 014 H08, 1BB 014 H09 P.O. No. P401D(Q)
Component Name: Hydraulic Snubbers

Type of Component: Electrical [ ] Mechanical [X]

Type of Replacement: Total [ ] Subcomponent [X] NA [ ]
Component: Qualified Life 40 years Vendor E-Systems, Inc. Montek Division Model 152003 (30 KIP Rating)

Subcomponent:

	Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
1.	Non-Extrusion Rings for T-Seals/Cotton Fabric with Phenolic Binder	See Note 1	L-P-590	5 years	1,2
2.	Thread Lubricant/Dow Corning #505	Dow Corning	Molykote 505 Paste	See Note 4	3,4
3.	Non-Extrusion Rings for Piston T-Seal/Unfilled Polyamide (6/6 Nylon)	See Note 1	910901-103	5 years	1,2
4.	Loctite/Loctite Compound AV	Loctite Corp.	#87(AV)	5 years	5
5.	Hydraulic Fluid/Silicone Snubber Fluid	General Eectric	SF1154	5 years	2,9
6.	Poly-Pak (Scraper)/Ethylene Propylene	See Note 6	25001750-4207	4 years	6,7,8
7.	T-Seal(Piston)/Ethylene Propylene	See Note 1	910901-103	4 years	1,7,8
8.	T-Seal Rod/Ethylene Propylene	See Note 1	105327009520041	4 years	1,7,8
9.	T-Seal Piston(RESVR)/Ethylene Propylene	See Note 1	104346009520041	4 years	1,7,8
10.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-017-E652-90	4 years	6,7,8
11.	BackUp Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-240-E652-90	4 years	6,7,8
12.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-116-E652-90	4 years	6,7,8
13.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-113-E652-90	4 years	6,7,8
14.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-109-E652-90	4 years	6,7,8

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent:

	Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
15.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-021-E652-90	4 years	6,7,8
16.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	3-906-E-740-75	4 years	6,7,8
17.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	3-904-E740-75	4 years	6,7,8
18.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-240-E740-75	4 years	6,7,8
19.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-116-E740-75	4 years	6,7,8
20.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-113-E740-75	4 years	6,7,8
21.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-109-E740-75	4 years	6,7,8
22.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-021-E740-75	4 years	6,7,8
23.	"O" Rings/Ethylene Propylene Parker Seal Co. Compound E740-75	See Note 6	2-017-3740-75	4 years	6,7,8

NOTES & SPECIAL REQUIREMENTS (MAINTENANCE/SUB COMP. DETAIL/OTHERS):

*Shelf Life, when given, is for when item is stored in accordance with product/manufacturer's printed requirements.

1. Vendors for this material are: a) Greene, Tweed and Co.; b) Parker Seal Co.
2. Shelf life* is not given.
3. Shelf life* is 18 months (Stored below 77°F).
4. Material used as a thread lubricant for assembly. Use whenever components are disassembled, whether required maintenance is performed or not.
5. Shelf life* is 1 year minimum (in original containers under 68° ± 20°F).
6. Vendors for this material are: a) DuPont (makes the resin); Final Fabricators: a) Parker Seals, "O" Ring Division; b) Precision Rubber Co.; c) Crane Packing Co.

EQMS NO.: P401D-VARS-001
REF. NO.: MS-P401D -BB -H-VARS -001
REV. NO.: 1
SHEET 3 of 3

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

7. Shelf life* is 15 years Uncompressed and 5 years Compressed.
8. Replace all soft seals every 4 years.
9. Check fluid level every 2 years.

REFERENCE INFORMATION:

DOCUMENT TITLE	DOC. NO.	REV.	DATE	PAGE NO.	REMARKS
Mechanical Equipment Environmental Qualification Report	MEQ-1	0	3-29-85	Appendices A,B,D,E P401D(Q) MDS-7,18, 21,22,298, 39	

PREPARED BY: J. Lisa DATE: 12/19/85 CHECKED BY: Samuel Eckhardt DATE: 12/20/85

az 7

EQMS NO.: P401D-VARS-002
REF. NO.: MS-P401D -AB -H-VARS -002
REV. NO.: 1
SHEET 1 of 3

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Safety Related System Main Steam Environment: Harsh [X] Mild [ ]
Component Tag No. 1AB 031 H04, 1AB 031 H07, 1AB 032 H04, 1AB 032 H07 P.O. No. P401D(Q)
Component Name: Hydraulic Snubbers

Type of Component: Electrical [ ] Mechanical [X]

Type of Replacement: Total [ ] Subcomponent [X] NA [ ]
Component: Qualified Life 40 years Vendor E-Systems, Inc. Montek Division Model 152005 (50 KIP Rating)

Subcomponent:

	Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
1.	Non-Extrusion Rings for T-Seals/Cotton Fabric with Phenolic Binder	See Note 1	L-P-590	5 years	1,2
2.	Thread Lubricant/Dow Corning #505	Dow Corning	Molykote 505 Paste	See Note 4	3,4
3.	Non-Extrusion Rings for Piston T-Seal/Unfilled Polyamide (6/6 Nylon)	See Note 1	910901-105	5 years	1,2
4.	Loctite/Loctite Compound AV	Loctite Corp.	#87(AV)	5 years	5
5.	Hydraulic Fluid/Silicone Snubber Fluid	General Eectric	SF1154	5 years	2,9
6.	Poly-Pak (Scraper)/Ethylene Propylene	See Note 6	25002250-4207	4 years	6,7,8
7.	T-Seal(Piston)/Ethylene Propylene	See Note 1	910901-105	4 years	1,7,8
8.	T-Seal Rod/Ethylene Propylene	See Note 1	105331009520041	4 years	1,7,8
9.	T-Seal Piston(RESVR)/Ethylene Propylene	See Note 1	104346009520041	4 years	1,7,8
10.	Backup Rings/Ethylene Propylene Parker Seal Co. Compound E652-90	See Note 6	8-017-652-90	4 years	6,7,8
11.	BackUp Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-427-E652-90	4 years	6,7,8
12.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-116-E652-90	4 years	6,7,8
13.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-113-E652-90	4 years	6,7,8
14.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-109-E652-90	4 years	6,7,8

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent:

	Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
15.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-021-E652-90	4 years	6,7,8
16.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	3-906-E-740-75	4 years	6,7,8
17.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	3-904-E740-75	4 years	6,7,8
18.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-427-E740-75	4 years	6,7,8
19.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-116-E740-75	4 years	6,7,8
20.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-113-E740-75	4 years	6,7,8
21.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-109-E740-75	4 years	6,7,8
22.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-021-E740-75	4 years	6,7,8
23.	"O" Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-017-E740-75	4 years	6,7,8

1. Vendors for this material are: a) Greene, Tweed and Co.; b) Parker Seal Co.
2. Shelf life* is not given.
3. Shelf life* is 18 months (Stored below 77°F).
4. Material used as a thread lubricant for assembly. Use whenever components are disassembled, whether required maintenance is performed or not.
5. Shelf life* is 1 year minimum (in original containers under 68° ± 20°F).
6. Vendors for this material are: a) DuPont (makes the resin); Final Fabricators: a) Parker Seals, "O" Ring Division; b) Precision Rubber Co.; c) Crane Packing Co.
7. Shelf life* is 15 years Uncompressed and 5 years Compressed.
8. Replace all soft seals every 4 years.
9. Check fluid level every 2 years.

EQMS NO.: P401D-VARS-002
REF. NO.: MS-P401D -AB -H-VARS -002
REV. NO.: 1
SHEET 3 of 3

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

REFERENCE INFORMATION:

DOCUMENT TITLE	DOC. NO.	REV.	DATE	PAGE NO.	REMARKS
Mechanical Equipment Environmental Qualification Report	MEQ-1	0	3-29-85	Appendices A,B,D,E P401D(Q) MDS-7,18, 21,22,29B, 39	

PREPARED BY: J. Lin DATE: 12/19/85 CHECKED BY: Samuel Lukins DATE: 12/20/85

az 10

EQMS NO.: P401D-VARS-003
REF. NO.: MS-P401D -BB -H-VARS -003
REV. NO.: 1
SHEET 1 of 3

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Safety Related System Nuclear Boiler & Recirc. Environment: Harsh [X] Mild [ ]

Component Tag No. 1BB 011 H02, 1BB 011 H03, 1BB 011 H07, 1BB 011 H08, 1BB 012 H02, 1BB 012 H03, 1BB 012 H07, 1BB 012 H08, 1BB 012 H09, 1BB 012 H10, 1BB 013 H01, 1BB 013 H04, 1BB 014 H01, 1BB 014 H04, 1BB 011 H09, 1BB 011 H10

P.O. No. P401D(Q)

Component Name: Hydraulic Snubbers

Type of Component: Electrical [ ] Mechanical [X]

Type of Replacement: Total [ ] Subcomponent [X] NA [ ]

Component: Qualified Life 40 years Vendor E-Systems, Inc. Montek Division Model 152005 (50 KIP Rating)

Subcomponent:

	Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
1.	Non-Extrusion Rings for T-Seals/Cotton Fabric with Phenolic Binder	See Note 1	L-P-590	5 years	1,2
2.	Thread Lubricant/Dow Corning #505	Dow Corning	Molykote 505 Paste	See Note 4	3,4
3.	Non-Extrusion Rings for Piston T-Seal/Unfilled Polyamide (6/6 Nylon)	See Note 1	910901-105	5 years	1,2
4.	Loctite/Loctite Compound AV	Loctite Corp.	#87(AV)	5 years	5
5.	Hydraulic Fluid/Silicone Snubber Fluid	General Eectric	SF1154	5 years	2,9
6.	Poly-Pak (Scraper)/Ethylene Propylene	See Note 6	25002250-4207	4 years	6,7,8
7.	T-Seal(Piston)/Ethylene Propylene	See Note 1	910901-105	4 years	1,7,8
8.	T-Seal Rod/Ethylene Propylene	See Note 1	105331009520041	4 years	1,7,8
9.	T-Seal Piston(RESVR)/Ethylene Propylene	See Note 1	104346009520041	4 years	1,7,8
10.	Backup Rings/Ethylene Propylene Parker Seal Co. Compound E652-90	See Note 6	8-017-E652-90	4 years	6,7,8
11.	BackUp Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-427-E652-90	4 years	6,7,8
12.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-116-E652-90	4 years	6,7,8
13.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-113-E652-90	4 years	6,7,8
14.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-109-E652-90	4 years	6,7,8

E.O. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent:

	Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
15.	Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-021-E652-90	4 years	6,7,8
16.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	3-906-E-740-75	4 years	6,7,8
17.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	3-904-E740-75	4 years	6,7,8
18.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-427-E740-75	4 years	6,7,8
19.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-116-E740-75	4 years	6,7,8
20.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-113-E740-75	4 years	6,7,8
21.	"O" Rings/Ethylene Propylene, Parker Seal Company Compound E740-75	See Note 6	2-109-E740-75	4 years	6,7,8
22.	"O" Rings/Ethylene Propiyene, Parker Seal Company Compound E740-75	See Note 6	2-021-E740-75	4 years	6,7,8
23.	"O" Rings/Ethylene Propiyene, Parker Seal Co. Compound E740-75	See Note 6	2-017-E740-75	4 years	6,7,8

NOTES & SPECIAL REQUIREMENTS (MAINTENANCE/SUB COMP. DETAIL/OTHERS):

*Shelf Life, when given, is for when item is stored in accordance with product/manufacturer's printed requirements.

1. Vendors for this material are: a) Greene, Tweed and Co.; b) Parker Seal Co.
2. Shelf life* is not given.
3. Shelf life* is 18 months (Stored below 77°F).
4. Material used as a thread lubricant for assembly. Use whenever components are disassembled, whether required maintenance is performed or not.
5. Shelf life* is 1 year minimum (in original containers under 68° ± 20°F).
6. Vendors for this material are: a) DuPont (makes the resin); Final Fabricators: a) Parker Seals, "O" Ring Division; b) Precision Rubber Co.; c) Crane Packing Co.

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

7. Shelf life* is 15 years Uncompressed and 5 years Compressed.
8. Replace all soft seals every 4 years.
9. Check fluid level every 2 years.

REFERENCE INFORMATION:

DOCUMENT TITLE	DOC. NO.	REV.	DATE	PAGE NO.	REMARKS
Mechanical Equipment Environmental Qualification Report	MEQ-1	0	3-29-85	Appendices A,B,D,E P401D(Q) MDS-7,18, 21,22,29B, 39	

PREPARED BY: J. Lin DATE: 12-19-85 CHECKED BY: Samuel Lebowitz DATE: 12/20/85

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EQMS NO.: P401D-VARS-004
REF. NO.: MS-P401D - AB -H- VARS -004
REV. NO.: 1
SHEET 1 of 4

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Safety Related System Main Steam Environment: Harsh [x] Mild [ ]

Component Tag No. 1AB 030 H02
1AB 030 H03
1AB 030 H04
1AB 030 H05
1AB 031 H02
1AB 031 H03
AB 031 H05
1AB 032 H02
1AB 032 H03
1AB 032 H05
1AB 033 H02
1AB 033 H03
1AB 033 H04
1AB 033 H05

P.O. No. P401D(Q)

Component Name: Hydraulic Snubbers

Type of Component: Electrical [ ] Mechanical [x]

Type of Replacement: Total [ ] Subcomponent [x] NA [ ]

Component: Qualified Life 40 Years Vendor E-Systems, Inc. Montek Division Model 152007 (70 KIP Rating)

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent:

	Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
1.	Non-Extrusion Rings for T Seals /Cotton Fabric with Phenolic Binder	See Note 1	L-P-590	5 Years	1,2
2.	Thread Lubricant/Dow Corning #505	Dow Corning	Molykote 505 Paste	See Note 4	3,4
3.	Non-Extrusion Rings for Piston T-Seal/Unfilled Polyamide (6/6 Nylon)	See Note 1	910901-107	5 Years	1,2

E.O. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent: Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
4. Loctite/Loctite Compound AV	Loctite Corp.	#87 (AV)	5 Years	5
5. Hydraulic Fluid/Silicone Snubber Fluid	General Electric	SF1154	5 Years	2,9
6. Poly-Pak (Scrapper)/ Ethylene Propylene	See Note 6	25002375-4207	4 Years	6,7,8
7. T-Seal Piston/ Ethylene Propylene	See Note 1	910901-107	4 Years	1,7,8
8. T-Seal Rod/Ethylene Propylene	See Note 1	105332009520041	4 Years	1,7,8
9. T-Seal Piston (RESVR)/ Ethylene Propylene	See Note 1	104346009520041	4 Years	1,7,8
10. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-017-E652-90	4 Years	6,7,8
11. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-434-E652-90	4 Years	6,7,8
12. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-116-E652-90	4 Years	6,7,8
13. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-113-E652-90	4 Years	6,7,8
14. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-109-E652-90	4 Years	6,7,8
15. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-021-E652-90	4 Years	6,7,8
16. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	3-906-E740-75	4 Years	6,7,8
17. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	3-904-E740-75	4 Years	6,7,8

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent: Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
18. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-434-E740-75	4 Years	6,7,8
19. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-116-E740-75	4 Years	6,7,8
20. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-113-E740-75	4 Years	6,7,8
21. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-109-E740-75	4 Years	6,7,8
22. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-021-E740-75	4 Years	6,7,8
23. 'O' Rings/Ethylene Propylene Parker Seal Co. Compound e740-75	See Note 6	2-017-E740-75	4 Years	6,7,8

NOTES & SPECIAL REQUIREMENTS (MAINTENANCE/SUB COMP. DETAIL/OTHERS):

*Shelf Life, when given, is for when item is stored in accordance with product/manufacturer's printed requirements.

1. Vendors for this material are: a) Greene, Tweed and Co.; b) Parker Seal Co.

2. Shelf life * is not given.

3. Shelf life * is 18 months (stored below 77°F).

4. Material used as a thread lubricant for assembly. Use whenever components are disassembled, whether required maintenance is performed or not.

5. Shelf life * is 1 year minimum (in original containers under 68° ± 20°F).

6. Vendors for this material are: a) DuPont (makes the resin); Final Fabricators: a) Parker Seals, 'O' Ring Division; b) Precision Rubber Co.; c) Crane Packing Co.

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS (CONT'D)

NOTES & SPECIAL REQUIREMENTS (MAINTENANCE/SUB COMP. DETAIL/OTHERS):

*Shelf Life, when given, is for when item is stored in accordance with product/manufacturer's printed requirements.

7. Shelf life * is 15 years uncompressed and 5 years compressed.

8. Replace all soft seals every 4 years.

9. Check fluid level every 2 years.

REFERENCE INFORMATION:

DOCUMENT TITLE	DOC. NO.	REV.	DATE	PAGE NO.	REMARKS
Mechanical Equipment Environmental Qualification Report	MEQ-1	0	3-29-85	Appendices A, B, D, E P401D(Q) MDS-7, 18, 21, 22, 29B, 39	

PREPARED BY: J. Lin DATE: 12-19-85 CHECKED BY: James G. Tebrugge DATE: 12/20/85

EQMS NO.: P401D-VARS-005
REF. NO.: MS-P401D - BB H- VARS -005
REV. NO.: 1

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Safety Related System Nuclear Boiler and Recirc. Environment: Harsh [x] Mild [ ]

Component Tag No. 1BB 013 H02
1BB 014 H02
P.O. No. P401D(Q)

Component Name: Hydraulic Snubbers

Type of Component: Electrical [ ] Mechanical [x]

Type of Replacement: Total [ ] Subcomponent [x] NA [ ]

Component: Qualified Life 40 Years Vendor E-Systems, Inc. Montek Division Model 152007 (70 KIP Rating)

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent:

	Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
1.	Non-Extrusion Rings for T Seals /Cotton Fabric with Phenolic Binder	See Note 1	L-P-590	5 Years	1,2
2.	Thread Lubricant/Dow Corning #505	Dow Corning	Molykote 505 Paste	See Note 4	3,4
3.	Non-Extrusion Rings for Piston T-Seal/Unfilled Polyamide (6/6 Nylon)	See Note 1	910901-107	5 Years	1,2

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent: Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
4. Loctite/Loctite Compound AV	Loctite Corp.	#87 (AV)	5 Years	5
5. Hydraulic Fluid/Silicone Snubber Fluid	General Electric	SF1154	5 Years	2,9
6. Poly-Pak (Scrapper)/ Ethylene Propylene	See Note 6	25002375-4207	4 Years	6,7,8
7. T-Seal Piston/ Ethylene Propylene	See Note 1	910901-107	4 Years	1,7,8
8. T-Seal Rod/Ethylene Propylene	See Note 1	105332009520041	4 Years	1,7,8
9. T-Seal Piston (RESVR)/ Ethylene Propylene	See Note 1	104346009520041	4 Years	1,7,8
10. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E-652-90	See note 6	8-017-E652-90	4 Years	6,7,8
11. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-434-E652-90	4 Years	6,7,8
12. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-116-E652-90	4 Years	6,7,8
13. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-113-E652-90	4 Years	6,7,8
14. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-109-E652-90	4 Years	6,7,8
15. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-021-E652-90	4 Years	6,7,8
16. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	3-906-E740-75	4 Years	6,7,8
17. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	3-904-E740-75	4 Years	6,7,8

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent: Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
18. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-434-E740-75	4 Years	6,7,8
19. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-116-E740-75	4 Years	6,7,8
20. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-113-E740-75	4 Years	6,7,8
21. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-109-E740-75	4 Years	6,7,8
22. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-021-E740-75	4 Years	6,7,8
23. 'O' Rings/Ethylene Parker Seal Co. Compound E740-75	See Note 6	2-017-E740-75	4 Years	6,7,8

NOTES & SPECIAL REQUIREMENTS (MAINTENANCE/SUB COMP. DETAIL/OTHERS):

*Shelf Life, when given, is for when item is stored in accordance with product/manufacturer's printed requirements.

1. Vendors for this material are: a) Greene, Tweed and Co.; b) Parker Seal Co.

2. Shelf life * is not given.

3. Shelf life * is 18 months (stored below 77°F).

4. Material used as a thread lubricant for assembly. Use whenever components are disassembled, whether required maintenance is performed or not.

5. Shelf life * is 1 year minimum (in original containers under 68° ± 20°F).

6. Vendors for this material are: a) DuPont (makes the resin); Final Fabricators: a) Parker Seals, 'O' Ring Division; b) Precision Rubber Co.; c) Crane Packing Co.

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS (CONT'D)

NOTES & SPECIAL REQUIREMENTS (MAINTENANCE/SUB COMP. DETAIL/OTHERS):

*Shelf Life, when given, is for when item is stored in accordance with product/manufacturer's printed requirements.

7. Shelf life * is 15 years uncompressed and 5 years compressed.

8. Replace all soft seals every 4 years.

9. Check fluid level every 2 years.

REFERENCE INFORMATION:

DOCUMENT TITLE	DOC. NO.	REV.	DATE	PAGE NO.	REMARKS
Mechanical Equipment Environmental Qualification Report	MEQ-1	0	3-29-85	Appendices A, B, D, E P401D(Q) MDS-7, 18, 21, 22, 29B, 39	

PREPARED BY: T. Fiss DATE: 12-19-85 CHECKED BY: Leonard Zukowski DATE: 12/20/85

EQMS NO.: P401D-VARS-006
REF. NO.: MS-P401D - BB -H- VARS -006
REV. NO.: 1
SHEET 1 of 4

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Safety Related System Nuclear Boiler & Recirc. Environment: Harsh [X] Mild [ ]

Component Tac No. 1BB 011 H11
1BB 011 H12
1BB 011 H13
1BB 011 H14
1BB 012 H11
1BB 012 H12
1BB 012 H13
1BB 012 H14

P.O. No. P401D(Q)

Component Name: Hydraulic Snubbers

Type of Component: Electrical [ ] Mechanical [X]

Type of Replacement: Total [ ] Subcomponent [X] NA [ ]

Component: Qualified Life 40 Years Vendor E-Systems, Inc. Montek Division Model 152010 (100 KIP Rating)

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent:

	Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
1.	Non-Extrusion Rings for T Seals /Cotton Fabric with Phenolic Binder	See Note 1	L-P-590	5 Years	1,2
2.	Thread Lubricant/Dow Corning #505	Dow Corning	Molykote 505 Paste	See Note 4	3,4
3.	Non-Extrusion Rings for Piston T-Seal/Unfilled Polyamide (6/6 Nylon)	See Note 1	910901-110	5 Years	1,2

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent: Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
4. Loctite/Loctite Compound AV	Loctite Corp.	#87 (AV)	5 Years	5
5. Hydraulic Fluid/Silicone Snubber Fluid	General Electric	SF1154	5 Years	2,9
6. Poly-Pak (Scraper)/ Ethylene Propylene	See Note 6	25003375-4207	4 Years	6,7,8
7. T-Seal Piston/ Ethylene Propylene	See Note 1	910901-110	4 Years	1,7,8
8. T-Seal Rod/Ethylene Propylene	See Note 1	105340009520041	4 Years	1,7,8
9. T-Seal Piston (RESVR)/ Ethylene Propylene	See Note 1	104346009520041	4 Years	1,7,8
10. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-017-E652-90	4 Years	6,7,8
11. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-441-E652-90	4 Years	6,7,8
12. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-116-E652-90	4 Years	6,7,8
13. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-113-E652-90	4 Years	6,7,8
14. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-109-E652-90	4 Years	6,7,8
15. Backup Rings/Ethylene Propylene, Parker Seal Co. Compound E652-90	See Note 6	8-021-E652-90	4 Years	6,7,8
16. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	3-906-E740-75	4 Years	6,7,8
17. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	3-904-E740-75	4 Years	6,7,8

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS

Subcomponent: Name/Material	Vendor	I.D./Part No.	Qualified Life	Notes
18. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-434-E740-75	4 Years	6,7,8
19. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-116-E740-75	4 Years	6,7,8
20. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-113-E740-75	4 Years	6,7,8
21. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-109-E740-75	4 Years	6,7,8
22. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E740-75	See Note 6	2-021-E740-75	4 Years	6,7,8
23. 'O' Rings/Ethylene Propylene, Parker Seal Co. Compound E-740-75	See Note 6	2-017-E740-75	4 Years	6,7,8

NOTES & SPECIAL REQUIREMENTS (MAINTENANCE/SUB COMP. DETAIL/OTHERS):

*Shelf Life, when given, is for when item is stored in accordance with product/manufacturer's printed requirements.

1. Vendors for this material are: a) Greene, Tweed and Co.; b) Parker Seal Co.

2. Shelf life * is not given.

3. Shelf life * is 18 months (stored below 77°F).

4. Material used as a thread lubricant for assembly. Use whenever components are disassembled, whether required maintenance is performed or not.

5. Shelf life * is 1 year minimum (in original containers under 68° ± 20°F).

6. Vendors for this material are: a) DuPont (makes the resin); Final Fabricators: a) Parker Seals, 'O' Ring Division; b) Precision Rubber Co.; c) Crane Packing Co.

E.Q. MAINTENANCE AND SURVEILLANCE INFORMATION SHEET FOR HCGS (CONT'D)

NOTES & SPECIAL REQUIREMENTS (MAINTENANCE/SUB COMP. DETAIL/OTHERS):
*Shelf Life, when given, is for when item is stored in accordance with product/manufacturer's printed requirements.

7. Shelf life * is 15 years uncompressed and 5 years compressed.

8. Replace all soft seals every 4 years.

9. Check fluid level every 2 years.

REFERENCE INFORMATION:

DOCUMENT TITLE	DOC. NO.	REV.	DATE	PAGE NO.	REMARKS
Mechanical Equipment Environmental Qualification Report	MEQ-1	0	3-29-85	Appendices A, B, D, E P401D(Q) MDS-7, 18, 21, 22, 29B, 39	

PREPARED BY: J. Lin DATE: 12-19-85 CHECKED BY: Samuel [signature] DATE: 12/20/85

FEB 08 B83

SUPPLIER DOCUMENT REVIEW

1. [X] WORK MAY PROCEED PER PO/CONTRACT PROVISIONS.
2. [ ] WORK MAY PROCEED AND FINAL DRAWING BE SUBMITTED PER PO/CONTRACT PROVISIONS.
3. [ ] REVISE AND RESUBMIT. WORK MAY PROCEED PER PO/CONTRACT PROVISIONS SUBJECT TO INCORPORATION OF CHANGES INDICATED.
4. [ ] REVISE AND RESUBMIT. WORK MAY NOT PROCEED.
5. [ ] REVIEW NOT REQUIRED. WORK MAY PROCEED PER PO CONTRACT PROVISIONS.

PERMISSION TO PROCEED DOES NOT CONSTITUTE ACCEPTANCE OR APPROVAL OF DESIGN DETAILS, CALCULATIONS, ANALYSES, TEST METHODS OR MATERIALS DEVELOPED OR SELECTED BY THE SUPPLIER AND DOES NOT RELIEVE SUPPLIER FROM FULL COMPLIANCE WITH CONTRACTUAL OBLIGATIONS.

REVIEWED	A	C	E	F	M	P	Q	JOB NO 10855
						X		

BY [signature] DATE 2-24-83

BECHTEL POWER CORPORATION

DISTRIBUTION

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JOB NO. 10855
BECHTEL POWER CORPORATION
SAN FRANCISCO

FOR INFORMATION ONLY

10855-P401D (Q)-18(1)-2

QUALITY DOC CATEGORY 1.1

DRAWING NO. 157507 Rev. B

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
–	RELEASE FOR PRODUCTION PER ER 00411	10-28-82	E Wms
A_1	EFFECTIVE----------	12-3-82	E Wms
B_1	EFFECTIVE ---------	10-22-82	E Wms

A. PUBLIC SERVICE ELECTRIC & GAS CO.
HOPE CREEK GENERATING STATION
UNIT NO. 1
RECIRCULATION & MAIN STEAM

B. PURCHASE ORDER NO.: 10855-P-401D (Q)-AC

C. MARK NO.: 1-AB-030-H02, 1-AB-030-H03,
1-AB-030-H04, 1-AB-030-H05,
1-AB-031-H02, 1-AB-031-H03,
1-AB-031-H05, 1-AB-032-H02,
1-AB-032-H03, 1-AB-032-H05,
1-AB-033-H02, 1-AB-033-H03,
1-AB-033-H04, 1-AB-033-H05,
1-BB-013-H02, 1-BB-014-H02

E-SYSTEMS
Montek Division
2268 South 3270 West
Salt Lake City, Utah 84119

THIS DRAWING IS HEREBY CERTIFIED
AS CORRECT AT B REVISION

E. Williams — PROJECT ENGINEER
10-22-82 — DATE

CONTRACT NO	
DRAWN	R.C.C. 22 Oct 80
CHECKED	E Wms 10-28-82
MECH	[illegible] 10-28-82
ELECT	[illegible] 10-28-82
PROJ ENG	[illegible] 10-28-82
[illegible]	[illegible] 10-28-82
APPROVED	DATE
APPROVED BY (OTHERS)	DATE

E-SYSTEMS
Montek Division
2268 SOUTH 3270 WEST
SALT LAKE CITY, UTAH 84119
PHONE (801) 973-4300

SNUBBER ASSEMBLY
70 KIP

DWG SIZE	CODE IDENT NO		REV
A	19156	157507	B

RECORD OF CURRENT REVISIONS – ALL SHEETS																	
SHEET	1	1a	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SYM	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

RECORD OF CURRENT REVISIONS – ALL SHEETS																	
SHEET	17	18	19	20													
SYM	B	A	A	A													

RECORD OF CURRENT REVISIONS – ALL SHEETS																	
SHEET																	
SYM																	

RECORD OF CURRENT REVISIONS – ALL SHEETS																	
SHEET																	
SYM																	

RECORD OF CURRENT REVISIONS – ALL SHEETS																	
SHEET																	
SYM																	

DWG SIZE	CODE IDENT NO		REV.
A	19156	157507	B

QUANTITY REQUIRED	ZONE	ITEM	CODE IDENT	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-PISTON	152107-100		107
1				CLEVIS-FIXED	152125-001		119
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-36.0FC		5, 11
-36.0FC							
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-PISTON	152107-100		107
1				END FITTING ASSY-FIXED	152078-131		126
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-34.5F		5, 11
-34.5F							
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-PISTON	152107-100		107
1				END FITTING ASSY-FIXED	152078-130		126
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-31.5F		5, 11
-31.5F							

DWG SIZE A | CODE IDENT NO 19156 | 157507 | SHEET 2 | REV A

QUANTITY REQUIRED	ZONE	ITEM	CODE IDENT	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE
1				NUT JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				END FITTING	152137-024		119
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-43		5, 11
-43							
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-100		107
1				ROD END ASSY-PISTON	152107-100		107
1				END FITTING	152137-023		119
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-40		5, 11
-40							
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-100		107
1				ROD END ASSY-PISTON	152107-100		107
1				END FITTING	152137-021		119
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-38.5		5, 11
-38.5							

DWG SIZE A | SCALE | CODE IDENT NO 19156 | 157507 | SHEET 3 | REV A

QUANTITY REQUIRED	ZONE	ITEM	CODE IDENT	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-208		106
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-55		5, 11
-55							
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-210		106
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-51		5, 11
-51							
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-209		106
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-47		5, 11
-47							

SIZE A | DWG NO 157507 | REV A | SHEET 4 | CODE IDENT NO 19156

QUANTITY REQUIRED	ZONE	ITEM	CODE IDENT	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-212		106
1				COMMON PARTS	157507-900		
1				SNUBBER ASSY	157507-67		5, 11
-67							
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-207		106
1				COMMON PARTS	157507-900		
1				SNUBBER ASSY	157507-63		5, 11
-63							
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-211		106
1				COMMON PARTS	157507-900		
1				SNUBBER ASSY	157507-59		5, 11
-59							

SIZE A | CODE IDENT NO. 19156 | 157507 | SHEET 5 | REV A

QUANTITY REQUIRED	ZONE	ITEM	CODE IDENT	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT EXTENSION	152157-215		106
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-79		5, 11
-79							
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT EXTENSION	152157-214		106
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-75		5, 11
-75							
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-213		119
1				COMMON PARTS	157507-900		
/				SNUBBER ASSY	157507-71		5, 11
-71							

SIZE A | DWG NO 157507 | REV A | SHEET 6 | CODE IDENT NO 19156

QUANTITY REQUIRED	ZONE	ITEM	CODE IDENT	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-218		106
1				COMMON PARTS	157507-900		
/ -91				SNUBBER ASSY	157507-91		5, 11
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-217		106
1				COMMON PARTS	157507-900		
/ -87				SNUBBER ASSY	157507-87		5, 11
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-216		106
1				COMMON PARTS	157507-900		
/ -83				SNUBBER ASSY	157507-83		5, 11

SIZE	DWG NO	REV
A	157507	A

CAGE NO. 19156

SHEET 7

QUANTITY REQUIRED	ZONE	ITEM	CODE IDENT	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-220		106
1				COMMON PARTS	157507-900		
/ -99				SNUBBER ASSY	157507-99		5, 11
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				ROD END ASSY-ADJUST	152117-101		107
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152157-219		106
1				COMMON PARTS	157507-900		
/ -95				SNUBBER ASSY	157507-95		5, 11

SIZE A | CODE IDENT NO 19155 | DWG NO 157507 | REV A | SHEET 8

QUANTITY REQUIRED	ZONE	ITEM	CODE IDENT	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE
1				NUT-JAM	910656-116		122
1				LOCKWASHER	152196-007		101, 134
1				POSITION INDICATOR ASSY	152187-100		127
1				CLEVIS	152122-024		118
1				ROD END ASSY-PISTON	152107-100		107
1				WELDMENT-EXTENSION	152137-021		106
1				COMMON PARTS	157507-900		
1				SNUBBER ASSY	157507-45C		5, 11

-45C

DWG 157507 | CODE IDENT NO 19156 | SIZE A | REV A | SHEET 9

1			NUT-JAM	910656-116	122
1			LOCKWASHER	152196-007	101, 134
1			POSITION INDICATOR-ASSY	152187-100	127
1			CLEVIS	152122-025	118
1			ROD END ASSY-PISTON	152107-100	107
1			WELDMENT-EXTENSION	152157-201	106
1			COMMON PARTS	157507-900	
/			SNUBBER ASSY	157507-75.3C3	5, 11
-75.3C3					
	1		NUT-JAM	910656-116	122
	1		LOCKWASHER	152196-007	101, 134
	1		POSITION INDICATOR ASSY	152187-100	127
	1		CLEVIS	152122-021	118
	1		ROD END ASSY-PISTON	152107-100	107
	1		WELDMENT-EXTENSION	152157-201	106
	1		COMMON PARTS	157507-900	
	/-75.3C2		SNUBBER ASSY	157507-75.3C2	5, 11
		1	NUT-JAM	910656-116	122
		1	LOCKWASHER	152196-007	101, 134
		1	POSITION INDICATOR ASSY	152187-100	127
		1	CLEVIS	152122-022	118
		1	ROD END ASSY-PISTON	152107-100	107
		1	WELDMENT-EXTENSION	152157-201	106
		1	COMMON PARTS	157507-900	
		/	SNUBBER ASSY	157507-75.3C1	5, 11
		-75.3C1			

DWG A CODE IDENT NO

1	NUT-JAM	910656-116	122
1	LOCKWASHER	152196-007	101, 134
1	POSITION INDICATOR ASSY	152187-100	127
1	CLEVIS	152122-021	118
1	ROD END ASSY-PISTON	152107-100	107
1	WELDMENT-EXTENSION	152157-203	106
1	COMMON PARTS	157507-900	
/	SNUBBER ASSY	157507-94.3C	5, 11

-94.3C

1	NUT-JAM	910656-116	122
1	LOCKWASHER	152196-007	101, 134
1	POSITION INDICATOR ASSY	152187-100	127
1	CLEVIS	152122-023	118
1	ROD END ASSY-PISTON	152107-100	107
1	WELDMENT-EXTENSION	152157-202	106
1	COMMON PARTS	157507-900	
/	SNUBBER ASSY	157507-84.7C2	5, 11

-84.7C2

ZONE	ITEM	CODE	NOMENCLATURE OR DESCRIPTION	PART OR	SPECIFICATION	MATERIAL
	2		PLUG-SEAL	910648-006	114	
	1		PLUG-SEAL	910648-004	114	
	4		SCREW-DRIVE	910647-050	101, 128	
	4		BOLT	910657-001	121	
	2		BOLT	910657-010	121	
	8		WASHER 1-1/4	910645-009	123, 101	
	2		WASHER 1/2	910645-003	123, 101	
	4/AR		WASHER 1/4	910645-001	123, 101	
	8		NUT	910656-009	122	
	1		NUT-JAM	910656-202	122	
	1		RETAINER SEAL	152066-001	114	
	1		RESERVOIR INDICATOR	152238-007	101, 131	
	4		TIE BOLT	152451-022	121B	
	1		CLIP RETAINER	152237-003	133	
	1		RETAINER RING	152234-002	101, 112	
	1		BAYONET	152231-001	114	
	1		RETAINER-RESVR	152830-002	133	
	1		PISTON & BEARING-RESVR	152226-001	101, 110	
	1		RESERVOIR-HOUS	152822-002	130, 133	
	1		SEAL-SHUT OFF	152195-001	114	
	1		CYLINDER-MAIN	152092-017	116	
	1		RETAINER THREADED	152067-001	114	
	1		VALVE ASSY	152055-107	102	
	1		PORTING TUBE	152048-004	116	
	1		NAMEPLATE	152045-057	101, 120	
	1		SPRING-RESVR	152040-009	101, 112	
	1		SPRING-RESVR	152040-008	101, 112	
	1		SPRING-RESVR	152040-007	101, 112	
	1		PISTON & ROD	152037-001	111	
	1		DAM ASSY-CENTER	152031-101	105	
	1		DAM ASSY	152024-101	104	
	\		COMMON PARTS	157507-900		

		ZONE	ITEM	CODE IDENT	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE
AR					LUBRICANT	MOLYKOTE 505 PASTE		101
AR					FLUID	SF1154		101
2					BACK-UP RING	8-434-E652-90		101, 2
2					BACK-UP RING	8-116-E652-90		101, 2
2					BACK-UP RING	8-113-E652-90		101, 2
1					BACK-UP RING	8-109-E652-90		101, 2
3					BACK-UP RING	8-021-E652-90		101, 2
2					O-RING	3-906-E740-75		101, 2
1					O-RING	3-904-E740-75		101, 2
2					O-RING	2-434-E740-75		101, 2
2					O-RING	2-116-E740-75		101, 2
2					O-RING	2-113-E740-75		101, 2
1					O-RING	2-109-E740-75		101, 2
3					O-RING	2-021-E740-75		101, 2
2					POLY-PAK (SCRAPER)	25002375-420/	w/E740-75 O-RING	101, 2
1					T-SEAL PISTON	910901-107		101, 2, 12
2					T-SEAL ROD	105332009520041		101, 2, 10
1					T-SEAL PISTON	104366009520041		101, 2, 10
/					COMMON PARTS-CONT'D	157507-900		

DWG SIZE	CODE IDENT NO	DWG NO
A	19156	157507

REVISIONS			
LTR	DESCRIPTION	DATE	APPROV

NOTES:

Fill, bleed, rig and acceptance test snubber assy per Spec. 157507-410.

All parts except non-metallic seals shall be thoroughly degreased, washed and cleaned in freon or equivalent prior to assembly.

Lightly lubricate all internal threads with SF 1154 fluid on assembly.

Clean and lubricate all seals with SF 1154 fluid on assembly.

1. Apply loctite compound AV per MIL-S-22473D to 152107 rod end threads, 152037 piston threads and threads and shank of noted bolts and mating threaded holes. Torque per F/D.

2. Noted non-metallic seals to be procured per Spec. 910641-001.

3. After fill and bleed procedure per 157507-410, insure 152195 shut-off seal is backed off one half turn from seated position. Torque jam nut per F/D.

4. Fully retract snubber, install 152187 position indicator with 2-1/2 inch posi mark aligned with edge of housing. Torque jam nut per F/D.

5. All external surfaces of carbon steel components shall be painted unless note in accordance with Spec. 940017-001. Do not paint:

   152078 Fixed End Fitting
   Rod End Bearings
   152195 Shut-Off Seal
   152226 Reservoir Piston/Bearing
   Clevis Pin Holes of 152122 & 152125

6. Metal stamp applicable data on nameplate per next assembly installation drawi prior to assembly per 940001-001.

7. Lubricate noted threads, both external and internal, including bolt shanks lightly, but thoroughly, with Dow Corning Molykote 505 paste lubricant.

8. Tie bolts (1) and (4) are threaded into 152031 Center Dam Assy. Apply torqu in 200 ft. lb. increments in the following sequence. Both nuts on tie bolt bo.h nuts on tie bolt (4); either nut of tie bolt (2); either nut of tie bol (3). Repeat sequence until all nuts are tightened to required torque and 1. ± .06 dimension is met. Remove torque from nuts in same sequence and increm except nut at end dam (152024) on tie bolt (1) and (4) may be left at 300 ft lb torque to retain assembly when changing end fittings of snubber.

9. Lubricate noted faying surfaces lightly, but thoroughly, with Molykote 505 paste lubricant on assembly.

DWG	CODE IDENT NO	
A SIZE	19156	157507
SCALE		SHEET 14

PART OR IDENTIFYING NO. | SPECIFICATION | MATERIAL OR NOTE
NOMENCLATURE OR DESCRIPTION
CODE IDENT
ITEM
ZONE

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

10. The following alternate parts may be used instead of part no. shown in L/M. See notes 2 and 101.

Part No. Per L/M	Alternate Part No.
104346009520041	608PS346-0-4248
105332009520041	608RT332-0-4248

11. See next assembly installation drawing prior to filling and bleeding to determine if "test in place" option is required. If test in place valves are required they must be installed prior to filling, bleeding and testing in accordance with instructions on installation drawing.

12. Seal back-up rings are one piece construction. Install T-Seal in piston groove. Stabilize piston with T-Seal installed and the two back-up rings at 250°F ± 20°F for two hours maximum. Carefully stretch back-up rings over piston head into place on T-Seal while parts are at elevated temperature. Allow assembly to cool. Back-up rings will contract to original size. Acceptable alternate methods of installation will be approved by Engineering when properly documented.

SEE E.C. 00411.2.502 SF

10855-P401-DQ-1(9)-1 JL 1-13-85

DWG SIZE A	CODE IDENT NO 19156	157507
SCALE		SHEET 15

REV A

REVISIONS			
LTR	DESCRIPTION	DATE	APPROV

MATERIAL NOTES

100. Weld shown on F/D is done in detail not on assy. Welding is in accordance with ASME Code Section III, Subsection NF and Section IX for Class 1 Linear Type Supports. 100% penetration required. Examination is per Section III, Subsect NF, Article NF-5000. ASME Code requirements are limited to 1977 edition including addenda thru winter of 1977.

101. Noted parts are exempt per ASME Code Section III, Subsection NF paragraph 2121(

102. See drawing 152055 Valve Assembly for materials. All parts of valve assembly except 152063 sleeve are exempt per note 101.

103. All parts not exempt per note 101 are made from (1) ASME material conforming to 1977 edition of Section II of ASME Code including addenda thru winter of 1977 or (2) equivalent ASTM material certified by E-Systems to conform to ASME material specification or (3) approved material per Code Case 1644-8.

104. 152024 contains (1) dam material per note 108 and (2) bearing material per note 109 exempt per note 101.

105. 152031 dam assembly contains(1) dam material per note 108 and (2) bearing material per note 109 exempt per note 101 and (3) two Lee Jet orifice assembli and Lee Plug made of stainless steel construction exempt per note 101.

106. 152157 Weldment Extension Assy contains (1) end fitting material per note 108 and (2) threaded adapter material per note 108 and (3) pipe material per note 113 or 125. Weld is in accord with note 100.

107. 152107 and 152117 Rod End Assys contain (1) rod end material per note 117 and (2) spherical ball bearing material per note 124 exempt per note 101.

108. Make from ASME SA-36 including supplemental requirement S2 and normalized. See note 103.

109. Make from aluminum bronze casting per ASME SB-148 alloy no. 954 heat treated; or make from ASME-SB-150 alloy 642 bar.

110. Make from aluminum bronze casting per ASME SB-148 alloy no. 952 or 954 (as cast or make from ASME-SB-150 alloy 642 bar.

111. Make from AISI 4340 forging per ASTM A 668-72 Class M. See note 103. Induction harden rod diameters to a depth of .050 to .090 inches R_C 50-54. Chrome plate rod diameters per QQ-C-320 Type 1, CL1.

DWG SIZE	CODE IDENT NO	
A	19156	152507
SCALE		SHEET 16

112. Make from 17-7PH per AMS 5673.

113. Make from pipe per ASME SA-53 Grade B, Type S, black finish. See Note 103.

114. Make from 17-4PH stainless steel per ASME SA-564 Type 630. See Note 103.

115. Make from casting per ASME SA-351 Grade CF8 or CF8M or from barstock per ASME SA 479 Type 304. See Note 103.

116. Make from seamless mechanical tubing per ASTM A519-76 Grade 1018 CW or Grade 1022 CW. See Note 103.

117. Make from AISI 4340 forging per ASTM A668-72 Class M. See Note 103.

118. Make from casting per ASTM A148-73 Grade 150-125 or make from ASME SA-540 Grade B23 (E4340H) Class 2 or Grade B24 (4340 Mod) Class 2. See Note 103.

119. Make from casting per ASME SA-216 Grade WCB, or make from ASME SA-36 includir supplemental requirements S2 and normalized. See Note 103.

120. Make from 3003 aluminum, alloy temper O.

121. This bolt shall conform dimensionally with ANSI Standard B18.2.1-72 for Hex Cap Screws (Finished Hex Bolts). Bolts shall be supplied without nuts or washers. No welding is permitted. Material, fabrication, and inspection shall conform to one of the following (A, B, or C):

A) Material composition per AISI 4037 or 4340. Fabrication and inspection per ASME SA 354 Grade BD.

B) Material composition per AISI 4135, 4140 or 4340 in accordance with ASME Code Case 1644-8. Fabrication and inspection per ASTM A490-76a. Tensil specimens in accordance with Supplement III of ASTM A370 or full size proof loading per ASTM A490-76a shall be used to certify mechanical properties.

C) Material, fabrication and inspection per ASTM A307-76b Grade A.

122. A) All nuts -001 thru -015 and -101 thru -129 shall be identical to those covered by ASTM A194-76 Grade 2H, including supplementary requirement S6 suitable for use as specified in ASTM A490-76a. Nuts shall be scale free, bright finish.

B) -201 nuts shall be identical to those covered by ASTM A194 Grade 2 or 2H or from material conforming to ASTM A307. These nuts are used in a sub-assembly that is exempt per Note 101.

C) -202 nuts shall be identical to those covered by ASTM A194 Grade 2H, including supplementary requirement S6, suitable for use as specified i ASTM A490-76a, or ASTM A307-76b Grade A except no welding is permitted. Nuts shall be scale, free, bright finish.

123. Material: Steel conforming to the requirements for quenched and tempered washers (non-carburized) as covered in ASTM Specification A-325. Washers

will be unplated and shall have a hardness of Rockwell C38 to C45.

124. Spherical Ball Bearing Material: Spherical ball 440C per AMS 5630 (R_c 55 min); outer race 17-4PH per AMS 5643, outer race and ball bore shall be dry-filmed with a coating that can withstand radiation environments and operational environment specified in 9IQ642 specification.

125. Make from ASME SA106 Steel Pipe, Grade B. See note 103.

126. 152078 contains (1) lug end material per note 115 and (2) spherical ball bearing material per note 124 exempt per note 101.

127. 152187 assy is exempt per note 101 and contains (1) strap material per note 136 and (2) bolt with material per note 121 and (3) nut with material per note 122B and (4) washer with material per note 123.

128. Material: CRES 18-8 or 16-18 AISI Type 302, 303, 304, 305, or 384.

129. Deleted.

130. Plate bore diameter per QQ-C-320, Type 1, Class 1.

131. Make from ASME SA 479 Grade 302 or 304.

132. Make from ASME SA-36. See note 103.

133. Make from ASME SA-36 or AISI 1018 CW per ASTM A108-73. See note 103.

134. Make from ASTM A569-72 or A570-72 Grade A or ASTM A167-74 or ASTM A240-75a Type 302 or 304.

135. Make from AISI 4140 or 4340 forging per ASTM A668-72 Class L or make from casting per ASTM A 148-73 Grade 105-85. See note 103.

136. Make from ASTM A569-72 or A570-72 Grade A.

OVERSIZE DOCUMENT PAGE PULLED

SEE APERTURE CARDS

NUMBER OF PAGES: 3

ACCESSION NUMBER(S):

8601090313-01
dupe of 8504090404
dupe of 8504090407

APERTURE CARD/HARD COPY AVAILABLE FROM RECORD SERVICES BRANCH, TIDC
FTS 492-8989

NOTES:(MATERIAL)
50:

51:

52. DELETED

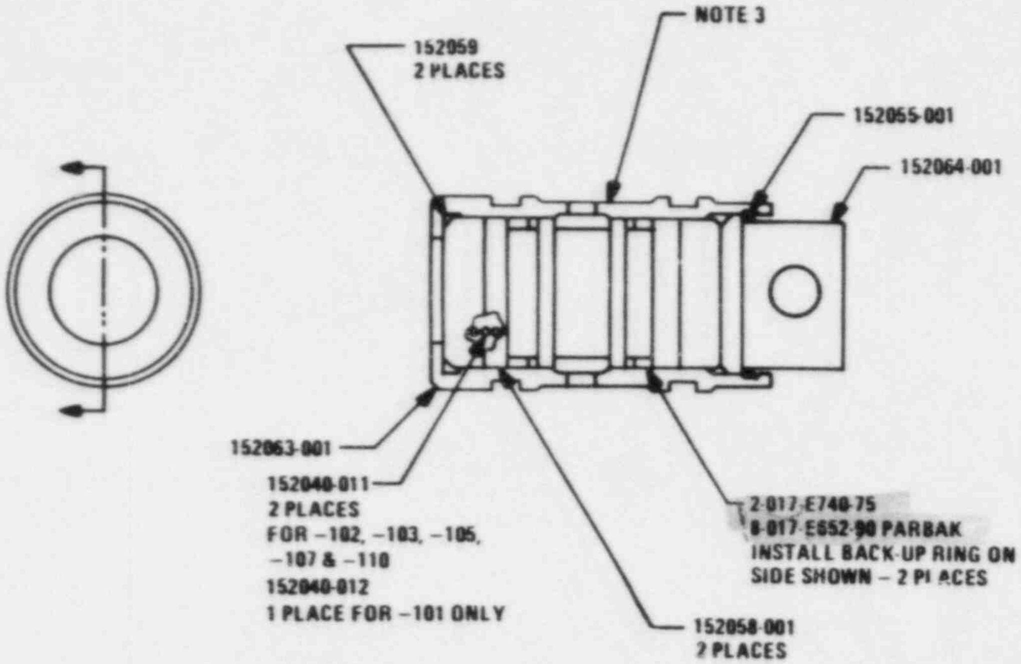
53.
54. MATERIAL:
A.

B.

55.

NOTES:
1. ACCEPTANCE TEST AFTER ASSY PER 152055-410.
2. COAT ALL PARTS WITH SF 1154 FLUID PRIOR TO ASSY.
3. AFTER ASSY AND TESTING, IDENTIFY WITH PART NO., DASH NO. AND SERIAL NO. IN AREA INDICATED PER 940001-001 TYPE II, VIBRATING PENCIL.
4. O-RINGS AND BACK-UP RINGS SHALL BE PROCURED IN ACCORDANCE WITH SPECIFICATION 910641-001.

	A	INITIAL RELEASE AT A REV PER CR 00411 FOR PRODUCTION		
	B	EFFECTIVE S/N 1 AND ON		
	B	EFFECTIVE S/N 1 AND ON		
	C	EFFECTIVE S/N 1 AND ON		
	D	EFFECTIVE S/N 1 AND ON		
	E	EFFECTIVE S/N 1 AND SUBQ		
	F	EFFECTIVE S/N 1 AND SUBQ		



SEMBLANCE

This drawing is a copy of the owners approved and certified drawing from which the material notes and non-pertinent dimensions have been removed. See the Owner's approved and certified drawing if additional material or dimensional data is required.

1	1	1	1	1	1	37		RETAINER WIRE	-001	NOTE 53
						36				
						35				
						34				
						33				
						32				
						31				
2	2	2	2	2	2	30	83259	BACK-UP RING	8-017-E652-90 PAR BAK	NOTE 4
2	2	2	2	2	2	29	83259	O-RING	2-017-E740-75	NOTE 4
						28				
					1	27		SPRING	152040-012	NOTE 55
2	2	2	2	2		26		SPRING	152040-011	NOTE 50
						25				
						24				
2	2	2	2	2	2	23		SEAT-SEAL	152058-001	NOTE 51
						22				
						21				
1	1	1	1	1	1	20		RETAINER - SEAT	152064-001	NOTE 54
1	1	1	1	1	1	19		SLEEVE - VALVE	152063-001	NOTE 54
						18				
						17				
2						16		MATCHED ASSY - POPPET & RETAINER	152059-110	NOTES 51 & 54
	2					15			152059-107	
		2				14			152059-105	
			2			13			152059-103	
				2		12			152059-102	
					2	11		MATCHED ASSY - POPPET & RETAINER	152059-101	NOTES 51 & 54
						10				
						9				
						8				
						7				
						6		VALVE ASSY	-110	NOTES 1, 3
						5		VALVE ASSY	-107	
						4		VALVE ASSY	-105	
						3		VALVE ASSY	-103	
						2		VALVE ASSY	-102	
						1		VALVE ASSY	-101	NOTES 1, 3

VALVE ASSEMBLY SNUBBER

E 19156 152055

SEE NOTES

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
—	INITIAL RELEASE TO PRODUCTION PER ER 00411		
A	EFF 1ST & SUBQ	10-12-77	12-22-77

FOR INFORMATION ONLY

10855-P401-DQ-1(1)-1

UNCONTROLLED PRINT

UPDATED DOC. CATEGORY 41.2

SEP 10 1981

SUPPLIER DOCUMENT REVIEW
1 ☑ WORK MAY PROCEED PER THE CONTRACT PROVISIONS
2 ☐ WORK MAY PROCEED AND FINAL DRAWING BE SUBMITTED PER THE CONTRACT PROVISIONS
3 ☐ REVISE AND RESUBMIT. WORK MAY PROCEED PER THE CONTRACT PROVISIONS SUBJECT TO INCORPORATION OF CHANGES INDICATED
4 ☐ REVISE AND RESUBMIT. WORK MAY NOT PROCEED
5 ☐ REVIEW NOT REQUIRED. WORK MAY PROCEED PER THE CONTRACT PROVISIONS
PERMISSION TO PROCEED DOES NOT CONSTITUTE ACCEPTANCE OR APPROVAL OF DESIGN DETAILS, CALCULATIONS, ANALYSES, TEST METHODS OR MATERIALS DEVELOPED OR SELECTED BY THE SUPPLIER AND DOES NOT RELIEVE SUPPLIER FROM FULL COMPLIANCE WITH CONTRACTUAL OBLIGATIONS
REVIEWED — JOB NO 10855
BY — DATE 3-4-82
BECHTEL POWER CORPORATION

(ALSO APPROVED BY GE – SEE ATTACHED)

DISTRIBUTION	COPY	DATE
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JOB NO 10855
BECHTEL POWER CORPORATION
San Francisco

CONTRACT NO	
DRAWN	3-11-77
CHECKED	3-11-77
MECH	3-11-77
ELECT	3-11-77
PROJ ENG	3-11-77
	3-11-77
APPROVED	DATE
APVD BY (OTHERS)	DATE

E-SYSTEMS
Montek Division
2268 SOUTH 3270 WEST
SALT LAKE CITY, UTAH 84119
PHONE (801) 484-3661

TEST REPORT ON NON-METALLIC SEAL MATERIAL FOR USE IN SNUBBERS

DWG SIZE	CODE IDENT NO		REV
A	19156	152000-600	A
SCALE		SHEET 1 of 44	

GENERAL ELECTRIC

NUCLEAR ENERGY DIVISION

☐ Disapproved per comments.
Revise and resubmit for approval.

☐ Approved with Comments.
Revise and resubmit IN FINAL FORM.

☐ Refer to EDS No. _____

☒ Approved. No further action req'd.

☐ Approved. Submit certified copy.

☐ Certified by Seller and Approved by Buyer.

Reviewed by [illegible]

Date 1/6/58

VPF No. 5503-11-2

DOCUMENT ORIGINATOR L-Systems, Inc.

DOCUMENT TITLE Heat Rejection

DOCUMENT NO. 152000-610 Sht 1 REV. B

OBJECTIVES

1. To obtain approval from General Electric for Montek Division of E-Systems to utilize non-metallic seals, in snubber assemblies, which are fabricated from the marerials included herein.

2. To supply General Electric with the physical properties of non-metallic seal material and their associated changes when subjected to the tests as required by General Electric specification 21A2702.

MATERIALS

1. Compound E740-75 fabricated by the Parker Seal Co.

2. Compound E652-90 fabricated by the Parker Seal Co.

3. Compound 952 fabricated by Greene, Tweed and Company.

4. Phenolic fabricated in accordance with Federal Specification L-P-590 and supplied independently by Greene, Tweed and Company and the Parker Seal Company in conjunction with their "T" type seals.

5. Unfilled Polyamide (Nylon 6/6) Non-Extrusion ring per ASTM D789 Type I Grade 2 or per Federal Spec L-P-410a.

TEST RESULTS

The following summary sheets depict the original physical properties of each seal material except Polyamide and the changes in the physical properties which occurred as a result of each of the following tests.

1. Immersion in water at 212°F for the length of time shown on summary sheet.

2. Immersion in G.E. SF-1154 silicone fluid for 24 hours with varying temperatures as follows:

   a) Three (3) hours at 340°F.
   b) Three (3) hours at 320°F.
   c) 18 hours at 250°F.

3. Subjected to gamma irradiation to the level noted on each summary sheet.

Special acceptability tests were performed on the Polyamide material and are described in Appendix B of this report.

TEST SUMMARY SHEET FOR NON-METALLIC SEALS

Compound Parker E740-75

Physical Properties	Original	Water Immersion For 70 Hours	SF-1154 Immersion	Irradiation * to 2×10^7 Rads
Hardness Shore A pts., (pts. chg.)	75	74 (-1)	72 (-3)	79 (+4)
Tensile Strength, PSI (chg. %)	2580	2270 (-12)	2380 (-8)	2554 (-1)
Elongation, % (chg. %)	182	170 (-7)	177 (-3)	136 (-25)
Modulus at 100% Elongation, psi, (chg.%)	928	941 (+1)	952 (+3)	1355 (+46) @ 10^7 Rads
Volume Change, %	--	-0.4	+1.9	N/A
Compression Set, % of original defl. (Per ASTM-D-395)	N/A	10	17.8	41

* Adjusted data from Parker Report. P-13 Sheet 27 of this report.

TEST SUMMARY SHEET FOR NON-METALLIC SEALS

Compound: Parker E652-90

Physical Properties	Original	Water Immersion For 70 Hours	SF-1154 Immersion	Irradiation * to 2 x 10^7 Rads
Hardness Shore A pts. (pts. chg.)	88	88 (0)	89 (+1)	91 (+3)
Tensile Strength, PSI (chg. %)	2330	2570 (+10)	2430 (+4)	2382 (+2)
Elongation, % (chg. %)	146	143 (-2)	143 (-2)	99 (-32)
Modulus at 100% Elongation psi (chg. %)	1230	1430 (+16)	1490 (+21)	N/A
Volume Change, %	--	-1.5	+0.4	N/A
Compression Set, % of original defl. (Per ASTM-D-395)	N/A	31.9	Cancelled	N/A

* Adjusted data from Parker Report. P-7 Sheet 21 of this Report

TEST SUMMARY SHEET FOR NON-METALLIC SEALS

Compound: Greene Tweed 952

Physical Properties	Original	Water Immersion For 100 Hours	SF-1154 Immersion	Irradiation* to 2×10^7 Rads
Hardness Shore A, pts. (pts., chg.)	81	81 (0)	80 (-1)	82 (+1)
Tensile Strength, PSI (chg. %)	1944	1761 (-9.4)	1730 (-11)	1788 (-8)
Elong[illegible], % (chg. %)	169	159 (-5.9)	158 (-6.5)	149 (-12)
Modulus at 100% Elongation psi (chg. %)	962	904 (-6.0)	915 (-4.9)	1222 (+27)
Volume Change, %	--	+1.8	+1.2	N/A
Compression Set, % of original defl. (Per ASTM-D-395)	N/A	27	21	51

* Adjusted data from Greene Tweed Report. GT-3 Sheet 11 of this Report

SIZE A | DWG NO 19156 | REV A | SCALE | SHEET 5

152000-600

TEST SUMMARY SHEET FOR NON-METALLIC SEALS

Compound: Parker Phenolic

Physical Properties	Original	Water Immersion For 100 Hours	SF-1154 Immersion	Irradiation to 2.9×10^7 Rads
Hardness Rockwell M, pts. (pts. chg.)				
Tensile Strength, PSI (chg. %)				
Volume Change, %				
Flex Str PSI Lengthwise				

NOTE: This phenolic is manufactured to the same specification as that used by Greene Tweed and Co. See data on Sheet 7 of this report. Also see #8, Sheet 22 for statement from Parker Seal Co. on radiation tests.

TEST SUMMARY SHEET FOR NON-METALLIC SEALS

Compound: Greene Tweed Phenolic

Physical Properties	Original	Water Immersion For 100 Hours	SF-1154 Immersion	Irradiation * to 2.96×10^7 Rads
Hardness Rockwell M pts, (pts. chg.)	107	81 (-26)	108 (+1)	See note below
Tensile Strength, PSI (chg. %)	13200	11484 (-13)	8184 (-38)	See note below
Volume Change, %	--	+5.3	+0.4	See note below
Flex Str PSI Lengthwise	28500	19950 (-30)	21090 (-26)	27142 (-18.8)

* Adjusted data from Greene Tweed Letter. GT-6 Sheet 14 of this Report.

NOTE: This phenolic material was subjected to 1.504×10^7 Rads during the test conducted for polyamide back-up rings. This test is described in Appendix B (Sheets 33-44) of this report. No physical tests were performed but parts showed no evidence of change visually.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

APPENDIX

Included herein are copies of the original test data supplied to Montek by the Parker Seal Company and Greene, Tweed and Company, from which the previous summary sheets were prepared.

NOTE: - Parker Reports have been re-typed (in part) for legibility.

GREENE, TWEED & CO.

7 March, 1977

GTC Compound 962
Test Results to E-Systems Specification 910641*

	910641 Requirements	Observed
Original Physicals		
Hardness, Shore A, points	80 ± 5	81
Tensile, psi, min.,	1200	1944
Elongation, %, min.	135	169
Modulus @ 100% Elong., psi, min.	900	926
TR-10/50, °F, max.	-50	-62
Immersion Tests;		
Distilled Water, 100 hours @ 212°F		
Hardness change, points	± 5	0.0
Tensile change, %	± 15	-9.4
Elongation change, %	± 10	-5.9
Modulus @ 100% Elong., change %	± 15	-6.0
Volume Swell, %	+ 5/- 0	+1.8
Compression Set, % of original deflection, max	30	27
GE SF-1154 Silicone Fluid, time & temp. to spec.		
Hardness change, points	± 5	- 1
Tensile change, %	± 15	-11
Elongation change, %	± 10	- 6.5
Modulus @ 100% Elong., change %	± 15	- 4.9
Volume Swell, %	+ 5/- 0	+ 1.2
Compression Set, % of original deflection, max.	30	21

* To specification as amended by GTC letter of 2/24/77

GREENE, TWEED & CO.
NORTH WALES, PENNSYLVANIA 19454 • 215 256-9521 • TELETYPE: 510 [illegible]

July 11, 1977

E-Systems
2268 South 3270 West
Salt Lake City, Utah 84119

Attn: Mr. Paul Masters, Chief Engineer

Subject: GTC 952 Compound, Radiation Resistance

Gentlemen:

Enclosed are results of testing conducted to evaluate the radiation resistance of our 952 Compound (PE 071177A).

Evaluation of the results indicate that seals from this material should perform their required sealing function in your application through an accumulated radiation exposure limit of $2x10^7$ rads. For seals immersed in a silicone fluid, the exposure limit would probably be increased by a factor of ten while continuous high temperature could reduce this limit.

All testing was done by an independent laboratory. Results compare very favorably with those conducted on other EPR compounds. It should be noted that published reports on other materials use a 10^7 rad level and not the $2x10^7$ level which are reflected in different property change levels. The $2x10^7$ rad level was selected for test to more nearly accomodate GE specification requirements and preclude necessity for interpolation between 10^7 and 10^8 rads, the range of which is considerable.

We trust the above meets with your approval and will enable continuation of your project. If questions arise please contact us at your earliest convenience.

Very truly yours,
GREENE TWEED & CO.

Thorval L. Berg
Manager, Product Engineering

TLB/sjw
encl.

TEST REPORT

EFFECT OF GAMMA RADIATION ON A GREENE, TWEED ETHYLENE PROPYLENE COMPOUND

Compound 952	Original	10^6 rads	$2x10^7$ rads	10^8 rads
Hardness, pts, Shore A (Chg, pts)	79	80(+1)	80(+1)	80(+1)
Tensile, psi (Chg, %)	1583	1475(-7)	1450(-8)	1350(-15)
Elongation, % (Chg, %)	136	118(-13)	120(-12)	85(-38)
Modulus @ 100%, psi (Chg, %)	1067	1040(-3)	1350(-27)	-
Compression Set, 25% deflection 29 days @ RT (*) % Original deflection				
Immediately	13.5	22.0	59.5	89.2
15 minutes	11.0	19.0	57.0	88.0
30 minutes	9.0	16.2	56.0	88.0
4 hours	7.0	13.5	55.0	88.0
1 week	1.0	8.1	51.0	86.5

* Fixtures were assembled for this time including radiation

G			GREENE, TWEED & CO. NORTH WALES, PA.			
F						
E						
D			EPR COMPOUND 952 EFFECT OF RADIATION ON PHYSICAL PROPERTIES			
C						
B			SCALE ------	DRN. ------	MATL. 952 Cpd	CUST.
A			DATE 9/11/77	APP.	DWG. NO. PE 071177A	
	REV.	DATE				

DIETZGEN 1994 12215

GREENE, TWEED & CO.
NORTH WALES, PENNSYLVANIA 19454 • 215 256-9321 • TELETYPE: 510 661-8158

July 12, 1977

E-Systems
2268 South 3270 West
Salt Lake City, Utah 84119

Attention: Mr. Paul Masters, Chief Engineer

Subject: Our letter of 7/11/77 and Dwg #PE071177A

Gentlemen:

Due to an error, above referenced Dwg. PE071177A should read under column $2x10^7$ rads 1350 (+27) and not (-27). Please change your copy to agree with ours.

If there are any questions involving this change, please call.

Sincerely,

GREENE, TWEED & CO.

T. L. Berg

Manager, Product Engineering

TLB/sjw

GREENE, TWEED & CO.

7 March, 1977

Grade L Phenolic
Test Results to E-Systems Spec. 910841*

	To Fed. Spec. LP 509	Originals	Aging Water, 100 Hrs. @ 212° F Max Chge allowed	Aging Water, 100 Hrs. @ 212° F Actual	Aging CE SF 1150 Fluid (to spec.) Max Chge allowed	Aging CE SF 1150 Fluid (to spec.) Actual
Tensile, psi						
Lengthwise	9520/18300	13700	-15%	-13%	-40%	-38%
Crosswise	7850/13200	8800	-10%	- 1.1%	-38%	-33%
Flex. Str.psi						
Lengthwise	13500/30200	28500	-35%	-30%	-30%	-26%
Crosswise	12600/22300	22000	-30%	-23%	-20%	-18%
Shear Strength psi	11000/15000	15000	-20%	-15%	± 5%	- 1%
Compressive Strength Flat, psi	--	32300	-25%	-23%	± 5%	+2.7%
Hardness, Points Rockwell M	M83/114	M107	-30	-26	± 3	+1
Volume Swell .062 thick specimen	-	-	+10%	+5.3%	+ 2%	+0.4%

* To specification as amended by GTC letter of 2/24/77

GREENE, TWEED & CO.
NORTH WALES, PENNSYLVANIA 19454 • 215 256-9521 • TELETYPE 510 661-8153

June 17, 1975

E-Systems
Div. of Montec
2268 South 3270 West
Salt Lake City, UT 84119

Attn: Mr. Bill Ayers

Gentlemen:

The following is submitted at your request for material information of our Phenolic Non-extrusion rings, reference your order #53001 of April 7, 1975:

Government specification LP-509, Grade L
Fine weave cotton fabric reinforced with Phenolic binder
Typical Properties:

Compressive strength, PSI	
Flatwise	35,000
Edgewise	23,500
Shear strength, PSI	12,000
Rockwell Hardness, M scale	105

In Radiation tests for this grade of phenolic sheet conducted by the National Electrical Manufacturers Association the following results were observed. After exposure to cobalt gamma rays (integrated flux 3.042×10^7 roentgens) for 1150 hours, the flexural strength decreased 18.8 %, from approximately 27,000 psi to 22,000 psi.

We trust this information meets with your approval. Please do not hesitate to contact me if I can assist you.

Very truly yours,

GREENE, TWEED & CO.

Alan Sherlock

Alan Sherlock
Applications Engineer

AS/k

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

An Evaluation of Parker E740-75 and E652-90 for Atomic Reactor Snubbers

OBJECTS:

1. To establish physical property changes, including compression set, of E740-75 and E652-90 when subjected to gamma radiation at varying levels (reference Report K10,063A).

2. To evaluate these compounds for resistance to GE silicone fluids SF96 and SF1154, and to water (reference Report K10,151-466-1, Revision B) under short term and immersion sequence procedures.

3. To determine long term aging in these silicone media at 212 °F and to derive estimated seal life from these data.

CONCLUSIONS:

1. The data show that E740-75 exhibits superior retention of physical properties and compression set when gamma radiated at room temperature. Service can be recommended to approximately 10^7 rads. A detailed discussion is found in Report K10,063A.

2. Both E740-75 and E652-90 are impervious to both the silicone fluids and to water. All degradation observed is due to thermal factors, not fluid interactions. Compound E652-90 shows somewhat less heat resistance than E740-75 as is typical of materials compounded for dynamic service.

3. Long term testing confirms the excellent resistance of E740-75 to these media. There has been no deterioration detected due to either silicone fluids or water. E652-90 shows a lesser resistance to heat aging as shown by set and modulus values, but is also highly resistant to the silicone fluids and to water.

4. For E740-75, a least squares analysis of the few data points available projects a seal life at a constant 212 °F of 5.6 years (±1.9 years1) when the conservative assumption of linear decay is made. Prediction of seal life for E652-90, is precluded by a high degree of experimental error; however, seal life will be substantially less than E740-75 when used under conditions of static compression.

N.B. Parker compound E740-75 is the same as Parker Packing compound E4248A75.

Parker compound E652-90 is the same as Parker Packing compound E4207A90.

Parker Seal Co. Technical Report
Report No. TR10, 151-466-1 Rev A
Dated January 28, 1977
Re-typed for legibility

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

	Original	10^7 rads	10^8 rads	10^9 rads
E740-75 (BN124, 646)				
Hardness, pts, Shore A (chg pts)	70	73 (+3)	79 (+9)	
Tensile, psi (Chg, %)	2080	2140 (+3)	1700 (-18)	
Elongation, % (Chg. %)	233	194 (-17)	96 (-59)	
Modulus @ 100%, psi (Chg. %)	554	808 (+46)	--	
Tear, Die C, ppi (Chg,%) (slab)	174	163 (-6)	70 (-60)	
TR-10, °F (slab)	-59	-60		
Compression Set, 25% Deflection 93 Days @ Room Temperature % Original Deflection	6.7	28.6	90.5	98.1

Parker Seal Co. Technical Report
See Sheet 15

DWG	CODE IDENT		REV
A	19155	152000-600	A
SCALE	P-2	SHEET 16	

Original Physical Properties	E740-75	E652-90
Hardness, Shore A, pts.	75	88
Tensile Strength, psi	2580	2330
Elongation, %	182	146
Modulus @ 100%, psi	928	1230
Specific Gravity	1.11	1.24
Immersion in GE SF96, 200 c/s Silicone Fluid for 3 Hrs @ 340°F, plus 3 Hrs @320° F plus 18 Hrs @250° F (SS Beakers)		
Hardness, Shore A, pts(Chg, pts)	74(-1)	9'(+3)
Tensile Strength, psi (Chg, %)	2640(+2)	2330(0)
Elongation, % (Change, %)	19?(+5)	146(0)
Modulus @ 100% (Change, %)	943(+2)	150?(+22)
Volume Change, %	-1.?	-2.5
Compression Set -25% Defl., Plies %of Original Deflection	18.1	44.9
Immersion in GE SF1154 Silicone Fluid for 3 Hrs @340° F plus 3 Hrs @ 320° F plus 18 Hrs @ 250° F (SS Beakers)		
Hardness, Shore A, pts (Chg, pts)	72(-3)	89(+1)
Tensile Strength, psi, (Chg, %)	2380(-8)	2430(+4)
Elongation, % (Change, %)	177(-3)	143(-2)
Modulus @ 100% (Change, %)	952(+3)	1490(+21)
Volume Change, %	+1.9	+0.4
Compression Set-25% Defl., Plies % of Original Deflection	17.8	Cancelled
Immersion in Water for 3 Hrs @ 340°F plus 3 Hrs @ 320° F plus 18 Hrs @250 ° F (SS Beakers)		
Hardness, Shore A, pts. (Chg., pts)	74(-1)	90(+2)
Tensile Strength, psi (Chg, %)	2680(+4)	2450(+5)
Elongation, %(Chg, %)	180(-1)	145(-1)
Modulus @ 100% (Chg,%)	990(+7)	1430(+16)
Volume Change, %	-0.3	-1.0
Compression Set-25% Defl., Plies % of Original Deflection	17.6	42.0

Parker Seal Co. Technical Report
See Sheet 15

E740-75

I. Original Physical Properties

Hardness, Shore A, pts.	75
Tensile Strength, psi	2580
Elongation, %	182
Modulus @ 100%, psi	928
Specific Gravity	1.11

II. Immersion in GE 96, 200 c/s Silicone Fluid @ 212° F (SS Beaker)

	70 Hours	168 Hours	504 Hours	1008 Hours
Hardness, Shore A, pts. (Chg, pts)	75(0)		75(0)	75 (0)
Tensile Strength, psi (Chg, %)	2600(+1)		2540(-2)	2820(+9)
Elongation, %(Change, %)	180(-1)		189(+4)	197(+8)
Modulus @ 100% (Change,%)	1010(+9)		931(0)	900(-3)
Volume Change, %	-1.8		-1.4	-1.9
Compression Set-25% Defl., Plies % of Original Deflection	8.1	Omitted	13.0	16.8

III. Immersion in GE SF1154 Silicone Fluid @ 212° F (SS Beaker)

Hardness, Shore A, pts. (Chg, pts)	73(-2)		74(-1)	73(-2)
Tensile Strength, psi (Chg, %)	2620(+2)		2430(-6)	2750(+7)
Elongation, % (Change, %)	183(+1)		179(-2)	197(+8)
Modulus @ 100%(Change, %)	941(+1)		921(-1)	878(-5)
Volume Change %	+0.8		+0.9	+1.1
Compression Set-25% Defl., Plies % of Original Deflection	12.1		15.7	16.7

IV. Immersion in Water @ 212°F (SS Beaker)

Hardness, Shore A, pts. (Chg, pts)	74(-1)		75(0)	77(+2)
Tensile Strength, psi (Chg, %)	2270(-12)		2440(-5)	2780(+8)
Elongation, % (Change, %)	170(-7)		173(-5)	195(+7)
Modulus @ 100% (Change, %)	941(+1)		938(+1)	890(-4)
Volume Change, %	-0.4		+0.5	-1.6
Compression Set-25% Defl., Plies % of Original Deflection	9.9		14.0	15.1

Parker Seal Co. Technical Report - See Sheet 1

SIZE A | DWG NO 152000-600 | REV A | CODE IDENT NO 19156 | SCALE | SHEET 18 | P-4

E652-90

I. Original Physical Properties				
Hardness, Shore A, pts	88			
Tensile Strength, psi	2330			
Elongation, %	146			
Modulus @ 100 %, psi	1230			
Specific Gravity	1.24			
II. Immersion in GE 96,200 c/s Silicone Fluid @212° F (SS Beaker)	70 Hours	168 Hours	504 Hours	1008 Hours
Hardness, Shore A, pts (Chg, pts)	90(+2)		90(+2)	92(+4)
Tensile Strength, psi (Change, %)	2500(+7)		2490(+7)	2110(-9)
Elongation, % (Change, %)	142(-3)		149(+2)	121(-17)
Modulus @ 100% (Change, %)	1460(+19)		1500(+22)	1670(+36)
Volume Change, %	+0.5		-3.0	-2.2
Compression Set-25% Defl, Plies % of Original Deflection	21.6	Omitted	41.7	45.6
III. Immersion in GE SF1154 Silicone Fluid @ 212° F (SS Beaker)				
Hardness, Shore A, pts. (Chg, pts)	90(+2)		90(+2)	90(+2)
Tensile Strength, psi (Chg, %)	2170(-7)		2160(-7)	2400(+3)
Elongation, % (Change, %)	132(-10)		135(-8)	137(-6)
Modulus @ 100% (Change, %)	1390(+13)		1400(+14)	1600(+30)
Volume Change, %	+1.2		-0.5	+0.3
Compression Set-25% Defl., Plies % of Original Deflection	29.2		38.9	50.8
IV. Immersion in Water @212°F (SS Beaker)				
Hardness, Shore A, pts. (Chg, pts)	88(0)		89(+1)	93(+5)
Tensile Strength, psi (Chg, %)	2570(+10)		2290(-2)	2370(+2)
Elongation, % (Change, %)	143(-2)		139(-5)	140(-4)
Modulus @100%, (Change, %)	1430(+16)		1400(+14)	1620(+32)
Volume Change, %	-1.5		+0.8	-1.2
Compression Set-25% Defl., Plies % of Original Deflection	31.9		29.9	40.5

Parker Seal Co. Technical Report - See Sheet 15

REVISIONS: LTR | DESCRIPTION | DATE | APPROVED

DWG SIZE A | CODE IDENT NO 19156 | 152000-600 | REV A
SCALE | P-5 | SHEET 19

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

TITLE: Evaluation of the Radiation Resistance of Selected Ethylene Propylene Compounds.

OBJECTIVE: To evaluate the changes in physical properties of E652-90 (intended for backup applications) when subjected to varying levels of gamma radiation.

To evaluate the compression set of E740-75 O-rings (intended for sealing applications) when subjected to varying levels of gamma radiation while under compression.

To compare this information to that generated under similar circumstances and reported in Report K10,063A.

CONCLUSIONS:

1. The data are consistent with those developed and reported in project K10,063A for E740-75 O-rings.
2. The results show increasingly severe degradation for both compounds as the level of radiation is increased.
3. E652-90 will be suitable as a backup material within the radiation range tested, as shown by the physical profiles. Modulus increases, as desired, but loss of elongation is not so severe that embrittlement is likely.
4. E740-75 will be suitable as a sealing material within the lower portion of the 10^7 - 10^8 rads decade if the expected temperature is not severe.

Parker Seal Co. Laboratory Report
Report No. P10, 400-310 Rev -
Dated June 10, 1977
Re-typed for legibility

DWG	CODE IDENT NO		REV
A SIZE	19156	152000-600	A
SCALE		P-6	SHEET 20

	Original	1 x 10^7 Rads	2 x 10^7 Rads	7 x 10^7 Rads	10 x 10^7 Rads
E652-70 (Lab Mix)					
Hardness, Type A, pts.	85	-	88(+3)	91(+6)	-
Tensile Strength, psi	1770	-	1810(+2)	1500(-15)	-
Elongation, %	116	-	79(-32)	39(-66)	-
Modulus @ 100%	1430	-	-	-	-
Compression Set 25% Deflection 30 days @ Room Temperature					
% of Original Deflection	-	-	-	-	-
E740-75 (Lab Mix)					
Hardness, Type A, pts.	72	-	-	-	-
Tensile Strength, psi	2660	-	-	-	-
Elongation, %	214	-	-	-	-
Modulus @ 100%	876	-	-	-	-
Compression Set, 25% Deflection 30 Days @ Room Temperature					
% of Original Deflection	2.9	-	39.1	73.3	-
93 Days @ Room Temperature					
% of Original Deflection	6.7*	28.6*	-	-	90.5*

* Reference- Project #K10,063A

Parker Seal Co. Laboratory Report
See Sheet 20

DWG SIZE A CODE IDENT NO 19156 152000-600 REV A
SCALE P-7 SHEET 21

Seals

August 22, 1977

Parker Hannifin Corporation
Seal Group
10567 Jefferson Boulevard
Culver City, CA 90230 USA
Phone (213) 837-5101

Mr. Carl Maupin
E-Systems
Montek Division
2268 South 3270 West
Salt Lake City, Utah 84119

Dear Carl:

In response to our telephone conversation on August 19, I confirm that the phenolic resin used as a backup material for the radiation application was subjected to radiation levels of 2 and 7 X 10^7 rads at the same time and under the same conditions as those elastomers reported in project number P10,400-310, a copy of which is in your hands.

Examination of these resin samples after radiation showed no detectable change in flexural strength as compared to unradiated samples.

Sincerely,

PARKER SEAL

Robert H. Barbarin
Chief Chemist

RHB:wsm

cc: Richard Benson

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

TITLE: An investigation into the radiation resistance of selected compounds.

OBJECT: To establish the changes in physical properties, including tear strength (die C), low temperature characteristics (TR-10), and compression set, of various Parker production compounds thought to be relatively radiation resistant.

To update Parker technical reports in this area, last reported on in 1964 using less rigorous criteria;

To assist Amphenol and other users of Parker products toward selection of radiation resistant polymers for their use.

METHODOLOGY: In order to achieve these goals, a cooperative program was set up with the Amphenol Sams Division of the Bunker Ramo Corporation, in which Parker agreed to supply test parts, carry out physical testing, and supply reports thereon, and Amphenol performed all phases of the actual radiation.

Samples supplied were 2-214 O-rings, slabs for tear and low temperature testing, and 2-214 rings, deflected 25% in small compression set fixtures. A like amount of material and fixtures were retained at Parker to provide the control specimens which would allow separation of the effects of aging from those of radiation. All tests were carried out at a nominal room temperature, which during radiation was actually 96° F for 10^7 rads and 112°F for 10^8 rads. Control samples were maintained at 72° F.

The samples were subjected to gamma radiation supplied by Cobalt 60 strips while sealed in a compartmented aluminum canister placed 16 feet under water. Technical details concerning design, individual sample placement, radiation profile within the canister, etc. are available on request.

Upon return to Parker, both the radiated samples and the control specimens were then tested, so that samples labeled control had been exposed to the same duration of compression, etc. but had not been irradiated. Thus a comparison of control data to those from varying levels of radiation provides direct information as to the effect of gamma radiation on the elastomeric materials tested.

Parker Seal Co. Laboratory Report
Report No. K10, 603A Rev -
Dated May 24, 1973
Re-typed (in part) for legibility

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

GENERAL CONCLUSIONS:

1) The data show unquestionably that significant deterioration has taken place at only 10^7 rads for all specimens and that severe degradation is evident at 10^8 rads. None of the elastomers could be recommended for use under the latter conditions even at ambient temperatures.

2) The degradation of the elastomers is evident first in compression set deterioration, wherein the radiation is probably inducing new cross-link sites while the sample is under compression. As a result, recovery to the original vulcanized shape is severely restricted.

3) This same phenomenon is shown by loss in elongation properties as radiation proceeds. This in turn would appear as a rise in modulus, which is not altogether detrimental. However, the new cross-link sites leading to loss in elongation would also lead to reduction in tear resistance, especially at elevated temperatures. The data support this contention. Therefore dynamic sealing properties would be adversely affected.

4) Low temperature properties as measured by TR-10 values do not appear to be affected by radiation. (However, the ability to measure the TR-10 was substantially hampered. In addition, it should be recalled that elastomers will lose their memory from the effects of gamma radiation irrespective of temperature. Only thermal degradation has been slowed.)

5) In general, the better the initial set resistance, the longer the elastomer can be expected to resist radiation; the fewer compounding ingredients capable of assisting the re-cross-linking mechanism, the better(viz. E515 vs E740).

6) It must be stressed that these data result from ambient temperature studies. Any thermal degradation caused by use at elevated temperatures would lead to even more rapid decay.

Parker Seal Co. Laboratory Report
See Sheet 23

DWG	CODE IDENT NO		REV
A	19156	152000-600	A
SIZE	SCALE	F-10	SHEET 24

CONCLUSIONS CONCERNING SPECIFIC COMPOUNDS:

1) S604-70, followed by E740-70 showed the best resistance and could be recommended for service to 10^7 rads or slightly above.

2) The fluorinated elastomers, such as the fluorocarbon V747-75 and the fluorosilicone L677-70, confirmed their lack of resistance to radiation, and should not be recommended for such service under any circumstances.

3) The alleged radiation resistance of polyurethane materials is not shown. While it is true that tensile (the best criterion in urethanes) has been retained at 10^7 rads, compression set has already deteriorated substantially. Cast and injection molded urethanes could be expected to be comparable.

Parker Seal Co. Laboratory Report
See Sheet 23

LTR	DESCRIPTION	DATE	APPROVED

S455-70 (BN 15, 148)	Original	10^7 rads	10^8 rads	10^9 rads
Hardness, pts, Shore A(chg, pts)	69	72(+3)	85(+16)	
Tensile psi(chg, %)	807	733(-9)		
Elongation, % (chg,%)	117	89(-24)		
Modulus @ 100%, psi (chg %)	668	-		
Tear, die C, ppi (chg,%) (slab)	63	63(0)		
TR-10, °F (slab)	-	-	-	
Compression Set, 25% deflection 93 days @ RT % orig deflection	7.6	31.4	90.5	108.6
S604-70 (BN 10,576)				
Hardness, pts, Shore A (chg, pts)	66	69(+3)	85(+19)	
Tensile, psi (chg, %)	1010	1020(+1)	939(-7)	
Elongation, % (chg, %)	149	129(-13)	31(-79)	
Modulus @ 100% psi (chg%)	695	833(+25)	-	
Tear, die C, ppi (chg, %) (slab)	70	62(-11)	29(-59)	
TR-10, °F(slab)	-	-	-	
Compression Set, 25% deflection 93 days @ RT % Orig deflection	3.8	20.0	92.4	104.7
E515-80 (BN 117,643)				
Hardness, pts, Shore A (chg, pts)	78	78(0)	84(+6)	
Tensile, psi (chg,%)	1450	1220(-16)	1030(-29)	
Elongation, % (chg, %)	213	176(-17)	79(-63)	
Modulus @ 100%, psi (chg %)	689	740(+7)	-	
Tear, die C, ppi (chg, %) (slab)	164	148(-10)	71(-57)	
TR-10, °F (slab)	-57	-53	-	
Compression Set, 25% deflection 93 days @ RT % Orig deflection	16.2	46.6	96.2	95.3

Parker Seal Co. Laboratory Report
See Sheet 23

DWG SIZE	CODE IDENT NO		REV
A	19156	152000-600	A
SCALE	P-12	SHEET 26	

E740-70 (BN 124,646)	Original	10^7 rads	10^8 rads	10^9 rads
Hardness, pts, Shore A (chg, pts)	70	73(+3)	79(+9)	
Tensile, psi (chg, %)	2080	2140(+3)	1700(-18)	
Elongation, % (chg, %)	233	194(-17)	96(-59)	
Modulus @ 100%, psi (chg %)	554	808(+46)	-	
Tear, die C, ppi, (chg,%)(slab)	174	163(-6)	70(-60)	
TR-10, °F(slab)	-59	-60		
Compression Set, 25% deflection 93 days @ RT % orig deflection	6.7	28.6	90.5	98.1
V747-75 (BN 124,697)				
Hardness, pts, Shore A (chg, pts)	75	76(+1)	88(+15)	
Tensile, psi (chg, %)	1510	1580(+5)	1180(-22)	
Elongation, % (chg, %)	190	130(-32)	29(-85)	
Modulus @ 100%, psi (chg, %)	634	1120(+77)	-	
Tear, die C, ppi, (chg, %) (slab)	128	87(-32)	32(-36)	
TR-10, °F(slab)	+2	-	-	
Compression Set, 25% deflection 93 days @ RT % orig deflection	14.7	66.7	93.3	-
P642-70 (BN 127,715)				
Hardness, pts, Shore A (chg, pts)	66	67(+1)	66(0)	
Tensile, psi (chg, %)	3560	3570(0)	1420(-60)	
Elongation, %(chg, %)	582	491(-16)	201(-65)	
Modulus @ 100%, psi (chg,%)	342	444(+30)	-	
Tear, dieC,ppi (chg, %) (slab)	306	374(+22)	146(-52)	
TR-10, °F	-25	-27	-26	
Compression Set, 25% deflection 56 days @ RT % orig deflection	17.1	55.2	91.4	98.1

Parker Seal Co. Laboratory Report
See Sheet 23

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

TITLE: A Further Investigation into the Radiation Resistance of Selected Compounds.

OBJECTS: To confirm the radiation resistance of Parker recommended compounds for the Hanford Engineering Development Laboratory;

To assess the radiation resistance of other polymer types previously unexamined.

For this study the following Parker compounds were tested:

E515-80	Industrial standard ethylene propylene.
E740-75	Recommended radiation resistant, high performance ethylene propylene.
A607-70	Commercial polyacrylate.
N674-70	Industrial standard nitrile.
N741-75	High temperature nitrile.

METHODOLOGY: For the present study, a cooperative program was set up with the Hanford Engineering Development Laboratory, where the actual radiation of samples was carried out. The procedures and controls were the same as those outlined in report K10,063A, issued in May, 1973. As before, resistance to radiation while under compression was taken as the main criterion.

The results labeled "Control" had been subjected to the same duration of compression at the Parker Laboratories as those which had received varying levels of radiation while at the Hanford Laboratories. Thus a comparison of control data to those from irradiated samples provides direct information as to the effect of gamma radiation on the elastomeric materials tested.

(continued)

Parker Seal Co. Laboratory Report
Report No. K10,063 B Rev -
Dated March 25, 1975
Re-typed for legibility

GENERAL CONCLUSIONS:

1. Results developed from this study on compound E740-75, used as the internal standard in all the radiation tests run in the current series, correlate extremely well with those developed independently in the previous study, K10,063A, of May 24, 1973.

2. In this study, two independent series of identical compounds were radiated to the same level of exposure (1×10^7 rads). Compression set correlations were very good, indicating further confidence in the validity of the results.

3. The results confirm the resistance of Parker E740-75 to radiation at levels of 10^7 rads under room temperature conditions. As before, very substantial deterioration had set in at 10^8 rads, as measured by compression set resistance.

4. Polyacrylates, as represented by Parker A607-70, are rather unsuited to radiation conditions as shown by relatively high compression set values after 10^7 rads. In this respect they are comparable to the flourinated elastomers (see Report K10,063A).

5. It is surprising to note the remarkable resistance of nitrile compounds N674-70 and N741-75 to radiation. Since the results shown at 10^6 and 10^7 rads were not expected, these tests were repeated at 10^7 and 10^8 rads. These results in turn confirmed those found previously and indicate radiation resistance superior even to E740-75.

An adequate explanation for these results has not been developed. It had been the view previously that radiation resistance of elastomers related in part to thermal compression set resistance, even though the anomaly of fluorocarbons was already known. Other data published on nitriles indicated poor resistance at low levels of radiation ("Evaluation of Insulation Materials and Composites for Use in a Nuclear Radiation Environment," NASA CR-2045, May 1972, pg 4-14) about 10^5 rads. The same source did note, however, dependence on filler level, acrylonitrile level, and anti-oxidant efficacy.

5. (continued)
Lacking further data, it is not useful to attempt an analysis of these nitrile results. The usual cautionary note should be heeded, however: All data reflect the results of radiation exposure at room temperature and may not serve as a successful model for other environments where the stresses may be synergistic.

RECOMMENDATIONS:

1. It is recommended that 10^7 rads continue to be the upper limit of radiation recommended for Parker seals.

2. It is recommended that either Parker N674-75 or N741-75 be considered where the chemical resistance of a nitrile is required.

   However, it should be noted that nitrile does not have the ozone and weathering resistance of ethylene propylene nor the temperature capability. Furthermore, nitrile is susceptible to extraction by the commonly used silicone fluids, resulting in shrinkage and earlier failure in service.

Parker Seal Co. Laboratory Report
See Sheet 28

COMPRESSION SET 2-214 O-RINGS

	(Control) *Room Temperature	*10^6 Rads	*10^7 Rads
Parker Compound: E515-80 % Original Deflection	15.7	Not Tested	60.0
Parker Compound: E740-75 % Original Deflection	8.6	9.7	35.7
Parker Compound: A607-70 % Original Deflection	8.6	15.7	61.5
Parker Compound: N674-70 % Original Deflection	5.7	Not Tested	24 3
Parker Compound: N741-75 % Original Deflection	2.9	5.7	24.3

* All above compression set fixtures were assembled for a total of twelve weeks.

	(Control) *Room Temp.	(Retest)$_7$ *1 x 10^7 rads	* 1 x 10^8 rads.
Parker Compound: E740-75 % Original Deflection	7.2	33.3	84.7
Parker Compound: N741-75 % Original Deflection	5.7	20.0	71.4
Parker Compound: N674-70 % Original Deflection	4.3	17.1	70.0

* All above compression set fixtures were assembled for a total of 33 days.

Parker Seal Co. Laboratory Report. See Sheet 28.

October 13, 1977

E-Systems Inc. Montec Div.
2268 South 3270 West
Salt Lake City, Utah 84119

Attention: Carl Muppin

Parker Packing
Parker Hannifin Corporation
2220 South 3600 West (Zip Code 84119)
P O Box 30005
Salt Lake City, UT 84125
Phone (801) 972-3000

Dear Sir:

Listed below are the physical and mechanical properties of phenolic material per Federal Spec. 509 Grade L:

MECHANICAL PROPERTIES

Tensile Strength, PSI, Lengthwise	14,000
Tensile Strength, PSI, Crosswise	10,000
Compressive Strength, PSI, Flatwise	35,000
Flexural Strength, PSI, Lengthwise	23,000
Flexural Strength, PSI, Crosswise	18,000
Modulus of Elasticity in Flexure x 10^5	
Lengthwise	11
Crosswise	8
Impact Strength, IZOD Edgewise	
ft lbs/in Notch, Lengthwise	1.3
Crosswise	1.2
Rockwell Hardness, M Scale	105
Bond Strength, lbs.	1,700

PHYSICAL PROPERTIES

Thermal Conductivity, CAL/SEC/CM^2/°C/CM	7.0 x 10^4
Specific Heat CAL/GM/°C	0.35 to 0.46
Heat Resistance °F, Short Time	275
Continuo	225
Thermal Expansion in/in/°Fx10^5 Lengthwise	.77
Crosswise	1.04
Water Absorption % 24 hours 1/16"	2
1/8"	1.4
1/2"	.8

Please let us know what more we can do to help.

Sincerely Yours,

Richard Benson

RB/dh

cc: Norm Milsap
Dick Gann

152000-600 Rev. A
P18 sheet 32

APPENDIX B

This appendix is included to establish qualification of polyamide as a seal back-up material for snubber application.

1. Background

After qualification tests of 20kip, 30 kip and 50 kip snubbers and subsequent disassembly it was noted that the scarf cut of the phenolic back-up rings on main piston seals had fractured and nibbling of the elastomeric seals had occurred. This did not prevent the snubbers from passing all phases of the qualification tests but the presence of the seal particles could cause future problems with valves and orifices. This prompted an investigation of new materials and/or back-up ring configuration to prevent this occurrence.

2. Materials and Tests

Previously published radiation test data showed that polyamide would be a good candidate material for the environment, and samples were prepared to the same configuration as the phenolic back-ups. Tests were performed in the 50 Kip unit with poor results. The polyamide remained unscathed but the scarf cut still nibbled the elastomer.

A special design was created for an uncut back-up ring made of polyamide and a technique was developed for assembling these rings on the non-separable grooves of the existing piston design. This requires heating the piston, elastomer and back-up rings to 200°F to 250°F and stretching the back-ups over piston head into the groove. When the assembly cools to room temperature, the back-up rings return to original size with no mechanical help. This back-up design was installed in both the 10Kip and 50 Kip unit and was subjected to all cycling requirements of the qualification test specification with no damage to either the elastomer or the back-up rings.

3. Tests With Irradiated Back-up Rings

To prove that the polyamide will perform adequately after being subjected to the radiation dosage as prescribed by the G.E. specification, the following tests were performed.

(a) A sample test vessel was fabricated to enclose the polyamide back-up rings, elastomer T-Seals and phenolic back-up rings. The vessel was constructed to simulate the minimum wall thickness of any snubber cylinder. See sheet 35 (B-3) of this appendix.

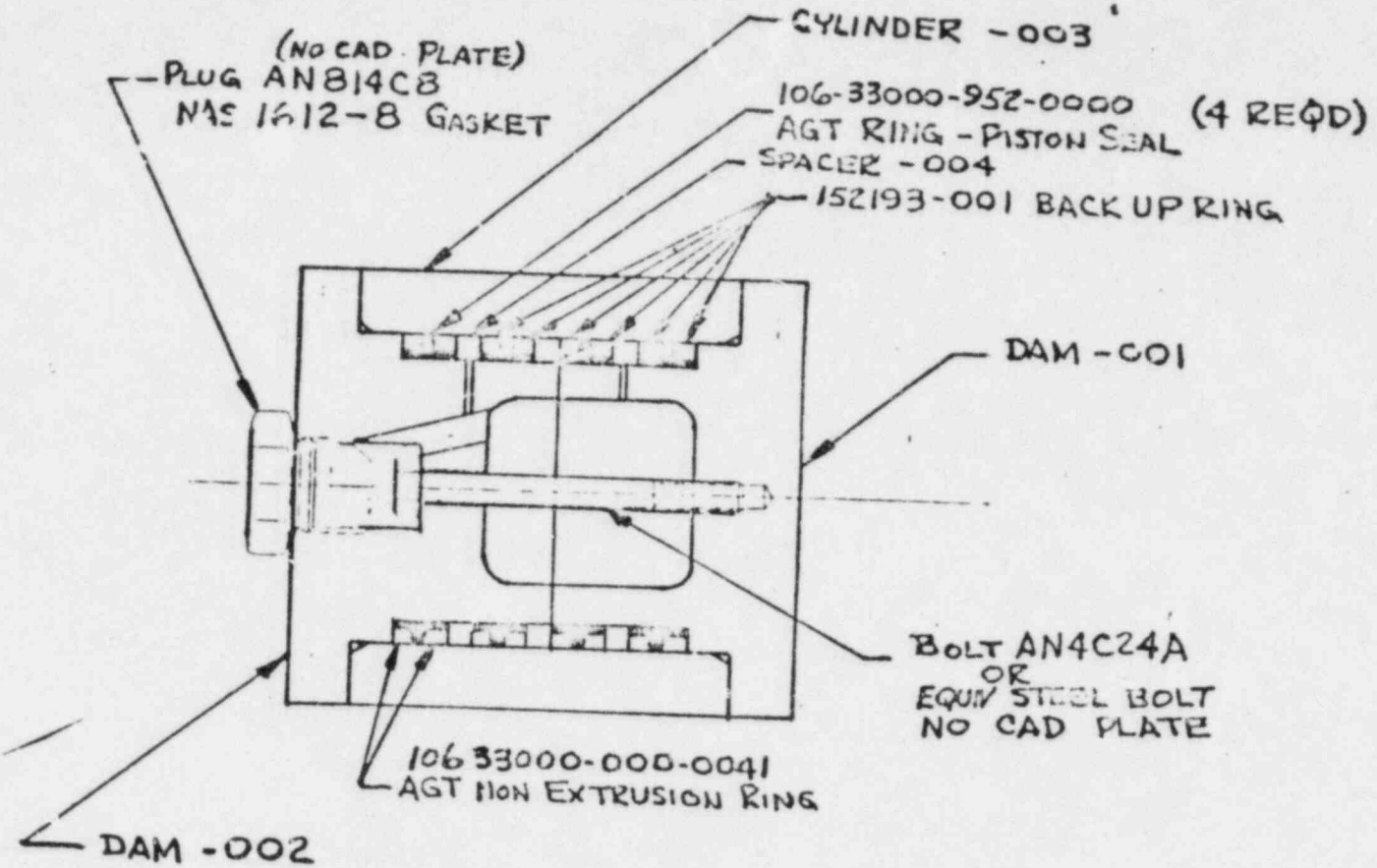
(b) The vessel was filled with SF1154 fluid and exposed to gamma radiation of 1.5×10^7 rads. See sheets 36 (B-4) and 37 (B-5) of this appendix.

(c) All of the irradiated samples were visually examined and no perceptable change had occurred. One of the back-up rings was installed on a production piston to determine if elastic properties had deteriorated to prevent stretching over the piston head. No additional difficulty was encountered during installation but the ring did not resume initial size after cooling. This phenomenon is not significant since rings will not be subjected to radiation prior to installation. See sheets 38, 39 & 40 (B-6) and 41 (B-7) of this appendix.

(d) A special separable gland 10kip piston was fabricated for test. See sheet 42 (B-8) of this appendix. Two of the irradiated seals and one irradiated elastomer T-seal were installed on the test piston and all cycling tests were performed per the qualification test procedure.

4. Conclusion

Montek concludes and certifies that the polyamide used for these tests, specifically unfilled 6/6 Nylon per Federal Specification L-P-410a or ASTM D789 Type I, Grade 2 is acceptable for use in snubbers for the environment specified in G.E. Specification 21A3502 (Rev 2). See test data sheets 43 (B-9) and 44 (B-10) of this appendix.


(NO CAD PLATE)
PLUG AN814C8
NAS 1612-8 GASKET
CYLINDER -003
106-33000-952-0000 (4 REQD)
AGT RING - PISTON SEAL
SPACER -004
152193-001 BACK UP RING
DAM -001
BOLT AN4C24A
OR
EQUIV STEEL BOLT
NO CAD PLATE
106 33000-000-0041
AGT NON EXTRUSION RING
DAM -002

THE UNIVERSITY OF MICHIGAN
PHOENIX MEMORIAL LABORATORY
FORD NUCLEAR REACTOR
ANN ARBOR, MICHIGAN 48105

September 21, 1977

Mr. Carl Maupin
Montek Division
E Systems, Inc.
2268 South 3270 West
Salt Lake City, Utah 84119

Dear Mr. Maupin:

Enclosed is a gamma attenuation table for the steel cylinder you sent. As you can see, the enclosure is quite a good attenuator. In both the longitudinal and radial directions, the gamma beam was attenuated by almost a factor of 10. I will be glad to answer any further questions.

We completed the gamma damage tests. Total gamma irradiation dose was 1.504×10^7 rads. The gamma field was 8.0×10^4 rad/hr and the sample was irradiated for 188 hours.

The sample was sent to you on September 26 via Federal Express. Total cost for both tests is $140 plus air freight. Your company will be billed by the University.

Sincerely,

Reed R. Burn
Reactor Manager
Ford Nuclear Reactor

RRB:z

MONITEK GAMMA ATTENUATION MEASUREMENTS

1. Theory

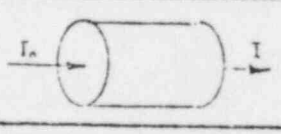
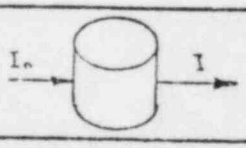
$$\text{Attenuation, } A = \frac{\text{Transmitted Beam, } I}{\text{Incident Beam, } I_o} = e^{-\mu T} \qquad (1.1)$$

where: μ = Attenuation coefficient, in^{-1}
T = Thickness, in.

Solve (1.1) for μ.

$$\mu = 1/T \ln (1/A) \qquad (1.2)$$

2. Test Data

Attenuation Measurement Configuration		
Gamma Source	CO 60, 1.2 Mev	CO 60, 1.2 Mev
Incident Beam, I_o (cts/min)	58,488	58,488
Transmitted Beam, I (cts/min)	7,064	7,322
Thickness, T (in)	4.0	3.5
Attenuation, A (I/I_o)	.121	.125
Attenuation Coefficient, μ (in^{-1})	.528	.594

GREENE, TWEED & CO.

NORTH WALES, PENNSYLVANIA 19454 • 215 256-9521 • TELETYPE: 510 661-8158

July 7, 1977

E-Systems
2268 South 3270 West
Salt Lake City, Utah84119

Attention: Mr. Carl Naupin

Subject: Radiation Resistance of Polyamide (Nylon 6) non-extrusion rings

Gentlemen:

In reference to your request for subject data, the following is submitted.

NWR material as used with our seals for non-extrusion rings is a wear resistant form of subject material. As tested by Battelle, it has a threshold damage level (dry) of 10^7 roentgens and at the 25% damage level (dry), 5.4 x 10^6 roentgens. The 25% damage level as defined by Battelle is that level where one or more of the physical properties changes by 25% without respect to direction of change. In the case of this material, the level was established due to a 25% reduction in impact strength which is not considered a critical property within observed range of change when utilized as a backup. Of more importance is tensile and shear strength, both showing an increase in properties up through 10^9 roentgens (dry) which would be considered a desirable feature as far as its use as a non-extrusion device.

It should be noted that above mentioned exposure levels were suffixed as "dry". When immersed in a suitable oil, these limiting levels could probably be increased by a factor of ten as a conservative estimate.

We appreciate this opportunity to comment and trust the above satisfies your requirements.

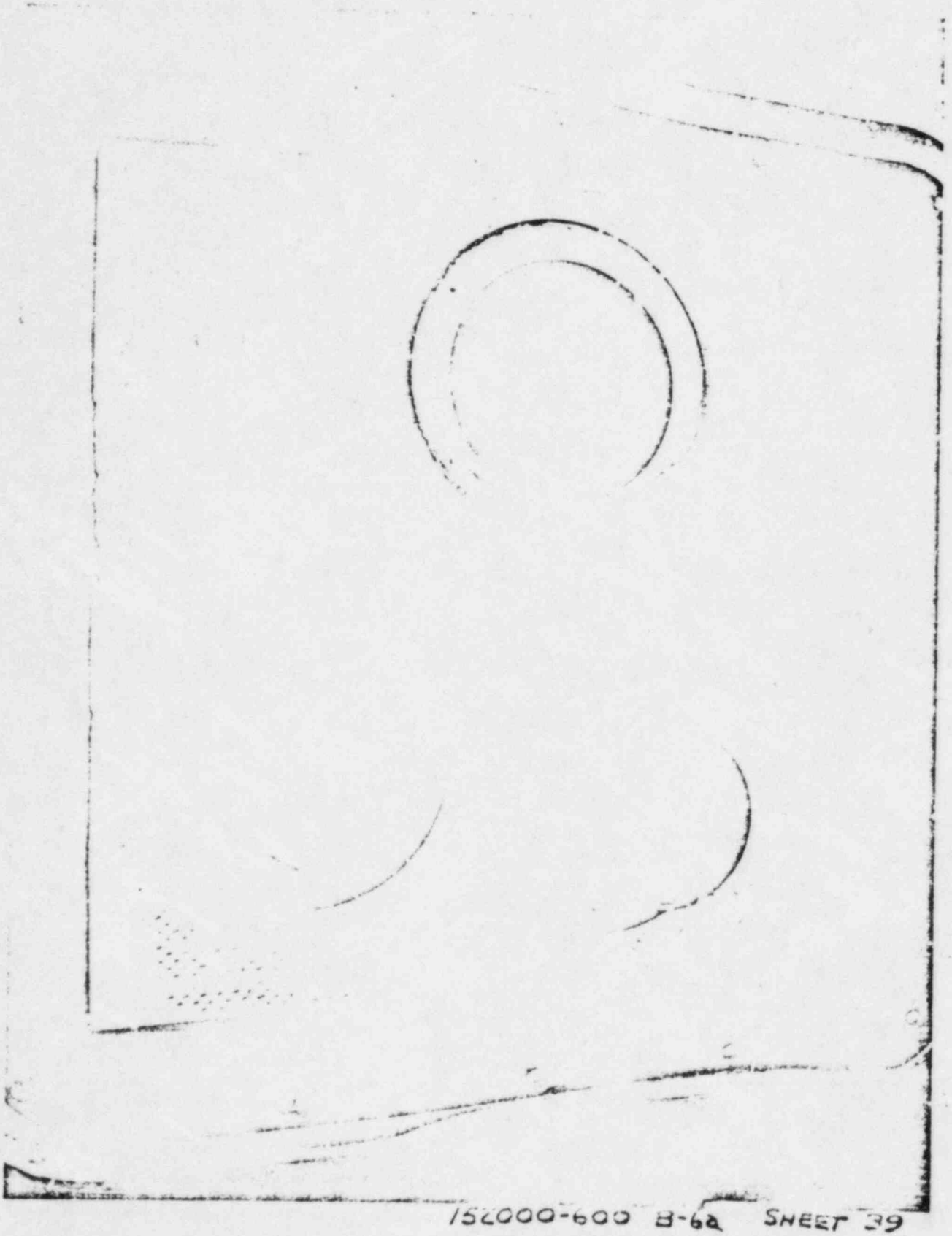
Very truly yours,
GREENE TWEED & CO.

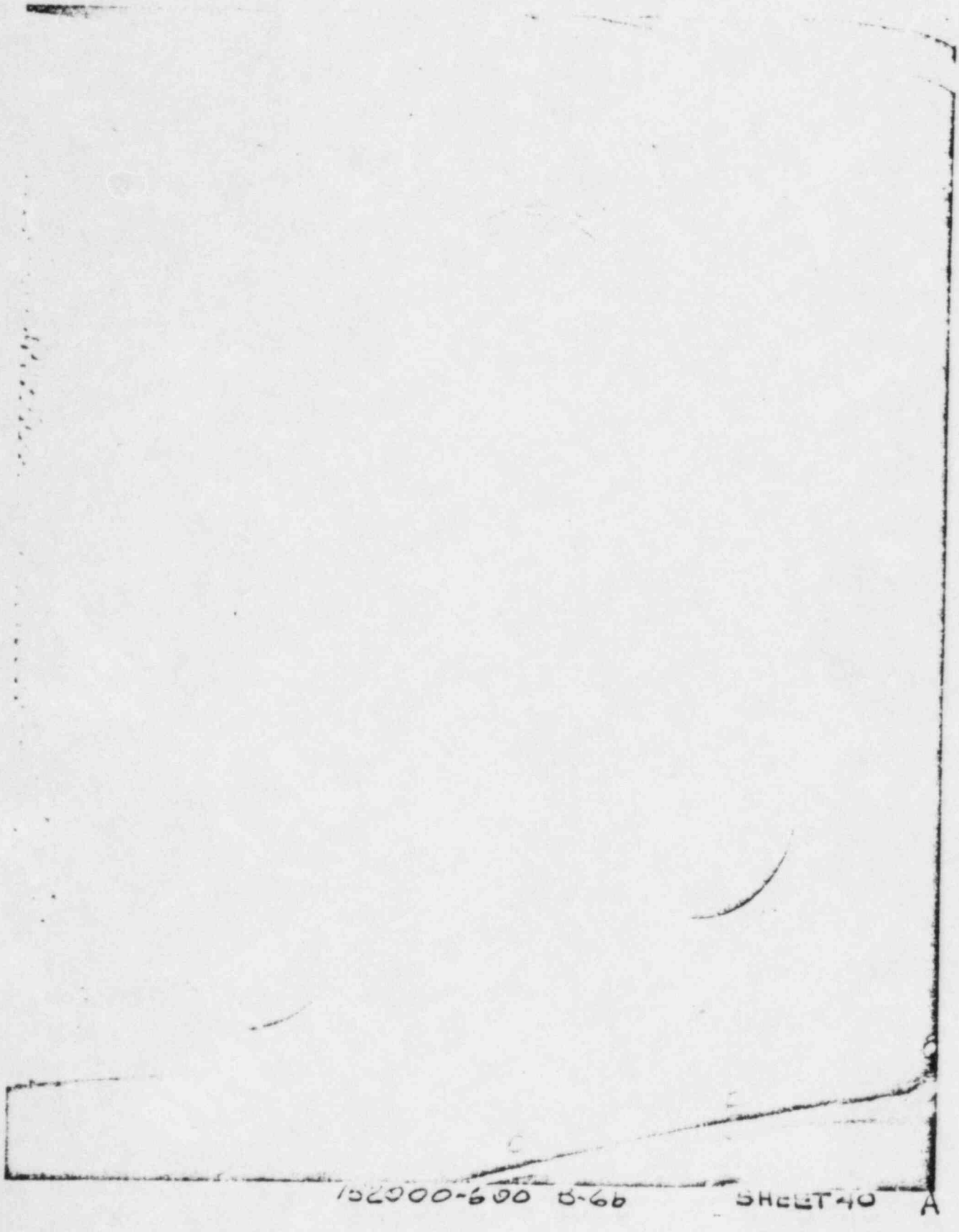
Thorval L. Berg
Manager, Product Engineering

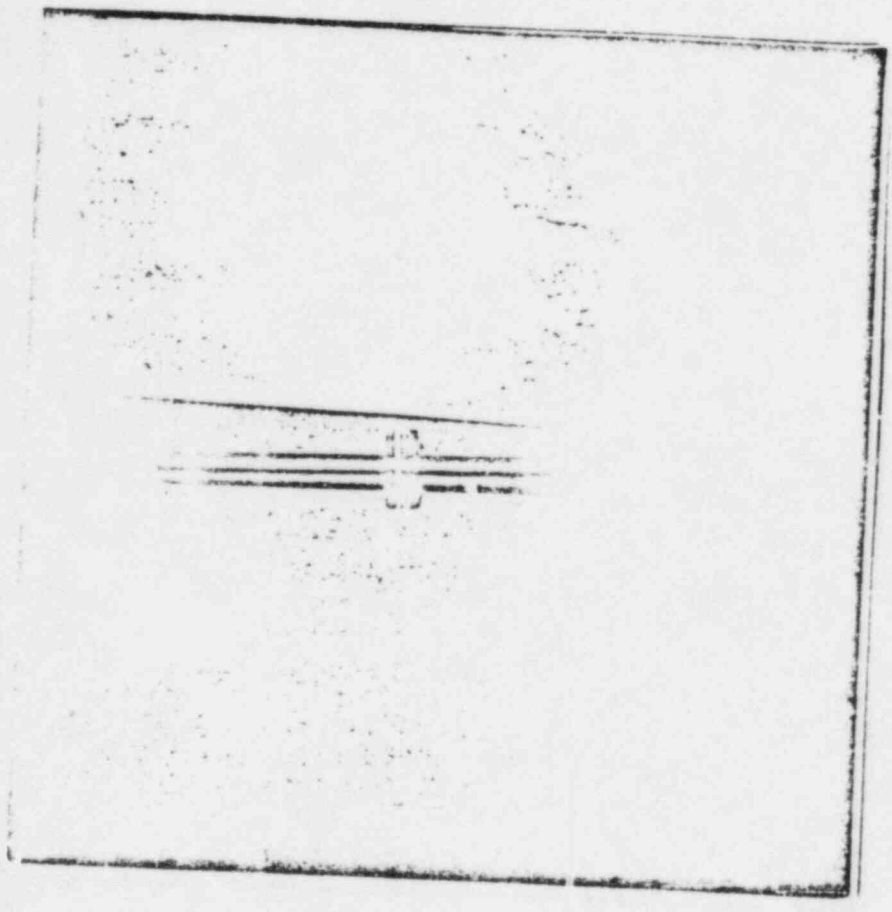
x,G74

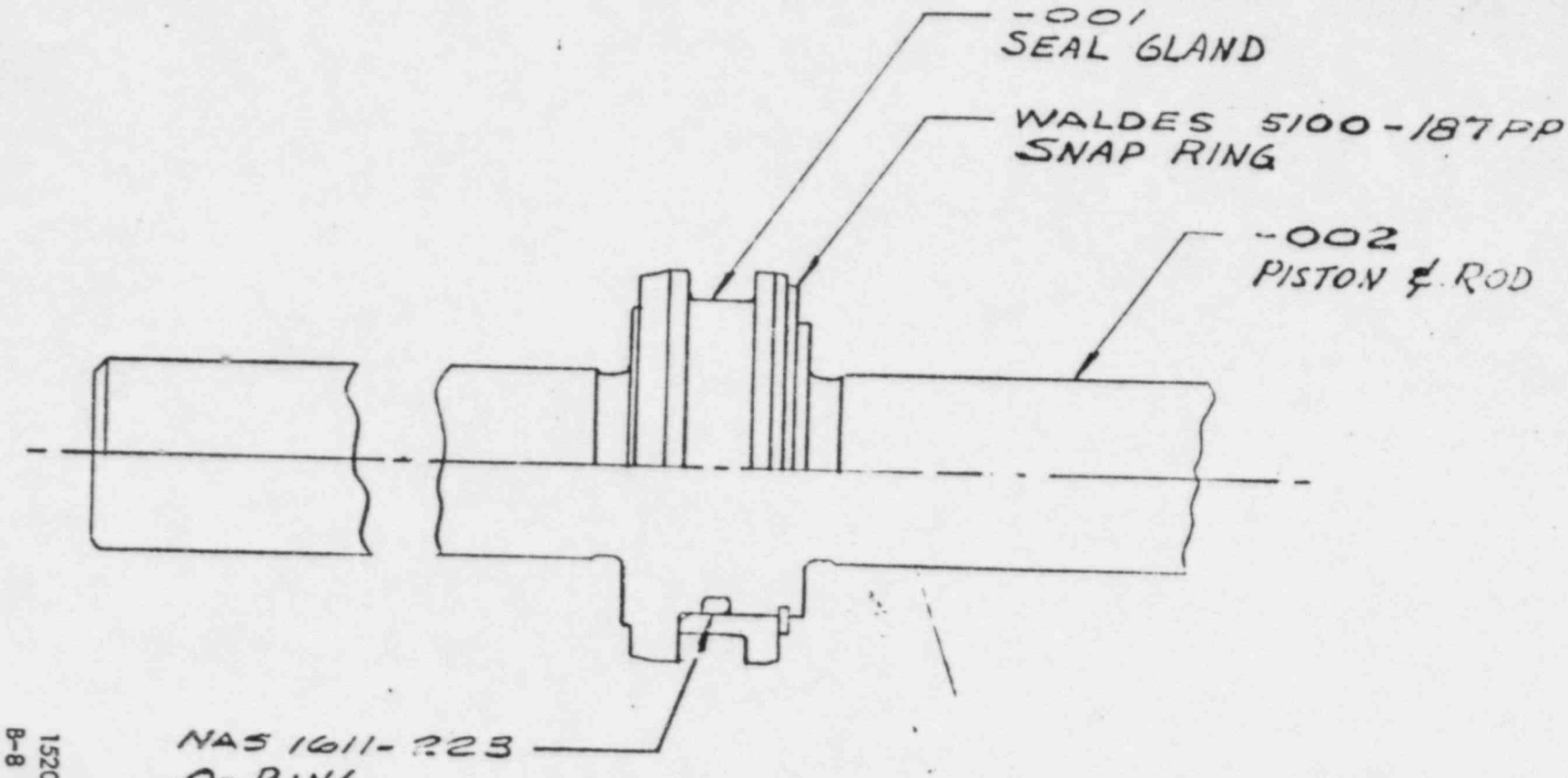
TLB/sjw

manufacturers of fluid sealing systems for fluid power components

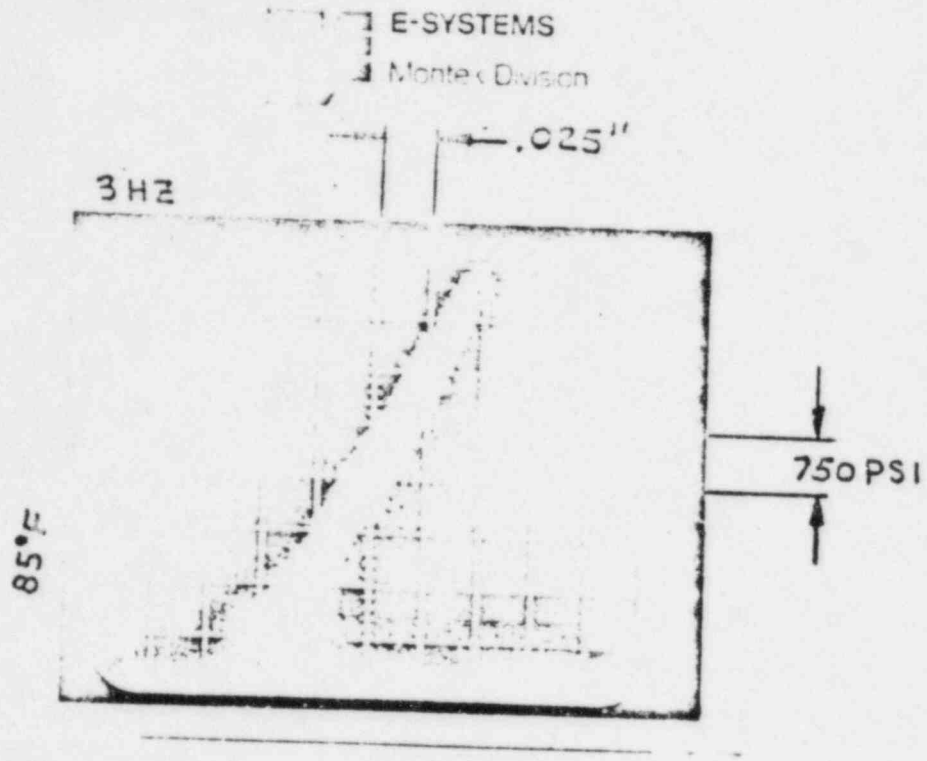


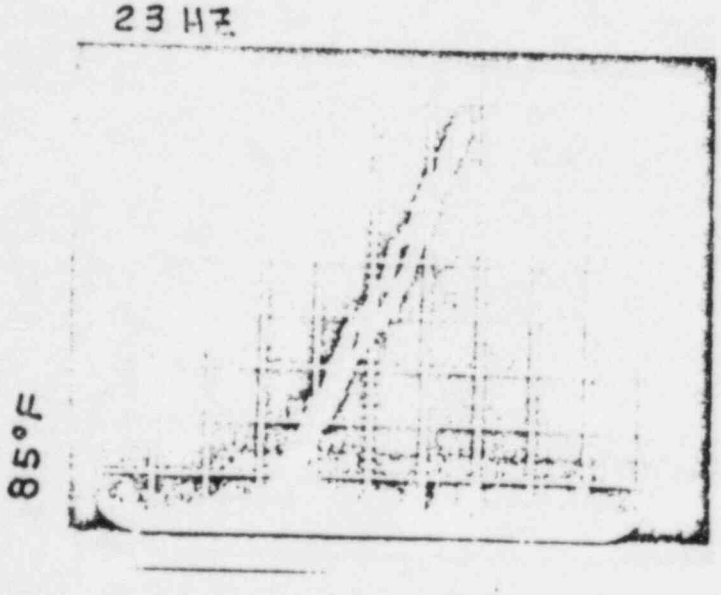

152000-600 B-66
SHEET 40
A

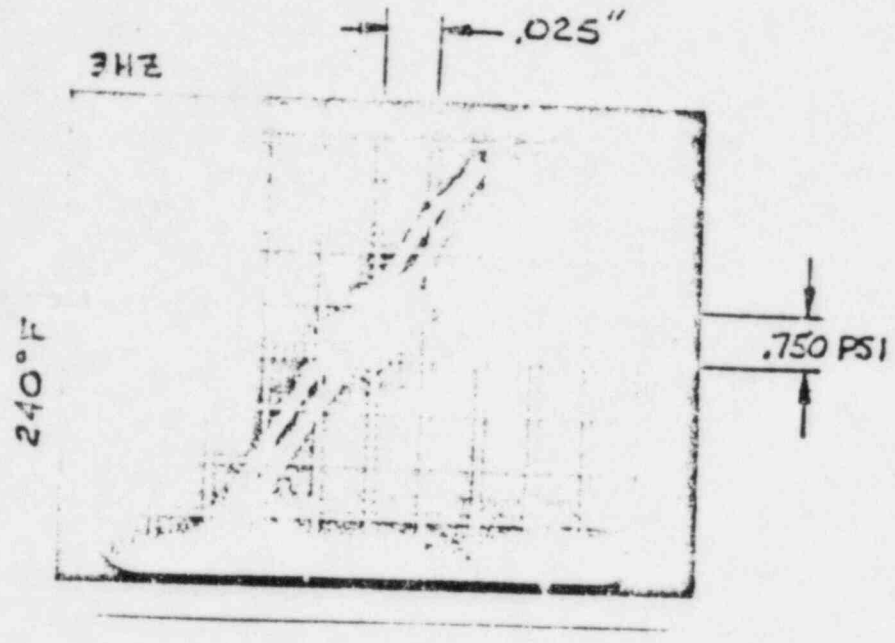


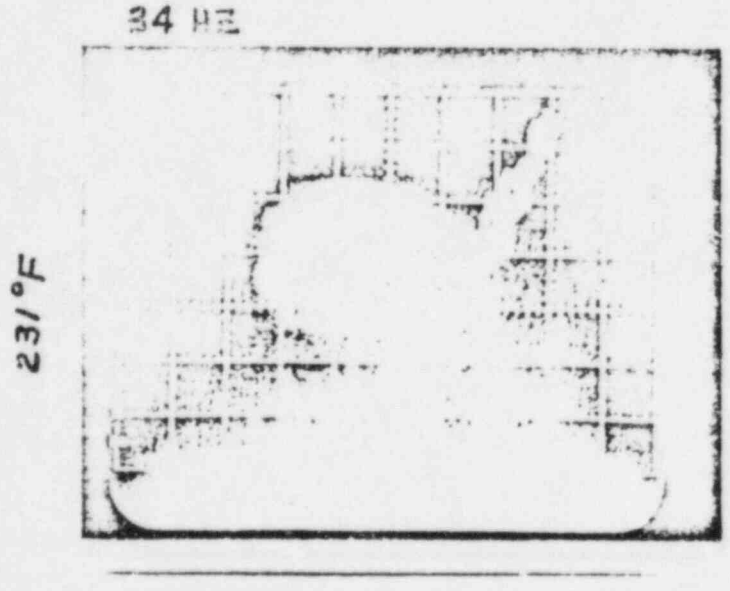


-100 ASSEMBLY

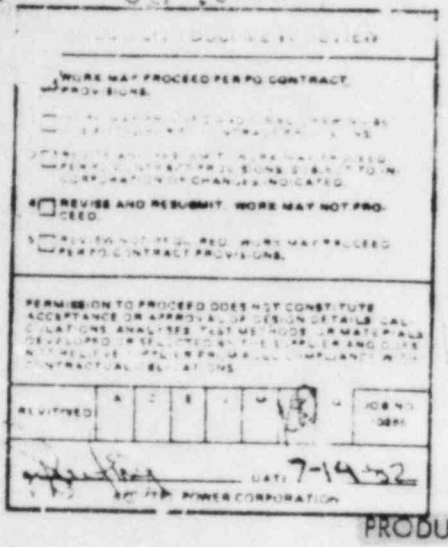

E-SYSTEMS
Monte< Division
.025"
3 HZ
750 PSI
85°F


23 HZ
85°F

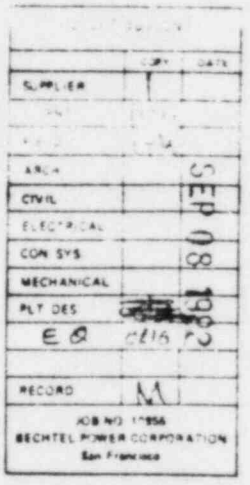

.025"
3HZ
240°F
.750 PSI


34 HZ
231°F

SEP 10 1981



41.2



PRODUCT QUALIFICATION TEST REPORT

152000-620
G.E. PIPE SUSPENSION SNUBBER
VOLUME 9 of 9
REVISION STATUS OF SNUBBER DRAWINGS

(ALSO APPROVED BY GE - SEE ATTACHED)

December 23, 1977 Original Release
March 23, 1979 Rev. A

GENERAL ELECTRIC SPECIFICATION No. 21A3502 REV. 2

FOR INFORMATION ONLY

10855-P401-DQ-1(9)-1

SEE PAGE 13 & 14 FOR PART NUMBERS OF 70 kips UNIT.

CALIFORNIA 95125

A(Wayne Provenza

Kush!

JAN 23 1978

E-Systems, Inc., Montel Division
(VENDOR)

J. R. Nuttall
(PERSON MAKING SUBMITTAL)

REUSE DISPOSITION PER: EQUIPMENT Shock Suppressors

(FOR GE USE ONLY)

TO: W. Provenza (1+3T)

J. Linington
Release Engineer
M/C 730 1-19-78

LP VPF
2+2T QAEESI
0 File
0 C. T. Nieh, Engr.
Kuo-Sheng 1&2
0 C. D. Shadinger
TVA X17-X22
0 L. H. Larson
Perry 1&2
0 N. R. Barker
Hope Creek 1&2
0 J. C. Larreu

PURCHASE ORDER NO.	MASTER PARTS LIST NUMBER (PPL)	PROJECT	VPF NO. (IF AVAILABLE)	VENDOR REF NO.	VENDOR DOCUMENT / TITLE/NUMBER	REV	SUB VENDOR	QTY DELIVERED	QTY	QTY REVIEWED
550	821-G00(	Skagit 1 Grnd Gulf 1&2	508-12(9) -1		Qualification Test Report No.	-			3	V
560	933-G00(	Skagit 1 Grnd Gulf 1&2			152000-620 Volume 9 of 9					
552	821-G00(	Kuo Sheng 1&2 CNV 1&2			Revision status of Snubber Drawings *					
553	833-G00(	Kuo Sheng 1&2 CNV 1&2			[illegible]					
552	821-G00(	TVA 17-22 Perry 1&2			[illegible]	A			3	
562	833-G00(	TVA 17-22 Perry 1&2			[illegible]					
554	821-G00(	Hope Creek 1&2								
563	831-G00(	Hope Creek 1&2			"					
553	821-G00(	Laguna Verde 1&2								
567	831-G00(	Hatch 2								
					*Documents apply to all listed projects.					

FOR APPLICABLE ATTACHMENT A
APPROVAL C - FOR CERTIFICATION APPROVAL
[illegible] - FOR INFORMATION

[illegible] D - DISAPPROVED; I - CERTIFIED - NO FURTHER ACTION;
V - APPROVED - NO FURTHER ACTION; W - APPROVED WITH COMMENTS;
X - [illegible] CATION BY VENDOR NECESSARY; H - APPROVED FOR USE

E-SYSTEMS
Montek Division

PREPARED BY:

C. M. Stieg
C. M. STIEG
A/C ENGINEERING

APPROVED BY:

Paul Masters 3-28-79
P. G. MASTERS
MANAGER
DESIGN ENGINEERING

APPROVED BY:

J. Lynch
J. LYNCH
QUALITY ASSURANCE

REVIEWED BY:

D. Teissler
D. TEISSLER
PROGRAM MANAGER

SNUBBER ASSEMBLIES QUALIFICATION TEST REPORT

REPORT NO. 152000-620

VOLUME 9 of 9

December 23, 1977

March 23, 1979
Rev. A

VOLUME 9

FOREWORD

This volume provides drawing revision status of each size snubber assembly, including component detail drawings, at the date of qualification unit assembly and as of the date of issue of this volume.

Tabulated on pages 5 and 6 is each drawing or part number used on the 10 kip qualification unit, drawing revision level at the date of qualification unit assembly, drawing revision level at the date of issue of this volume, and engineering change document number (00411.2.XXX) of any changes issued after the date of qualification unit assembly.

Similar configuration data to that provided for the 10 kip unit is contained on pages 7 and 8 for 20 kip unit, pages 9 and 10 for 30 kip unit, pages 11 and 12 for 50 kip unit, pages 13 and 14 for 70 kip unit, and pages 15 and 16 for 100 kip unit. Following the 100 kip data is a numerical listing of all engineering change document numbers (E.C. 00411.2.XXX), which are included herein in numerical sequence, a brief summary of the change and Montek's assessment of the changes' effect on the validity of the qualification test. All future engineering changes issued against drawings on the snubber assemblies will have a statemnnt that "validity of qualification testing is unaffected" unless the contrary is so in which case re-qualification must be performed.

It is Montek's assessment that at the date of issue of this volume, no changes to any snubber assembly part have been made that effect the validity of qualification tests on the 10, 20, 30, 50, 70 or 100 kip snubber assemblies.

TABLE OF CONTENTS

10 KIP 8-26-77 Assembled (Q-10-1 & Q-10-2)

DRAWING NO.	PART NAME	REV AT QUAL TEST	PRESENT REV.	REVISIONS AFTER ASSY DATA
				E.C. 00411.2. ___
152001	Snubber Assy	D	E	.409, .423
152020	Dam Assy	C_1	C_1	-
152026	Bushing	C	F	.375, .444, .454, .506, .541
152027	Body Assy	C_1	C_3	.458, .473
152033	Piston & Rod	D_2	D_3	.395
152039	Forging - P. & R	F_1	F_1	-
152040	Spring	E	J	.381, .414, .440, .509
152045	Nameplate	B	F_1	.388, .407, .486, .522
152055	Valve Assy	E	F	.383
152057	Seal Poppet	C	E	.382, .403
152058	Seal, Seat	C	C	-
152059	Poppet & Ret.	C	D	.380
152062	Retainer	C	C	-
152063	Valve Sleeve	C	C	-
152064	Retainer, Seat	C	C	-
152066	Retainer, Seal	A	B_1	.306 Ref, .369
152067	Retainer, Thrd	A	A	.306 Ref
15	Retainer Valve	C	C	.306 Ref
152101	Rod End Assy - Piston	D_2	D_2	-
152111	Rod End Assy - Adjust	D_2	D_2	-
152131	End Fitting	C	C	-
152181	Pos. Indicator	A	B	.368, .520
152195	Seal, Shut off	B	B	-
152196	Lockwasher	A	A	-
152219	Reservoir Hsg	D_1	E_1	.455
152223	Piston & Bearing Resvr	D_1	D_1	-
152227	Retainer, Resvr	C	D	.376
152231	Bayonet	B	B	-
152234	Retainer Ring	B	C	.507
152236	Block Retainer	C_2	C	490
152238	Indicator, Resvr	B	B	-
910642	Ball Bushing	A	A	-
910644	Nut	C	F	.386, .441, .460, .485
910645	Washer	A	A	-
910646	Bolt	G_1	G_2	.545
910647	Screw	A	A	-
910648	Plug	A	A	-
910641	Seal Procurement	C	D	.406

10 KIP (continued)

P/N	PART NAME	PROCUREMENT OR SUPPLIER
MOLYKOTE 505	Lubricant	Dow Corning
SF 1154	Fluid	General Electric
104 333009520041	T-seal	Procured Per Spec 910641-001
105 217009520041	T-Seal	
910901-101	T-Seal	
1E701187-4207 with E740-75	Scraper-Poly Pak	
2-017-E740-75	O-ring	
2-021-E740-75	O-ring	
2-109-E740-75	O-ring	
2-113-E740-75	O-ring	
2-228-E740-75	O-ring	
3-904-E740-75	O-ring	
3-906-E740-75	O-ring	
8-017-E652-90	Back-up Ring	
8-021-E652-90	Back-up Ring	
8-109-E652-90	Back-up Ring	
8-113-E652-90	Back-up Ring	
8-228-E652-90	Back-up Ring	
PLGA4061020	Lee Plug	910641-001 Lee Company
JET A1875-170H	Lee Jet	Lee Company

20 KIP 6-26-77 Assembled (Q-20-1 & Q-20-2)

DRAWING No.	PART NAME	REV AT QUAL TEST	PRESENT REV	REVISIONS AFTER ASSY DATA
				E.C. 00411.2.
152002	Snubber Assy	E	G	.336, .409, .418 306
152021	Dam Assy	E	F_1	.342
152026	Bushing	B	F	.341, .375, .444, .454, .506,
152028	Body Assy	E	F_4	.342, .458, . 474, .504 .54
152034	Piston & Rod	F_2	G_1	.371, .394
152039	Forging, Pist. & Rod	E	F_1	.317
152040	Spring	E_3	J	.330, .509
152045	Nameplate	B	F_1	.381, .414, .440
152055	Valve Assy	D	F	.388, .417, .486, .522
152057	Seal - Poppet	C	E	.332, .383
152058	Seal, Seat	B	C	.382, .403
152059	Poppet & Ret. Assy	B	D	.333
152062	Retainer	C	C	.331, .380
152063	Valve Sleeve	C	C	-
152064	Retainer Seat	C	C	-
[illegible]	Retainer, Seal	A	B_1	-
152067	Retainer, Threaded	A	A	.306 Ref, .369
152068	Retainer, Valve	C	C	.306 Ref
152102	Rod End Assy, Piston	D_1	D	.306 Ref
152112	Rod End Assy, Adjust	E_1	E	.370
152132	End Fitting	D	D	.457
152182	Pos. Indicator Assy	A	B_1	-
152195	Seal-Shut Off	B	B	.368
152196	Lockwasher	A	A	-
152219	Reservoir Hsg	C	E_1	-
152223	Piston & Brg. Resvr	C	D_1	.350, .455
152227	Retainer, Resvr	C	D	.316
152231	Bayonet	B	B	.376
152234	Retainer Ring	B	C	-
152236	Block Retainer	C_2	C	.307
152238	Indicator-Resvr	B	B	.490
910642	Ball Bushing	A	A	-
910644	Nut	B	F	-
910645	Washer	A	A	.313, .386, .441, .460, .485
910646	Bolt	F	G_2	-
910647	Screw	A	A	.334, .545
910648	Plug	A	A	-
910641	Seal Procurement	B	D	-
				.293, .406

20 KIP (continued)

P/N	PART NAME	PROCUREMENT OR SUPPLIER
MOLY[illegible]OTE 505	Lubricant	Dow Corning
SF 115[illegible]	Fluid	General Elec. Co.
104533009520041	T-Seal	Procured Per Spec.
105220009520041	T-Seal	910641-001
9[illegible]0901-102	T-Seal	
1[illegible]701375-4207	Scraper-Poly Pak	
wi[illegible] E740-75	O-Ring	
2-017-E740-75	O-Ring	
2-021-E740-75	O-Ring	
2-109-E740-75	O-Ring	
2-113-E740-75	O-Ring	
2-234-E740-75	O-Ring	
3-904-E740-75	O-Ring	
3-906-E740-75	O-Ring	
8-017-E652-90	Back-Up Ring	
[illegible]021-E652-90	Back-Up Ring	
[illegible]-109-E652-90	Back-Up Ring	
8-113-E652-90	Back-Up Ring	
8-234-E652-90	Back-Up Ring	
PLGA4061020	Lee Plug	910641-001
JETA1875-100H	Lee Jet	Lee Company
		Lee Company

30 KIP 6-1-77 Assembled (Q-30-1 & Q-30-2)

wing No.	Part Name	Rev. At Qual Test	Present Rev	Revisions After Assembly Data
				E.C. 00411.2.
52003	Snubber Assy	C	F_1	.307, .409, .428, .419, .503
52022	Dam Assy	B	C_2	.342, .524
52026	Bushing	B	F	.341, .375, .444, .454, .506
52029	Dam Assy-Ctr	D_2	D_2	.342, .458, .473, .541
52035	Piston & Rod	E_2	F_1	.371, .393
52039	Forging - Piston & Rod	E	F	.317
52040	Spring	E_3	J_1	.330, .381, .414, .509
52045	Nameplate	B	F	.440
52048	Porting Tube	C	C	.368, .407, .486, .522
52055	Valve Assy	D	F	-
52057	Seal-Poppet	C	E	.382, .383
52058	Seat Seat	B	C	.382, .403
52059	Poppet & Ret. Assy	B	D	.380
062	Retainer	C	C	.331, .380
52063	Valve Sleeve	C	C	-
52064	Retainer Seat	C	C	-
52066	Retainer Seal	A	B_1	-
52067	Retainer, Threaded	A	A_1	.306 Ref, .369
52068	Retainer, Valve	C	C	.306 Ref
52092	Cylinder - Main	D	E_1	.306 Ref
52103	Rod End Assy - Piston	D_1	D	.488
52113	Rod End Assy - Adjus.	D_1	D	.370
52133	End Fitting	C_1	C	.457
52183	Position Indicator Assy	A	B_1	-
52195	Seal - Shut Off	B	B	.368
52196	Lockwasher	A	A	-
52220	Reservoir - Hsg	C	E_1	-
52224	Piston & Bearing-Resvr	D	E_1	.350, .456
52228	Retainer - Resvr	D	E	.316
52231	Bayonet	B	B	.377
52234	Retainer Ring	B	C	-
52237	Clip Retainer	B	B	.507
52238	Indicator - Resvr	B	B	-
52449	Tie Bolt	C_1	C_3	-
0642	Ball Bushing	A_1	A	.530, .558
0644	Nut	B	F	-
0645	Washer	A	A	.313, .386, .441, .460, .485
0646	Bolt	E	G_2	-
647	Screw	A	A	.292, .334, .545
648	Plug	A	A	-
0641	Seal Procurement	B	D	-
				.293, .406

P/N	Product Name	Procurement Or Supplier
Molykote 505 Paste	Lubricant	Dow Corning
SF 1154	Fluid	General Elec. Co.
104346009520041	T-Seal	Procured Per Spec
105327009520041	T-Seal	910641-001
910901-103	T-Seal	
25001750-4207	Scraper Poly Pak	
with E740-75	O-Ring	
2-017-E740-75	O-Ring	
2-021-E740-75	O-Ring	
2-109-E740-75	O-Ring	
2-113-E740-75	O-Ring	
2-116-E740-75	O-Ring	
2-240-E740-75	O-Ring	
3-904-E740-75	O-Ring	
3-906-E740-75	O-Ring	
8-017-E652-90	Ring Back-Up	
8-021-E652-90	Ring Back-Up	
8-109-E652-90	Ring Back-Up	
8-113-E652-90	Ring Back-Up	
8-116-E652-90	Ring Back-UP	
8-240-E652-90	Ring Back-Up	
PLGA 4061020	Lee Plug	901641-001
JETA 1875-650D	Lee Jet	Lee Company
		Lee Company

30 KIP 5-24-77 Assembled (G-30-1 & G-30-2)

Drawing No.	Part Name	Rev. At Qual Test	Present Rev.	Revisions After Assembly Date
				E.C. 00411.2.
152005	Snubber Assy	C	F	.373, .409, .420, .429, .30
152023	Dam Assy	B	C_2	.342, .524 /.514
152026	Bushing	B	F	.341, .375, .444, .454, .506
152030	Dam Assy-Ctr.	C	D_3	.342, .458, .476 /.541
152036	Piston & Rod	E_2	F_1	.371, .392
152039	Forging - Piston & Rod	E	F_1	.317
152040	Spring	E_3	J	.330, .381, .414, .509
152045	Nameplate	B		.440
152046	Forging- Piston & Rod	B	F_1	.388, .407, .486, .522
152048	Porting Tube	C	C_1	.459
152055	Valve Assy	D	C	-
152057	Seal-Poppet	C	F	.332, .380
152058	Seal Seat	B	E	.382, .403
152059	Poppet & Ret. Assy	B	C	.333
152062	Retainer	C	D	.331, .380
152063	Valve Sleeve	C	C	-
152064	Retainer Seat	C	C	-
15[illegible]	Retainer, Seal	A	C	-
15[illegible]	Retainer, Threaded	A	B_1	.306 Ref, .369
152068	Retainer, Valve	C	A_1	.306 Ref
152092	Cylinder-Main	D	C	.306 Ref
152105	Rod End Assy - Piston	D_1	E_1	.488
152115	Rod End Assy - Adjust	D_1	D	.370
152135	End Fitting	C	D	.457
152185	Position Indicator Assy	A	C	-
152195	Seal-Shut Off	B	B_1	.368
152196	Lockwasher	A	B	-
152220	Reservoir Hsg	C	A	-
152224	Piston & Bearing Resvr	D	E_1	.350, .456
152228	Retainer-Resvr	D	E_1	.316
152231	Bayonet	B	E	.377
152234	Retainer Ring	B	B	-
152236	Block Retainer	C_2	C	.507
152238	Indicator Reservoir	B	C_2	-
152448	Tie Bolt	B	B	-
910642	Ball Bushing	A	C_3	.283, .530, .558
910644	Nut	B	A	-
910645	Washer	A	F	.313, .386, .441, .460, .485
910646	Bolt	F	A	-
910647	Screw	A	G_2	.334, .545
910648	Plug	A	A	-
910641	Seal Procurement	B	A	-
			D	.293, .406

5.0 KIP (Continued)

P/N	Part Name	Procurement Or Supplier
Molykote 505 Paste	Lubricant	Dow Corning
SF1154	Fluid	General Elec. Co
104346009520041	T-Seal	Procured Per Spec
105331009520041	T-Seal	910641-001
910901-105	T-Seal	
25002250-4207	Scraper Poly-Pak	
with E740-75	O-Ring	
2-017-E740-75	O-Ring	
2-021-E740-75	O-Ring	
2-109-E740-75	O-Ring	
2-113-E740-75	O-Ring	
2-116-E740-75	O-Ring	
2-427-E740-75	O-Ring	
3-904-E740-75	O-Ring	
3-906-E740-75	O-Ring	
3-017-E652-90	Ring Back-Up	
3-[illegible]652-90	Ring Back-Up	
3-[illegible]652-90	Ring Back-Up	
3-113-E652-90	Ring Back-Up	
3-116-E652-90	Ring Back-Up	
3-427-E652-90	Ring Back-Up	
PLGA2810020	Lee Plug	910641-001
JETA1875-380D	Lee Jet	Lee Company
		Lee Company

70 KIP Assembled 10-03-77 (Q-70-1 & Q-70-2)

Drawing No.	Part Name	Rev. At Qual Test	Present Rev.	Revisions After Assembly Data
				E.C. 00411.2.
152007	Snubber Assy.	D	G	.409, .430, .421, .492, .571
152024	Dam Assy	D_1	D_2	.524
152026	Bushing	D_1	F	.444, .454, .506, .541
152031	Dam Assy, Ctr.	D_1	D_3	.458, .477
152037	Piston & Rod	F_1	F_1	-
152039	Forging - Piston & Rod	F_1	F_1	-
152040	Spring	F	J	.414, .440, .509
152045	Nameplate	C	F_1	.407, .486, .522
152048	Porting Tube	C	C	-
152055	Valve Assy	F	F	-
152057	Seal-Poppet	D	E	.403
152058	Seal Seat	C	C	-
152059	Poppet and Ret. Assy	D	D	-
152062	Retainer	C	C	-
152063	Valve Sleeve	C	C	-
152064	Retainer Seat	C	C	-
152066	Retainer, Seal	B_1	B_1	.306 Ref
152067	Retainer, Threaded	A^1	A^1	.306 Ref
15[illegible]	Cylinder-Main	D	E_1	.488
15[illegible]	Rod End Assy- Piston	D	D	-
152123	Rod End Assy	C_1	C	.457
152137	End Fitting	C^1	C	-
152187	Position Indicator Assy	B_1	B_1	-
152195	Seal - Shut Off	B^1	B^1	-
152196	Lockwasher	A	A	-
152222	Reservoir - Hsg	C	D_2	.450, .456
152226	Piston & Bearing - Resvr	B_1	B^1	-
152230	Retainer - Resvr	B^1	B^1	-
152231	Bayonet	B	B	-
152234	Retainer Ring	B	C	.507
152237	Clip Retainer	B	B	-
152238	Indicator - Resvr	B	B	-
152451	Tie Bolt	C_1	C_2	.558
910642	Ball Bushing	A	A	-
910644	Nut	D	F	.441, .460, .485
910645	Washer	A	A	-
910646	Bolt	G_1	G_2	.545
910647	Screw	A^1	A	-
910648	Plug	A	A	-
910641	Seal Procurement	C	D	.406

70 KIP (Continued)

P/N	Part Name	Procurement Or Supplier
Molykote 505 Paste	Lubricant	Dow Corning
SF 1154	Fluid	General Elec. Co.
104346009520041	T-Seal	Procured Per Spec.
105332009520041	T-Seal	910641-001
910901-107	T-Seal	↑
25002375-4207	Scraper Poly-Pak	↑
with E740-75	O-Ring	↑
2-017-E740-75	O-Ring	↑
2-021-E740-75	O-Ring	↑
2-109-E740-75	O-Ring	↑
2-113-E740-75	O-Ring	↑
2-116-E740-75	O-Ring	↑
2-434-E740-75	O-Ring	↑
3-904-E740-75	O-Ring	↑
3-906-E740-75	O-Ring	↑
8-017-E652-90	Back-Up Ring	↑
8-[illegible] E652-90 (8-021)	Back-Up Ring	↑
8-[illegible] E652-90 (8-109)	Back-Up Ring	↑
8-113-E652-90	Back-Up Ring	↑
8-116-E652-90	Back-Up Ring	↑
8-434-E652-90	Back-Up Ring	↑
PLGA2810020	Lee Plug	910641-001
JETA 1875-260D	Lee Jet	Lee Company
	> SEE NOTE 105 OF 10855-P401D(Q)-18(1)-2	Lee Company

100 KIP Assembled 12-13-77 (Q-100-1 & Q-100-2)

Drawing No.	Part Name	Rev. At Qual Test	Present Revision	Revisions After Assembly Data
				E.C. 00411.2.
152010	Snubber Assy	F_1	F_2	.502
152025	Dam Assy	D_1	D_2	.524
152026	Bushing	D_1	F	.454, .506, .541
152032	Dam Assy, Ctr	D_1	D_3	.458, .478
152038	Piston & Rod	E_1	E_1	-
152039	Forging - Piston & Rod	F_1	F_1	-
152040	Spring	H	J	.509
152045	Nameplate	D	F_1	.486, .522
152048	Porting Tube	C	C	-
152055	Valve Assy	F	F	-
152057	Seal-Poppet	E	E	-
152058	Seal Seat	C	C	-
152059	Poppet & Ret. Assy	D	D	-
152062	Retainer	C	C	-
152063	Valve Sleeve	C	C	-
152[illegible]4	Retainer Seat	C	C	-
15	Retainer Seal	B_1	B_1	.306 Ref
152067	Retainer, Threaded	A	A	.306 Ref
152092	Cylinder - Main	D	E_1	.488
152110	Rod End Assy - Piston	D	E	.559
152119	Adapter	A	A	-
152160	Weldment Extension	C	C	-
152190	Position Indicator Assy	B_1	B_1	-
152195	Seal - Shut Off	B_1	B_1	-
152196	Lockwasher	A	A	-
152222	Reservoir Assy	C	D_2	.450, .456
152226	Piston & Bearing - Resvr	B_1	B_1	-
152230	Retainer - Resvr	B_1	B_1	-
152231	Bayonet	B	B	-
152234	Retainer Ring	B	C	.507
152237	Clip Retainer	B	B	-
152238	Indicator - Resvr	B	B	-
152452	Tie Bolt	C_1	C_2	.558
210642	Ball Bushing	A	A	-
210644	Nut	E	F	.460, .485
210645	Washer	A	A	-
210646	Bolt	G_1	G_2	.545
210647	Screw	A	A	-
210648	Plug	A	A	-
210641	Seal Procurement	D	D	-
210901-110	T-Seal	A	C	.462, .523

100 KIP (Continued)

P/N	Part Name	Procurement Or Supplier
Molykote 505 Paste	Lubricant	Dow Corning
SF 1154	Fluid	General Elec. Co
1043460095 20041	T-Seal	Procured Per Spec
1053400 09520041	T-Seal	910641-001
910901-110	T-Seal	
25003375-4207	Scraper Poly-Pak	
with E740-75	O-Ring	
2-017-E740-75	O-Ring	
2-021-E740-75	O-Ring	
2-109-E740-75	O-Ring	
2-113-E740-75	O-Ring	
2-116-E740-75	O-Ring	
2-441-E740-75	O-Ring	
3-904-E740-75	O-Ring	
3-906-E740-75	O-Ring	
8-017-E652-90	Ring Back-Up	
8-[illegible]652-90	Ring Back-Up	
8-109-E652-90	Ring Back-Up	
8-113-E652-90	Ring Back- Up	
8-116-E652-90	Ring Back-Up	
8-441-E652-90	Ring Back-Up	
PLGA 2810020	Lee Plug	910641-001
JETA 1875-190D	Lee Jet	Lee Company
		Lee Company

NUMERICAL LISTING OF ENGINEERING CHANGES
(INCLUDED HEREIN)

E. C. NUMBER	CHANGE DESCRIPTION	EFFECT ON VALIDITY OF QUALIFICATION
00411.2.282	Update Material Note	None
.2.292	Added optional materials	None
.2.293	Revised seal procurement specification - parts in accord	None
.2.306	Valve retainer changed to two pieces	None
.2.313	Revised nut material	None
.2.316	Increase turning center size	None
.2.317	Correct material specification note	None
.2.330	Delete -010 valve assembly spring	None - Note 2
.2.331	Update poppet-retainer assembly	None - Note 2
.2.332	Update valve assembly drawing	None - Note 2
.2.333	Delete small valve seat	None - Note 2
.2.334	Change bolt grip length	None
.2.336	Update assembly drawing and material alternates	None
.2.337	Update material alternates and assembly drawing	None
.2.341	Cancelled by E. C. 00411.2.375	None
.2.342	Added chamfer to journal bushing	None
.2.350	Added optional radius	None
.2.368	Deleted ink fill of markings	None
.2.369	Defined serial number location	None
.2.370	Deleted alternate material permitted	None
.2.371	Deleted alternate material permitted	None
.2.373	Update material alternates and assembly drawing	None
.2.375	Added vent hole to bushing	Note 1
.2.376	Increase reservior spring retainer clearance	None
.2.377	Increase reservoir spring retainer clearance	None
.2.380	Update poppet and retainer gap	None - Note 2
.2.381	Added spring for 10 Kip valve	None - Note 2
.2.382	Update poppet-seal-valve for 10 Kip	None - Note 2
.2.383	Update valve assembly drawing	None - Note 2
.2.386	Added nut for rigid struts	None
.2.388	Added nameplate for Hatch	None
.2.392	Improved chrome plating incorporated	None
.2.393	Improved chrome plating incorporated	None
00411.2.394	Improved chrome plating incorporated	None

E. C. NUMBER	CHANGE DESCRIPTION	EFFECT ON VALIDITY OF QUALIFICATION
00411.2.395	Improved chrome plating incorporated	None
.2.403	Delete optional cut on poppet seal	None
.2.406	Backup ring change	None
.2.407	Added nameplates for TVA	None
.2.409	Added piston seal material	None
.2.414	Added test in place valve spring	None
.2.418	Update piston seal material, added test in place option	None
.2.419	Update piston seal material, added test in place option	None
.2.420	Update piston seal material, added test in place option	None
.2.421	Update piston seal material, added test in place option	None
.2.423	Update piston seal material, added test in place option	None
.2.428	Added faying surface lubrication	None
.2.429	Added faying surface lubrication	None
.2.430	Added faying surface lubrication	None
.2.440	Redesign of test in place valve	None
.2.441	Delete jam nut proof load	None
.2.444	Delete bushing counterbore	None
.2.450	Increase tolerance on diameter	None
.2.454	Delete duplicate chamfer dimension	None
.2.455	Added "Before Plating" Dimension	None
.2.456	Added "Before Plating" Dimension	None
.2.457	Update material note and remove heat treat note	None
.2.458	Added note for rework or salvage of Lee Plug and Jet Holes	None
.2.459	Revised material note	None
.2.460	Revised material note	None
.2.462	Revised 100 KIP T-seal approved parts list	None
.2.473	Added drilled holes to detail drawing	None
.2.474	Added drilled holes to detail drawing	None
.2.475	Added drilled holes to detail drawing	None
.2.476	Added drilled holes to detail drawing	None
.2.477	Added drilled holes to detail drawing	None
.2.478	Added drilled holes to detail drawing	None
00411 .2.485	Revise material note	None

E.C. NUMBER	CHANGE DESCRIPTION	EFFECT ON VALIDITY OF QUALIFICATION
00411.2.486	Added nameplates for Zimmer	None
.2.488	Added Brinell hardness requirement	None
.2.490	Added -003 & -004 Block assy	None
.2.492	Added new snubber length for Zimmer	None
.2.502	Revised piston seal back-up note	None
.2.504	Updated cylinder drawing	None
.2.506	Added 6 KIP bushing requirements	None
.2.507	Added -004 retainer ring	None
.2.509	Added -014 & -015 springs	None
.2.514	Added new snubber length for Hatch	None
.2.520	Added -102 position indicator assy	None
.2.522	Added 6 KIP plate requirements	None
.2.523	Added 6 KIP T-seal requirements	None
.2.524	Revised tap drill depth	None
.2.530	Added straightness requirement	None
.2.541	Added heat treat note	None
.2.545	Added -024 bolt	None
.2.558	Added option to make parts from hot rolled stock	None
.2.559	Added new forging configuration	None
00411.2.571	Revised mark numbers on Zimmer	None

NOTES

1. Vent holes added to permit passage of qualification units. Incorporated Serial Number 001 and subq.

2. Qualification unit configuration in accord with noted engineering changes.

ENGINEERING CHANGE

YSTEMS ...ntek Division	DOCUMENT TITLE: NOTED BOLT	DOCUMENT NUMBER: 152448 NOTED	CHANGE IDENTIFICATION: C1 NOTED

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED

REASON FOR CHANGE: ASME CODE REQUIREMENT

DESCRIPTION OF CHANGE: THIS CHANGE DOES NOT AFFECT VALIDITY OF QUAL TESTS

ISSUE DATE: 6-1-77

CONTROL NUMBER: 00411.2.282

EFFECTIVITY: S/N 001 & SUB

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICATION
U-BOLT	152430	C2
U-BOLT	152431	C3
U-BOLT	152432	C2
U-BOLT	152433	B1
TIE BOLT	152450	C1
TIE BOLT	152451	C1
TIE BOLT	152452	C1
TIE BOLT	(152448)	C1
TIE BOLT	152449	C1

REVISE NOTE 1 OF GEN. NOTES TO READ AS FOLLOWS:

1. MATERIAL COMPOSITION PER AISI 4135, 4140, OR 4340, FABRICATION AND INSPECTION PER ASTM A490-71, WITHOUT NUTS OR WASHERS, WELDING NOT PERMITTED.

H. WILKERSON TO ACKNOWLEDGE RECEIPT TRANSMITTAL OF THIS E.C. IN WRITING TO PROGRAM MGR. & PROJECT ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO.	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	R Nicely 5-27-77	PROGRAM MANAGER	
CHECKED	Williams 5-27-77	PROJECT ENGINEER	McAtee 5-27-77
MECH/STRESS ENG.	[illegible] 5-27-7	MANUFACTURING ENG	[illegible] 5-27-77
ELECTRICAL	N/A	PRODUCTION CONTROL	[illegible] 5-27-77
CONFIGURATION CONTROL	[illegible] 5-27-7	QUALITY	[illegible] 5-27-77
OTHER	[illegible] 6/1/77	CUSTOMER	

COST RESPONSIBILITY: CUSTOMER / DIVISION ☒

FOR MANUFACTURING ONLY — PRODUCTION EFFECTIVITY: S/N 001 & SUB

DISPOSITION OF PARTS: REWORK ☐ SCRAP ☐ USE AS IS ☐ (Use up then continue)

MD 150

Division	DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICATION
... Division	HEX BOLT SNUBBER ASSEMBLY	910696	F1

PROGRAMS AFFECTED: SNUBBERS

OTHER DOCUMENTS AFFECTED: N/A

REASON FOR CHANGE: TO ADD NEW REQUIREMENTS AND OPTIONAL MATERIAL

ISSUE DATE: 6-21-77

CONTROL NUMBER: 0041.2.292

EFFECTIVITY: S/N 001 & ON

DESCRIPTION OF CHANGE

1. REVISED NOTE 1 ON SHEET 2 TO ADD REQUIRED AISI MATERIAL COMPOSITION AND ADDED OPTIONAL MATERIALS.

2. REVISED NOTE 2 ON SHEET 2 TO ADD REQUIRED AISI MATERIAL COMPOSITION.

3. ADDED -022 AND -023 BOLTS

4. ADDED SHEET 4.

H. WILKERSON TO ACKNOWLEDGE RECEIPT AND TRANSMITTAL OF THIS E.C., IN WRITING, TO PRGM MGR AND PROJ ENGR

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY	PRENTICE 6-16-77
CHECKED	
STRESS ENG	[illegible]
ELECTRICAL	[illegible]
CONFIGURATION CONTROL	[illegible]
OTHER	[illegible]

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	[signature] 6-16-77
MANUFACTURING ENG	[illegible]
PRODUCTION CONTROL	[signature] 6-[illegible]-77
QUALITY	[signature] 6-[illegible]-77
CUSTOMER	

COST RESPONSIBILITY: CUSTOMER; DIVISION [illegible]

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: S/N 001 & ON

DISPOSITION OF PARTS: REWORK ☒ N/A SCRAP ☐ USE AS IS ☐

Aitek Division

PROCUREMENT SPECIFICATION FOR NON-METALLIC SEALS ROD WIPERS & NON-EXTR. RINGS

DOCUMENT NUMBER 910641-001

CHANGE IDENTIFICATION C1

PROGRAMS AFFECTED G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED —

REASON FOR CHANGE ADD APPROVED SOURCES

DESCRIPTION OF CHANGE

ISSUE DATE 6-28-77

CONTROL NUMBER 00411.2.273

EFFECTIVITY S/N 001 & ON

1. ADDED PARA 5.3, 5.4, 5.4.1 & 5.4.1.2
2. DOCUMENT (NOW) 6 SHEETS TOTAL (WAS) 5 SHEETS
3. ALL SHEETS UPDATED TO 'C' REVISION LEVEL

QTY	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED YES ☐ NO ☒

CHANGE CLASSIFICATION CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY

FOR MANUFACTURING ONLY

SIGNATURE APPROVALS			
PREPARED BY	[illegible]	CUSTOMER	PRODUCTION EFFECTIVITY S/N 001 & ON
CHECKED	[illegible] 6-27-77		
MECH/STRESS ENG	[illegible]		
ELECTRICAL	N/A		
CONFIGURATION CONTROL	[illegible] 6-27-77	DIVISION X	DISPOSITION OF PARTS REWORK ☐ N/A ☒ SCRAP ☐ USE AS IS ☐
OTHER	[illegible] 6-27-77		

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 6-27-77
MAT'L FAC. LIRING ENG	[illegible] 6-27-77
PRODUCTION CONTROL	[illegible] 6-27-77
QUALITY	[illegible] 6-27-77
CUSTOMER	

ENGINEERING CHANGE

E-SYSTEMS Montek Division

DOCUMENT TITLE: SNUBBER - ASSY NOTED	DOCUMENT NUMBER: 152002, 3, 5 NOTED	[illegible]: NOTED
PROGRAMS AFFECTED: G.E. SNUBBERS	[illegible] DATE: 7-5-77	
OTHER DOCUMENTS AFFECTED:	[illegible] NUMBER: 00411	[illegible] 30
REASON FOR CHANGE: [illegible] THESE RETAINER PERMITS THE USE OF [illegible] WITH THREADS	EFFECTIVITY: S/N 001 / ON	
DESCRIPTION OF CHANGE: AND VALVE BORES EXCEEDING DRAWING TOLERANCE		

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICATION
10 KIP	152001	D_1
20 KIP	152002	E_1
30 KIP	152003	D_1
50 KIP	152005	D_1
70 KIP	152007	D_1
100 KIP	152010	D_1

IN THE L/M AND ON THE F/D OF ALL THE ABOVE DRAWINGS THE 152068 RETAINER IS REPLACED BY (1) ONE EACH OF THE 152066 AND 152067 RETAINERS

NO DISTRIBUTION TO H. WILKERSON

COPIES OF AFFECTED SHEETS TO [illegible] FOR TRANSMITTAL TO G.E. IN ACCORDANCE WITH ATTACHMENT 'A' OF CONTRACT

ON F/D

152066-001
152067-001 (NOW)

152068-001 (WAS)

IN L/M

	QTY		ITEM	NOMENCLATURE	PART NO.
(NOW)	1			RETAINER - THREADED	152067-001
(NOW)	1			RETAINER, SEAL	152066-001
(WAS)	1			RETAINER - VALVE	152068-001

INTERCHANGEABILITY AFFECTED	YES ☐ NO ☒
SIGNATURE APPROVALS	
PREPARED BY	R. Nisely 6-22-77
CHECKED	[illegible] 6-22-77
MECH STRESS ENG	[illegible]
ELECTRICAL	[illegible]
CONFIGURATION CONTROL	[illegible] 6-22-77
OTHER	[illegible]

CHANGE CLASSIFICATION	CLASS I ☐ CLASS II ☒ RECORD ☐
SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 6-22-77
MAJOR [illegible] ENG	[illegible] 6-22-77
[illegible] CONTROL	[illegible]
QUALITY	[illegible]
CUSTOMER	

COST RESPONSIBILITY	
CUSTOMER	
DIVISION	8K 8 Sch.
FOR MANUFACTURING USE	
PRODUCTION EFFECTIVITY	S/N 001 & ON
DISPOSITION [illegible]	REWORK ☒ [illegible] ☐ [illegible] ☐

MD 156

E-SYSTEMS
Mo-Tek Division

ENGINEERING CHANGE

DOCUMENT TITLE	HEX NUT
DOCUMENT NUMBER	910644
CHANGE IDENTIFICATION	C1
ISSUE DATE	7-15-77
CONTROL NUMBER	[illegible] 513
EFFECTIVITY	1st [illegible]
PROGRAMS AFFECTED	GE [illegible]
OTHER DOCUMENTS AFFECTED	[illegible]
REASON FOR CHANGE	REV. MATERIAL REQUIREMENTS

DESCRIPTION OF CHANGE

GENERAL NOTES (SHEET 5

NOTE 1. (DELETE) - 20C

NOTE 2. (ADD) MATERIAL CONFORMING TO ASTM A507-74

NOTE 3 (ADD) (NEW NOTE)

NOTE 3 NOW 4

NOTE 4 NOW 5

NOTE 5 NOW 6

L/M (SHEETS 2,3 & 4)

REV. MATERIAL OR NOTES TO AGREE WITH ABOVE NOTE CHANGES

INTERCHANGEABILITY AFFECTED	CHANGE CLASSIFICATION	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
YES [ ] NO [ ]	CLASS I [ ] CLASS II [X] RECORD [ ]		PRODUCTION EFFECTIVITY: 1st [illegible]
SIGNATURE APPROVALS	SIGNATURE APPROVALS		
PREPARED BY [illegible] 7-15-77	PROGRAM MANAGER	CUSTOMER	
CHECKED [illegible]	PROJECT ENGINEER [illegible] 7-15-77		
MECH/STRESS ENG [illegible]	MANUFACTURING ENG [illegible]		
ELECTRICAL N/A [illegible]	PRODUCTION CONTROL [illegible]	DIVISION	DEPOSIT OF PARTS
CONFIGURATION CONTROL [illegible] 7-14-77	QUALITY [illegible] 7-13-77	X	REWORK N/A SCRAP [ ] USE AS IS [ ]
OTHER [illegible]	OTHER		

QTY	[illegible]	ITEM	NOMENCLATURE	PART NO	MATERIAL ORDERS

E-SYSTEMS
Montek Division

ENGINEERING CHANGE

DOCUMENT TITLE: PISTON BEARING RESERVOIR

DOCUMENT NUMBER: NOTED

CHANGE IDENTIFIER: NOTED

PROGRAMS AFFECTED: C.E. [illegible]

OTHER DOCUMENTS AFFECTED: —

ISSUE DATE: 7-22-77

REASON FOR CHANGE: Vendor Request - [illegible] Center Dia Increase

CONTROL NUMBER: 0041.2.316

DESCRIPTION OF CHANGE:

EFFECTIVITY: S/N 001 & ON

Aerojet [illegible] To Acknowledge Receipt & Transmittal of This E.C. In Addition To Prog. Mgr & Proj Eng.

Snubber Size	Document Number	Change Ident
10/20 KIP	152223	D
30/50 KIP	152224	E
70/100 KIP	152226	B

1. On 152223 Zone B-3 Sht 1
Revise Callout As Shown

60° x .46 DIA MAX
CENTER DRILL
OPTIONAL BOTH ENDS
(NOW)

60° x .40 DIA MAX
CENTER DRILL
OPTIONAL BOTH ENDS
(WAS)

2. ON 152224 ZONE B-4 & 152226 ZONE B-2, SHT 1
REVISE CALLOUT AS SHOWN

$.307^{+.014}_{-.000}$ DIA x 1.50 MAX DEEP
CSK 60° x .46 DIA MAX FOR TURNING CTR (OPTIONAL BOTH ENDS)
3/8-16 UNC-2B THD x .88 MIN DEEP
(NOW)

$.307^{+.014}_{-.000}$ DIA x 1.50 MAX DEEP
CSK 60° x .40 DIA MAX FOR TURNING CTR (OPTIONAL)
3/8-16 UNC-2B THD x .88 MIN DEEP
(WAS)

At Zone C-7 Sht 1 Delete Field Note { NO 5 Center Drill (Optional) / CSK 60° x 40 DIA MAX }

QTY	CODE	ITEM	NOMENCLATURE	PART NO.	MATERIAL IDENT

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

COST RESPONSIBILITY

FOR MANUFACTURING ONLY

SIGNATURE APPROVALS

PREPARED BY: [signature] 7-21-77
CHECKED: [signature] 21 Jul 77
MECH/STRESS ENG: [signature]
ELECTRICAL: N/A [signature]
CONFIGURATION CONTROL: [signature] 7-22-77
OTHER: [illegible]

SIGNATURE APPROVALS

PROGRAM MANAGER:
PROJECT ENGINEER: [signature] 7-22-77
MANUFACTURING ENG: [signature]
PRODUCTION CONTROL: [signature]
QUALITY: [signature] 7-[illegible]-77
CUSTOMER:

CUSTOMER:

DIVISION: N/A X

PRODUCTION EFFECTIVITY: S/N 001 & ON

DISPOSITION OF PARTS: REWORK [ ] SCRAP [ ] USE AS IS [ ]

E-SYSTEMS
Montek Division

ENGINEERING CHANGE

DOCUMENT TITLE	FORGING PISTON & ROD
DOCUMENT NUMBER	152039
CHANGE IDENTIFIC.	F
PROGRAMS AFFECTED	G.E. SNUBBER
OTHER DOCUMENTS AFFECTED	
REASON FOR CHANGE	ADD PART TO MATL SPEC
ISSUE DATE	8-1-77
CONTROL NUMBER	00411, E.S.M.
EFFECTIVITY	1ST & ON

DESCRIPTION OF CHANGE

FORGING NOTES:-

(NOW) 2. MATERIAL:- AISI 4340 FORGING PER ASTM A668-72 CLASS M HEAT TREATED TO 155 KSI MIN. ULT, 170 KSI MAX. ULT., 125 KSI MIN YIELD Rc 35-38

(WAS) 2. MATERIAL:- AISI 4340 FORGING PER ASTM A668 CLASS M HEAT TREATED TO 155 KSI MIN. ULT, 170 KSI MAX. ULT. 125 KSI MIN YIELD Rc 35-38

QTY	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

SIGNATURE APPROVALS
- PREPARED BY: [illegible] 21 JULY 77
- CHECKED: [illegible] 7-28-77
- MECH/STRESS ENG: [illegible]
- ELECTRICAL: [illegible]
- CONFIGURATION CONTROL: [illegible]
- OTHER: [illegible] 8-1-77

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS
- PROGRAM MANAGER:
- PROJECT ENGINEER: [illegible] 7-28-77
- MANUFACTURING ENG: [illegible] 7-28-77
- PRODUCTION CONTROL: [illegible] 7-28-77
- QUALITY: [illegible] 7-28-77
- CUSTOMER:

COST RESPONSIBILITY
- CUSTOMER:
- DIVISION: NO COST AS SCR.

FOR MANUFACTURING ONLY
- PRODUCTION EFFECTIVITY: 1ST & ON
- DISPOSITION OF PARTS: REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	SPRING, RESERVOIR - VALVE
DOCUMENT NUMBER	152040
CHANGE IDENTIFICATION	E-7
PROGRAMS AFFECTED	[illegible] NUMBERS
OTHER DOCUMENTS AFFECTED	-
ISSUE DATE	8-11-71
REASON FOR CHANGE	DELETE REQD FOR -010 SPRING
CONTROL NUMBER	[illegible]
DESCRIPTION OF CHANGE	(NOW)
EFFECTIVITY	S/N 001 thru B.

(NOW)

152005, 152007, 152010	2 OF -011
152[illegible], 152003	2 OF -011

QTY PER MAJOR ASSY

(WAS)

152005, 152007, 152010	2 OF -011
152004, 152002, 152003	2 OF -010

QTY PER MAJOR ASSY

HELD ON

CHANGE PARTS LIST TO READ: SPRING - CONTROL VALVE -011

FROM: SPRING - CONTROL VALVE (150-70-[illegible]) -011

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY [illegible]
CHECKED [illegible]
MECH STRESS ENG [illegible]
ELECTRICAL [illegible]
CONFIGURATION CONTROL [illegible]
OTHER [illegible]

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER
PROJECT ENGINEER [illegible] 8/1/71
MANUFACTURING ENG [illegible]
PRODUCTION CONTROL
QUALITY [illegible]
CUSTOMER

COST RESPONSIBILITY

CUSTOMER
DIVISION $1200 ✓
W/O Schedule

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY
S/N 001 thru B.

DISPOSITION OF PARTS

REWORK	SCRAP	USE AS IS
☐	☐	☐

E-SYSTEMS
Montek Division

DOCUMENT TITLE	ASSY - MATCHED POPPET AND RETAINER
DOCUMENT NUMBER	152059
CHANGE IDENTIFIC	C1
PROGRAMS AFFECTED	1, 1 [illegible] SHEETS
OTHER DOCUMENTS AFFECTED	-
REASON FOR CHANGE	ENGINEERING DEVELOPMENT [illegible]
ISSUE DATE	3-11-77
CONTROL NUMBER	0021[illegible]
EFFECTIVITY	S/N 001 [illegible]
DESCRIPTION OF CHANGE	ADD -105 ASSY TO MATERIAL & PARTS LIST 2 PLACES

(NOW)

DASH NO.	"A" DIM
-101	.0056 +.0005 -.0000
-102	.0085 +.0007 -.0000
-103	.0117 ±.0007
-105	.0200 ±.0006
-107	.0290 ±.0010
-110	.0380 ±.0010

152001	2 OF -102
USED ON	QTY PER ASSY

-102

(WAS)

DASH NO.	"A" DIM
-101	.0070 ±.0005
-102	.0100 ±.0005
-103	.0130 ±.0010
-107	.0180 ±.0010
-110	.0230 ±.0010

152005	2 OF -105
USED ON	QTY PER ASSY

-105

(REVISE)

QTY	FORM	ITEM	NOMENCLATURE	PART NO	MATERIAL & NOTES

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY	[illegible]
CHECKED	[illegible]
MECHANICAL	[illegible] 3/14/77
ELECTRICAL	[illegible]
CONFIGURATION CONTROL	[illegible]
OTHER	[illegible]

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER	[illegible]
PROJECT ENGINEER	[illegible] 3/14/77
MANUFACTURING ENG	[illegible]
PRODUCTION CONTROL	[illegible]
QUALITY	[illegible] 3/21/77
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER	
DIVISION	56.00
	3 wk Schedule

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY
S/N 001 [illegible] I.D.

DISPOSITION OF PARTS

REWORK	SCRAP	USE AS IS
☒	☐	☐

ENGINEERING CHANGE

E-SYSTEMS Muntek Division

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICA
VALVE ASSY ~ - USSER	152055	E1

SHT 1 OF 2

PROGRAMS AFFECTED: G.T. SNUBBERS

OTHER DOCUMENTS AFFECTED: —

REASON FOR CHANGE: [illegible]

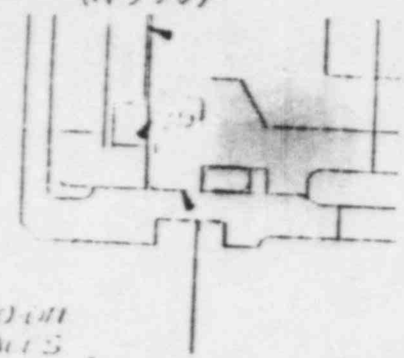
ISSUE DATE: 5-11-77

CONTROL NUMBER: [illegible]

EFFECTIVITY: S/N 001 [illegible]

DESCRIPTION OF CHANGE

(NOW)



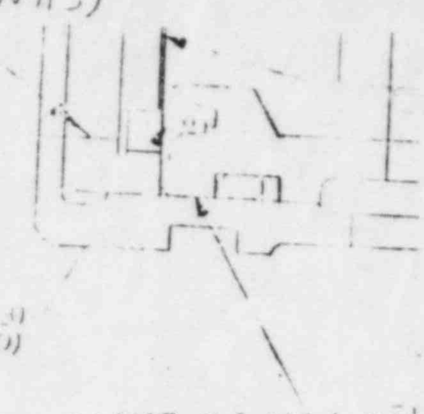
152040-011
2 PLACES

152058-001
2 PLACES

FOR -102, -103, -105, -107 & -110

(REVISE) 152059 -~~103~~ -105 (FOR -105)
~~152059-101~~ (FOR -101)

(WAS)



152040-010 (FOR -101, -103 & -110)
152040-011 (FOR -107, -101 & -110)
2 PLACES

152058-001 (FOR -105, 107 & -110)
152058-002 (FOR -101, 102 & -103)
2 PLACES

(REMOVE) 152040-010 FROM L/M. (ADD) 152040-011 FOR ALL ASSYS. EXCEPT -101
(REMOVE) 152058-00_ FROM L/M. (ADD) 152058-001 FOR ALL ASSY'S. EXCEPT -101
(REMOVE) 152059-101 FROM -101 ASSY IN L/M
(ADD) 152059-102 TO -102 ASSY IN L/M
(REMOVE) 152059 -103 FROM -105 ASSY ONLY IN L/M
(ADD) 152059 - 105 TO -105 ASSY ONLY IN L/M

QTY	[illegible]	ITEM	NOMENCLATURE	PART NO	MATERIAL/NOTE

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☐ RECORD ☐

SIGNATURE APPROVALS	
PREPARED BY	[illegible]
CHECKED	[illegible] 8/4/77
MECH/STRESS ENG	[illegible]
ELECTRICAL	[illegible]
CONFIGURATION CONTROL	[illegible]
OTHER	[illegible]

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 8/4/77
MANUFACTURING ENG	[illegible]
PRODUCTION CONTROL	[illegible]
QUALITY	[illegible]
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER

DIVISION 850 ✓

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: S/N 001 & SUB.

DISPOSITION OF PARTS: REWORK ☒ SCRAP ☐ USE AS IS ☐

VALVE ASSY [illegible]

PROG. AFFECTED	[illegible]
OTHER DOCUMENTS AFFECTED	[illegible]
REASON FOR CHANGE	[illegible]
DESCRIPTION OF CHANGE	[illegible]

DOCUMENT NUMBER	152055
CHANGE IDENTIFICATION	E,
ISSUE DATE	[illegible]
CONTROL NUMBER	[illegible]
EFFECTIVITY	[illegible]

(NOW)

DASH NO.	DIM "A"
	REF
-101	.0285 +.0001 −.0000
-102	.0285 +.0001 −.0000
-103	.0117 ±.0007
-105	.0240 ±.0003
-107	.0230 ±.0010
-110	.0380 ±.0010

NOTE 1

(WAS)

DASH NO.	DIM "A"
	REF
-101	.0285 ±.0005
-102	.0285 ±.0005
-103	.0117 ±.0010
-105	.0240 ±.0010
-107	.0230 ±.0010
-110	.0230 ±.0010

REVISE NOTE 1 TO READ: ACCEPTANCE TEST WITH ASSY PER SPEC. [illegible] 5-410. DIMENSIONS NOTED AS REFERENCE DIMENSIONS MAY BE MODIFIED AS REQUIRED TO MEET THE ATP REQUIREMENT. MAXIMUM GAP TO BE [illegible] INCHES.

NOTES: 1. THE -101 VALVE ASSY IS NOT RELEASED FOR PRODUCTION

2. DO NOT SUBMIT THIS REV TO G.E. FOR APPROVAL.

E-SYSTEMS
Montek Division

DOCUMENT TITLE	SEAL, SEAT VAL
DOCUMENT NUMBER	152058
CHANGE IDENTIFICATION	C1
PROGRAMS AFFECTED	G.I. SNUBBERS
OTHER DOCUMENTS AFFECTED	
REASON FOR CHANGE	DELETED -002 SEAT REQUIREMENT
ISSUE DATE	3-11-77
CONTROL NUMBER	00411 2-3-3
EFFECTIVITY	1 & SUB
DESCRIPTION OF CHANGE	

(NOW)

NEXT ASSY	USED ON	QTY PER MAJOR ASSY
152055	152010	2 OF -001
152055	152007	2 OF -001
152055	152005	2 OF -001
152055	152003	2 OF -001
152055	152002	2 OF -001

(WAS)

NEXT ASSY	USED ON	QTY PER MAJOR ASSY
152055	152010	2 OF -001
152055	152007	2 OF -001
152055	152005	2 OF -001
152055	152003	2 OF -002
152055	152002	2 OF -002
152055	152001	2 OF -002

INTERCHANGEABILITY AFFECTED	CHANGE CLASSIFICATION	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
YES [ ] NO [X]	CLASS I [ ] CLASS II [ ] RECORD [ ]		
SIGNATURE APPROVALS	SIGNATURE APPROVALS	CUSTOMER	PRODUCTION EFFECTIVITY
PREPARED BY	PROGRAM MANAGER		1 & SUB.
CHECKED	PROJECT ENGINEER		
MECH STRESS ENG	MANUFACTURING ENG		
ELECTRICAL	PRODUCTION CONTROL	DIVISION COST	DISPOSITION OF PARTS
CONFIGURATION CONTROL	QUALITY	AS SHOWN	REWORK [ ] SCRAP [ ] USE AS IS [ ]
OTHER	CUSTOMER		

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

Muntek Division

PROD AFFECTED G.E. SNUBBERS		DOCUMENT NUMBER 910646	CHANGE IDENTIFICATION G1
OTHER DOCUMENTS AFFECTED		ISSUE DATE 8-11-77	
REASON FOR CHANGE CORRECT BOLT LTH		CONTROL NUMBER 00411.2.587	
DESCRIPTION OF CHANGE		EFFECTIVITY 1ST & SUBQ	

-022 (NOW) L LENGTH $7.75^{+.00}_{-.25}$ (WAS) L LENGTH $8.25^{+.00}_{-.25}$

INTERCHANGEABILITY AFFECTED YES [ ] NO [X]	CHANGE CLASSIFICATION CLASS I [ ] CLASS II [✓] RECORD [ ]	COST RESPONSIBILITY	FOR MANUFACTURING ONLY	
SIGNATURE APPROVALS	SIGNATURE APPROVALS		PRODUCTION EFFECTIVITY	
PREPARED BY [illegible] 11 Aug 77	PROGRAM MANAGER	CUSTOMER	1ST & SUBQ	
CHECKED [illegible] 11 Aug 77	PROJECT ENGINEER [illegible] 8-11-77			
MECH STRESS ENG [illegible]	MANUFACTURING ENG [illegible] 8-11-77			
ELECTRICAL	PRODUCTION CONTROL [illegible] 8/11/77	DIVISION		
CONFIGURATION CONTROL [illegible]	QUALITY [illegible] 8-11-77			
OTHER [illegible] 8-11-77	CUSTOMER			

E-SYSTEMS
Memphis, Lawson

DOCUMENT TITLE: SNUBBER ASSEMBL . .) MP (Page 1 of 2)

DOCUMENT NUMBER: 152002

CHANGE IDENTIFICATION: F_2

PROGRAMS AFFECTED: G.E. Snubber

OTHER DOCUMENTS AFFECTED:

ISSUE DATE: 8-23-77

REASON FOR CHANGE: Update Material Changes & Incorporate G. E. Length Change

CONTROL NUMBER: 00411 . 336

EFFECTIVITY: 1st & Subq.

DESCRIPTION OF CHANGE

Sheet 1 of 21
Recertified to "F" revision

1a of 21
All Sheet "F" Revision

Sheets 2, 3, 4, 5 of 21
No Change "F" Revision

Sheets 6, 7, 8, 9, 10, 11, 12, 13 of 21
Lockwasher 152196-002 Material
(Now) 101, 134 (Was) 101, 108
22 places

Sheet 13 of 21
(Now) Snubber Assy 152002-60.5C
(Was) Snubber Assy 152002-59.5C

Sheet 14 of 21
Bolt 910647-003 & Bolt 910647-006
Material (Now) 121A (Was) 130
Bolt 910646-009 Material (Now) 121B (Was) 121
Nut-Jam 910644-202 Material
(Now) 122 (Was) 130
(Add) Retainer, Seal 152066-001
(Add) Retainer Threaded 152067-001

Sheet 14 of 21 (continued)
(Delete) Retainer Valve 152068-001
Reservoir Indicator 152238-002
Material (Now) 101, 131 (Was) 101, 128
Block-Retainer 152235-001 Material
(Now) 133 (Was) 132
Retainer-Resvr 152227-001 Material
(Now) 132 (Was) 131
Reservoir Hous 152219-001 Material
(Now) 108, 130 (Was)131, 129

Sheets 15, 16 of 21
No Change "F" Revision

Sheet 17 of 21
Note 105 (3) (Was) Two Lee Jet Orifice Assemblies (Now) Two Lee Jet Orifice Assemblies and Lee Plug
Note 106, Change the word Flange to End Fitting

Sheet 18 of 21
Note 111 (Was) R .50 minimum (Now) R_c 50-54
Delete old note 121 & 122, Add new note 121

Sheet 18a of 21
Add new note 121, 122 & 123; remove note 123 & 124 from sheet 17

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☒ DIVISION ☒

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY: 1st & Subq

DISPOSITION OF PARTS: REWORK ☐ SCRAP N/A ☐ USE AS IS ☐

SIGNATURE APPROVALS

PREPARED BY	Parkin 8 Aug 77
CHECKED	[illegible] 8-23-77
MECH/STRESS ENG	[illegible] 8-22-77
ELECTRICAL	N/A
CONFIGURATION CONTROL	[illegible] 8-23-77
OTHER (QE)	8-23-77

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 8-23-77
MANUFACTURING ENG	[illegible] 8-23-77
PRODUCTION CONTROL	[illegible] 8-23-77
QUALITY	[illegible] 8-23-77
CUSTOMER	

	SNUBBER ASSEMBLY 2 iP (Page 2 of 2)	DOCUMENT NUMBER 152002	CHANGE IDENTIFICATION F_2
PROGRAMS AFFECTED	E. Snubber	ISSUE DATE	9-23-77
OTHER DOCUMENTS AFFECTED		CONTROL NUMBER	00411.2.5[illegible]
REASON FOR CHANGE	Update Material Changes & Incorporate E. Length Issue 2	EFFECTIVITY	1st & Subs.
DESCRIPTION OF CHANGE			

Sheet 19 of 21

Move note 123 & 124 to sheet 18a. Note 128 (Add) Cres 18-8 or 16-18, 302 and 384 (Delete) 316, 321 or 347. Note 129 (Add) ASTM A434-64
Note 130 Define sequence for chromium plate
Delete old note 131
Add new note 131. Add notes 134, 135 & 136

Sheet 20

Inc. F_1

Changed Table Zone C-7 As Shown :

	Drawing No.	'A' Dim.	ADJ.
(Now)	152002-60.5C	60.50	1.50
(Was)	152002-59.5C	59.50	1.50

Sheet 21

Changed picture of 152127-001

E-SYSTEMS Monitek Division	DOCUMENT TITLE: SNUBBER ASSEMBLY 30 KIP	DOCUMENT NUMBER: 152003	CHANGE IDENTIFICATION: D_2
PROGRAMS AFFECTED: G.E. Snubber		ISSUE DATE: 8-25-77	
OTHER DOCUMENTS AFFECTED		CONTROL NUMBER: 00411.2.331	
REASON FOR CHANGE: Update Material Changes		EFFECTIVITY: 1st & Subq.	

DESCRIPTION OF CHANGE

Sheet 1 of 18
Recertified to "D" Revision

Sheet 1a of 18
All sheets "D" Revision.

Sheet 2, 10, 12, 13, 13a of 18
No Change "D" Revision

Sheet 3, 4, 5, 6, 7, 8, 9 of 18
Lockwasher 152196-003 Material
(Now) 101, 134 (Was) 101, 108

Sheet 11 of 18
Bolt 910646-001 & Bolt 910646-007
Material (Now) 121A (Was) 130.
Nut-Jam 910644-202 Material
(Now) 122 (Was) 130
(Add) Retainer Seal 152066-001
(Add) Retainer Threaded 152067-001
(Delete) RetainerValve 152068-001
Reservoir Indicator 152238-003 Material
(Now) 101, 131 (Was) 101, 128
Retainer-Resvr 152228-001 Material
(Now) 132 (Was) 131
Reservoir-Hous 152220-001 Material
(Now) 130, 132 (Was) 129, 131

Sheet 14 of 18
Note 105 (3) (Was) Two Lee Jet Orifice Assemblies (Now) Two Lee Jet Orifice Assemblies and Lee Plug
Note 106, Change the word Flange to End Fitting

Sheet 15 of 18
Note 111 (Was) R_c50 minimum (Now) R_c50-54
Delete old note 121 & 122, Add new note 121

Sheet 15a of 18
Add new note 121, 122 & 123; move note 123 & 124 from sheet 15

Sheet 16 of 18
Move note 123 & 124 to sheet 15a Note 128 (Add) Cres 18-8 or 16-18, 302 and 304 (Delete) 316, 321 or 347. Note 129 (Add) ASTM A434-64
Note 130 Define sequence for chromium plate
Delete old note 131
Add new note 131. Add notes 134, 135 & 136

Sheet 17, 18 of 18
Inc. D_1

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒	CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
SIGNATURE APPROVALS	SIGNATURE APPROVALS		PRODUCTION EFFECTIVITY
PREPARED BY: [illegible] 3 Aug. 77	PROGRAM MANAGER	CUSTOMER	
CHECKED	PROJECT ENGINEER 8-23-77		1st & Subq
MECH-STRESS ENG	MANUFACTURING ENG 8-22-77		
ELECTRICAL	PRODUCTION CONTROL	DIVISION X	DISPOSITION OF PARTS
CONFIGURATION CONTROL 8-23-77	QUALITY		REWORK ☐ SCRAP ☐ USE AS IS ☐ N/A
OTHER	CUSTOMER 8-23-77		

Unitek Division

	152026.
IDENTIFICATION	C
ISSUE DATE	8-23-77
CONTROL NUMBER	C0911.2.341
EFFECTIVITY	1st & subs

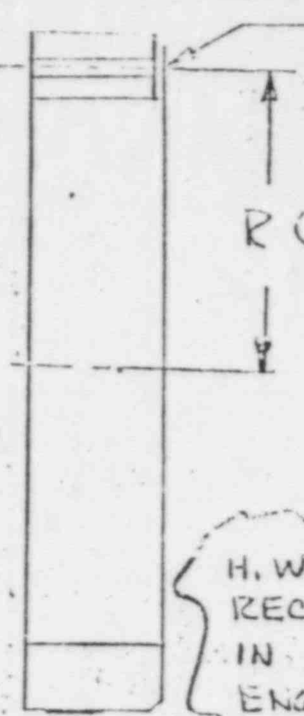
PROGRAM AFFECTED: G.E. Shoreham

OTHER DOCUMENTS AFFECTED: —

REASON FOR CHANGE: Reduce ΔP Across Journal Bushing

DESCRIPTION OF CHANGE

BUSHING DASH No	R. (ADD)
-001	.714
-002	.813
-003	1.031
-004	1.031
-005	1.281
-006	1.281
-007	1.344
-008	1.344
-009	1.844
-010	1.844



.063 DIA. THRU (ADD)
ON -001 & -002
.093 DIA THRU (ADD)
ON -005 THRU -010
C'BORE .500 DIA x .040 DEEP
R (ADD) .010-.030 R ON CUTTER
-001 THRU -010

NOTE:-
IF BUSHING IS INSTALLED SEE SALVAGE E.C. FOR THE ASSEMBLY TO ADD THIS HOLE.

H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C IN WRITING TO PROG. MGR & PROJ ENGR

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NO.

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	Sankin 17 Aug 77	PROGRAM MANAGER	
CHECKED	Wilkerson 8-23-77	PROJECT ENGINEER	8-23-77
MECH STRESS ENG	8-23	MANUFACTURING ENG	8-23
ELECTRICAL		PRODUCTION CONTROL	8-22
CONFIGURATION CONTROL	8-24-77	QUALITY	8-23-77
	8-23-77	CUSTOMER	

COST RESPONSIBILITY

CUSTOMER

DIVISION .66 HRS. R&D
To BE MODIFIED AT ASSY. LEVEL-GE Job

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1st & Subs

DISPOSITION OF PARTS: REWORK ☒ SCRAP ☐ USE AS IS ☐

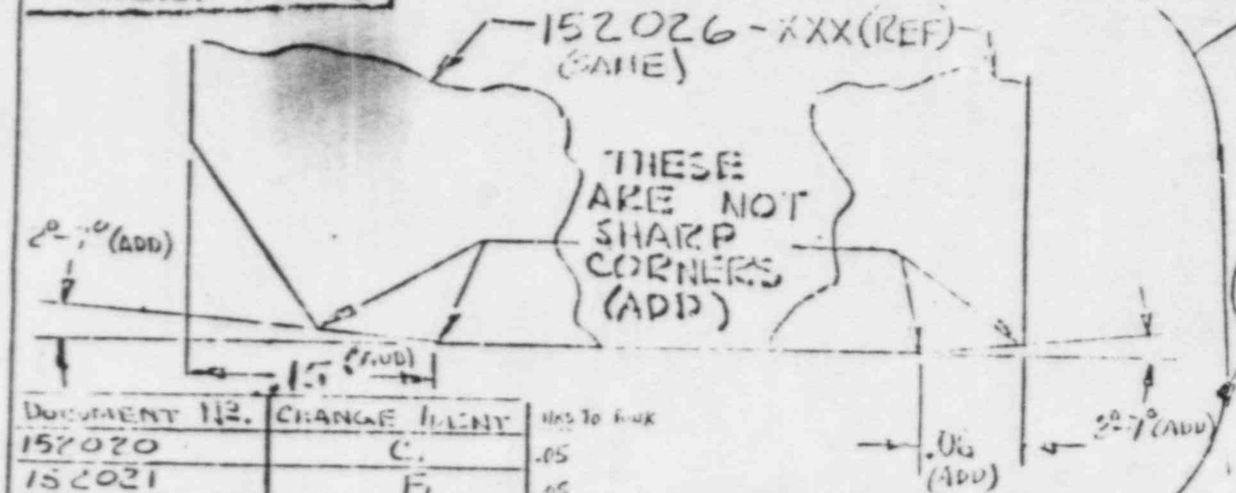
ENGINEERING CHANGE

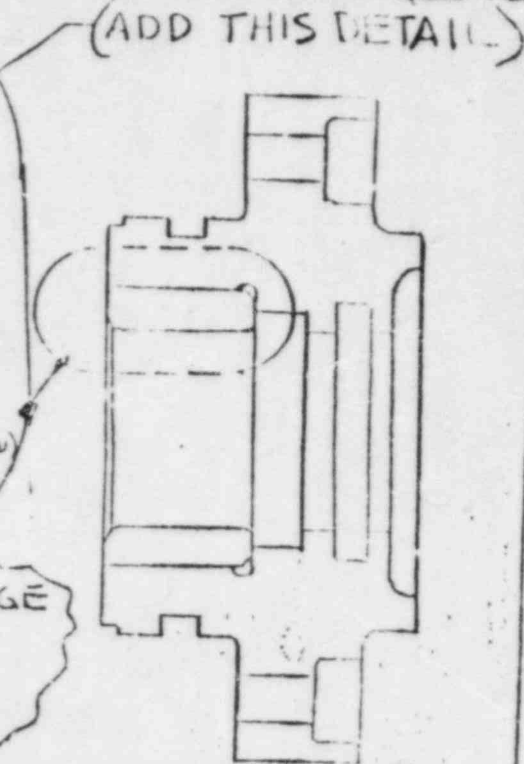
E-SYSTEMS Montek Division

DOCUMENT TITLE	DAM ASSEMBLY
DOCUMENT NUMBER	NOTED
CHANGE IDENTIFICATION	NOTED
PROGRAMS AFFECTED	G.E. SNUBBERS
OTHER DOCUMENTS AFFECTED	~
REASON FOR CHANGE	REMOVE SHARP EDGE OF [illegible]
ISSUE DATE	8-23-77
CONTROL NUMBER	[illegible]
EFFECTIVITY	1ST & SUBQ

DESCRIPTION OF CHANGE

SHEET 1 OF 2





DOCUMENT NO.	CHANGE IDENT	HRS TO WORK
152020	C.	.05
152021	F.	.05
152022	C.	.06
152023	C.	[illegible]
152024	D.	[illegible]
152025	D.	.10
152027	C.	.05
152028	F.	.05
152029	D3	.01
152030	D.	.6
152031	D.	.04
152032	D.	.10

J. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C. IN WRITING TO PROG. MGR. & PROJ. ENGR

SEE SHEET 2 FOR ALT. CONFIG.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL ON HAND

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS		
PREPARED BY	RANKIN	2 AUG 77
CHECKED	[illegible]	8-19-77
MECH STRESS ENG	[illegible]	
ELECTRICAL	[illegible]	
CONFIGURATION CONTROL	[illegible]	
OTHER	[illegible] 8-23-77	

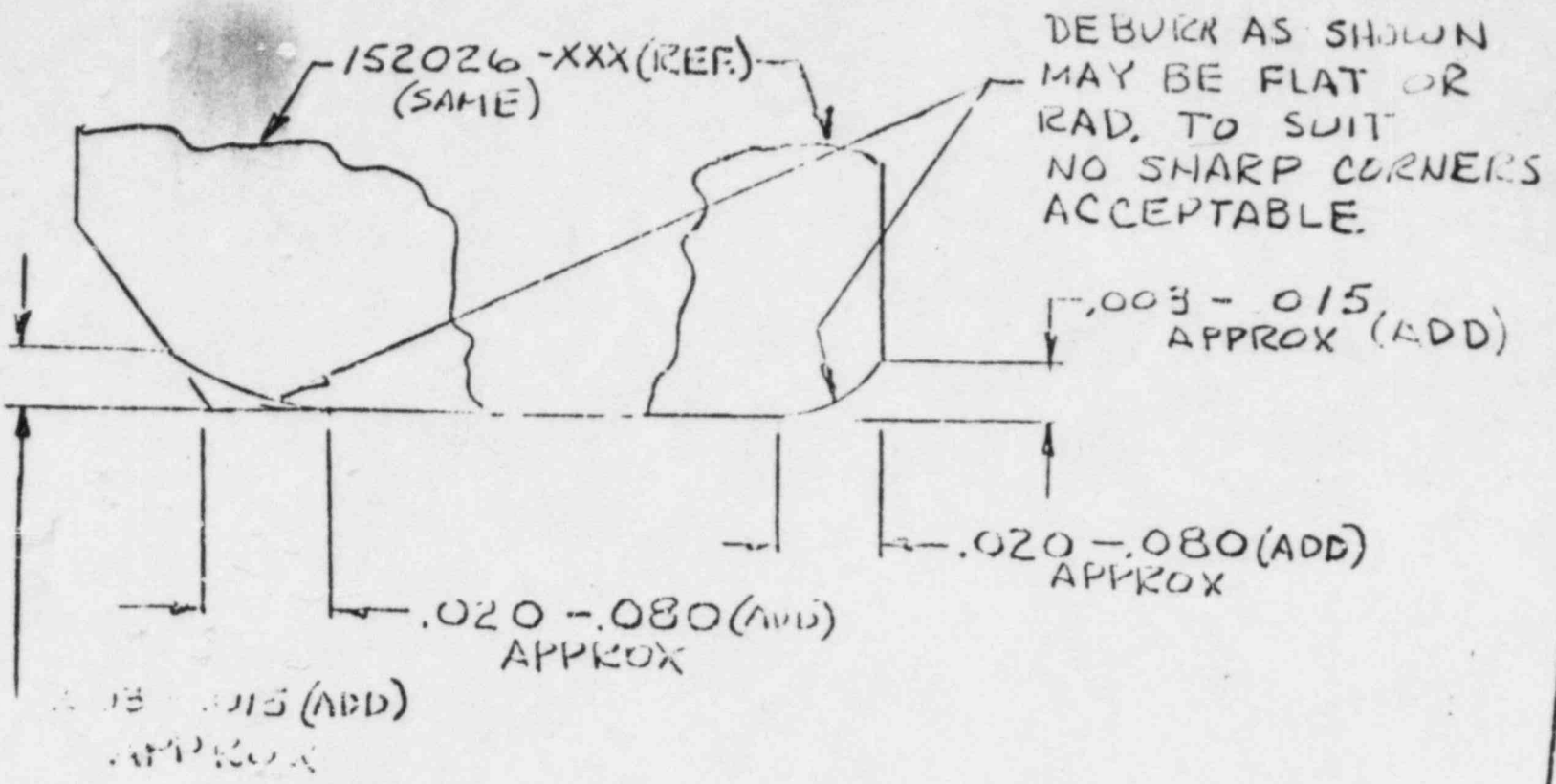
SIGNATURE APPROVALS		
PROGRAM MANAGER		
PROJECT ENGINEER	G. Moat[illegible]	8-23-77
MANUFACTURING ENG	[illegible]	[illegible]
PRODUCTION CONTROL	[illegible]	[illegible]
QUALITY	[illegible]	[illegible]
CUSTOMER		

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒ — EST. $6,995.00

FOR MANUFACTURING ONLY — PRODUCTION EFFECTIVITY: 1ST & SUBQ

DISPOSITION OF PARTS: REWORK ☒ SCRAP ☐ USE AS IS ☐

	DOCUMENT TITLE DAM A 4	DOCUMENT NUMBER NOTED	CHANGE DESIGNATION NOTED
PROGRAMS AFFECTED G.E. SNUBBERS			
OTHER DOCUMENTS AFFECTED ~		ISSUE DATE 8-23-71	
REASON FOR CHANGE SEE SHEET 1		CONTROL NUMBER 00411	
DESCRIPTION OF CHANGE SHEET 2 OF 2		EFFECTIVITY SET 8	

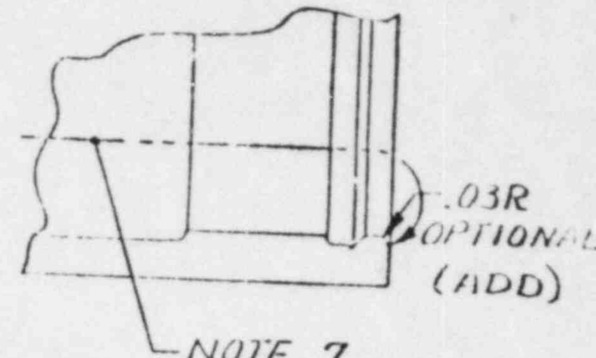


E-SYSTEMS
Montek Division

ENGINEERING CHANGE

DOCUMENT TITLE	HOUSING - ESERVOIR 10/20 KIP
DOCUMENT NUMBER	152219 / 152220
CHANGE IDENTIFICATION	D
PROGRAMS AFFECTED	G.E. SNUBBER
OTHER DOCUMENTS AFFECTED	
REASON FOR CHANGE	VENDOR REQUEST
ISSUE DATE	8-23-77
CONTROL NUMBER	[illegible]
EFFECTIVITY	S/N 001 & 508

DESCRIPTION OF CHANGE



(ZONE D-5
ADD OPTIONAL RADIUS
AS SHOWN)

H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C. IN WRITING TO PROG. MGR. & PROJ ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NO.

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	RAUKER	PROGRAM MANAGER	
CHECKED	[illegible] 8-17-77	PROJECT ENGINEER	[illegible]
MECH/STRESS ENG	[illegible]	MANUFACTURING ENG	[illegible]
ELECTRICAL	[illegible]	PRODUCTION CONTROL	[illegible]
CONFIGURATION CONTROL	[illegible]	QUALITY	[illegible] 8-15-77
OTHER	[illegible]	CUSTOMER	

COST RESPONSIBILITY: CUSTOMER / DIVISION X

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY: S/N 001 & 508
DISPOSITION OF PARTS: REWORK [ ] SCRAP [ ] USE AS IS [X]

ENGINEERING CHANGE

E-SYSTEMS Montek Division

DOCUMENT TITLE	POSITION ICATOR ASSY
DOCUMENT NUMBER	NOTED
CHANGE IDENTIFICATION	B,
PROGRAMS AFFECTED	G.E. SNUBBERS
OTHER DOCUMENTS AFFECTED	~
REASON FOR CHANGE	COST REDUCTION
ISSUE DATE	9-2-77
CONTROL NUMBER	OC-911-2-368
EFFECTIVITY	1ST & ON

DESCRIPTION OF CHANGE

DOCUMENT NUMBER
152181
152182
152183
152185
152187
152190

DELETE PAINT FILL OF MARKINGS AS SHOWN

GENERAL NOTES

(DELETE) 5. INDICATOR MARKINGS TO BE FILLED WITH CARBOLINE 3912 WHITE PAINT AVAILABLE FROM: CARBOLINE CO., 350 HANLEY INDUSTRIAL CT., ST. LOUIS, MO., 63144. WIPE OFF EXCESS PAINT WITH A CLEAN CLOTH.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PREPARED BY	RANKIN 8-31-77
CHECKED	Williams 8-31-77
MECH STRESS ENG	[illegible]
ELECTRICAL	[illegible]
CONFIGURATION CONTROL	[illegible] 8-31-77
OTHER	[illegible] 9-2-77

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 8-31-77
MANUFACTURING ENG	[illegible] 8-31-77
PRODUCTION CONTROL	[illegible] 8-31-77
QUALITY	[illegible] 8-31-77
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER	
DIVISION	X

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1ST & SUBQ

DISPOSITION OF PARTS: REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

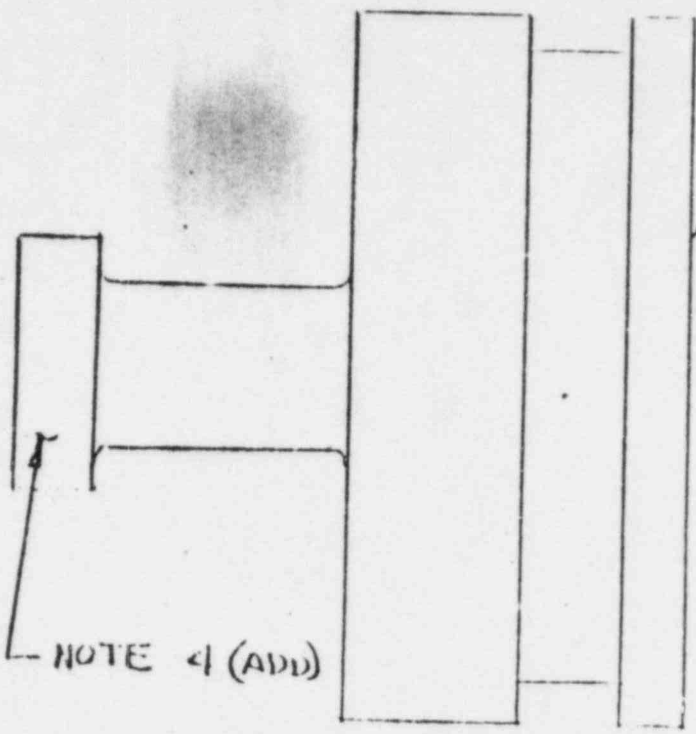
MO 198

E-SYSTEMS Montek Division

ENGINEERING CHANGE

DOCUMENT TITLE	RETAINER SEAL
DOCUMENT NUMBER	152066
CHANGE IDENTIFIC	B1
PROGRAMS AFFECTED	G.E. SNUBBER'S
OTHER DOCUMENTS AFFECTED	—
REASON FOR CHANGE	INDICATE LOCATION FOR S/N, P/N &c.
ISSUE DATE	9-7-77
CONTROL NUMBER	00-1162, 369
EFFECTIVITY	1ST 1 S/O

DESCRIPTION OF CHANGE



H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C. IN WRITING TO PROGRAM MGR. & PROJECT ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	[illegible]	PROGRAM MANAGER	
CHECKED	[illegible] 9-1-77	PROJECT ENGINEER	[illegible] 9-6-77
MECH/STRESS ENG.	[illegible]	MANUFACTURING ENG	[illegible] 9-7-77
ELECTRICAL	[illegible]	PRODUCTION CONTROL	[illegible] 9-2-77
CONFIGURATION CONTROL	[illegible]	QUALITY	[illegible] 9-6-77
OTHER	9-7-77	CUSTOMER	

COST RESPONSIBILITY: CUSTOMER / DIVISION

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1ST 1 S/O

DISPOSITION OF PARTS: REWORK ☒ SCRAP ☐ USE AS IS ☐

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: ROD END SSY FEMALE

DOCUMENT NUMBER: NOTED

CHANGE IDENT: NOTED

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED: ~

REASON FOR CHANGE: DELETE ALT. MATL. & HEAT TREAT

ISSUE DATE: 4-9-77

CONTROL NUMBER: 00411.2.370

EFFECTIVITY: 1ST & SUBS

DESCRIPTION OF CHANGE

DELETE GENERAL NOTES FOR ALT. MATL. & HEAT TREAT

DOCUMENT N°	CHANGE IDENT
152102	D2
152103	D2
152105	D2
152107	D2
152110	D3

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY: LANKIN 4-6-77
CHECKED: FRANCISCO 4-7-77
MECH STRESS ENG: [illegible] 4-7-77
ELECTRICAL: [illegible]
CONFIGURATION CONTROL: [illegible] 4-8-77
OTHER: [illegible] 4-7-77

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER
PROJECT ENGINEER: [illegible] 4-8-77
MANUFACTURING ENG: [illegible] 4-7-77
PRODUCTION CONTROL
QUALITY: [illegible] 4-7-77
CUSTOMER

COST RESPONSIBILITY

CUSTOMER: X
DIVISION

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1ST & SUBS

DISPOSITION OF PARTS

REWORK ☐ SCRAP ☒ USE AS IS ☐

MD 198

E-SYSTEMS
Montek Divison

DOCUMENT TITLE: PISTON & ROD

DOCUMENT NUMBER: NOTED

CHANGE IDENTIFIC: NOTED

PROGRAMS AFFECTED: G.F. SNUBBERS

OTHER DOCUMENTS AFFECTED:

REASON FOR CHANGE: DELETE ALT. MATL

ISSUE DATE: 9-9-77

CONTROL NUMBER: 00911.2-371

EFFECTIVITY: 1ST # SUBQ.

DESCRIPTION OF CHANGE

DELETE GENERAL NOTES FOR ALT. MATL & HEAT TREAT

DOCUMENT Nº	CHANGE IDENT
152034	E3
152035	E3
152036	E3
152037	E3
152038	D3

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR MFR

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

COST RESPONSIBILITY: CUSTOMER [X] DIVISION [ ]

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1ST & SUBQ

DISPOSITION OF PARTS: REWORK [ ] N/A SCRAP [ ] USE AS [ ]

SIGNATURE APPROVALS

PREPARED BY	[illegible] 2-6-77	PROGRAM MANAGER
CHECKED	[illegible] 2-7-77	PROJECT ENGINEER [illegible] 9-8-77
MECH STRESS ENG	[illegible]	MANUFACTURING ENG [illegible] 9-8-77
ELECTRICAL	[illegible]	PRODUCTION CONTROL
CONFIGURATION CONTROL	[illegible] 2-7-77	QUALITY [illegible] 9-7-77
OTHER	[illegible]	CUSTOMER

	DOCUMENT TITLE: SNUBBER ASSEMBLY	DOCUMENT NUMBER: 152005	CHANGE IDENTIF: D_2
PROGRAMS AFFECTED: G.E. Snubber			
OTHER DOCUMENTS AFFECTED		ISSUE DATE: 7-9-72	
REASON FOR CHANGE: G.E. Requirement Add Dash No. (New Part) and Update Material Classes		CONTROL NUMBER: 00111,2,3	
DESCRIPTION OF CHANGE		EFFECTIVITY: 1st & Subsq.	

SHEET 2 OF 2

Sheet 17 of 18

Move note 123 & 124 to sheet 16a. Note 128 (Add) Cres 16-8 or 16-18, 302 and 384 (Delete) 316, 321 or 347. Note 129 (Add) ASTM A434-64
Note 130 Define sequence for chromium plate
Delete old note 131
Add new note 131. Add notes 134, 135 & 136

Sheet 18 of 18 Zone C-10

	Drawing	"A" Dim	Adjustment
(Add)	152005-36.1FC2	36.1	Fixed
(Add)	152005-36.1FC1	36.1	Fixed
(Add)	152005-41.7FC	41.7	Fixed
(Add)	152005-30.0F	30.0	Fixed

Zone C-2 & D-2 Added -004, -005, & -006 to 152121 Fixed Clevis Callouts.
Zone B-8 Added "thru -111 " to 152075-100 Fixed End Fitting Callout.

CHANGES REQUIRED FOR HATCH No. 2 POWER PLANT

Sheets 10a, 11a and 18

Added requirements for 152005-31.9FC3, 152005-56.5C and 152005-60.5C

Sheet 18

Zone C-2 & D2 Added-007 to 152121 Fixed Clevis Callouts

Zone A-2 Added -010 to 152122 Adjustable Clevis Callout

MD 198 2

E-SYSTEMS / Montek Division

DOCUMENT TITLE: BUSHING, JOURNAL

152026

IDENTIFICATION: D,

PROGRAMS AFFECTED: G.E. SHUTTLE

OTHER DOCUMENTS AFFECTED: —

REASON FOR CHANGE: REDUCE ΔP ACROSS JOURNAL BUSHING

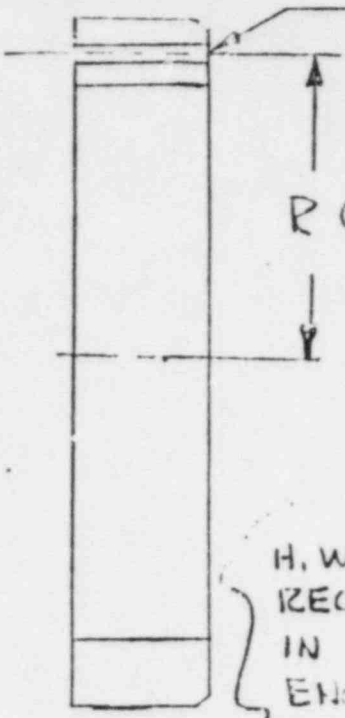
ISSUE DATE: 9-14-77

CONTROL NUMBER: 00911.2.375

EFFECTIVITY: 121 & SUBQ

DESCRIPTION OF CHANGE

BUSHING DASH NO	R. (ADD
-001	.714
-002	.813
-003	1.031
-004	1.031
-005	1.281
-006	1.281
-007	1.344
-008	1.344
-009	1.644
-010	1.644



NOTE:-
IF BUSHING IS INSTALLED SEE SALVAGE E.C. FOR THE ASSEMBLY TO ADD THIS HOLE.

H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C. IN WRITING TO PROG. MGR & PROJ ENGR.

THIS E.C. CANCELS E.C. C, (00411.2.341)

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1ST # SUBQ

DISPOSITION OF PARTS: REWORK ☒ SCRAP ☐ USE AS IS ☐

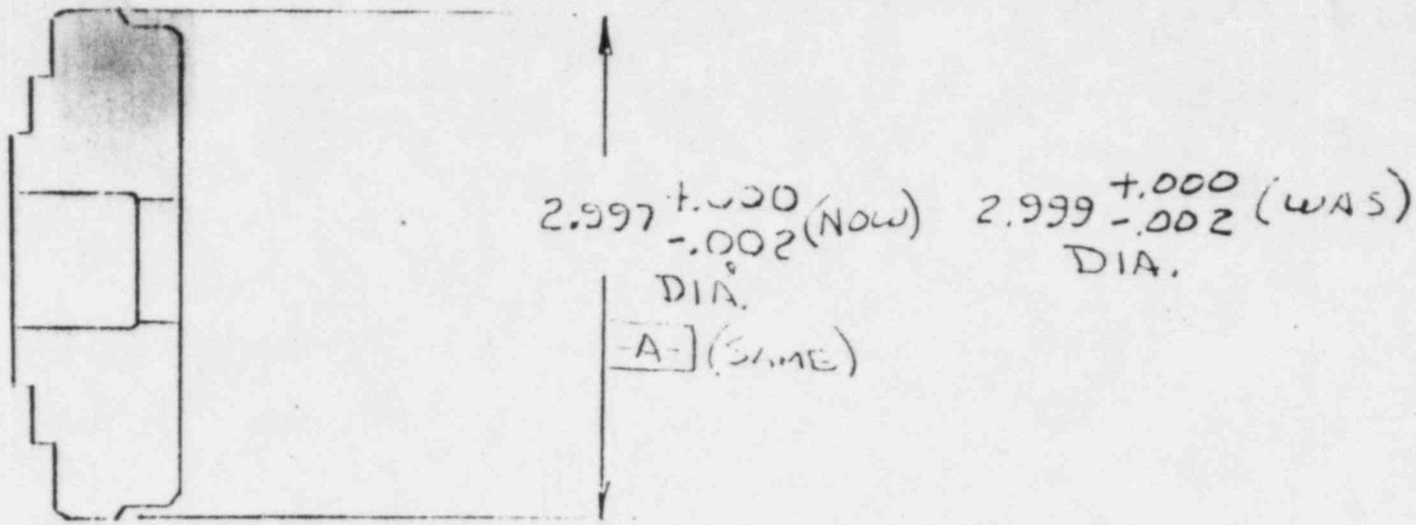
SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	[illegible] 9-13-77	PROGRAM MANAGER	
CHECKED	[illegible] 9-13-77	PROJECT ENGINEER	G. Majka 9-12-77
MECH STRESS ENG	[illegible]	MANUFACTURING ENG	[illegible]
ELECTRICAL	N/A	PRODUCTION CONTROL	[illegible]
CONFIGURATION CONTROL	[illegible]	QUALITY	[illegible]
OTHER	[illegible]	CUSTOMER	

MD 1-78

ENGINEERING CHANGE

E-SYSTEMS Montek Division	DOCUMENT TITLE: RETAINER RESERVOIR 10/20 KIP	DOCUMENT NUMBER: 152227	CHANGE IDENTIFIC: D1
PROGRAMS AFFECTED: (C.E.?) SNUBBER		ISSUE DATE: 9-16-77	
OTHER DOCUMENTS AFFECTED: —		CONTROL NUMBER: 004172.374	
REASON FOR CHANGE: INCREASE CLEARANCE FOR EASE OF ASSEMBLY AND		EFFECTIVITY: 1ST & ON	

DESCRIPTION OF CHANGE: COMPENSATE FOR OUT OF TOLERANCE MATING PART



QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	RANKIN 9-12-77	PROGRAM MANAGER	
CHECKED	[illegible] 9-15-77	PROJECT ENGINEER	Mather 9-15-77
MECH STRESS ENG	[illegible]	MANUFACTURING ENG	[illegible]
ELECTRICAL	N/A	PRODUCTION CONTROL	[illegible]
CONFIGURATION CONTROL	[illegible] 9/16/77	QUALITY	[illegible]
OTHER	9-16-77 [illegible]	CUSTOMER	

COST RESPONSIBILITY	
CUSTOMER	
DIVISION	X

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1st & On

DISPOSITION OF PARTS: REWORK ☒ SCRAP ☐ USE AS IS ☐

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	RETAINER, RESERVOIR 30/50 KIP
DOCUMENT NUMBER	152228
CHANGE IDENTIFICAT	E1
PROGRAMS AFFECTED	G.E. SNUBBER
OTHER DOCUMENTS AFFECTED	—
ISSUE DATE	9-16-77
REASON FOR CHANGE	INCREASE CLEARANCE FOR EASE OF ASSEMBLY AND
CONTROL NUMBER	004172 77
DESCRIPTION OF CHANGE	COMPENSATE FOR OUT OF TOLERANCE MATING PART
EFFECTIVITY	121 AND UP

4.622 $^{+.000}_{-.003}$ (NOW) DIA.

4.624 $^{+.000}_{-.003}$ (WAS) DIA.

-A- (SAME)

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY
CUSTOMER
DIVISION ☒

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY
1ST & ON

DISPOSITION OF PARTS
REWORK ☒ SCRAP ☐ USE AS IS ☐

SIGNATURE APPROVALS

PREPARED BY	[illegible] 9-16-77
C'KED	[illegible] 9-15-77
MECH STRESS ENG	[illegible]
ELECTRICAL	N/A
CONFIGURATION CONTROL	[illegible] 9-16-77
OTHER	[illegible] 9-16-77

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 9-15-77
MANUFACTURING ENG	[illegible] 9-16-77
PRODUCTION CONTROL	[illegible] 9-16-77
QUALITY	[illegible] 9-16-77
CUSTOMER	

E-SYSTEMS Montek Division

DOCUMENT TITLE	POPPET & RETAINER ASSY
DOCUMENT NUMBER	152059
CHANGE IDENTIFICATION	D1
PROGRAMS AFFECTED	G. L. MODELS
OTHER DOCUMENTS AFFECTED	
REASON FOR CHANGE	ADD -002 SEAL POPPET & CHANGE "A" DIM
ISSUE DATE	9-16-77
CONTROL NUMBER	001 & SUBS
EFFECTIVITY	S/N 001 & SUBS

DESCRIPTION OF CHANGE

ADD 152057-002 SEAL

(1)

(NOW)

QTY REQUIRED	NOMENCLATURE	PART NO
1	POPPET ~ SEAL	152057-002
-101	POPPET SEAL	152057-001

(WAS)

QTY REQUIRED	NOMENCLATURE	PART NO
1	POPPET ~ SEAL	152057-001
-101		

(2)

(NOW)

NEXT ASSY	USED ON	QTY PER MAJOR ASSY
152055	152002	2 OF -102
152055	152001	2 OF -101

(WAS)

NEXT ASSY	USED ON	QTY PER ASSY
152055	152002, 152001	2 OF -102

(3) CHANGE "A" DIM FOR -101

(NOW)

DASH NO	A DIM
101	.0085 +.002 -.001

(WAS)

DASH NO.	A DIM
-101	.0056 +.002 -.001

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED YES ☐ NO ☒

CHANGE CLASSIFICATION CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PREPARED BY	9-8-77
CHECKED	9/8/77
MECH/STRESS ENG.	
ELECTRICAL	N/A
CONFIGURATION CONTROL	
OTHER	9-12-77

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	9-15-77
MANUFACTURING ENG	9-15-77
PRODUCTION CONTROL	
QUALITY	9-14-77
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER		
DIVISION	X	

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: S/N 001 & SUBS

DISPOSITION OF PARTS: REWORK ☒ SCRAP ☐ USE AS IS ☐

MD 198

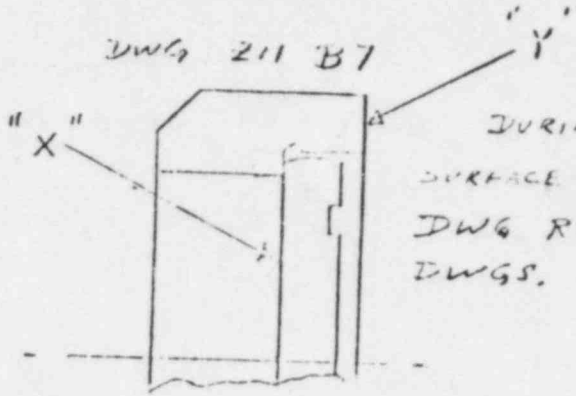
	POPPET & RETAINER ASSY	DOCUMENT NUMBER 152059	CHANGE IDENTIFICATION D1
PROGRAMS AFFECTED	(SEE SHT 1)		
OTHER DOCUMENTS AFFECTED		ISSUE DATE 9-16-77	
REASON FOR CHANGE		CONTROL NUMBER 00411.2.380	
DESCRIPTION OF CHANGE		EFFECTIVITY S/N 0015 & UP	

MFG RWK NOTES:

152059 POPPET & RETAINER ASSYS WERE ORIGINALLY MFG IN ACCORD WITH "B" REV OF DWG. AS SHOWN BELOW

DWG "B" REV

DASH NO	"A" DIM
-101	.0070 ±.0005
-102	.0100 ±.0005
-103	.0130 ±.0010
-107	.0180 ±.0010
-110	.0230 ±.0010



DURING RWK MAINTAIN SURFACE FINISH, ▱ & 11 DWG REQ OF DETAIL DWGS.

AS REQUIRED

1. REWORK "B" REV -101 TO "D" REV -101 BY FIRST REWORKING SEAL-POPPET 152057-001 TO -002 PER E.C. D1. THEN BY MACHINING SURFACE "X" ABOVE.
2. REWORK "B" REV -102 TO "D" REV -102 BY MACH. SURF. "Y" ABOVE
3. REWORK "B" REV -103 TO "D" REV -103 BY MACH. SURF. "Y" ABOVE
4. RWK "B" REV -103 TO "D" REV -105 BY MACH. SURF "X" ABOVE
5. RWK "B" REV -107 TO "D" REV -107 BY MACH. SURF. "X" ABOVE
6. RWK "B" REV -110 TO "D" REV -110 BY MACH. SURF. "X" ABOVE

MD 198 2

E-SYSTEMS
Montek Division

DOCUMENT TITLE	RESERVOIR & VALVE SPRING
DOCUMENT NUMBER	152040
CHANGE IDENTIFICATION	F1
PROGRAMS AFFECTED	G.E. SNUBBER
OTHER DOCUMENTS AFFECTED	
REASON FOR CHANGE	ADD -012 SPRING FOR 10 KIP VALVE
DESCRIPTION OF CHANGE	
ISSUE DATE	4-16-77
CONTROL NUMBER	004 11.2.3.21
EFFECTIVITY	S/N 001 & SUBS

CREATE -012 SPRING FOR 10 KIP CONTROL VALVE

(ADD) →	SPRING - CONTROL VALVE (10 KIP)	-012	NOTES 1, 4-6, 10
	NOMENCLATURE	PART NO.	MATL OR NOTE

(ADD) →	152055	152001	1 OF -012
	NEXT ASSY	USED ON	QTY PER MAJOR ASSY

QTY	FOR ITEM	NOMENCLATURE	PART NO.	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS		COST RESPONSIBILITY		FOR MANUFACTURING ONLY
PREPARED BY	DILLARD 9/12/77	SIGNATURE APPROVALS		PRODUCTION EFFECTIVITY
CHECKED	[illegible] 9/12/77	PROGRAM MANAGER	CUSTOMER	
MECH/STRESS ENG	[illegible]	PROJECT ENGINEER		1 & SUBS
ELECTRICAL	N/A	MANUFACTURING ENG		
CONFIGURATION CONTROL	[illegible] 9-14-77	PRODUCTION CONTROL	DIVISION	DISPOSITION OF PARTS
OTHER	K 9-14-77	QUALITY	✓	REWORK ☐ SCRAP ☐ USE AS IS ☐ N/A
		CUSTOMER		

	DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICATION
	RESERVOIR & VALVE SPRING	152070	F
PROGRAMS AFFECTED	G.E. SHUBBER	ISSUE DATE 07-14-75	
OTHER DOCUMENTS AFFECTED		CONTROL NUMBER 0001	
REASON FOR CHANGE	ADD -012 SPRING	EFFECTIVITY S/N 001 & SUB	
DESCRIPTION OF CHANGE			

(3)

SPRING DATA

PART DASH NO		-012
WIRE DIA		.018 ±.0005
INSIDE DIA A		REF
OUTSIDE DIA A		.180 ±.005
DIRECTION OF HELIX		OPT
TOTAL COILS		16
ACTIVE COILS		14
FREE LENGTH (REF)		1.25
SOLID LENGTH (MAX)		.302
SPRING RATE (REF)		2.083
MAX WORKING STRESS (REF)		30,000
INITIAL OPERATING POINT	LOAD (LBS)	.315 ±.031
	LENGTH	1.099
FINAL OPERATING POINT	LOAD (LBS)	.354 ±.035
	LENGTH	1.080
I.D. CHAMFER DIA ±.03		NONE
O.D. CHAMFER DIA ±.03		NONE

4. ADD NOTE 10.

10. MAY BE PURCHASED AS P/N LC-018B-12SS, FROM LEL SPRING CO, A KIKER-MAXSON SUBSIDARY, 30 MAIN ST., BROOKLYN NY. 11201. MATL: STAINLESS STEEL, PER QQ-W-423 COMPOSITION FS302, OR PER AMS 5688. FLUORESCENT PENETRANT INSPECT PER SPEC 9-40016-001.

PAGE 2 OF 2

ENGINEERING CHANGE

E-SYSTEMS Montek Division	DOCUMENT TITLE: SEAL - POPPET VALVE - SNUBBER	DOCUMENT NUMBER: 152057	[illegible] ...TION: D1
PROGRAMS AFFECTED	G. E. SNUBBER	ISSUE DATE: 9-16-77	
OTHER DOCUMENTS AFFECTED		CONTROL NUMBER: 00411-2-[illegible]	
REASON FOR CHANGE	CREATE SEAL FOR 10 KIP SNUBBER	EFFECTIVITY: 1 $\frac{3}{4}$ S080	

DESCRIPTION OF CHANGE

CREATE -002 POPPET SAME AS -001 POPPET EXCEPT AS FOLLOWS:

-002 HAS .193 $^{+.005}_{-.000}$ DIA x .020 ±.005 DEEP C'BORE WHICH IS OPT. FOR -001

-002 ALSO HAS OPT FOR .495 & .405 DIA X .020 ±.005 DEEP GROOVE

IN GENERAL NOTES: ADD NOTE 5

5. DEMAGNETIZE AS SPECIFIED IN MIL-I-6868.

REVISE N/A

152059 152001 1 OF ~~-001~~ -002

MFG NOTE: 1. -002 MAY BE REWORKED FROM -001 BY ADDITION OF .193 DIA x .020 DEEP C'BORE

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED	CHANGE CLASSIFICATION	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
YES [ ] NO [X]	CLASS I [ ] CLASS II [X] RECORD [ ]		
SIGNATURE APPROVALS	SIGNATURE APPROVALS	CUSTOMER	PRODUCTION EFFECTIVITY
PREPARED BY: Pillar 9/9/77	PROGRAM MANAGER		1 $\frac{3}{4}$ S080
CHECKED: [illegible] 9/15/77	PROJECT ENGINEER: [illegible] 9-15-77		
MECH/STRESS ENG: [illegible]	MANUFACTURING ENG: [illegible] 9-15-77		
ELECTRICAL: N/A	PRODUCTION CONTROL: [illegible] 9-15-77	DIVISION ✓	DISPOSITION OF PARTS
CONFIGURATION CONTROL: [illegible] 9-15-77	QUALITY: [illegible] 9-14-77		REWORK [X] SCRAP [ ] USE AS IS [ ]
OTHER: [illegible] 9-16-77	CUSTOMER		

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: PLATE I ...NTIFICATION
SNUBBERS

DOCUMENT NUMBER: 152045

CHAP IDEN ...TION: C1

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED:

ISSUE DATE: 1-23-77

REASON FOR CHANGE: ADD NEW REQUIREMENT FOR BATCH #2

CONTROL NUMBER: CD41-2,33[illegible]

DESCRIPTION OF CHANGE:

EFFECTIVITY: 1ST & ON

A00 -022

QTY	FROM	ITEM	NOMENCLATURE	PART NO	NEXT HIGHER ASSY

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

SIGNATURE APPROVALS
PREPARED BY: [illegible] 1-27-77
CHECKED: [illegible] 1-22-77
MECH STRESS ENG: [illegible]
ELECTRICAL: [illegible]
CONFIGURATION CONTROL: [illegible]
OTHER: [illegible]

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS
PROGRAM MANAGER: [illegible]
PROJECT ENGINEER: Meafis 1-22-77
MANUFACTURING ENG: [illegible] 1-22-77
PRODUCTION CONTROL: [illegible] 1-22-77
QUALITY: [illegible] 1-22-77
CUSTOMER: [illegible]

COST RESPONSIBILITY
CUSTOMER: X
DIVISION:

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY: 1ST & ON
DISPOSITION OF PARTS
REWORK ☒ N/A SCRAP ☐ USE AS IS ☐

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: PISTON & .OD SS NIP		DOCUMENT NUMBER: 152036	CHANGE IDENTIFICATION: F1
PROGRAMS AFFECTED: G.E. SNUBBERS			
OTHER DOCUMENTS AFFECTED		DATE: 1-28-77	
REASON FOR CHANGE: CHROME PLATE IMPROVEMENT		CUSTOMER NUMBER: 00	
		EFFECTIVITY: S/N 001 & ON (SEE NOTE 2)	

DESCRIPTION OF CHANGE

GENERAL NOTES:-

PLATING NOTE:- (WAS) PLATE NICKEL PER QQ-N-290, TYPE I, CLASS I, IN THE FOLLOWING SEQUENCE:- APPLY .0002 TO .0003 SINGLE THICKNESS OF COPPER TO THE BASE METAL. APPLY .0002 TO .0003 SINGLE THICKNESS OF NICKEL OVER THE COPPER. APPLY .0002 TO .0006 SINGLE THICKNESS OF CHROMIUM OVER THE NICKEL. CHROMIUM PLATE TO BE AS DENSE AS POSSIBLE. PLATING MAY FLASH ON ANY OTHER SURFACE, HOWEVER THE COPPER MUST BE ENTIRELY OVERPLATED AS PREVIOUSLY PROVIDED AND ALL DIMENSIONS INCLUDE APPLIED FINISH. BAKE FOR 4 HOURS AT 375°F ±25°F WITHIN 4 HOURS AFTER PLATING.

(NOW) PLATE NICKEL PER QQ-N-290, TYPE I, CLASS I, IN THE FOLLOWING SEQUENCE:- APPLY .0001 MAX SINGLE THICKNESS OF COPPER TO THE BASE METAL. APPLY .0002 TO .0003 SINGLE THICKNESS OF NICKEL OVER THE COPPER. APPLY .0005 TO .0006 SINGLE THICKNESS OF CHROMIUM OVER THE NICKEL. PLATING MAY FLASH ON ANY OTHER SURFACE, HOWEVER THE COPPER MUST BE ENTIRELY OVERPLATED AS PREVIOUSLY PROVIDED AND ALL DIMENSIONS INCLUDE APPLIED FINISH. BAKE FOR 4 HOURS AT 375°F ±25°F WITHIN 4 HOURS AFTER PLATING.

NOTES:- 1. STRIP & REPLATE S/NS 766, 767, 769, 771, 773, 777, 778, 780, 784, 750 & 753

2. ACCEPTABLE AS IS — DO NOT REWORK
743, 744, 753, 762, 759, 772, 782, 783 & 785

QTY	FROM	ITEM	IDENTIFICATION	PART NO	MATERIAL OR SPEC	

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☐	CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ NEGL ☐	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
SIGNATURE APPROVALS	SIGNATURE APPROVALS		PRODUCTION EFFECTIVITY
PREPARED BY: P. Perkins 9-27-77	PROGRAM MANAGER	CUSTOMER	S/N 001 & ON (SEE NOTE 2)
CHECKED	PROJECT ENGINEER 1-25-77		
MFG STRESS ENG	MANUFACTURING ENGR		
ELECTRICAL N/A	PRODUCTION CONTROL	DELIVERY TBD	DISPOSITION OF PARTS
CONFIGURATION CONTROL	QUALITY	2 to 4 weeks	REWORK ☒ SCRAP ☐ USE AS IS ☐
OTHER	CUSTOMER		NOTE 2

E-SYSTEMS Montek Division

ENGINEERING CHANGE

DOCUMENT TITLE	VALVE ASSY SNUBBER	DOCUMENT NUMBER 152055	CHANGE IDENTIFICATION F1
PROGRAMS AFFECTED	G.E. SNUBBER	ISSUE DATE 9-16-77	
OTHER DOCUMENTS AFFECTED		CONTROL NUMBER 004 [illegible]	
REASON FOR CHANGE	COMPLETE -101 VALVE ASSY	EFFECTIVITY 1 & SUBSQ	

DESCRIPTION OF CHANGE

COMPLETE DESIGN OF -101 AS FOLLOWS:

-101 VALVE ASSY SAME AS -102 VALVE ASSY EXCEPT:

(A) 152040-012 SPRING, IS USED IN PLACE OF 152040-011 SPRING.

(B) 152059-102 POPPET & RETAINER IS USED IN PLACE OF 152059-101 POPPET & RETAINER.

(ADD) NOTE 55. TO GENERAL NOTES. (CODED TO 152040-012 SPRING)

55. MAKE FROM STAINLESS STEEL PER FEDERAL SPEC QQ-W-423 COMPOSITION FS 302, OR PER AMS 5688.

MFG NOTE: 152055-101 VALVE ASSY S/N'S 001, 002, 006, 007, 009 & 008 IN ACCORD

S/N 008 LOCATED IN Q 10 1 SNUBBER
S/N 006 LOCATED IN Q 10 -2 SNUBBER
S/N 007 LOCATED IN S/N 003 SNUBBER
S/N 009 LOCATED IN S/N 004 SNUBBER

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☑

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☑ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ✓

FOR MANUFACTURING ONLY — PRODUCTION EFFECTIVITY: 1 & SUBSQ

DISPOSITION OF PARTS: REWORK ☑ SCRAP ☐ USE AS IS ☐

SIGNATURE APPROVALS	
PREPARED BY	Dillard 9/13/77
CHECKED	Dillard 9/15/77
MECH STRESS ENG	[illegible]
ELECTRICAL	N/A
CONFIGURATION CONTROL	[illegible] 9/16/77
OTHER	[illegible] 9-16-77

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 9-15-77
MANUFACTURING ENG	[illegible] 9-15-77
PRODUCTION CONTROL	[illegible] 9-15-77
QUALITY	[illegible] 9-14-77
CUSTOMER	

ENGINEERING CHANGE

E-SYSTEMS Montek Division	DOCUMENT TITLE HEX NU	DOCUMENT NUMBER 910644	CHANGE IDENT D1

PROGRAMS AFFECTED G.E. SUDBBERG

OTHER DOCUMENTS AFFECTED ~

REASON FOR CHANGE NEW REQUIREMENT FOR BATCH #2

ISSUE DATE 9-21-77

CONTROL NUMBER 00411.2.386

EFFECTIVITY 1ST & ON

DESCRIPTION OF CHANGE

ADD- 121 (2-8UN-2B LEFT HAND THD, NUT)

Note: This Nut Reqd Per Program Directive ER 00411.24 (Rev B)

H. Wilkerson To Acknowledge Receipt & Transmittal of This E.C. In Writing To Program Mgr & Proj Engr.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO.	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PREPARED BY	Rankin 9-21-77
CHECKED	Williams 9-21-77
MECH STRESS ENG	[illegible]
ELECTRICAL	
CONFIGURATION CONTROL	[illegible] 9-22-77
OTHER	[illegible] 9-21-77

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 9-21-77
MANUFACTURING ENG	[illegible] 9-21-77
PRODUCTION CONTROL	[illegible] 9-21-77
QUALITY	[illegible] 9-21-77
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER	X
DIVISION	

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1ST & ON

DISPOSITION OF PART: REWORK ☐ SCRAP ☐ USE AS IS ☐

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: PISTON & [illegible] D 3.0 KIP		DOCUMENT NUMBER: 152035	CHANGE IDENTIFIER: F
PROGRAMS AFFECTED: G.E. SNUBBERS		ISSUE DATE: 9-28-77	
OTHER DOCUMENTS AFFECTED:		CONTROL NUMBER: 9021 [illegible]	
REASON FOR CHANGE: CHROME PLATE IMPROVEMENT		EFFECTIVITY: 1ST & ON (SEE NOTE)	

DESCRIPTION OF CHANGE

GENERAL NOTES:-

PLATING NOTE:- (WAS) PLATE [illegible] AREA [illegible], TYPE I, CLASS I, IN THE FOLLOWING SEQUENCE:- APPLY .0002 TO .0003 SINGLE THICKNESS OF COPPER TO THE BASE METAL. APPLY .0002 TO .0003 SINGLE THICKNESS OF NICKEL OVER THE COPPER. APPLY .0003 TO .0006 SINGLE THICKNESS OF CHROMIUM OVER THE NICKEL. CHROMIUM PLATE TO BE AS DENSE AS POSSIBLE. PLATING MAY FLASH ON ANY OTHER SURFACE, HOWEVER THE COPPER MUST BE ENTIRELY OVERPLATED AS PREVIOUSLY PROVIDED AND ALL DIMENSIONS INCLUDE APPLIED FINISH. BAKE FOR 4 HOURS AT 375°F ±25°F WITHIN 4 HOURS AFTER PLATING.

(NOW) PLATE NOTE: [illegible] TYPE I, CLASS I, IN THE FOLLOWING SEQUENCE:- APPLY .0001 MAX SINGLE THICKNESS OF COPPER TO THE BASE METAL. APPLY .0002 TO .0003 SINGLE THICKNESS OF NICKEL OVER THE COPPER. APPLY .0005 TO .0006 SINGLE THICKNESS OF CHROMIUM OVER THE NICKEL. PLATING MAY FLASH ON ANY OTHER SURFACE, HOWEVER THE COPPER MUST BE ENTIRELY OVERPLATED AS PREVIOUSLY PROVIDED AND ALL DIMENSIONS INCLUDE APPLIED FINISH. BAKE FOR 4 HOURS AT 375°F ±25°F [illegible] AFTER PLATING.

NOTES:- 1. STRIP AND REPLATE S/Ns 507, 521, 523, 526, 546, 550, 551, 571

2. ACCEPTABLE - DO NOT REWORK
495, 502, 522, 524, 527, 528, 529, 532, 553, 559, 572, 573, 574, 578, 581, 584, 588, 591 AND 599.

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]	CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]	COST RESPONSIBILITY	FOR MANUFACTURING ONLY	
SIGNATURE APPROVALS	SIGNATURE APPROVALS	CUSTOMER	PRODUCTION EFFECTIVITY: 1ST & ON SEE NOTE	
PREPARED BY: [illegible] 9-27-77	PROGRAM MANAGER			
CHECKED: [illegible]	PROJECT ENGINEER: [illegible] 9-28-77			
MECH STRESS PROP: [illegible]	MANUFACTURING ENG: [illegible]			
ELECTRICAL: [illegible]	PRODUCTION CONTROL: [illegible]	DIVISION: TBD 3-4 WEEKS	DISPOSITION OF UNITS	
CONFIGURATION CONTROL: [illegible] 9-28-77	QUALITY: [illegible] 9-28-77		REWORK [X] SEE NOTE	SCRAP [ ] USE AS IS [ ]
OTHER: [illegible] 9-28-77	CUSTOMER			

QTY	[illegible]	ITEM	NOMENCLATURE	PART NO.	MATERIAL OR NOTE

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: PISTON & F D 20 KIT		DOCUMENT NUMBER: 152034	CHANGE IDENTIFICA: G1
PROGRAMS AFFECTED: G.E. SNUBBERS		ISSUE DATE: 9-28-77	
OTHER DOCUMENTS AFFECTED		CONTROL NUMBER: 0041	
REASON FOR CHANGE: CHROME PLATE IMPROVEMENT		EFFECTIVITY: 1ST & ON — SEE NOTE	

DESCRIPTION OF CHANGE

GENERAL NOTES:-

PLATING NOTE:- (WAS) PLATE ... PER QQ-C-320, TYPE I, CLASS I, IN THE FOLLOWING SEQUENCE:- APPLY .0002 TO .0003 SINGLE THICKNESS OF COPPER TO THE BASE METAL. APPLY .0002 TO .0003 SINGLE THICKNESS OF NICKEL OVER THE COPPER. APPLY .0003 TO .0006 SINGLE THICKNESS OF CHROMIUM OVER THE NICKEL. CHROMIUM PLATE TO BE AS DENSE AS POSSIBLE. PLATING MAY FLASH ON ANY OTHER SURFACE, HOWEVER THE COPPER MUST BE ENTIRELY OVERPLATED AS PREVIOUSLY PROVIDED AND ALL DIMENSIONS INCLUDE APPLIED FINISH. BAKE FOR 4 HOURS AT 375°F ± 25°F WITHIN 4 HOURS AFTER PLATING.

(NOW) PLATE NOTED AREA PER QQ-C-320 TYPE I, CLASS I, IN THE FOLLOWING SEQUENCE:- APPLY .0001 MAX SINGLE THICKNESS OF COPPER TO THE BASE METAL. APPLY .0002 TO .000? SINGLE THICKNESS OF NICKEL OVER THE COPPER. APPLY .0005 TO .0006 SINGLE THICKNESS OF CHROMIUM OVER THE NICKEL. PLATING MAY FLASH ON ANY OTHER SURFACE, HOWEVER THE COPPER MUST BE ENTIRELY OVERPLATED AS PREVIOUSLY PROVIDED AND ALL DIMENSIONS INCLUDE APPLIED FINISH. BAKE FOR 4 HOURS AT 375°F ± 25°F WITHIN 4 HOURS AFTER PLATING.

NOTES:- 1. STRIP AND REPLATE S/N 119, 141, 100, 095, 091, 061, 101, 027, 047, 083, 133, 132, 001, 146, 150, 110, 125, 092, 112, 121, 131, & 111

QTY	ASSY	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED	CHANGE CLASSIFICATION	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
YES [ ] NO [X]	CLASS I [ ] CLASS II [X] RECORD [ ]		
SIGNATURE APPROVALS	SIGNATURE APPROVALS	CUSTOMER	PRODUCTION EFFECTIVITY: 1ST & ON SEE NOTES
PREPARED BY: Kenyin 9-27-77	PROGRAM MANAGER		
CHECKED: [signature] 9-27-77	PROJECT ENGINEER: [signature] 9-28-77		
MECH STRESS ENG: [signature] 9-27-77	MANUFACTURING ENG: [signature] 9-27-77		
ELECTRICAL: [signature]	PRODUCTION CONTROL: [signature]	DIVISION: TBD	DISPOSITION OF PARTS
CONFIGURATION CONTROL: [signature] 9-28-77	QUALITY: [signature] 9-28-77	3-4 weeks	REWORK [X] SEE NOTES SCRAP [ ] USE AS IS [ ]
OTHER: [signature] 9-28-77	CUSTOMER		

E-SYSTEMS Montek Division

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICAT
PISTON & P.D. 10 KIP	152033	D3

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED: —

REASON FOR CHANGE: CHROME PLATE IMPROVEMENT

ISSUE DATE: 9-28-77

CONTROL NUMBER: 00411 Z 3315

EFFECTIVITY: S/N 001 to [illegible] (SEE NOTES)

DESCRIPTION OF CHANGE

GENERAL NOTES:-

PLATING NOTE:- (WAS) PLATE NOTED AREA PER QQ-C-320, TYPE I, CLASS I, IN THE FOLLOWING SEQUENCE:- APPLY .0002 TO .0003 SINGLE THICKNESS OF COPPER TO THE BASE METAL. APPLY .0002 TO .0003 SINGLE THICKNESS OF NICKEL OVER THE COPPER. APPLY .0003 TO .0006 SINGLE THICKNESS OF CHROMIUM OVER THE NICKEL. CHROMIUM PLATE TO BE AS DENSE AS POSSIBLE. PLATING MAY FLASH ON ANY OTHER SURFACE, HOWEVER THE COPPER MUST BE ENTIRELY OVERPLATED AS PREVIOUSLY PROVIDED AND ALL DIMENSIONS INCLUDE APPLIED FINISH. BAKE FOR 4 HOURS AT 375°F ±25°F WITHIN 4 HOURS AFTER PLATING.

(NOW) PLATE NOTED AREA PER QQ-C-320 TYPE I, CLASS I, IN THE FOLLOWING SEQUENCE:- APPLY .0001 MAX SINGLE THICKNESS OF COPPER TO THE BASE METAL. APPLY .0002 TO .000[illegible] SINGLE THICKNESS OF NICKEL [illegible] THE COPPER. APPLY .0005 TO .0006 SINGLE THICKNESS OF CHROMIUM OVER THE NICKEL. PLATING MAY FLASH ON ANY OTHER SURFACE, HOWEVER THE COPPER MUST BE ENTIRELY OVERPLATED AS PREVIOUSLY PROVIDED AND ALL DIMENSIONS INCLUDE APPLIED FINISH. BAKE FOR 4 HOURS AT 375°F ±25°F WITHIN 4 HOURS AFTER PLATING.

NOTES:- 1. STRIP AND REPLATE S/N 327, 314 & 299

2. ACCEPTABLE — DO NOT REWORK S/N 294, 286 & 310

QTY	[illegible]	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	[illegible] 9-27-77	PROGRAM MANAGER	
CHECKED	[illegible]	PROJECT ENGINEER	[illegible] 9-28-77
MECH/STRESS ENG	[illegible]	MANUFACTURING ENG	[illegible]
ELECTRICAL	[illegible]	PRODUCTION CONTROL	[illegible]
CONFIGURATION CONTROL	[illegible]	QUALITY	[illegible]
OTHER	[illegible] 9-28-77	CUSTOMER	

COST RESPONSIBILITY: CUSTOMER [ ] DIVISION TBD [X] 3-4 weeks

FOR MANUFACTURING ONLY — PRODUCTION EFFECTIVITY: S/N 011 & on (see notes)

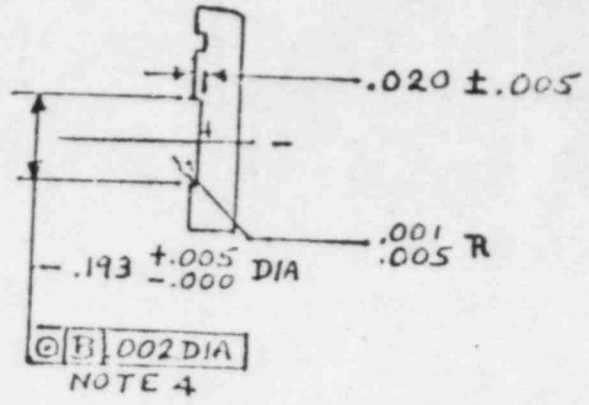
DISPOSITION OF PARTS: REWORK [X] SCRAP [ ] Not [illegible] USE AS IS [ ]

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	SEAL, POPPET VALVE - SNUBBER
DOCUMENT NUMBER	152057
CHANGE IDENTIFICATION	E1
PROGRAMS AFFECTED	[illegible]
OTHER DOCUMENTS AFFECTED	
ISSUE DATE	10-5-77
REASON FOR CHANGE	STRESS PROBLEM ON 20-100 KSI SIZES (-001 CONFIG)
CONTROL NUMBER	004-11.2.40
DESCRIPTION OF CHANGE	
EFFECTIVITY	1 & SUBQ

REVISE F/D, ZN B4
AS SHOWN:



NOTE
MFG. IN ACCORD

(REMOVE) -002 ONLY
~~-001 OPTIONAL~~

INTERCHANGEABILITY AFFECTED	CHANGE CLASSIFICATION	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
YES ☐ NO ☒	CLASS I ☐ CLASS II ☒ RECORD ☐		
SIGNATURE APPROVALS	SIGNATURE APPROVALS		
PREPARED BY [illegible] 10/5/77	PROGRAM MANAGER	CUSTOMER	PRODUCTION EFFECTIVITY
CHECKED [illegible] 10/5/77	PRODUCT ENGINEER [illegible] 10/5/77		1 & SUBQ
MECH STRESS ENG [illegible] 10/5/77	MANUFACTURING ENGINEER [illegible] 10/5/77		
ELECTRICAL	PRODUCTION CONCENTRATION	DIVISION	DISPOSITION OF PARTS
CONFIGURATION CONTROL [illegible]	QUALITY [illegible]		REWORK N/A ☐ SCRAP ☐ USE AS IS ☐
OTHER [illegible] 10/5/77	[illegible]		

ITEM	QUAN	ITEM	NOMENCLATURE	PART NO	MATERIAL SPECIFIED

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: PROCUREMENT SPECIFICATION FOR NON-METALLIC SEALS, ROD WIPERS AND NON-EXTRUSION RINGS

DOCUMENT NUMBER: 910641

CHANGE IDENTIFICATION: D

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED:

ISSUE DATE: 10-7-77

REASON FOR CHANGE: ADD NEW MATERIAL FOR NON-EXTRUSION RINGS

CONTROL NUMBER: 004112466

DESCRIPTION OF CHANGE:

EFFECTIVITY: 1ST & SUBQ

SHEET 2 ¶3.0 MATERIALS

(ADD) 3.3. THE NYLON NON-EXTRUSION RINGS USED IN CONJUNCTION WITH PISTON T-SHAPED SEALING RINGS SHALL BE FABRICATED FROM UNFILLED POLYAMIDE (6/6 NYLON OR EQUIVALENT) PER FEDERAL SPECIFICATION L-P-410A OR ASTM D789 TYPE I, GRADE 2.

¶4.1 (NOW) 1.5×10^7 RADS CUMULATIVE NYLON PER #3.3 HAS BEEN QUALIFIED PER REPORT 152000-600

(WAS) 2.7×10^7 RADS CUMULATIVE

SHEET 6

¶5.4.1.2 (DELETE) 608PTXXX041298 | 106-XXXXX952004 1

(ADD) ** | **

ADD ** SEE 910901 FOR PISTON SEAL APPROVED PARTS LIST

SHEET 4

¶4.2.4 (NOW) ----ETHYLENE PROPYLENE AND PHENOLICS ----

(WAS) ----(ETHYLENE PROPYLENE) PHENOLICS ----

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1ST & SUBQ

DISPOSITION OF PARTS: REWORK ☐ SCRAP ☐ USE AS IS ☐ N/A

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	KANEIN 10-3-77	PROGRAM MANAGER	
CHECKED	[illegible] 10-6-77	PROJECT ENGINEER	Martin 10-6-77
MECH/STRESS ENG	[illegible] 10-3-77	MANUFACTURING ENG	[illegible] 10-3-77
ELECTRICAL N/A		PRODUCTION CONTROL	[illegible] 10-3-77
CONFIGURATION CONTROL	[illegible] 10-6-77	QUALITY	[illegible] 10-3-77
OTHER [illegible]		CUSTOMER	

E-SYSTEMS
Montek Division

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICA
PLATE IDE TIFICATION	152045	D

PROGRAMS AFFECTED G.P. SNUBBERS
OTHER DOCUMENTS AFFECTED —
REASON FOR CHANGE ADD NEW REQUIREMENTS FOR TVA

ISSUE DATE 10-7-77
CONTROL NUMBER 00411-7-407
EFFECTIVITY 1ST & SUBQ

DESCRIPTION OF CHANGE

ADD -031, -032, -033, -035, -037 & -040

Paul K
10-7-77

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY	RANKIN 9-30-77
CHECKED	[illegible] 10-4-77
MECH/STRESS ENG	[illegible]
ELECTRICAL	N/A
CONFIGURATION CONTROL	[illegible] 10-6-77
OTHER	[illegible] 10-7-77

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 10-6-77
MANUFACTURING ENG	[illegible]
PRODUCTION CONTROL	[illegible]
QUALITY	Smith 9-30-77
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER	X
DIVISION	

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY
1ST & SUBQ

DISPOSITION OF PARTS
REWORK ☐ SCRAP ☐ USE AS IS ☐
N/A

MD 158

ENGINEERING CHANGE

E-SYSTEMS Montek Division

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICATION
SNUBBER ASSY	NOTED (SEE SHEET 2)	NOTED (SEE SHEET 2)

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED: ~

REASON FOR CHANGE: REPLACE PHENOLIC WITH NYLON BACKUP RINGS

DESCRIPTION OF CHANGE: ON PISTON T-SEALS ON PISTON & ROD

ISSUE DATE: 10-7-77

CONTROL NUMBER: 0041.2.402

EFFECTIVITY: 1st 8 SUBQ.

SHEET 1 OF 2.

GENERAL NOTES

(ADD) SEAL BACK-UP RINGS ARE ONE PIECE CONSTRUCTION. INSTALL T-SEAL IN PISTON GROOVE. STABILIZE PISTON WITH T-SEAL INSTALLED AND THE TWO BACK-UP RINGS AT +250°F ± 20°F FOR 2 HOURS MAXIMUM. CAREFULLY STRETCH BACK-UP RINGS OVER PISTON HEAD INTO PLACE ON T-SEAL WHILE PARTS ARE AT ELEVATED TEMPERATURE. ALLOW ASSEMBLY TO COOL. BACK-UP RINGS WILL CONTRACT TO ORIGINAL SIZE.

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

SIGNATURE APPROVALS	
PREPARED BY	RANKIN 10-7-77
CHECKED	[illegible] 10-7-77
MECH STRESS ENG	[illegible] 10-7-77
ELECTRICAL	N/A
CONFIGURATION CONTROL	[illegible]
OTHER	[illegible] 10-7-77

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 10-7-77
MANUFACTURING ENG	[illegible]
PRODUCTION CONTROL	[illegible]
QUALITY	[illegible] 10-7-77
CUSTOMER	

COST RESPONSIBILITY — CUSTOMER: / DIVISION: [illegible]

FOR MANUFACTURING ONLY — PRODUCTION EFFECTIVITY: 1st # SUBQ

DISPOSITION OF PARTS: [illegible]

MF 159

ENGINEER CHANGE

DOCUMENT TITLE: SNUBBER ASSY

DOCUMENT NUMBER: NOTED

CHANGE IDENTIFICATION: NOTED

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED:

REASON FOR CHANGE: REPLACE PHENOLIC WITH NYLON BACK UP RINGS

DESCRIPTION OF CHANGE: ON PISTON T-SEALS ON PISTON & ROD

ISSUE DATE: 0-7-77

CONTROL NUMBER: 00411, 2 ...

EFFECTIVITY: 1ST ...

SHEET 2 OF 2

SNUBBER ASSEMBLY NUMBER	CHANGE IDENT	SEAL * (WAS)	SEAL * (NOW)
152001	E1	10633000952 0041 OR 608PT330-0-4248	910901-101
152002	G1	10633600952 0041 OR 608PT336-0-4248	910901-102
152003	E1	10634200952 0041 OR 608PT342-0-4248	910901-103
152005	E1	10642700952 0041 OR 608PT427-0-4248	910901-105
152007	E1	10643400952 0041 OR 608PT434-0-4248	910901-107
152010	E1	10644100952 0041 OR 608PT441-0-4248	910901-110

* MAKE THIS CHANGE IN L/M & F/D ... SEAL REMAIN THE SAME ... NEW NOTE ON SHEET 1 OF THIS ...

... KERSON TO ACKNOWLEDGE RECEIPT TRANSMITTAL OF THIS E.C. IN WRITING. ... MGR & PROJ. ENGR

ENGINEERING CHANGE

E-SYSTEMS Montek Division	DOCUMENT TITLE: SPRING	DOCUMENT NUMBER: 152040	CHANGE IDENTIFICATION: G
PROGRAMS AFFECTED: G.E. SNUBBER		ISSUE DATE: 10-21-77	
OTHER DOCUMENTS AFFECTED:		CONTROL NUMBER: [illegible]	
REASON FOR CHANGE: ADD NEW REQUIREMENT (TEST IN PLACE VALUE)		EFFECTIVITY: 1ST & ON	

DESCRIPTION OF CHANGE

(ADD) -013 L/M, F/D & NEXT ASSY

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PREPARED BY	[illegible] 10-19-77
CHECKED	[illegible] 10-18-77
MECH STRESS ENG	[illegible]
ELECTRICAL	N/A
CONFIGURATION CONTROL	[illegible] 10-21
OTHER	[illegible] 10-21-77

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 10-20-77
MANUFACTURING ENG	[illegible] 10-20-77
PRODUCTION CONTROL	[illegible]
QUALITY	[illegible] 10-20-77
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER	X
DIVISION	

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1ST & ON

DISPOSITION OF PARTS: REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

EF[illegible]ING CHANGE

SYSTEMS
Montek Division

DOCUMENT TITLE	DOCUMENT NUMBER	PAGE IDENTIFICATION
SNUBBER ASSEMBLY 20 KIP	152002	G2.

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED:

REASON FOR CHANGE: TO COVER TEST-IN-PLACE OPTIONS & ADD CHG. DICTATED BY QUAL TEST

ISSUE DATE: 10-21-77

CONTROL NUMBER: 00-11-2-H7

EFFECTIVITY: S/N 001 & ON

DESCRIPTION OF CHANGE

1. SHT 1 ~ RECERTIFIED TO G. REV.
2. SHT 1a ~ ALL SHEETS UPDATED TO G REV
3. SHT 2 THRU 13 ~ NOTE 10 REF ADDED TO ALL ASSEMBLIES.
4. SHT 15 ~ DELETED NOTE 9 REF & ADDED NOTE 11 REF TO 910901-102 CALLOUTS.
5. SHT 16a, NOTE 9 ~ DELETED ALTERNATE PART FOR MAIN PISTON T-SEAL
6. SHT 16a ~ ADDED NOTE 11 (ADD SHT 16a AND RETYPED SHTS 16 & 17 TO ADD ROOM FOR ADDITIONAL NOTES)
7. SHT 17 ~ REVISED CHROME PLATE NOTE 111
   (NOW) .0001 MAX CU & .0005-.0006 CHROMIUM
   (WAS) .0002-.0003 CU & .0005-.0006 CHROMIUM

COPIES OF THIS E.C. & E.C. WITH COPIES OF DWG TO J. NUTTALL FOR SUBMITTAL IN ACCORDANCE WITH ATTACHMENT A

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

SIGNATURE APPROVALS		
PREPARED BY	Rankin	10-13-77
CHECKED	Williams	10-18-77
MECH STRESS ENG	[illegible]	[illegible]
ELECTRICAL		
CONFIGURATION CONTROL	[illegible]	[illegible]
OTHER	[illegible]	

SIGNATURE APPROVALS		
PROGRAM MANAGER		
PROJECT ENGINEER	[illegible]	10-18-77
MANUFACTURING ENG	[illegible]	[illegible]
PRODUCTION CONTROL	[illegible]	11-10-77
QUALITY	[illegible]	[illegible]
CUSTOMER		

COST RESPONSIBILITY		
CUSTOMER	X	
DIVISION	X	N/A

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY: S/N 001 & ON

DISPOSITION OF PARTS: REWORK [ ] SCRAP [ ] N/A

SYSTEMS
Montek Division

E ENGINEERING CHANGE

DOCUMENT TITLE: SNUBBER ASSEMBLY 30 KIP

DOCUMENT NUMBER: 152003

CHANGE IDENTIFICATION: E2

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED:

REASON FOR CHANGE: TO COVER TEST-IN-PLACE OPTIONS & ADD CHG. DICTATED BY QUAL TEST

DESCRIPTION OF CHANGE

1. SHT 1 ~ RECERTIFIED TO E REV.
2. SHT 1a ~ ALL SHEETS UPDATED TO E REV
3. SHT 2 THRU 10 ~ NOTE 11 REF ADDED TO ALL ASSEMBLIES.
4. SHT 12 ~ DELETED NOTE 10 REF & ADDED NOTE 12 REF TO 910901-103 CALLOUTS.
5. SHT 13a, NOTE 10 ~ DELETED ALTERNATE PART FOR MAIN PISTON T-SEAL.
6. SHT 13a ~ ADDED NOTE 12
7. SHT 15 ~ REVISED CHROME PLATE NOTE 111

(NOW) .0001 MAX CU & .0005-.0006 CHROMIUM

(WAS) .0002-.0003 CU & .0003-.0006 CHROMIUM

COPIES OF THIS E.C. & E.C. WITH COPIES OF DWG TO J. NUTTALL FOR SUBMITTAL IN ACCORDANCE WITH ATTACHMENT A

INTERCHANGEABILITY AFFECTED
YES [ ] NO [X]

SIGNATURE APPROVALS

PREPARED BY RANKIN 10-13-77

CHECKED [illegible] 10-18-77

MECH STRESSING

ELECTRICAL

CONFIGURATION CONTROL

OTHER

CHANGE CLASSIFICATION
CLASS I [ ] CLASS II [X]

SIGNATURE APPROVALS

PROGRAM MANAGER

PROJECT ENGINEER [illegible] 10-18-77

MANUFACTURING

PRODUCT ASSURANCE

SAFETY

CUSTOMER

COST RESPONSIBILITY

CUSTOMER

DIVISION N/A X

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY
S/N 001 & ON

DISPOSITION OF PARTS

REWORK [ ] SCRAP [ ] USE AS IS [ ] NA [ ]

E. ...NEERING CHANGE

E-SYSTEMS
Monitek Division

DOCUMENT TITLE: SNUBBER ASSEMBLY 50 KIP

DOCUMENT NUMBER: 152005

CAGE IDENTIFICATION: E2

PROGRAMS AFFECTED: G.F. SNUBBERS

OTHER DOCUMENTS AFFECTED: —

REASON FOR CHANGE: TO COVER TEST-IN-PLACE OPTIONS & ADD CALS DICTATED BY DUAL TEST

DATE: 10-31-77

CONTROL NUMBER: (X)-11.2-425

EFFECTIVITY: S/N 001 & ON

DESCRIPTION OF CHANGE

1. SHT 1 ~ RECERTIFIED TO E REV.
2. SHT 1a ~ ALL SHEETS UPDATED TO E REV
3. SHT 2 THRU 11a ~ NOTE 11 REF ADDED TO ALL ASSEMBLIES.
4. SHT 13 ~ DELETED NOTE 10 REF & ADDED NOTE 12 REF TO 910901-105 CALLOUTS.
5. SHT 14a, NOTE 10 ~ DELETED ALTERNATE PART FOR MAIN PISTON T-SEAL.
6. SHT 14a ~ ADDED NOTE 12
7. SHT 16 ~ REVISED CHROME PLATE NOTE 111

   (NOW) .0001 MAX CU & .0005-.0006 CHROMIUM

   (WAS) .0002-.0003 CU & .0003-.0006 CHROMIUM

COPIES OF THIS E.C. & E.C. WITH COPIES OF DWG TO J. NOTTALL FOR SUBMITTAL IN ACCORDANCE WITH ATTACHMENT A

QTY	ZONE	ITEM	NOMENCLATURE	PART NO.	REMARKS

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

SIGNATURE APPROVALS

PREPARED BY: RANKIN 10-18-77

CHECKED: [illegible] 10-18-77

MECH STRESS ENG: [illegible]

ELECTRICAL

CONFIGURATION CONTROL: [illegible]

OTHER: [illegible]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

SIGNATURE APPROVALS

PROGRAM MANAGER

PROJECT ENGINEER: [illegible] 10-18-77

QUALITY ASSURANCE (ENG): [illegible]

PRODUCTION CONTROL: [illegible] 10-18-77

QUALITY: [illegible] 10-18-77

CUSTOMER

COST RESPONSIBILITY

CUSTOMER	X
DIVISION N/A	X

FOR MATERIAL REVIEW ONLY

PRODUCTION EFFECTIVITY: S/N 001 & ON

DISPOSITION: REWORK [ ] SCRAP [ ] USE AS IS [ ] REPAIR [ ] N/A [ ]

E-SYSTEMS
Montek Division

ENGINEERING CHANGE

DOCUMENT TITLE	DOCUMENT NUMBER	IDENTIFICATION
SNUBBER ASSEMBLY 70 KIP	152007	E2

PROGRAMS AFFECTED: G.E. SNUBBERS
OTHER DOCUMENTS AFFECTED: — —
REASON FOR CHANGE: TO COVER TEST-IN-PLACE OPTIONS & ADD CHG DICTATED BY QUAL TEST
ISSUE DATE: 10-07-77
EFFECTIVITY: S/N 001 & ON

DESCRIPTION OF CHANGE

1. SHT 1 ~ RECERTIFIED TO E REV.
2. SHT 1a ~ ALL SHEETS UPDATED TO E REV
3. SHT 2 THRU 7 ~ NOTE 11 REF ADDED TO ALL ASSEMBLIES.
4. SHT 9 ~ DELETED NOTE 10 REF & ADDED NOTE 12 REF TO 910901-107 CALLOUTS.
5. SHT 10a, NOTE 10 ~ DELETED ALTERNATE PART FOR MAIN PISTON T-SEAL.
6. SHT 10a ~ ADDED NOTE 12
7. SHT 12 ~ REVISED CHROME PLATE NOTE 111
   (NOW) .0001 MAX CU & .0005-.0006 CHROMIUM
   (WAS) .0002-.0003 CU & .0003-.0006 CHROMIUM

COPIES OF THIS E.C. & E.C. WITH COPIES OF DWG TO J. NUTTALL FOR SUBMITTAL IN ACCORDANCE WITH ATTACHMENT A

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

SIGNATURE APPROVALS

PREPARED BY	Rankin	10-13-77
CHECKED	Williams	10-18-77
MECH STRESS ENG	[illegible]	
ELECTRICAL		
CONFIGURATION CONTROL	[illegible]	10-18-77
OTHER		

PROGRAM MANAGER		
PROJECT ENGINEER	B. Mirtes	10-18-77
MANUFACTURING ENG	[illegible]	
PRODUCTION CONTROL	[illegible]	10-18-77
QUALITY	[illegible]	
CUSTOMER		

COST RESPONSIBILITY: CUSTOMER [ ] X DIVISION n/a X

FOR MANUFACTURING ONLY — PRODUCTION EFFECTIVITY: S/N 001 & ON
DISPOSITION OF PARTS: REWORK [ ] N/A [ ] SCRAP [ ] USE AS IS [ ]

ENGINEERING CHANGE

[illegible]-SYSTEMS Montek Division	DOCUMENT TITLE: SNUBBER ASSEMBLY 10 KIP	DOCUMENT NUMBER: 152001	IDENTIFICATION: E 2
PROGRAMS AFFECTED: G.E. SNUBBERS		DATE: 10 [illegible]	
OTHER DOCUMENTS AFFECTED:		CONTROL NUMBER: (X)-411-2-492	
REASON FOR CHANGE: TO COVER TEST-IN-PLACE OPTIONS & ADD CHGS DICTATED BY QUAL TEST		EFFECTIVITY: S/N 001 & ON	

DESCRIPTION OF CHANGE

1. SHT 1 ~ RECERTIFIED TO E REV.
2. S[illegible] ~ ALL SHEETS UPDATED TO E REV
3. SHT 2 THRU 3 ~ NOTE 10 REF ADDED TO ALL ASSEMBLIES.
4. SHT 5 ~ DELETED NOTE 9 REF & ADDED NOTE 11 REF TO 910901-101 CALLOUTS.
5. SHT 6, NOTE 9 ~ DELETED ALTERNATE PART FOR MAIN PISTON T-SEAL.
6. SHT 6a ~ ADDED NOTE 11
7. SHT 8 ~ REVISED CHROME PLATE NOTE !11
   (NOW) .0001 MAX CU & .0005-.0006 CHROMIUM
   (WAS) .0002-.0003 CU & .0003-.0006 CHROMIUM

COPIES OF THIS E.C. & E.C. WITH COPIES OF DWG TO J. NUTTALL FOR SUBMITTAL IN ACCORDANCE WITH ATTACHMENT A

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] [illegible] [ ]

SIGNATURE APPROVALS			
PREPARED BY	RANKIN	10-13-77	
CHECKED	Williams	10-18-77	
MECH STRESS ENG	[illegible]		
ELECTRICAL			
CONFIGURATION CONTROL	[illegible]	10-18-77	
OTHER	[illegible]		
PROGRAM MANAGER			
PROJECT ENGINEER	P Mathis	10-11-77	
MANUFACTURING ENG	[illegible]		
PRODUCTION CONTROL	[illegible]		
QUALITY	[illegible]	[illegible]	
CUSTOMER			

CUSTOMER		X	S/N 001 & ON
DIVISION	N/A	X	FINAL [illegible]

E-SYSTEMS
Montek Division

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENT
SNUBBER ASSEMBLY 30 KIP	152003	

PROGRAMS AFFECTED: GE Snubber

OTHER DOCUMENTS AFFECTED: ~

REASON FOR CHANGE: Add Corrosion Protection to Ends of Rating Tube 152048-001

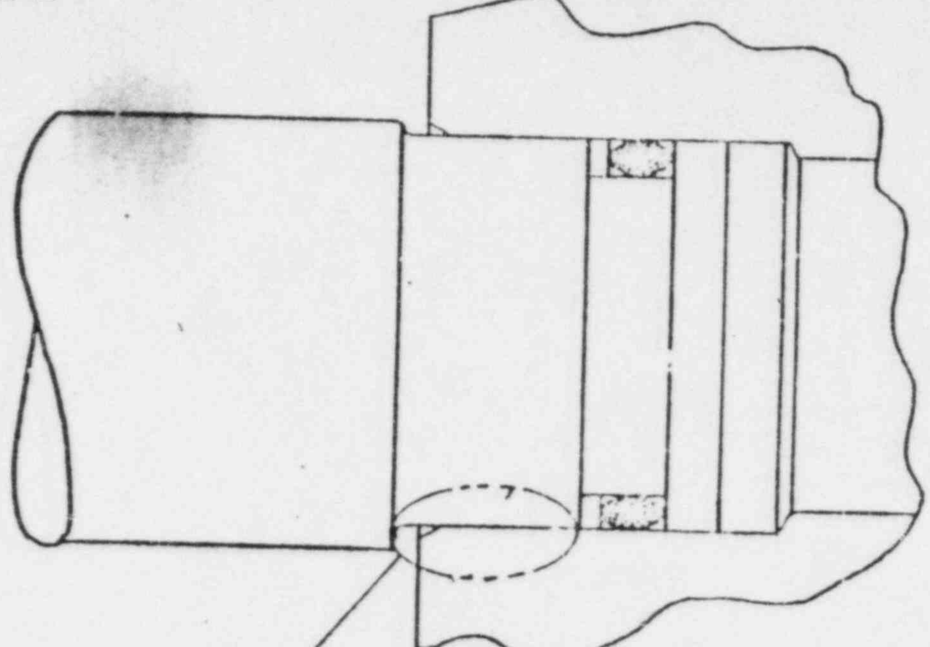
ISSUE DATE: 11-9-77

CONTROL NUMBER: 0041L7

EFFECTIVITY: 1st & On

DESCRIPTION OF CHANGE

Sheet 17, Zone 4C



QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

COST RESPONSIBILITY: CUSTOMER / DIVISION [X]

FOR MANUFACTURING ONLY — PRODUCTION EFFECTIVITY: 1st & On

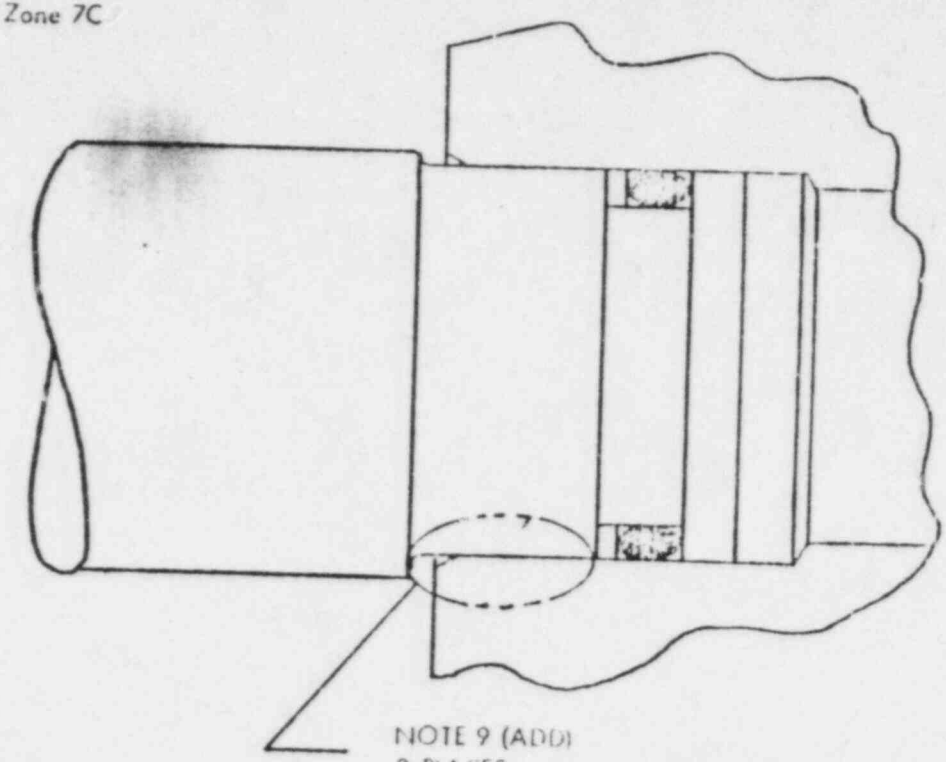
DISPOSITION OF PARTS: REWORK [X] SCRAP [ ] USE AS IS [ ]

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	RANKIN 11-8-77	PROGRAM MANAGER	
CHECKED	S. Williams 11-9-77	PROJECT ENGINEER	Martin 11-9-77
TECH/STRESS ENG.	11-9	MANUFACTURING ENG.	11-9-77
ELECTRICAL		PRODUCTION CONTROL	
CONFIGURATION CONTROL		QUALITY	11-9-77
OTHER	11-9-77	CUSTOMER	

E-SYSTEMS
Montek Division

DOCUMENT TITLE	SNUBBLER MBLY 50 I...
DOCUMENT NUMBER	152005
CHANGE DESIGNATION	F1
PROGRAM AFFECTED	G.E. SNUBBER
OTHER DOCUMENTS AFFECTED	~
ISSUE DATE	11.9.77
REASON FOR CHANGE	Add Corrosion Protection To Ends of Tarting Tube 1.[illegible]8-002
CONTROL NUMBER	00411.2.[illegible]
DESCRIPTION OF CHANGE	EFFECTIVITY 1st & ON

Sheet 18, Zone 7C



NOTE 9 (ADD)
2 PLACES

KEY	ZONE	ITEM	IDENTIFICATION	PART NO	MATERIAL OR NOTES

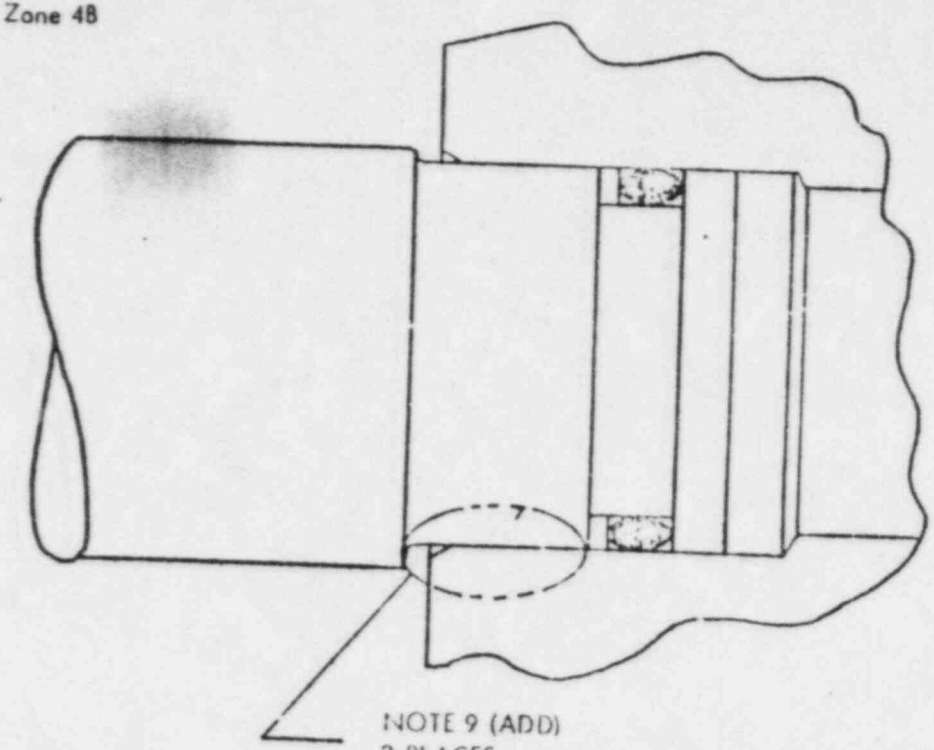
INTERCHANGEABILITY AFFECTED	CHANGE CLASSIFICATION	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
YES ☐ NO ☒	CLASS I ☐ CLASS II ☒ RECORD ☐		PRODUCTION EFFECTIVITY
SIGNATURE APPROVALS	SIGNATURE APPROVALS	CUSTOMER	1st & ON
PREPARED BY RANKIN 11-8-77	PROGRAM MANAGER		
CHECKED [illegible] 11-9-77	PROJECT ENGINEER Martin 11-9-77		
RE: STRESS ENG. [illegible]	MANUFACTURING ENG. [illegible]	DIVISION	DISPOSITION OF PARTS
ELECTRICAL [illegible]	PRODUCTION CONTROL [illegible]		REWORK ☒ SCRAP ☐ USE AS IS ☐
CONFIGURATION CONTROL [illegible]	QUALITY [illegible] 11-1-77		
OTHER [illegible]	CUSTOMER		

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: SNUBBER ASS'Y 70 FTP		DOCUMENT NUMBER: 152007	CHANGE IDENTIFICATION: F,
PROGRAMS AFFECTED: G.E. Snubber			
OTHER DOCUMENTS AFFECTED: ~		ISSUE DATE: 11-9-77	
REASON FOR CHANGE: Add Corrosion Protection to Ends of Fairing Tube 152048-002		CONTROL NUMBER: 00411.2-430	
DESCRIPTION OF CHANGE:		EFFECTIVITY: 1st & ON	

Sheet 14, Zone 48



QTY	FOR USE ON	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒	CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
SIGNATURE APPROVALS	SIGNATURE APPROVALS		PRODUCTION EFFECTIVITY: 1st & ON
PREPARED BY: RANKIN 11-8-77	PROGRAM MANAGER	CUSTOMER	
CHECKED: [illegible] 11-9-77	PROJECT ENGINEER: Masters 11-9-77		
MECH/STRESS ENG: [illegible]	MANUFACTURING ENG: [illegible] 11-9-77		
ELECTRICAL: [illegible]	PRODUCTION CONTROL: [illegible]	DIVISION: X	DISPOSITION OF PARTS
CONFIGURATION CONTROL: [illegible]	QUALITY: [illegible] 11-9-77		REWORK ☒ SCRAP ☐ USE AS IS ☐
OTHER: BVC 11-9-77	CUSTOMER		

ENGINEERING CHANGE

SYSTEMS
Montek Division

DOCUMENT TITLE: SPRING

DOCUMENT NUMBER: 152040

IDENTIFICATION: H1

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED: ~

ISSUE DATE: 11-21-77

REASON FOR CHANGE: REDESIGN & REDRAWN TEST IN PLACE VALUE

CONTROL NUMBER: 0041

DESCRIPTION OF CHANGE

EFFECTIVITY: 1ST 4 ON

REDESIGN & REDRAWN — D13

* Parts have not been purchased

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR PART

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY
CUSTOMER
DIVISION ☒

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY
1st 4 ON

DISPOSITION OF PARTS
REWORK SCRAP RETURN TO VENDOR
☒ ☐ ☐

SIGNATURE APPROVALS

PREPARED BY	RANKIN	11-10-77
CHECKED	[illegible]	11-16-77
MECH/STRESS ENG	[illegible]	[illegible]
ELECTRICAL	N/A	
POWER CONDITIONING	[illegible]	[illegible]
OTHER QA/C	[illegible]	11-21-77

SIGNATURE APPROVALS

PROGRAM MANAGER		
PROJECT ENGINEER	[illegible]	11-17-77
MANUFACTURING ENG	[illegible]	[illegible]
PRODUCTION CONTROL	[illegible]	11-17-77
QUALITY	[illegible]	11-17-77
CUSTOMER		

ENGINEERING CHANGE

E-SYSTEMS Montek Division	DOCUMENT TITLE: SNUBBER ASSEMBLY 50 GPM	DOCUMENT NUMBER: 152005	CHANGE IDENTIFICATION: D_2
PROGRAMS AFFECTED: G.E. Snubber		ISSUE DATE: 4-5-77	
OTHER DOCUMENTS AFFECTED		CONTROL NUMBER: 0411.2-773	
REASON FOR CHANGE: G.E. Requirement Add Dash No. (New Part) and Update Material Changes		EFFECTIVITY: 1st S/Subg.	

DESCRIPTION OF CHANGE

Sheet 1 of 18
Recertified to "D" Revision

Sheet 1a of 18
All sheet "D" Revision

Sheet 2 of 18
(Add) 152005-30.0F

Sheets 3, 4, 5, 6, 7, 8, 9, 10, 11, 11a of 18
Lockwasher 152196-005 Material
(Now) 101, 104 (Was) 101, 108
24 places

Sheet 10a of 18
(Add) This sheet
(Add) 152005-36.1FC2
(Add) 152005-36.1FC1
(Add) 152005-41.7FC

Sheet 12 of 18
Bolt 910646-005, Bolt 910646-004 and Bolt 910646-007 Material
(Now) 121A (Was) 130
Nut-Jam 910644-202 Material
(Now) 122 (Was) 130
(Add) Retainer Seal 152066-001
(Add) Retainer Threaded 152067-001
(Deleted) Retainer Valve 152068-001
Reservoir Indicator 152238 Material (Now) 101, 131 (Was) 101, 128

Sheet 12 of 18 (Cont'd)
Bolt 152448-001 Material
(Now) 121B (Was) 121
Block Retainer 152236-002 Material
(Now) 133 (Was) 132
Retainer-Resvr 152228-001 Material
(Now) 132 (Was) 131
Reservoir-Hous 152220-001 Material
(Now) 130, 132 (Was) 129, 131

Sheets 13, 14, 14a of 18
No Change "D" Revision

Sheet 15 of 18
Note 105 (3) (Was) Two Lee Jet Orifice Assemblies
(Now) Two Lee Jet Orifice Assemblies and Lee Plug
Note 106, Change the word Flange to End Fitting

Sheet 17 of 18
Note 111 (Was) R 50 minimum (Now) R_c50-54
Delete old note 121 & 123. Add new note 121

Sheet 17a of 18
Add new note 121, 122 & 123.
Move note 123 & 124 from sheet 17.

QTY	FOR ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED YES ☐ NO ☐	CHANGE CLASSIFICATION CLASS I ☐ CLASS II ☒ RECORD ☐	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
SIGNATURE APPROVALS	SIGNATURE APPROVALS	CUSTOMER X	PRODUCTION EFFECTIVITY
PREPARED BY: CANKIN 8 Apr 77	PROGRAM MANAGER		1st & Subq
CHECKED	PROJECT ENGINEER 4-7-77		
MECH STRESS ENG	MANUFACTURING ENG 4-7-77		
ELECTRICAL	PRODUCTION CONTROL 4-7-77		
CONFIGURATION CONTROL	QUALITY 4-7-77	DIVISION	DISPOSITION OF PARTS
OTHER	CUSTOMER		REWORK ☐ SCRAP ☐ USE AS IS ☐

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: HEX NUT	DOCUMENT NUMBER: 910644
	CHANGE IDENTIFICATION: E1
PROGRAMS AFFECTED: G.E. SNUBBERS	ISSUE DATE:
OTHER DOCUMENTS AFFECTED:	CONTROL NUMBER: 0041.2.141
REASON FOR CHANGE: PROOF LOADING CRITERIA NOT APPLICABLE TO JAM NUTS	EFFECTIVITY: S/N 001 & SUB.

DESCRIPTION OF CHANGE

ON SHEET 5 (NOTE 1)

1. ADDED (SEE NOTE 7.)

ON SHEET 5

2. ADDED NOTE 7

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☐ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFAC NG ONLY

PRODUCTION EFFECTIVITY: S/N 0041.2.141

DISPOSITION OF PARTS: REWORK ☐ N/A ☐ SCRAP ☐ USE AS IS ☐

SIGNATURE APPROVALS		
PREPARED BY	[illegible] 11-24-77	
CHECKED	[illegible] 11-30-77	PROGRAM MANAGER
MECH STRESS ENG	[illegible] 11-30-77	PROJECT ENGINEER [illegible] 11-30-77
ELECTRICAL N/A		MANUFACTURING ENG [illegible] 11-30-77
CONFIGURATION CONTROL	[illegible] 11-1-77	PRODUCTION CONTROL [illegible] 11-30-77
OTHER		QUALITY [illegible] 11-30-77
		CUSTOMER

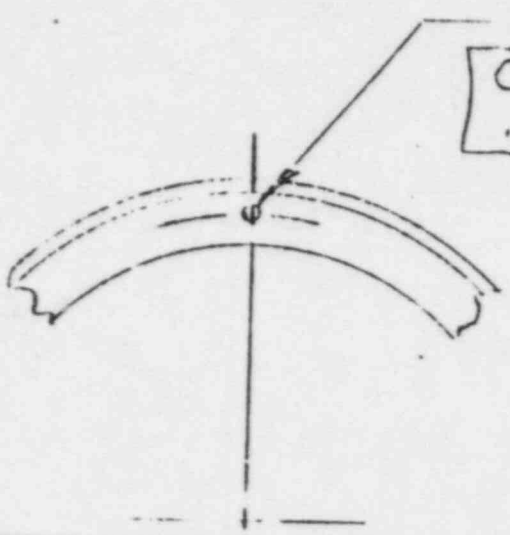
MD 198

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: BUSHING JOURNAL	DOCUMENT NUMBER: 152026
	CHANGE IDENTIFICATION: D2
PROGRAMS AFFECTED: G.E. SNUBBER	ISSUE DATE: 12-6-77
OTHER DOCUMENTS AFFECTED: ~	CONTROL NUMBER: 0011.2.44.1
REASON FOR CHANGE: COST REDUCTION (REMOVE C'BORE)	EFFECTIVITY: 1ST ANU DLI
DESCRIPTION OF CHANGE	

F/D
ZONE B4



QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL

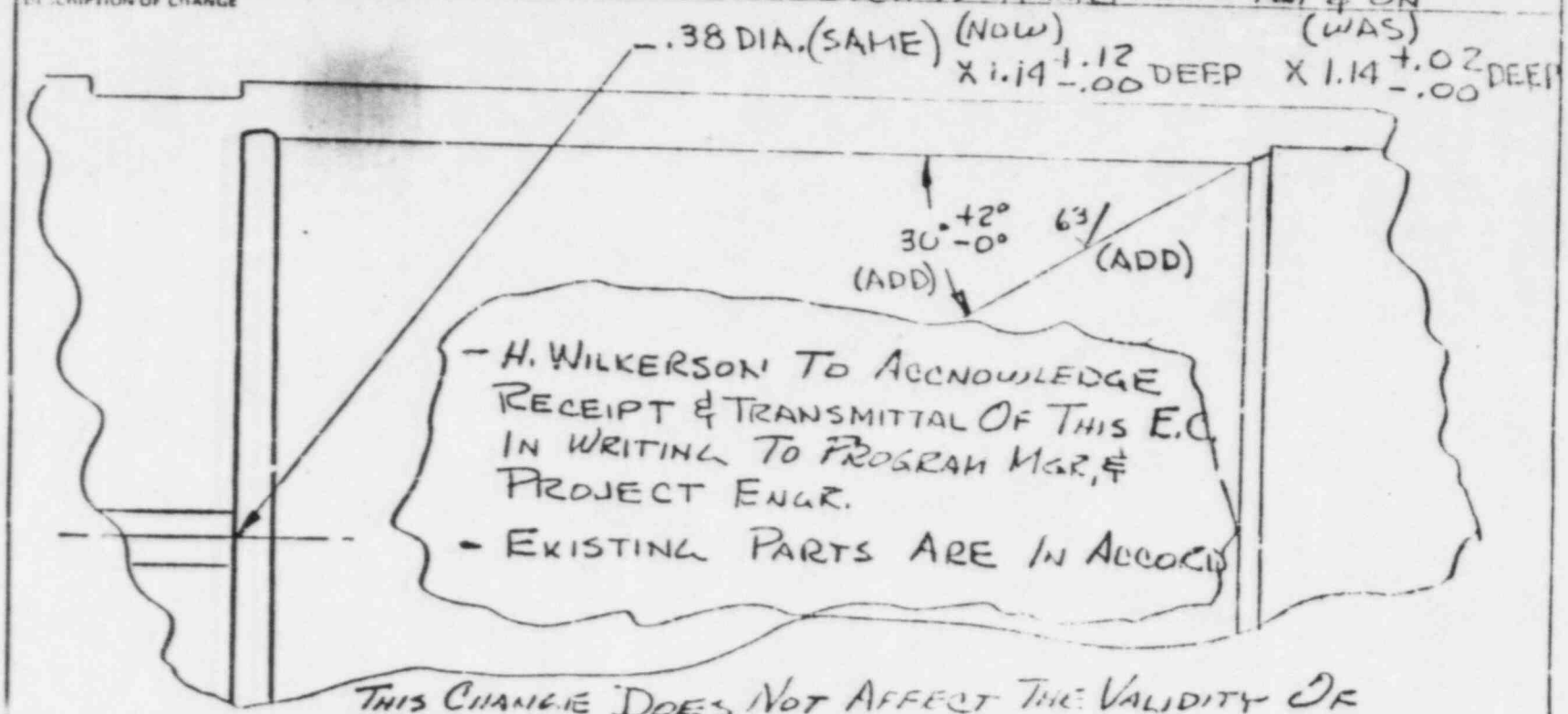
INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒	CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ REJECT ☐
SIGNATURE APPROVALS	SIGNATURE APPROVALS
PREPARED BY: LANKIN 12-1-77	PROGRAM MANAGER:
CHECKED: [illegible] 12-1-77	PROJECT ENGINEER: [illegible] 12-7-77
MECH STRESS ENG: [illegible]	MANUFACTURING ENG: [illegible] 12-1-77
ELECTRICAL: [illegible]	PRODUCTION CONTROL: [illegible] 12-7-77
CONFIGURATION CONTROL: [illegible] 12-7-77	QUALITY: [illegible] 12-7-77
OTHER: [illegible] 12-6-77	CUSTOMER:

COST RESPONSIBILITY	FOR MANUFACTURING ONLY	
CUSTOMER	PRODUCTION EFFECTIVITY: 1ST ON	
DIVISION: X	DISPOSITION OF PARTS	
	REWORK ☐	SCRAP ☐ USE AS IS ☒

ENGINEERing CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	HOUSING, RESERVOIR 70 & 100 KIP
DOCUMENT NUMBER	152222
CHANGE IDENTIFICATION	D1
PROGRAMS AFFECTED	G.E. SNUBBER
OTHER DOCUMENTS AFFECTED	
REASON FOR CHANGE	ADD DIM. OMITTED IN ERROR AND OPEN TOLERANCE
DESCRIPTION OF CHANGE	
ISSUE DATE	1-9-78
CONTROL NUMBER	00411.2.1.50
EFFECTIVITY	UNIT # ON



THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

QTY	CODE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTE

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY	Konkin 1-6-78
CHECKED	D. Wilkerson 1-6-78
MECH/STRESS ENG.	
ELECTRICAL	
CONFIGURATION CONTROL	
OTHER	

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	1-6-78
MANUFACTURING ENG.	1-6-78
PRODUCTION CONTROL	1-6-78
QUALITY	1-6-78
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER	
DIVISION	X

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY
1ST & ON

DISPOSITION OF PARTS
REWORK ☒ SCRAP ☐ USE AS IS ☐

MD 198

ENGINEERING CHANGE

E-SYSTEMS
Memtek Division

DOCUMENT TITLE: BUSHING JOURNAL

DOCUMENT NUMBER: 1E2026

CHANGE IDENTIFICATION: E1

ITEM(S) AFFECTED: G.E. SNUBBER

UNIT(S) AFFECTED: ~

ISSUE DATE: 1-20-78

REASON FOR CHANGE: CHALEER WAS DOUBLE DIMENSIONED

CONTRACT NUMBER: 05411.2.454

EFFECTIVITY: 1ST & ON

.040 (DELETE)

THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

- H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C. IN WRITING TO PROGRAM MGR & PROJECT ENGR.
- PARTS ARE IN ACCORD.

QTY	UNIT	ITEM	NOMENCLATURE	PART NO	SERIAL NO.

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY: PRODUCTION EFFECTIVITY: 1ST & ON

DISPOSITION: REWORK ☐ [illegible] ☐ [illegible] ☒

SIGNATURE APPROVALS		
PREPARED BY	RANKIN 1-19-78	
CHECKED	[illegible] 1-19-78	
MECH/STRESS ENG	[illegible]	
ELECTRICAL N/A		
CONFIGURATION CONTROL	[illegible]	

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 1-19-78
MFG/MANUFACTURING ENG	[illegible] 1-19-78
PRODUCTION CONTROL	[illegible] 1-19-78
QUALITY	[illegible] 1-19-78

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	HOUSING RESERVOIR SNUBBER ASSY
DOCUMENT NUMBER	152219
CHANGE IDENTIFICATION	L1
PROGRAMS AFFECTED	10/20 KIP G.E. SNUBBERS
ISSUE DATE	1-23-78
OTHER DOCUMENTS AFFECTED	
CONTROL NUMBER	C0411.2.455
REASON FOR CHANGE	TO ADD BEFORE PLATING DIM
EFFECTIVITY	S/N 1 & SUB

DESCRIPTION OF CHANGE

THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

-A- (SAME)

2.875 $^{+.004}_{-.000}$ DIA (SAME)

8-16 √ AFTER PLATING AND CROSS HATCH HONE (NOTE 7) (SAME)

2.8774 $^{+.0030}_{-.0000}$ DIA (ADD)

4-32 √ BEFORE PLATING (SAME)

.03R OPTIONAL (WAS)

.03R (NOW)

-B- (SAME)

(*) | A | .502 | (SAME)

3.000 $^{+.004}_{-.000}$ DIA (SAME)

AFTER PLATING (ADD)

3.0024 $^{+.0030}_{-.0000}$ DIA (ADD)

BEFORE PLATING (ADD)

- EXISTING PARTS ARE IN ACCORD - H. WILKERSON TO ACKNOWLEDGE, IN WRITING, RECEIPT AND TRANSMITTAL TO APPROPRIATE VENDOR, OF THIS E.C., TO PRGM MGR AND PROJ ENGR.

ITEM	ZONE	LTR	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED YES ☐ NO ☒

CHANGE CLASSIFICATION CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY S/N 1 & SUB

SIGNATURE APPROVALS

PREPARED BY	E Nicely 1-25-78	
CHECKED	[illegible] 1-23-78	PROGRAM MANAGER
MECH/STRESS ENG	[illegible] 1-23-78	PROJECT ENGINEER [illegible] 1-28-78
ELECTRICAL	N/A	MANUFACTURING ENG [illegible] 1-23-78
CONFIGURATION CONTROL	[illegible] 1-23-78	PRODUCTION CONTROL [illegible] 1-23-78
OTHER	BJK 1-23-78	QUALITY [illegible] 1-23-78
		CUSTOMER

CUSTOMER

DIVISION X

DISPOSITION OF PARTS

REWORK ☐ N/A ☐ SCRAP ☐ U.S. AS IS ☐

MD 109

EN[illegible]ERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	HOUSING RESERVOIR SNUBBER ASSY
DOCUMENT NUMBER	152220 / 152222
CHANGE IDENTIFICATION	[illegible]
PROGRAMS AFFECTED	30, 50, 70, & 100 KIP G.E. SNUBBERS
OTHER DOCUMENTS AFFECTED	—
REASON FOR CHANGE	TO ADD BEFORE PLATING DIM
ISSUE DATE	1-23-78
CONTROL NUMBER	0041 [illegible]
EFFECTIVITY	S/N 1 & SUB

DESCRIPTION OF CHANGE

- EXISTING PARTS ARE IN ACCORD -

H. WILKERSON TO ACKNOWLEDGE, IN WRITING, RECEIPT AND TRANSMITTAL TO APPROPRIATE VENDOR, OF THIS E.C., TO PRGM MGR AND PROJ ENGR.

THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

[illegible] (SAME)

[illegible] NOTE 6 (SAME)

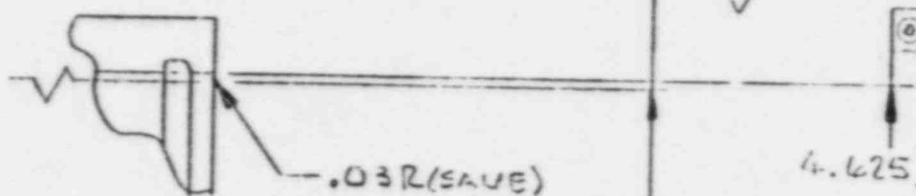
— 4.500 +.005 / -.000 DIA (SAME)

8-16 √ AFTER PLATING & CROSSHATCH HONE NOTE 7 (SAME)

— 4.5024 +.0040 / -.0000 DIA (ADD)

4-32 √ BEFORE PLATING (SAME)

◎ A .002DIA (SAME)



.03R (SAME) OPTIONAL (REMOVE)

4.625 +.005 / -.000 DIA (SAME) AFTER PLATING (ADD)

4.6274 +.0040 / -.0000 DIA (ADD) BEFORE PLATING (ADD)

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED	YES ☐ NO ☒
CHANGE CLASSIFICATION	CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS	
PREPARED BY	R Nicely 1-23-78
CHECKED	[signature] 1-23-78
MECH/STRESS ENG	[signature] 1-23-78
ELECTRICAL	N/A
CONFIGURATION CONTROL	[signature] 1-23-78
OTHER	[signature] 1-23-78

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[signature] 1-23-78
MANUFACTURING ENG	[signature] 1-23-78
PRODUCTION CONTROL	[signature] 1-23-78
QUALITY	[signature] 1-23-78
CUSTOMER	

COST RESPONSIBILITY	
CUSTOMER	
DIVISION	X

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: S/N 1 & SUB

DISPOSITION OF PARTS: REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: ROD END ASSY ~ MALE

DOCUMENT NUMBER: NOTED

CHANGE ID: NOTED

ISSUE DATE: 1-24-78

PROGRAMS AFFECTED: SNUBBERS

CONTROL NUMBER: C0911-2.0.427

OTHER DOCUMENTS AFFECTED:

EFFECTIVITY: P/N CN

REASON FOR CHANGE: TO CONFORM TO WINTER OF 76 CODE

DESCRIPTION OF CHANGE: THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

1. REMOVED OPTIONAL MATERIAL FROM NOTE 3 AS FOLLOWS:

   3b. MAKE -001 OR -002 FROM ASME SA 540, GRADE B23 (E 4340 11) CLASS 2 OR GRADE B24 (4340 MOD) CLASS 2, CONFORMING TO 1974 EDITION OF SECTION II OF ASME CODE, NO LATER ADDENDA APPLICABLE.

   3C. MAKE -001 OR -002 FROM ASTM A 590-70, GRADE B23 (E 4340 11) CLASS 2 OR GRADE B24 (4340 MOD) CLASS 2, (MONTEK TO CERTIFY THAT ASTM MATERIAL CONFORMS TO (b) ABOVE).

2. REMOVED HEAT TREATMENT NOTE FROM NOTES AND L/M.

   * HEAT TREAT: FOR MATERIAL OTHER THAN FORGINGS. HEAT TREAT TO 155 KSI MIN ULT, 170 KSI MAX ULT, 140 KSI MIN YIELD, R_c 35-38.

3. REMOVED THE FOLLOWING FROM SHEET 1 ONLY.

   GRAIN DIRECTION NOTE 3

DOCUMENT Nº	CHANGE IDENT	*NOTE Nº
152112	E2	4
152113	D2	4
152115	D2	4
152117	E2	4
152123	C2	5

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	DISPOSITION

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: S/N 001 & CN

DISPOSITION OF PARTS: REWORK ☒ N/A SCRAP ☐ USE AS IS ☐

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	TARDIKE 1-24-78	PROGRAM MANAGER	
CHECKED	1-24-78	PROJECT ENGINEER	Mathews 1-24-78
MECH/STRESS ENG		MANUFACTURING ENG	1-24-78
ELECTRICAL	N/A	PRODUCTION CONTROL	
CONFIGURATION CONTROL		QUALITY	1-24-78
OTHER	BJK 1-24-78	CUSTOMER	

MD 198

ENGINEERING CHANGE

152027 C2

E-SYSTEMS Montek Division

DOCUMENT TITLE	NOTED SNUBBER ASSY
DOCUMENT NUMBER	NOTED
CHANGE IDENTIFICATION	NOTED
PROGRAMS AFFECTED	10, 20, 30, 50, 70, & 100 KIP G.E. SNUBBER
OTHER DOCUMENTS AFFECTED	
REASON FOR CHANGE	TO PERMIT SALVAGE ACTION ON LEE PLUG & JET
DESCRIPTION OF CHANGE	
ISSUE DATE	1-24-78
CONTROL NUMBER	SOLIT-2-758
EFFECTIVITY	S/N 1 & SUB

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICATION
BODY ASSY-CYLINDER	152027	C2
BODY ASSY-CYLINDER	152028	F2
DAM ASSY-CENTER	152029	D1
DAM ASSY-CENTER	152030	D2
DAM ASSY-CENTER	152031	D2
DAM ASSY-CENTER	152032	D2

ADD NOTE "X" TO GEN. NOTE AND ADD SEE NOTE "X" TO F/D & L/M.

NOTE X. REWORK OR SALVAGE OF REAMED HOLES FOR LEE PLUGS AND LEE JETS IS PERMISSIBLE BY INCREASING THE MAXIMUM AND MINIMUM REAM DIAMETERS, AS CALLED OUT ON F/D, BY .010 AND INSTALLING AN OVERSIZE LEE PLUG OR LEE JET. WHEN REWORK OR SALVAGE ACTION HAS BEEN TAKEN, THE HOLE SHALL BE IDENTIFIED BY STAMPING A "X", WITH A LOW STRESS STAMPING TOOL, ADJACENT TO THE HOLE.

THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST - EXISTING PARTS ARE IN ACCORD -

H. WILKERSON TO ACKNOWLEDGE, IN WRITING, RECEIPT AND TRANSMITTAL TO APPROPRIATE VENDOR, OF THIS E.C., TO PRGM MGR AND PROJ ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED YES ☐ NO ☒

CHANGE CLASSIFICATION CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY S/N 1 & SUB

SIGNATURE APPROVALS			
PREPARED BY	R.N. Cely 1-23-78	PROGRAM MANAGER	
CHECKED	PARDUE 1-23-78	PROJECT ENGINEER	Masters 1-23-78
MECH/STRESS ENG	[illegible] 1-23-78	MANUFACTURING ENG	[illegible] 1-23-78
ELECTRICAL	N/A	PRODUCTION CONTROL	[illegible] 1-23-78
CONFIGURATION CONTROL	[illegible] 1-23-78	QUALITY	[illegible] 1-23-78
OTHER	[illegible] 1-24-78	CUSTOMER	

CUSTOMER ☐ DIVISION ☒

DISPOSITION OF PARTS: REWORK ☐ SCRAP ☐ N/A ☐ USE AS IS ☐

END 198

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	FORGING ~ UPSET, PISTON END ROD, 50 KIP SNUBBER
DOCUMENT NUMBER	152046
CHANGE IDENTIFICATION	C-1
PROGRAMS AFFECTED	G.E. SNUBBER
OTHER DOCUMENTS AFFECTED	
ISSUE DATE	1-24-78
CONTROL NUMBER	00411.2.457
REASON FOR CHANGE	ADD DATE TO MATERIAL SPEC
EFFECTIVITY	S/N 001 & ON

DESCRIPTION OF CHANGE THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

REVISE NOTE 1 AS FOLLOWS:

(IS) 1. MATERIAL: AISI 4340 FORGING PER ASTM A668-72, CLASS M, ...

(NAS) 1. MATERIAL: AISI 4340 FORGING PER ASTM A668, CLASS M, ...

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED	YES ☐ NO ☒
CHANGE CLASSIFICATION	CLASS I ☐ CLASS II ☒ RECORD ☐
COST RESPONSIBILITY	CUSTOMER ☐ DIVISION ☒
FOR MANUFACTURING ONLY	PRODUCTION EFFECTIVITY: S/N 001 & ON

SIGNATURE APPROVALS		
PREPARED BY	PARDUE 1-24-78	
CHECKED	PARDUE 1-24-78	PROGRAM MANAGER
MECH/STRESS ENG	[illegible] 1-24-78	PROJECT ENGINEER [illegible] 1-24-78
ELECTRICAL		MANUFACTURING ENG [illegible] 1-24-78
CONFIGURATION CONTROL	[illegible] 1-24-78	PRODUCTION CONTROL [illegible] 1-24-78
OTHER	QC 1-24-78	QUALITY [illegible] 1-24-78
		CUSTOMER

DISPOSITION OF PARTS: REWORK ☒ N/A SCRAP ☐ USE AS IS ☐

MD 198

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: HEX NUT	DOCUMENT NUMBER: 910644
	CHANGE IDENTIFICATION: F1
PROGRAMS AFFECTED: G.E. SNUBBER	ISSUE DATE: 1-24-78
OTHER DOCUMENTS AFFECTED:	CONTROL NUMBER: 0041.3-150
REASON FOR CHANGE: TO ADD REQUIREMENT TO COMPLY WITH S.C. 1641-4	EFFECTIVITY: S/N 001 & ON

DESCRIPTION OF CHANGE

1. REVISE NOTE 3 ON SHEET 5 AS FOLLOWS:

3. -202 SHALL BE ..... OR FROM MATERIAL CONFORMING TO ASTM A307-74, GRADE A, EXCEPT NO WELDING IS PERMITTED. NUT SHALL HAVE A SCALE FREE, BRIGHT, FINISH. (IS)

3. -202 SHALL BE ..... OR FROM MATERIAL CONFORMING TO ASTM A307 '74 GRADE A, AND SHALL BE SCALE FREE, BRIGHT FINISH. (WAS)

THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

QTY	CODE	ITEM	NOMENCLATURE	PART NO	MATERIAL DESIGNATION

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒	CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
SIGNATURE APPROVALS	SIGNATURE APPROVALS		PRODUCTION EFFECTIVITY
PREPARED BY PARDISE 1-24-78	PROGRAM MANAGER	CUSTOMER	S/N 001 & ON
CHECKED PARDISE 1-24-78	PROJECT ENGINEER 1-24-78		
MECH/STRESS ENG [illegible]	MANUFACTURING ENG [illegible]	DIVISION	DISPOSITION OF PARTS
ELECTRICAL N/A	PRODUCTION CONTROL [illegible]		REWORK ☒ N/A SCRAP ☐ USE AS IS ☐
CONFIGURATION CONTROL [illegible]	QUALITY [illegible]		
OTHER BY 1-24-78	CUSTOMER		

MD 198

ENGINEERING CHANGE

E-SYSTEMS Montek Division

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICATION
APPROVED PARTS LIST FOR T-SEALS PISTON	910901	B

PROGRAMS AFFECTED: G.E. SNUBBERS
OTHER DOCUMENTS AFFECTED: ~
ISSUE DATE: 1-27-78
CONTROL NUMBER: [illegible] 4762
REASON FOR CHANGE: FINALIZATION OF 100 KIP SEAL CONFIGURATION AFTER QUALIFICATION TEST
EFFECTIVITY: 1st [illegible]

DESCRIPTION OF CHANGE

SHEET 4 OF 4

T-SEAL PISTON ASSEMBLY	OPTION Nº	APPROVED PARTS LIST	SUPPLIER	
910901	1	126-44100-952-0289	GREENE TWEED	(New)
	2	126-44100-952-0000/ 152193-010N (2 REQD)	GREENE TWEED / MONTEK	
910901	1	6002T441-0-4248	PARKER	(Was)
	2	106-44100-952-0281	GREENE TWEED	
	3	P7705429/ 152193-010 (2 REQD)	GREENE TWEED / MONTEK	

THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER / DIVISION ☒

FOR MANUFACTURING ONLY — PRODUCTION EFFECTIVITY: 1st of Sub

DISPOSITION OF PARTS: REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

SIGNATURE APPROVALS

PREPARED BY	Rankin 1-25-78
CHECKED	Williams 1-26-78
MECH/STRESS ENG	[illegible] 1-26-78
ELECTRICAL	[illegible]
CONFIGURATION CONTROL	[illegible] 1-27-78
OTHER	BJK 1-26-78

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	Mathias 1-27-78
MANUFACTURING ENG	[illegible]
PRODUCTION CONTROL	[illegible]
QUALITY	[illegible]
CUSTOMER	

MD 198

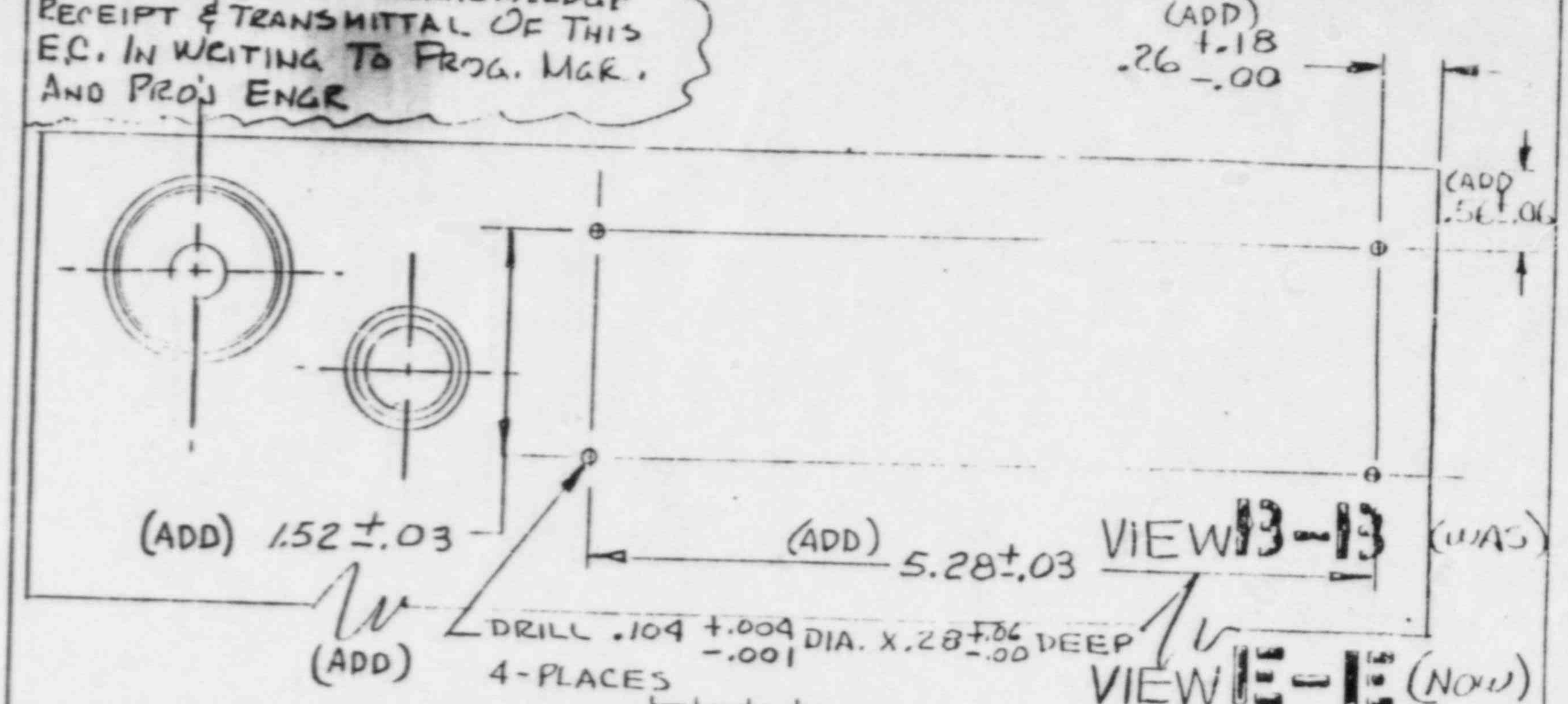
14. 9

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	BODY ASSY - CYLINDER 10 KIP
DOCUMENT NUMBER	152027
CHANGE IDENTIFICATION	C3
ISSUE DATE	2-20-78
CONTROL NUMBER	00411.2.7/3
EFFECTIVITY	1ST & ON
PROGRAMS AFFECTED	G.E. SNUBBER
OTHER DOCUMENTS AFFECTED	–
REASON FOR CHANGE	MOVE MACHINE OPERATION FROM ASSY TO DETAIL.
DESCRIPTION OF CHANGE	THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C. IN WRITING TO PROG. MGR. AND PROJ ENGR



QTY	CODE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS	
PREPARED BY	B.L. RANKIN 2-17-78
CHECKED	[signature] 2-20-78
MECH/STRESS ENG	[signature]
ELECTRICAL	N/A
CONFIGURATION CONTROL	[signature] 2-20-78
OTHER	[signature] 2-20-78

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[signature] 2-20-78
MANUFACTURING ENG	[signature] 2-20-78
PRODUCTION CONTROL	[signature] 2-20-78
QUALITY	[signature] 2-20-78
CUSTOMER	

COST RESPONSIBILITY	
CUSTOMER	
DIVISION	X

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY: 1ST & ON

DISPOSITION OF PARTS: REWORK N/A SCRAP USE AS IS

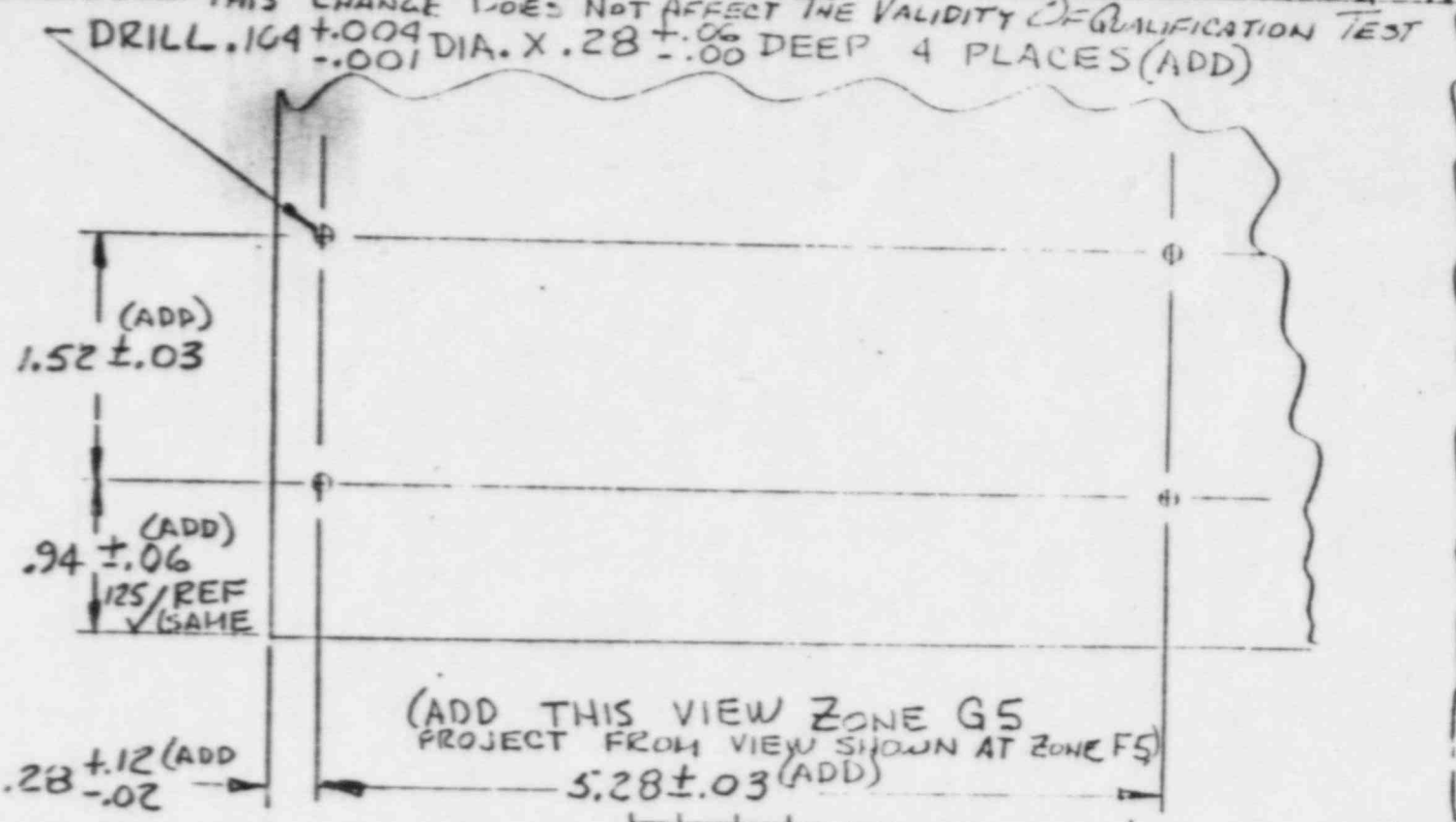
MD 198

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	BODY ASSY - CYLINDER 20 KIP
DOCUMENT NUMBER	152028
CHANGE IDENTIFICATION	F3
PROGRAMS AFFECTED	G.E. SHUBBEL'S
OTHER DOCUMENTS AFFECTED	~
REASON FOR CHANGE	MOVE MACHINE OPERATION FROM ASSY TO DETAIL
ISSUE DATE	2-20-78
CONTROL NUMBER	00411.2.111
EFFECTIVITY	1ST R ON

DESCRIPTION OF CHANGE: THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST



H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C.O. TO PROG. MGR. AND PROJ. ENGR.

QTY	CODE	ITEM	NOMENCLATURE	PART NO.	MATERIAL SPECIFICATION

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒	CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
SIGNATURE APPROVALS	SIGNATURE APPROVALS	CUSTOMER	PRODUCTION EFFECTIVITY: Kit On
PREPARED BY: B.L. FANKIN 2-17-78	PROGRAM MANAGER		
CHECKED: [illegible] 2-20-78	PROJECT ENGINEER: [illegible] 2-20-78		
MECH/STRESS ENG: [illegible]	MANUFACTURING ENG: [illegible] 2-20-78		
ELECTRICAL: N/A	PRODUCTION CONTROL: [illegible] 2-20-78	DIVISION: X	DISPOSITION
CONFIGURATION CONTROL: [illegible] 2-20-78	QUALITY: [illegible] 2-20-78		REWORK ☐ SCR ☐ USE AS IS ☐
OTHER: [illegible] 2-20-78	CUSTOMER		

MD 198

ENGINE CHANGE

E-SYSTEMS Montek Division

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICATION
DAM ASSY ~ CENTER 30 KIP	152029	D5

PROGRAMS AFFECTED: S.E. SNUBBERS

OTHER DOCUMENTS AFFECTED: ~

REASON FOR CHANGE: MOVE MACHINE OPERATION FROM ASSY TO DETAIL

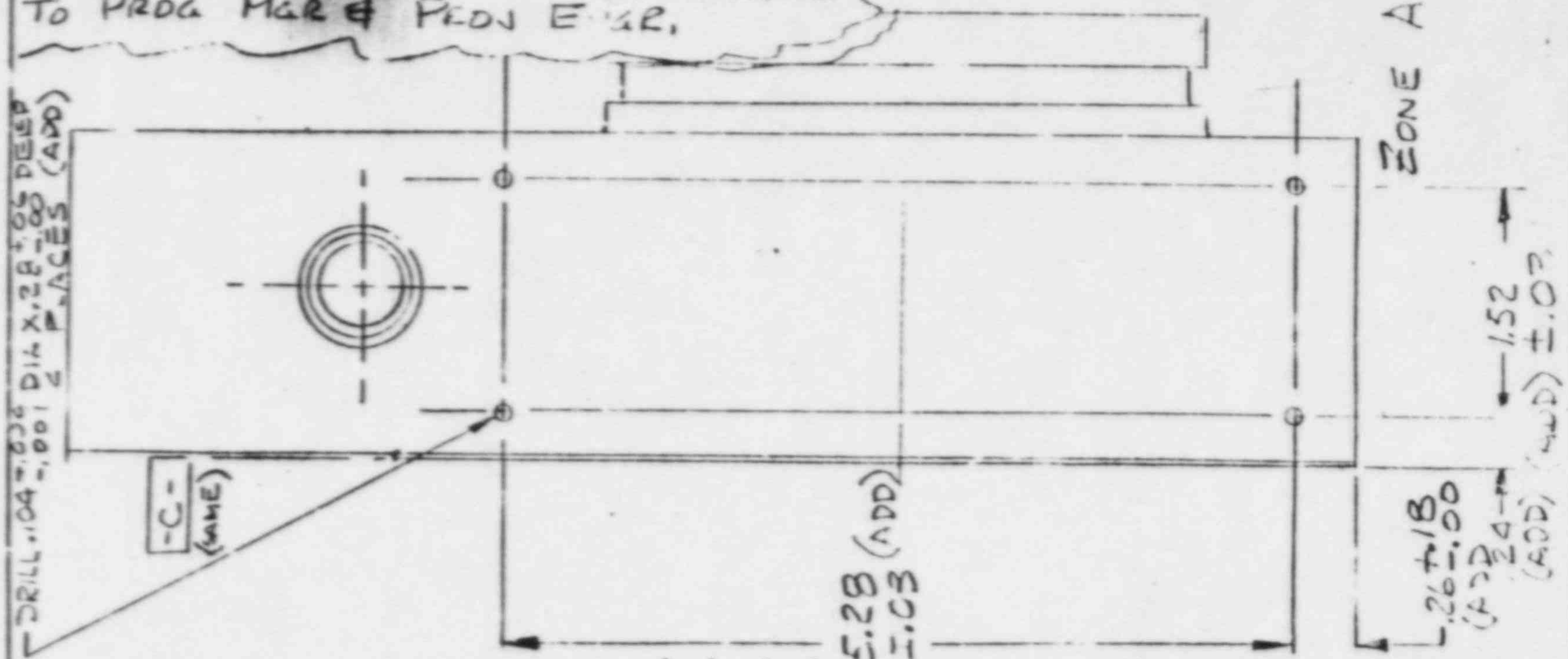
DESCRIPTION OF CHANGE: THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

ISSUED: 2-20-78

CONTROL NUMBER: 20411.2.475

EFFECTIVITY: 1ST & ON

H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C. IN WRITING TO PROG MGR & PROD ENGR.



QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL / NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY: H.L. RANKIN 2-17-78
CHECKED: [signature] 2-20-78
MECH/STRESS ENG: [signature]
ELECTRICAL: N/A
CONFIGURATION CONTROL: [signature]
OTHER: [signature] 2-20-78

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER:
PROJECT ENGINEER: [signature] 2-20-78
MANUFACTURING ENG: [signature] 2-20-78
PRODUCTION CONTROL: [signature] 2-21-78
QUALITY: [signature]
CUSTOMER:

COST RESPONSIBILITY
CUSTOMER:
DIVISION:

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY: 1ST & ON

DISPOSITION OF PARTS: REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

MD 158

ENGINEERING CHANGE

E-SYSTEMS
Memtek Division

DOCUMENT TITLE: DAM ASSY ~ CENTER 50 KIP

DOCUMENT NUMBER: 152030

CHANGE IDENTIFICATION: D3

PROGRAMS AFFECTED: G.E. SNUBBER

OTHER DOCUMENTS AFFECTED:

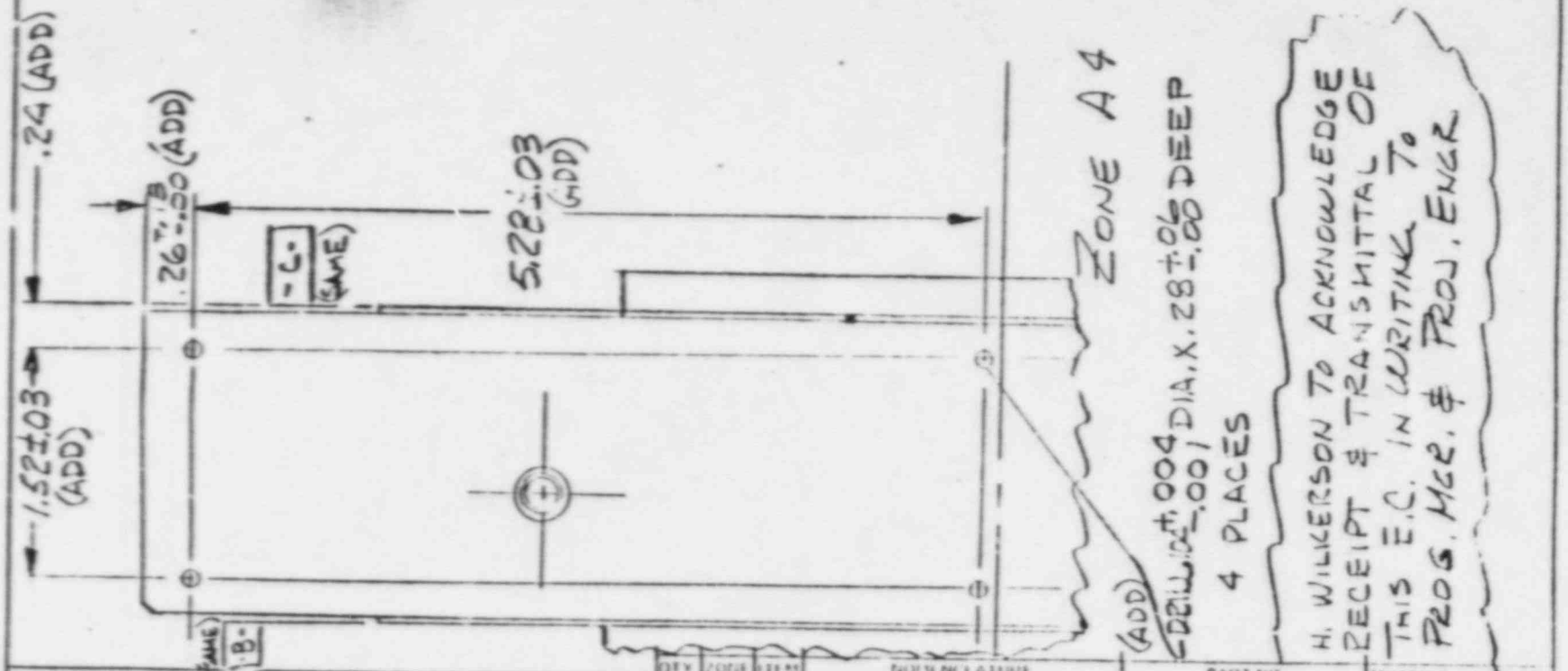
ISSUE DATE: 2-20-78

CONTRACT NUMBER: 0041, 2, 4, 7, 6

REASON FOR CHANGE: MOVE MACHINE OPERATION FROM ASSY TO DETAIL

EFFECTIVITY: 1ST # ON

DESCRIPTION OF CHANGE: THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST



QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1ST # ON

DISPOSITION OF PARTS: REWORK ☐ SCRAP ☐ USE AS IS ☐

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	B.L. KANKIN 2-17-78	PROGRAM MANAGER	
CHECKED	[illegible] 2-20-78	PROJECT ENGINEER	[illegible] 2-20-78
MECH STRESS ENG.	[illegible]	MANUFACTURING ENG.	[illegible] 2-20-78
ELECTRICAL	N/A	PRODUCTION CONTROL	[illegible] 2-20-78
CONFIGURATION CONTROL	[illegible] 2-20-78	QUALITY	[illegible] 2-20-78
OTHER	[illegible] 2-20-78	CUSTOMER	

MD 158

E-SYSTEMS
Montek Division

DOCUMENT TITLE: DAM ASS - CENTER 70 KIP

DOCUMENT NUMBER: 152031

CHANGE IDENTIF: D3

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED:

ISSUE DATE: 2-20-78

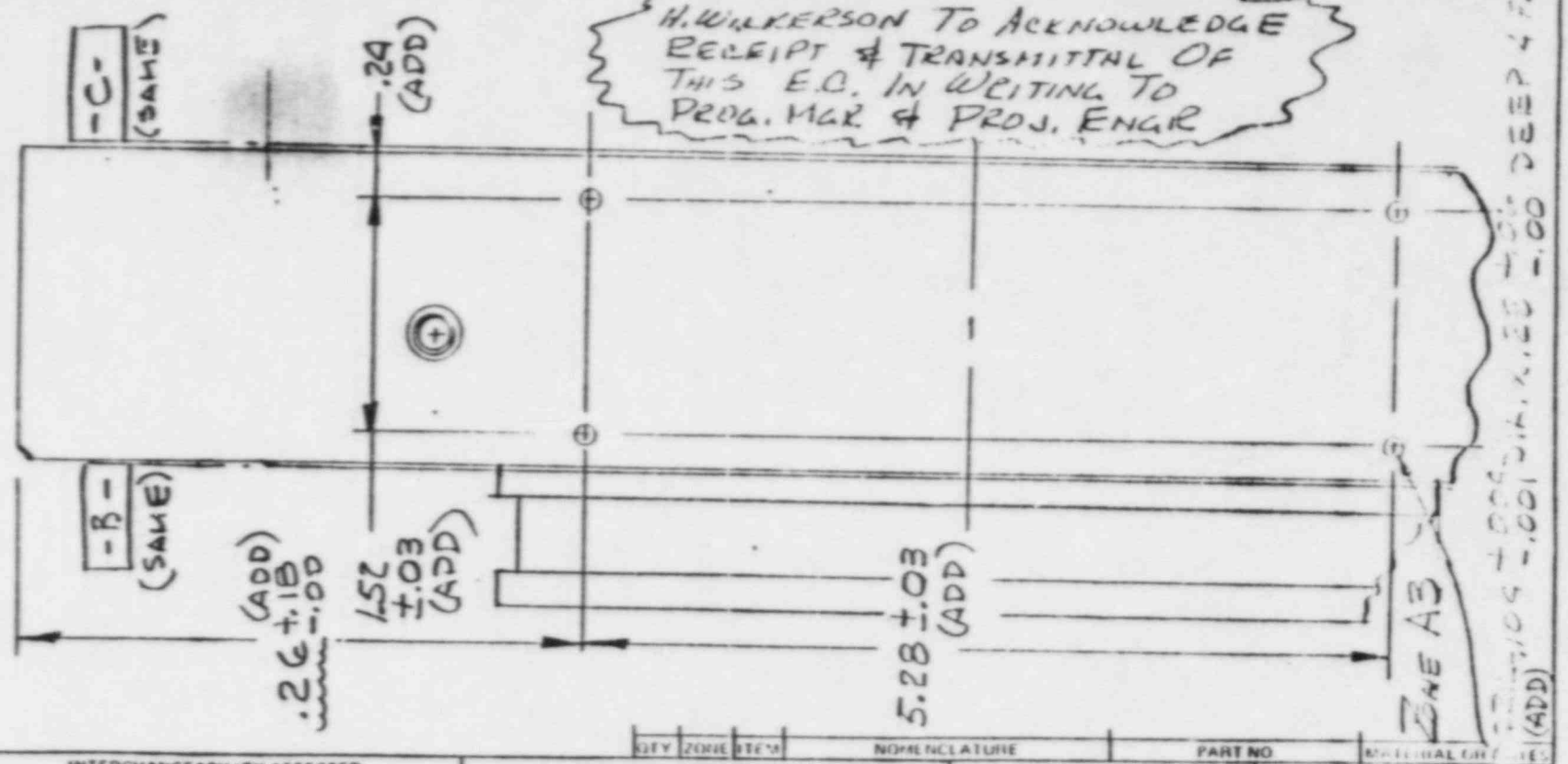
CONTROL NUMBER: 0041.2.477

EFFECTIVITY: 1ST & ON

REASON FOR CHANGE: MOVE MACHINE OPERATION FROM ASSY TO DETAIL

DESCRIPTION OF CHANGE: THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C. IN WRITING TO PROG. MGR & PROJ. ENGR



QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR [illegible]

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1ST & ON

DISPOSITION OF PARTS: REWORK ☐ SCRAP ☐ USE AS IS ☒

SIGNATURE APPROVALS		
PREPARED BY	B.L. RANKIN 2-17-78	
CHECKED	Bea Williams 2-20-78	
MECH/STRESS ENG.	Jacky	
ELECTRICAL	N/A	
CONFIGURATION CONTROL	[illegible] 2-20-78	
OTHER	[illegible] 2-20-78	

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 2-20-78
MANUFACTURING ENG.	[illegible] 2-20-78
PRODUCTION CONTROL	[illegible] 2-20-78
QUALITY	[illegible] 2-20-78
CUSTOMER	

MD 198

E-SYSTEMS
Montek Division

DOCUMENT TITLE: DALI A: ~ CENTER 100 KIP

DOCUMENT NUMBER: 152032

CHANGE DOCUMENT NUMBER: D3

PROGRAMS AFFECTED: G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED: ~

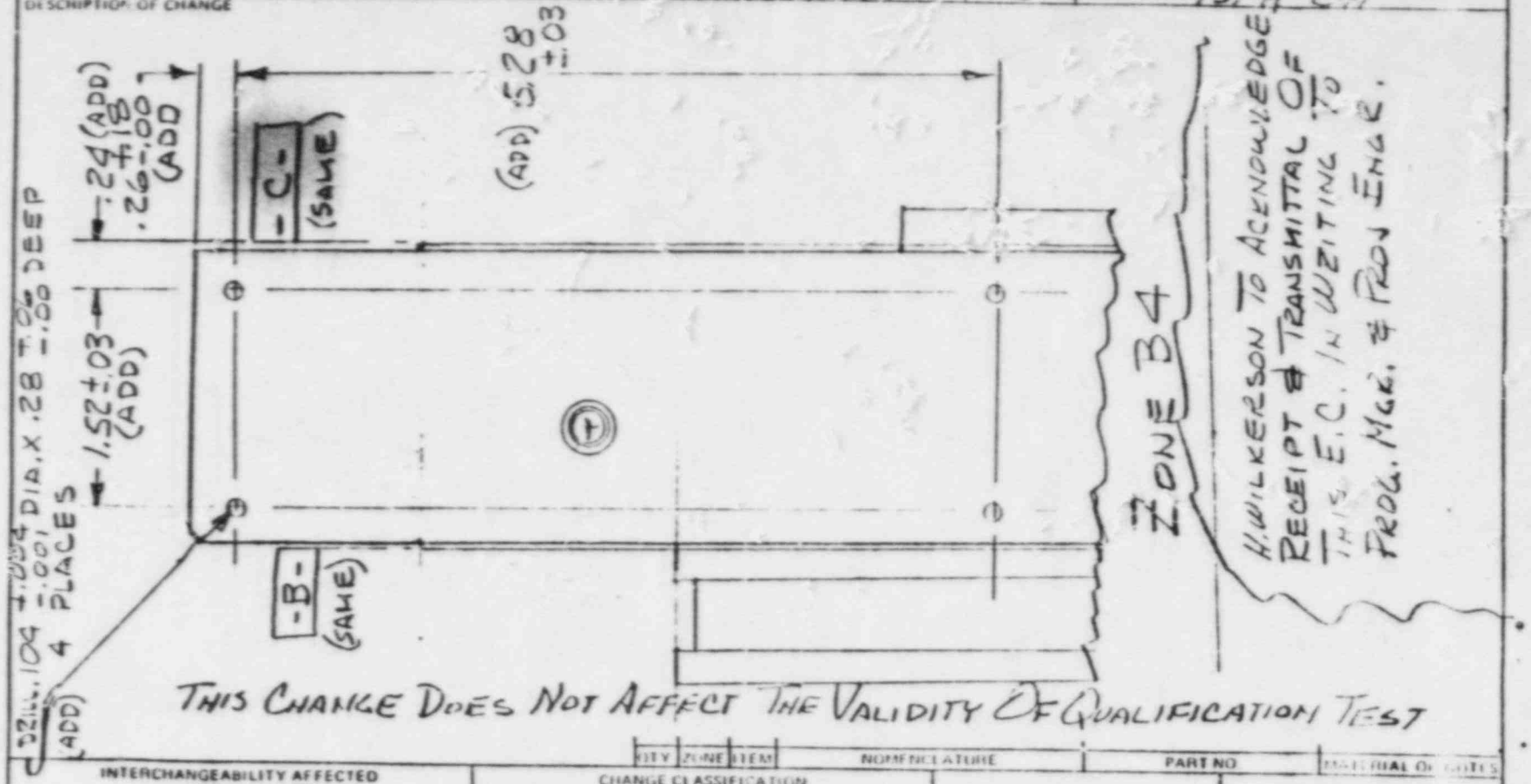
REASON FOR CHANGE: MOVE MACHINE OPERATION FROM ASSY TO DETAIL

ISSUE DATE: 2-20-78

CONTROL NUMBER: 0041.2.4.8

EFFECTIVITY: 1ST PROD ON

DESCRIPTION OF CHANGE



THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY: 1ST QN
DISPOSITION OF PARTS
REWORK ☐ SCRAP ☐ USE AS IS ☐

SIGNATURE APPROVALS		
PREPARED BY	B.L. KANKIN 2-17-78	
CHECKED	[illegible] 2-20-78	
MECH/STRESS ENG	[illegible]	
ELECTRICAL	N/A	
CONFIGURATION CONTROL	[illegible] 2-20-78	
OTHER	N/A 2-20-78	

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 2-20-78
MANUFACTURING ENG	[illegible] 2-20-78
PRODUCTION CONTROL	[illegible] 2-20-78
QUALITY	[illegible] 2-20-78
CUSTOMER	

MD 198

E-SYSTEMS Montek Division	DOCUMENT TITLE: HEX ~ NUT	DOCUMENT NUMBER: 910644	CHANGE IDENTIF: F2

PROGRAMS AFFECTED: SNUBBERS

OTHER DOCUMENTS AFFECTED: —

ISSUE DATE: 3-15-78

CONTROL NUMBER: 00411.2.485

EFFECTIVITY: S/N 001 AND ON

REASON FOR CHANGE: YEAR DATING IS NOT APPLICABLE IN A490 IN

DESCRIPTION OF CHANGE: RESPECT TO A194 NUTS

REVISE NOTES 1 AND 3 AS SHOWN BELOW

(IS)
1. ALL NUTS -001 .... AS SPECIFIED IN ASTM A490, AND.....
1. ALL NUTS - 001 .... AS SPECIFIED ON ASTM A490-71, AND.....
(WAS)

(IS)
3. -202 SHALL.............. AS SPECIFIED IN ASTM A490, OR FROM.....
3. -202 SHALL.... .AS SPECIFIED IN ASTM A490-71, OR FROM.....
(WAS)

NOTE: THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TESTS.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO.	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	PARDIKE 3-3-78	PROGRAM MANAGER	
CHECKED	DILLARD 3/3/78	PROJECT ENGINEER	Masters 3-14-78
MECH/STRESS ENG	[illegible] 3-8-78	MANUFACTURING ENG	[illegible] 3-3-78
ELECTRICAL	[illegible]	PRODUCTION CONTROL	[illegible] 3-7-78
CONFIGURATION CONTROL	[illegible] 3-3-78	QUALITY	[illegible] 3-3-78
OTHER	[illegible] 3-15-78	CUSTOMER	

COST RESPONSIBILITY: CUSTOMER / DIVISION [X]

FOR MANUFACTURING ONLY — PRODUCTION EFFECTIVITY: S/N 001 & 011

DISPOSITION OF PARTS: REWORK [ ] SCRAP [ ] USE AS IS [ ]

MD 198

ENGINEERING CHANGE

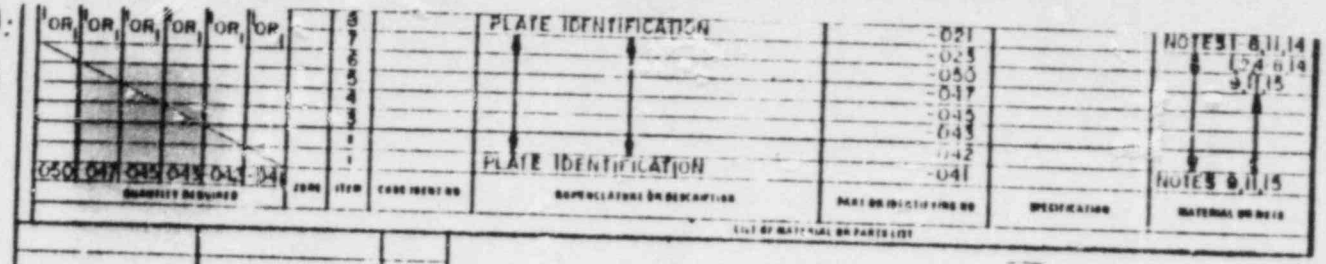
E-SYSTEMS
Montek Division

DOCUMENT TITLE	PLATE IDENTIFICATION, SNUBBERS
DOCUMENT NUMBER	152045
CHANGE IDENTIFICATION	E1
PROGRAMS AFFECTED	G.E. SNUBBERS
OTHER DOCUMENTS AFFECTED	—
ISSUE DATE	3-16-78
REASON FOR CHANGE	ADD -041 THRU -050 SERIES OF NAME PLATES
CONTROL NUMBER	00411 2.4.6
EFFECTIVITY	S/N 001 & SUBSQ

DESCRIPTION OF CHANGE

1) RENUMBERED SHEETS (NOW) SHEETS 4 THRU 9 (WAS) SHEETS 3 THRU 8

2) (ADD): (SHEET 3)



157010	157010	
157007	157007	
157005	157005	
157003	157003	
157002	157002	
157001	157001	

NOTE:
THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TESTS

3) ADD NOTES: (SHEET 4)

14. -023 TO BE IDENTICAL TO -021 EXCEPT AS SHOWN.

15. ENTER TABLE I INFORMATION ONTO -023, PER NOTE 9, TO OBTAIN DESIRED DASH NUMBER. "BLOCK C" INFORMATION IS APPLICABLE TO ALL DASH NUMBERS.

4) ADD -023 PLATE (SHEETS 10 & 11)

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED YES ☐ NO ☒

CHANGE CLASSIFICATION CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: Zimmer 1 S/N 001 & SUBSQ

SIGNATURE APPROVALS

PREPARED BY	[signature]	3/15/78	
CHECKED	[signature]	3/16/78	
MECH/STRESS ENG	[signature]	3/16/78	
ELECTRICAL	N/A		
CONFIGURATION CONTROL	[signature]		
OTHER			
PROGRAM MANAGER			
PROJECT ENGINEER	[signature]	3-16-78	
MANUFACTURING ENG			
PRODUCTION CONTROL	[signature]	3/16/78	
QUALITY	[signature]	3-16-78	
CUSTOMER			

CUSTOMER

DIVISION X

DISPOSITION OF PARTS: REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

MD 198

ENGINEERING CHANGE

E-SYSTEMS Montek Division	DOCUMENT TITLE: CYLINDER ASSY	DOCUMENT NUMBER: 152092	CHANGE IDENTIFICATION: E1
PROGRAMS AFFECTED: G.E. SNUBBER'S		ISSUE DATE: 3-21-77	
OTHER DOCUMENTS AFFECTED: —		CONTROL NUMBER: 00411.2.4	
REASON FOR CHANGE: DRAWING OMISSION		EFFECTIVITY: 1 / 303	

DESCRIPTION OF CHANGE

REVISE NOTE 1 AS SHOWN

1. MATERIAL: SEAMLESS MECHANICAL TUBING ----- 50 KSI MIN YIELD. (SAME)

MAX HARDNESS - BHN 197 ← (ADD)

NOTE:

1. EXISISTING PARTS ARE IN ACCORD
2. THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TESTS.
3. H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C. IN WRITING TO PROG. MGR & PROJ ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS	
PREPARED BY	WILLIAMS
CHECKED	S. Williams 3-15-78
MECH/STRESS ENG	[signature] 3-20
ELECTRICAL	N/A
CONFIGURATION CONTROL	[signature] 3-20
OTHER	[signature] 3-21-78

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[signature] 3-20-78
MANUFACTURING ENG	[signature] 3-17-78
PRODUCTION CONTROL	[signature] 3-16-78
QUALITY	[signature] 3-3-78
CUSTOMER	

COST RESPONSIBILITY	
CUSTOMER	
DIVISION	X

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: 1 / SUE

DISPOSITION OF PARTS: REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

MD 198

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	BLOCK-RETAINER, SNUBBER ASSY 10/20/50 K|P
DOCUMENT NUMBER	152236
CHANGE IDENTIFICATION	C 3
PROGRAMS AFFECTED	SNUBBERS
ISSUE DATE	3-23-78
OTHER DOCUMENT AFFECTED	~
CONTROL NUMBER	CO411.2.10
REASON FOR CHANGE	TO COMPLY WITH CODE FOR WINTER '77
EFFECTIVITY	S/N 001 & ON

DESCRIPTION OF CHANGE

1. ADDED -003 & -004 TO M/L AND F/D.
2. ADDED NOTE 10 IN ITS ENTIRETY.

NOTE: THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TESTS.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR SPECIFICATIONS

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY	PARDIKE 3-23-78
CHECKED	PARDIKE 3-23-78
MECH/STRESS ENG	[illegible]
ELECTRICAL	N/A
CONFIGURATION CONTROL	[illegible] 3/23/78
OTHER	[illegible] 3-23-78

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 3-23-78
MANUFACTURING ENG	[illegible] 3-23-78
PRODUCTION CONTROL	[illegible] 3-23-78
QUALITY	[illegible] 3-23-78
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER	
DIVISION	X

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY
S/N 001 & ON

DISPOSITION OF PARTS
REWORK ☐ SCRAP ☐ USE AS IS ☐

MD 198

ENGINEERING CHANGE

E-SYSTEMS Montek Division	DOCUMENT TITLE: SNUBBER ASSEMBLY 70 KIP	DOCUMENT NUMBER: 152007	CHANGE IDENTIFICATION: F2
PROGRAMS AFFECTED: G.E. SNUBBERS		ISSUE DATE: 4-4-78	
OTHER DOCUMENTS AFFECTED:		CONTROL NUMBER: 004 11.2.492	
REASON FOR CHANGE: NEW CONTRACT REQMT - ZIMMER		EFFECTIVITY: ----	

DESCRIPTION OF CHANGE

SHEET 14
ADDED 152007-56C, -62C & -79C

SHEET 15
ADDED 152122-012

ADD SHEET 7a

SHEET 1a
REV. TO SHOW F REV. ON SHEETS 1, 1a, 14 & 15 & ADD SHEET 7a AT F REV.

NOTE:
1.) THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TESTS.
2) REVISION 'E' OR 'F' MAY BE USED IN ALL INSTALLATION & INSTRUCTION MANUALS ON AN OPTIONAL BASIS AFTER G.E. APPROVAL IS OBTAINED EXCEPT ZIMMER MANUALS. REV F WILL BE MANDATORY FOR ZIMMER MANUALS.
3) FOR G.E. SUBMITTAL, THE THREE OZALID COPIES SHALL BE PRODUCED FROM THE REDUCED SIZE TRANSPARENCIES.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS	
PREPARED BY	RANKIN 4/3/78
CHECKED	[signature] 4-3-78
MECH/STRESS ENG.	[signature] 4/3/78
ELECTRICAL	[signature]
CONFIGURATION CONTROL	[signature] 4-3-78
OTHER	[signature] 4-4-78

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[signature] 4-3-78
MANUFACTURING ENG.	[signature] 4-3-78
PRODUCTION CONTROL	[signature] 4-3-78
QUALITY	[signature] 4-3-78
CUSTOMER	

COST RESPONSIBILITY	
CUSTOMER	X
DIVISION	

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY: ----
DISPOSITION OF PARTS: REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

MD 198

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE: SNUBBER ASSEMBLY 100 KIP	DOCUMENT NUMBER: 152010
CHANGE IDENTIFICATION: F_2	
PROGRAMS AFFECTED: G. E. Snubber	
OTHER DOCUMENTS AFFECTED: -	ISSUE DATE: 4-18-78
REASON FOR CHANGE: Define Piston Seal Back-up Orientation	CONTROL NUMBER: 00411.2 502.
DESCRIPTION OF CHANGE	EFFECTIVITY: 1st and on

Revise Note 12 - sheet 7a as shown.

(NOW)

12. Install T-Seal and solid (uncut) backup rings as follows: Assemble the T-Seal into the piston groove and elevate the temperature of the assembly and two (2) solid backup rings to 250°F ± 20°F. Do not remain at the elevated temperature for more than two hours. With all parts at the elevated temperature, carefully stretch the backup rings into the piston groove, insuring that the notches are positioned adjacent to the groove sides. Allow entire assembly to cool and inspect the backup rings for conformity to the groove and T-Seal.

(WAS)

12. Seal back-up rings are one piece construction. Install T-Seal in piston groove. Stabilize piston with T-Seal installed and the two back-up rings at 250°F ± 20°F for two hours maximum. Carefully stretch back-up rings over piston head into place on T-Seal while parts are at elevated temperature. Allow assembly to cool. Back-up rings will contract to original size. Acceptable alternate methods of installation will be approved by Engineering when properly documented.

NOTE:

1. All previously assembled snubbers are in accord.
2. The qualification units were assembled in accordance with this change.

NOTE:
3 COPIES TO
J NUTTALL FOR
TRANSMISSION TO [illegible]

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR FINISH

INTERCHANGEABILITY AFFECTED	CHANGE CLASSIFICATION	COST RESPONSIBILITY		FOR MANUFACTURING ONLY
YES [ ] NO [X]	CLASS I [ ] CLASS II [X] RECORD [ ]			
SIGNATURE APPROVALS	SIGNATURE APPROVALS			PRODUCTION EFFECTIVITY
PREPARED BY: L. Williams 4-14-78	PROGRAM MANAGER	CUSTOMER		1st and ON
CHECKED: C. M. Lee 4-17-78	PROJECT ENGINEER: [illegible] 4-18-78			
MECH STRESS ENG: Jackie Butcher 4-17-78	MANUFACTURING ENG: [illegible] 4-17-78			
ELECTRICAL: N/A	PRODUCTION CONTROL: [illegible] 4-17-78	DIVISION	X	DISPOSITION OF PARTS
CONFIGURATION CONTROL: [illegible] 4-18-78	QUALITY: [illegible] 4-17-78			REWORK [-] SCRAP [-] USE AS IS [-] N/A
OTHER: [illegible] 4-18-78	CUSTOMER			

MD 198

Morlek Division

BODY ASY ~CYLINDER
20 KIP

DOCUMENT NUMBER	152028
REVISION	14
ISSUE DATE	4-21-78
CONTROL NUMBER	00911.2.504
EFFECTIVITY	1ST & SUBS

PROGRAMS AFFECTED G.E. SNUBBERS

OTHER DOCUMENTS AFFECTED ~

REASON FOR CHANGE FACILITATE MFG.

DESCRIPTION OF CHANGE

F/D ZONE B-1 (NOW) .642 $^{+.021}_{-.000}$ DIA. X 1.83 TO 2.30 DEEP

(WAS) .642 $^{+.021}_{-.000}$ DIA. X 1.83 $^{+.06}_{-.00}$ DEEP

F/D ZONE B-8 (NOW) .500 / .5166 DIA. X 2.12 $^{+.06}_{-.00}$ DEEP

(WAS) .5084 $^{+.0082}_{-.0000}$ DIA. X 2.12 $^{+.06}_{-.00}$ DEEP

THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TEST

EXISTING PARTS ARE IN ACCORD

H. WILKERSON TO ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C. IN WRITING TO PROG. MGR. AND PROJ. ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL / NOTES

INTERCHANGEABILITY AFFECTED YES ☐ NO ☒

CHANGE CLASSIFICATION CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY

FOR MANUFACTURING ONLY

SIGNATURE APPROVALS

PREPARED BY	RANKIN 4-20-78
CHECKED	[illegible] 4-21-78
MECH/STRESS ENG	[illegible]
ELECTRICAL	N/A
CONFIGURATION CONTROL	[illegible] 4-21-78
OTHER	[illegible] 4-21-78

SIGNATURE APPROVALS

PROGRAM MGR	
PROJ ENG	[illegible] 4-21-78
MANUF ENG	[illegible] 4-21-78
QUALITY CONTROL	[illegible] 4-21-78
QUALITY	[illegible] 4-21-78
CUSTOMER	

CUSTOMER

DIVISION X

PRODUCTION EFFECTIVITY

DISPOSITION OF PARTS

REWORK ☐ SCRAP ☐ AS IS ☒

MD 198

E-SYSTEMS Montek Division

DOCUMENT TITLE: BUSH. G JOURNAL

DOCUMENT NUMBER: 152026

CHANGE IDENTIFICATION: E_2

PROGRAMS AFFECTED: G.E. SNUBBER

OTHER DOCUMENTS AFFECTED: ~

ISSUE DATE: 5-5-78

REASON FOR CHANGE: TO ADD 6 KIP SNUBBER REQUIREMENTS

CONTROL NUMBER: 000-111.2.006

DESCRIPTION OF CHANGE

EFFECTIVITY: 1 ST ℄ 001

ADD -011 & -012 TO L/M, F/D, NEXT ASSY & USED ON.

DEFINED [-A-] BASE & ADDED --℄-- A

CHANGED CONCENTRICITY REQMT FROM "B DIA" TO "A DIA"

NOTES:

1. THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TESTS.
2. P. HARTLEY TO ACKNOWLEDGE RECEIPT OF THIS E.C. IN WRITING TO PROG MGR & PROJ ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES [ ] NO [X]

CHANGE CLASSIFICATION: CLASS I [ ] CLASS II [X] RECORD [ ]

COST RESPONSIBILITY: CUSTOMER / DIVISION [X]

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: S/N 001 & ON

SIGNATURE APPROVALS	
PREPARED BY	F. BAVCES 4-19-78
CHECKED	PARDIKE 5-9-78
MECH/STRESS ENG	[signature] 5-5-78
ELECTRICAL	
CONFIGURATION CONTROL	R. [signature] 5-5-78
OTHER	SW 5-5-78

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[signature] for P. Martin 5-5-78
MANUFACTURING ENG	[signature] 5-5-78
PRODUCTION CONTROL	[signature] 5-6-78
QUALITY	[signature] 5-5-78
CUSTOMER	

DISPOSITION OF PARTS: REWORK [ ] SCRAP [ ] USE AS IS [X]

MD 198

E-SYSTEMS
Montek Division

DOCUMENT TITLE: RETAINER RING ~ RESERVOIR SNUBBER ASSY

DOCUMENT NUMBER: 152234 | CHAN IDENTIFICATION: C1

PROGRAMS AFFECTED: SNUBBERS

OTHER DOCUMENTS AFFECTED: ~

REASON FOR CHANGE: ADD SIX KIP REQMTS

ISSUE DATE: 5-5-78

CONTROL NUMBER: 0041 | 2507

EFFECTIVITY: S/N 001 & ON | & ON

DESCRIPTION OF CHANGE

ADDED -004 TO L/M, F/D, NEXT ASSY & USED ON.

NOTE:

1. THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TESTS.
2. P. HARTLEY TO ACKNOWLEDGE RECEIPT OF THIS E.C. IN WRITING TO PROGRAM MGR & PROJECT ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PREPARED BY	PARDIKE 5-5-78	
CHECKED	PARDIKE 5-5-78	
MECH/STRESS ENG	C. Mayer 5-5-78	PROGRAM MANAGER
ELECTRICAL		PROJECT ENGINEER L.D. Knight for P. Hartley 5-5-78
CONFIGURATION CONTROL	R. Hoffman 5-5-78	MANUFACTURING ENG R. Hoffman 5-5-78
OTHER	QCO 5-5-78	PRODUCTION CONTROL [illegible] 5-5-78
		QUALITY [illegible] 5-5-78
		CUSTOMER

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: S/N 001 & ON

DISPOSITION OF PARTS: REWORK ☐ SCRAP ☐ AS IS ☐

MD 198

E-SYSTEMS
Montek Division

DOCUMENT TITLE: SPRING ~ RESERVOIR & VALVE

DOCUMENT NUMBER: 152040

CHANGE IDENTIFICATION: J

PROGRAMS AFFECTED: SNUBBERS

OTHER DOCUMENTS AFFECTED: ~

REASON FOR CHANGE: ADD SIX KIP REQMTS

DESCRIPTION OF CHANGE

ISSUE DATE: 5-8-78

CONTROL NUMBER: 004[illegible]50

EFFECTIVITY: S/N 001 & ON

ADDED -014 & -015 TO L/M, F/D, NEXT ASSY & USED ON.

NOTES:

1. THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TESTS
2. G. HUTT TO ACKNOWLEDGE RECEIPT OF THIS CHANGE IN WRITING TO PROG. MGR & PROJ ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL / NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: S/N 001 & ON

DISPOSITION OF PARTS: REWORK ☐ SCRAP ☐ AS IS ☒

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	TARDIKE 5-5-78	PROGRAM MANAGER	
CHECKED	TARDIKE 5-5-78	PROJECT ENGINEER	[illegible] 5-5-78
MECH/STRESS ENG	[illegible] 5-5-78	MANUFACTURING ENG	[illegible] 5-5-78
ELECTRICAL		PRODUCTION CONTROL	[illegible] 5-6-78
CONFIGURATION CONTROL	[illegible] 5-8-78	QUALITY	[illegible] 5-5-78
OTHER [illegible]	5-8-78	CUSTOMER	

MD 198

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	SNUBBER ASSY, 50 KIP
DOCUMENT NUMBER	152005
CHANGE IDENTIFICATION	1
PROGRAMS AFFECTED	G.E. SNUBBER
OTHER DOCUMENTS AFFECTED	-
ISSUE DATE	5-15-78
REASON FOR CHANGE	ADD NEW ASSEMBLY FOR E.I. HATCH POWER PLANT
CONTROL NUMBER	0211.6.514
DESCRIPTION OF CHANGE	EFFECTIVITY S/N 001 & UP

(1) ADD -56.5LC SNUBBER ASSEMBLY

1	NUT-JAM	910641-121	122, 13
1	LOCKWASHER	152196-005	101, 134
1	POS. INDICATOR	152185-100	127
1	CLEVIS	152122-011	118, 13
1	ROD END ASSY, PISTON	152105-100	107
1	WELDMENT	152155-100L	106
1	COMMON PARTS	152005-900	-
/	SNUBBER ASSY	152005-56.5LC	5, 11

REVISE F/D ACCORDINGLY.

(2) ADD NOTE 13: CAUTION - 152122-011 CLEVIS AND 910644-121 JAM NUT ARE LEFT HAND THREADED.

NOTE:

1. THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TESTS.
2. REVISION 'F' IS MANDATORY FOR HATCH POWER PLANT INSTALLATION & INSTR. MANUALS & OPTIONAL ON ALL OTHERS.
3. COPIES TO J. NUTTALL FOR SUBMITTAL TO CUSTOMER FOR APPROVAL

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NO.

INTERCHANGEABILITY AFFECTED YES ☐ NO ☒

CHANGE CLASSIFICATION CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS		SIGNATURE APPROVALS	
PREPARED BY	5/15/78	PROGRAM MANAGER	
CHECKED	5-15-78	PROJECT ENGINEER	5-15-78
MECH/STRESS ENG	5-15	MANUFACTURING ENG	5-12-78
ELECTRICAL	N/A	PRODUCTION CONTROL	5-15-78
CONFIGURATION CONTROL	5-15-78	QUALITY	5-15-78
OTHER	5-15-78	CUSTOMER	

COST RESPONSIBILITY		FOR MANUFACTURING ONLY
CUSTOMER	X	PRODUCTION EFFECTIVITY S/N 001 & SUB
DIVISION		DISPOSITION OF PARTS REWORK ☐ SCRAP ☐ USE AS IS ☐ N/A

MD 198

E-SYSTEMS
Montek Division

DOCUMENT TITLE	POSITION INDICATOR ASSY SNUBBER ASSY ~ 6 & 10 KIP
DOCUMENT NUMBER	152181
CHANGE IDENTIFICATION	B_2
PROGRAMS AFFECTED	SNUBBERS
OTHER DOCUMENTS AFFECTED	~
ISSUE DATE	6-2-78
REASON FOR CHANGE	TO ADD 6 KIP REQMTS
CONTROL NUMBER	0541.2.520
DESCRIPTION OF CHANGE	EFFECTIVITY S/N 001 & ON

1. ADDED -102 ASSY TO M/L, RELEASE BLOCK AND FACE of DWG
2. REVISED TITLE BLOCK TO INCLUDED 6 KIP.

NOTES:

1. ORGINAL REQMTS FOR 10 KIP SNUBBER WERE NOT CHANGED.
2. THIS E.C. DOES NOT AFFECT VALIDITY OF QUALIFICATION TEST.
3. G. HIATT TO ACKNOWLEDGE RECEIPT OF THIS E.C. IN WRITING TO PROG MGR & PROJ ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED	CHANGE CLASSIFICATION	COST RESPONSIBILITY	FOR MANUFACTURING ONLY
YES ☐ NO ☒	CLASS I ☐ CLASS II ☒ RECORD ☐		PRODUCTION EFFECTIVITY
SIGNATURE APPROVALS	SIGNATURE APPROVALS	CUSTOMER	S/N 001 & ON
PREPARED BY PARDIKE 6-2-78	PROGRAM MANAGER		
CHECKED PARDIKE 6-2-78	PROJECT ENGINEER 6-2-78		
MECHANICAL STRESS ENG. 6-2-78	MANUFACTURING ENG 6-2-78		
ELECTRICAL N/A	PRODUCTION CONTROL 6-2-78	DIVISION	DISPOSITION OF PART
CONFIGURATION CONTROL 6-2-78	QUALITY 6-2-78	X	REWORK ☒ SCRAP N/A ☐ USE AS IS ☐
OTHER 6-2-78	CUSTOMER		

MD 198

E-SYSTEMS Montek Division

DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICATION
PLATE, IDENTIFICATION SNUBBERS	152045	F1

PROGRAMS AFFECTED: SNUBBER

OTHER DOCUMENTS AFFECTED: ~

REASON FOR CHANGE: TO ADD 6KIP REQMTS

ISSUE DATE: 6-5-78

CONTROL NUMBER: 0041.2.522

EFFECTIVITY: ~

DESCRIPTION OF CHANGE

THIS E.C. DOES NOT AFFECT THE VALIDITY OF THE QUAL TEST. G. HIATT TO ACKNOWLEDGE RECEIPT OF THIS E.C. IN WRITING TO PRGM MGR & PROJ ENGR

	TABLE II			
	DASH NO	BLOCK A	BLOCK B	BLOCK C
(ADD)	-046	6	152560	1644-6

ADD TO TABLE II ON SHEET 11 AS SHOWN ABOVE

CHANGE SHEET 3 AS SHOWN

(ADD)

NEXT ASSY	USED ON	QTY PER MAJOR ASSY	QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES
152560	152560	1 OF -046	1			PLATE IDENT	-021	NOTE 1-8
			-046			PLATE IDENT	-046	NOTE 9; 11

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PREPARED BY	PARDIKE 6-2-78
CHECKED	Williams 6-5-78
MECH/STRESS ENG	[illegible] 6-2-78
ELECTRICAL	N/A
CONFIGURATION CONTROL	[illegible] 6-2-78
OTHER	[illegible] 6-5-78

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	Martin 6-5-78
MANUFACTURING ENG	[illegible] 6-2-78
PRODUCTION CONTROL	[illegible] 6-2-78
QUALITY	[illegible] 6-2-78
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER

DIVISION

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: ~

DISPOSITION OF PARTS

REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

MD 198

E-SYSTEMS
Montek Division

DOCUMENT TITLE: APPROVED PARTS LIST FOR T-SEALS PISTON

DOCUMENT NUMBER: 910901

CHANGE IDENTIFICATION: C1

PROGRAMS AFFECTED: SNUBBER'S

OTHER DOCUMENTS AFFECTED: N

REASON FOR CHANGE: TO ADD 6 KIP REQMTS

ISSUE DATE: 6-5-78

CONTROL NUMBER: 0041 1.2.5.3

EFFECTIVITY: ~

DESCRIPTION OF CHANGE

ADD TO TABLE AS SHOWN BELOW

T-SEAL PISTON ASSY	OPTION Nº	APPROVED PARTS LIST	SUPPLIER
910901-111	1	106-32800-952-0281	GREEN TWEED
	2	609PT328-0-4248	PARKER

THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TEST

G. HIATT TO ACKNOWLEDGE RECEIPT OF THIS E.C. IN WRITING TO PROJ ENGR & PRGM MGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: ~

DISPOSITION OF PARTS: REWORK ☐ SCRAP ☐ USE AS IS ☐ N/A

SIGNATURE APPROVALS		
PREPARED BY	PARDISE 6-2-78	PROGRAM MANAGER
CHECKED	PARDISE 6-5-78	PROJECT ENGINEER 6-5-78
MECH/STRESS ENG.	[illegible] 6-5-78	MANUFACTURING ENG 6-5-78
ELECTRICAL	N/A	PRODUCTION CONTROL 6-5-78
CONFIGURATION CONTROL	[illegible] 6-2-78	QUALITY 6-5-78
OTHER	[illegible] 6-5-78	CUSTOMER

MD 158

E-SYSTEMS
Memtek Division

DOCUMENT TITLE: DAM ASSY - ROD END SNUBBER ASSY

DOCUMENT NUMBER	NOTED
CHANGE IDENTIFICATION	NOTED
PROGRAMS AFFECTED	G.E. SNUBBERS
OTHER DOCUMENTS AFFECTED	(NONE)
REASON FOR CHANGE	VENDOR REQUEST
DESCRIPTION OF CHANGE	
ISSUE DATE	6-20-78
CONTROL NUMBER	004[illegible]524
EFFECTIVITY	1 & SUBS

DOCUMENT No.	CHANGE IDENTIFICATION
152022	C 2
152023	C 2
152021	D 2
152025	D 2

CHANGE DEPTH CALLOUT FOR TAP DRILL
FOR 1/4-20 UNC-2B THREAD

(NOW) .196 -.207 DIA x 1.12 MAX DEEP
(WAS) .196-.207 DIA x .68 $\pm^{.06}_{.00}$ DEEP
(FOR 152022 ENF-6 & 152023 ENB7)

NOTE: THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TESTS.

(NOW).196-.207DIA x 1.12MAX DEEP
(WAS).196-.207DIA x .68 $\pm^{.12}_{.00}$ DEEP
(FOR 152024 ENG-5 & 152025 ENC-2)

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☐

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

COST RESPONSIBILITY: CUSTOMER ☐ DIVISION ☒

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY

DISPOSITION OF PARTS: REWORK ☒ SCRAP ☐ USE AS IS ☐

SIGNATURE APPROVALS		
PREPARED BY	M. HENRIE 6-16-78	
CHECKED	JTD / [illegible]	
MECH/STRESS ENG	[illegible] 6-19-78	
ELECTRICAL	N/A	
CONFIGURATION CONTROL	[illegible] 6-19-78	
OTHER - QE	6-20-78	
PROGRAM MANAGER	[illegible] 6-19-78	
PROJECT ENGINEER	[illegible] 6-19-78	
MANUFACTURING ENG	[illegible] 6-19-78	
PRODUCTION CONTROL	[illegible] 6-19-78	
QUALITY	[illegible] 6-19-78	
CUSTOMER		

MD 198

E-SYSTEMS
Montek Division

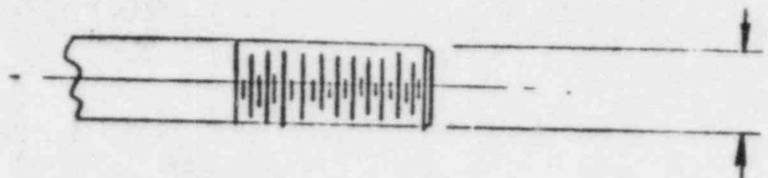
DOCUMENT TITLE	DOCUMENT NUMBER	CHANGE IDENTIFICATION
TIE BOLT	152448 152449	C

PROGRAMS AFFECTED: G.E. SNUBBERS
OTHER DOCUMENTS AFFECTED: —
REASON FOR CHANGE: COST REDUCTION
ISSUE DATE: 8-11-78
CONTROL NUMBER: 00411-2.5 30
EFFECTIVITY: 1st 2 SUP.

DESCRIPTION OF CHANGE

ADD STRAIGHTNESS REQMT AS SHOWN BELOW

EXISTING PARTS ARE ACCEPTABLE



NOTE: THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TEST

GORDON HIATT SHALL ACKNOWLEDGE RECEIPT & TRANSMITTAL OF THIS E.C IN WRITING TO PROG. MGR & PROJ ENGR.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☑

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☑ RECORD ☐

SIGNATURE APPROVALS	
PREPARED BY	[signature]
CHECKED	[signature] 8-10-78
MECH/STRESS ENG	[signature]
ELECTRICAL	N/A
CONFIGURATION CONTROL	[signature] 8/10/78
OTHER	[signature] 8-11-78

SIGNATURE APPROVALS		
PROGRAM MANAGER		
PROJECT ENGINEER	[signature]	8-10-78
MANUFACTURING ENG	[signature]	8-10-78
PRODUCTION CONTROL	[signature]	8-10-78
QUALITY	[signature]	8-10-78
CUSTOMER		

COST RESPONSIBILITY
CUSTOMER
DIVISION ☒

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY

DISPOSITION OF PARTS: REWORK ☐ SCRAP ☐ USE AS IS ☐

MD 198

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	JOURNAL BUSHING
DOCUMENT NUMBER	152026
CHANGE IDENTIFICATION	F1
PROGRAMS AFFECTED	G.E. SNUBBERS
OTHER DOCUMENTS AFFECTED	—
REASON FOR CHANGE	ADD HEAT TREAT NOTE
DESCRIPTION OF CHANGE	
ISSUE DATE	9-25-78
CONTROL NUMBER	0041.2.591
EFFECTIVITY	S/N 001 & SUBQ

ADD TO NOTES:

5. HEAT TREAT ASME SB-148 & ASTM B-148 TO 90 KSI MIN. ULT, 45 KSI MIN YIELD, BHN 190, 6% ELONGATION.

NOTE: THIS CHANGE DOES NOT EFFECT VALIDITY OF QUALIFICATION

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY	9/21/78
CHECKED	9-22-78
MECH/STRESS ENG.	
ELECTRICAL	N/A
CONFIGURATION CONTROL	
OTHER	BJK 9-25-78

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	9-22-78
MANUFACTURING ENG	9-22-78
PRODUCTION CONTROL	9-22-78
QUALITY	9-22-78
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER	
DIVISION	X

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: S/N 001 & SUBQ

DISPOSITION OF PARTS
REWORK ☐ SCRAP ☐ USE AS IS ☐ N/A ☐

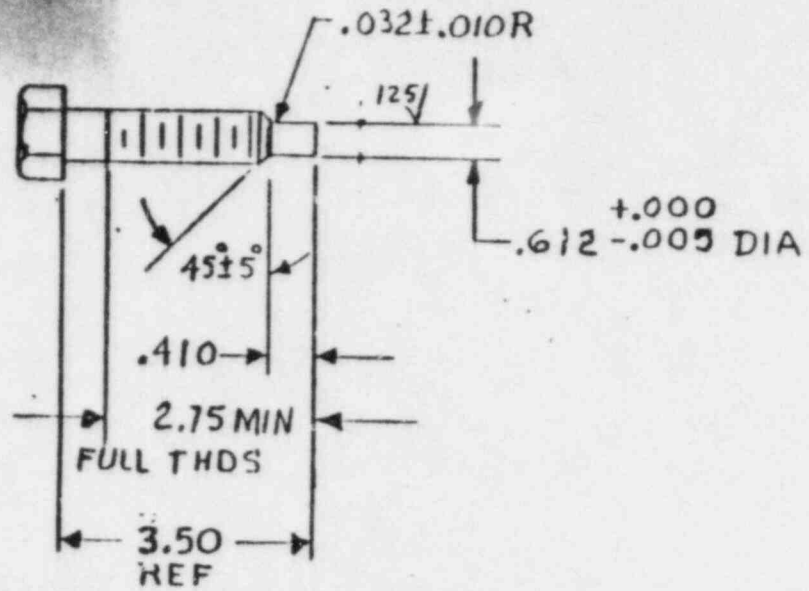
MD 198

ENGINEERING CHANGE

E-SYSTEMS
Montek Division

DOCUMENT TITLE	HEX BOLT SNUBBER ASSY
DOCUMENT NUMBER	910646
CHANGE IDENTIFICATION	G 2
PROGRAMS AFFECTED	G.E. SNUBBERS
OTHER DOCUMENTS AFFECTED	~
REASON FOR CHANGE	ADD DASH NO. FOR LASALLE I & II
DESCRIPTION OF CHANGE	
ISSUE DATE	10-3-78
CONTROL NUMBER	08-11.25/2
EFFECTIVITY	1 & SUB Q

CREATE -024 BOLT, SAME AS -009 EXCEPT AS SHOWN BELOW:



NOTES:
1. THE -024 BOLT MAY BE REWORKED FROM THE -009 BOLT.

THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TESTS.

REVISE NOTE 2. AS FOLLOWS:

2. THIS BOLT SHALL CONFORM DIMENSIONALLY WITH ANSI STANDARD B18.2.1-72 FOR HEAVY HEX STRUCTURAL BOLT, UNLESS OTHERWISE SPECIFIED. BOLTS SHALL BE ..... ETC

KEY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

	PREPARED BY	CHECKED	MECH/STRESS ENG	ELECTRICAL	CONFIGURATION CONTROL	OTHER
	Arnold Schaer 2 Oct 78	[illegible] 10/2/78	[illegible] 10-3-78	N/A	[illegible] 10-3-78	QA 10-3-78

SIGNATURE APPROVALS	
PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 10-3-78
MANUFACTURING ENG	[illegible] 10-3-78
PRODUCTION CONTROL	[illegible] 10-3-78
QUALITY	[illegible] 10-3-78
CUSTOMER	

COST RESPONSIBILITY: CUSTOMER [X] DIVISION [ ]

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY

DISPOSITION OF PARTS
REWORK ☐ N/A SCRAP ☐ USE AS IS ☐

MD 198

E-SYSTEMS
Memtek Division

DOCUMENT TITLE: NOTED BOLT

DOCUMENT NUMBER: NOTED

CHANGE IDENTIFICATION: NOTED

PROGRAMS AFFECTED: G.E. SHUBBERS

OTHER DOCUMENTS AFFECTED: VENDOR REQUEST:

REASON FOR CHANGE: (TO ALLOW PARTS TO BE MADE FROM HOT ROLLED STOCK

ISSUE DATE: 1/25/79

CONTROL NUMBER: 004

EFFECTIVITY: I & SUBQ

DESCRIPTION OF CHANGE:

1. CHANGE STOCK DIA TOLERANCE.

DWG NO.	TITLE	TOLERANCE (DIA) NOW	TOLERANCE (DIA) WAS	CHANGE IDENT.
152430	U-BOLT 3/4-10 UNC-2A	.7600/.7288	.7500/.7288	C_1
152431	U-BOLT 1.0-8UNC-2A	1.0100/0.9755	1.000/0.9755	C_4
152432	U-BOLT 1 1/4-8 UN-2A	1.2650/1.2254	1.2500/1.2254	C_3
152433	U-BOLT 1 1/2-8 UN-2A	1.5150/1.4753	1.500/1.4753	B_2
152448	TIE BOLT SNUB. ASSY 50KIP	1.1004-1.1350	1.1004-1.125	C_3
152449	TIE BOLT SNUB. ASSY 30KIP	.8523-.8850	.8523-.8750	C_3
152450	TIE BOLT 1.0-8UNC-2A	.9755/1.0100	.9755/1.000	C_2
152451	TIE BOLT 1 1/4-8UN-2A	1.2254/1.2650	1.2254/1.250	C_2
152452	TIE BOLT 1 1/2-8UN-2A	1.5150/1.4753	1.500/1.4753	C_2
157430	U-BOLT 3/4-10 UNC-2A	.7600/.7288	.7500/.7288	A_1
157431	U-BOLT 1.0-8 UNC-2A	1.0100/0.9755	1.000/0.9755	A_1
157432	U-BOLT 1 1/4-8 UN-2A	1.2650/1.2254	1.2500/1.2254	A_1
157433	U-BOLT 1 1/2-8 UN-2A	1.5150/1.4753	1.500/1.4753	A_1
157448	TIE BOLT SNUB. ASSY 50KIP	1.1004-1.1350	1.1004-1.125	A_1
157449	TIE BOLT SNUB. ASSY 30KIP	.8523-.8850	.8523-.8750	A_1
157451	TIE BOLT 1 1/4-8 UN-2A	1.2254/1.2650	1.2254/1.250	A_2
157452	TIE BOLT 1 1/2-8 UN-2A	1.5150/1.4753	1.500/1.4753	A_1

QTY	FOR ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY: [illegible] 1-25-79
CHECKED: [illegible] 1/26/79
MECH/STRESS ENG: [illegible] 1-25-79
ELECTRICAL: N/A
CONFIGURATION CONTROL: [illegible]
OTHER: [illegible] 1-26-79

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER
PROJECT ENGINEER: [illegible] 1-26-79
MANUFACTURING ENG: [illegible] 1-26-79
PRODUCTION CONTROL: [illegible]
QUALITY: [illegible] 1-25-79
CUSTOMER

COST RESPONSIBILITY

CUSTOMER
DIVISION: X

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: I & SUBQ

DISPOSITION OF PARTS: REWORK ☐ N/A SCRAP ☐ USE AS IS ☒

MD 198

E-SYSTEMS
Monitek Division

DOCUMENT TITLE: FORGING, ROD END 100 KIP SNUBBER

DOCUMENT NUMBER: 152110

CHANGE IDENTIFICATION: E1

PROGRAMS AFFECTED: SNUBBERS

OTHER DOCUMENTS AFFECTED: —

ISSUE DATE: 1-30-79

CONTROL NUMBER: 004 11.2.359

REASON FOR CHANGE: NEW FORGING CONFIG. REQ'D FOR 100 KIP STRUT

EFFECTIVITY: S/N 001 & ON

DESCRIPTION OF CHANGE

ADD -010 FORGING TO SHEET 2

(1) Zn E5

(NOW) 3.000 FOR -009
11.500 FOR -010

(WAS) 3.000

(2) Zn D4

(NOW) 12.45 MIN FOR -009
21.45 MIN FOR -010

(WAS) 12.45 MIN

(3) Zn B1-B2 (ADD -010 -OUTER TO S/N)

THIS CHANGE DOES NOT AFFECT VALIDITY OF QUALIFICATION TESTS.

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED: YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY: Fellman 79-1-15
CHECKED: Williams 1-15-79
MECH/STRESS ENG.: [illegible]
ELECTRICAL: N/A
CONFIGURATION CONTROL: [illegible] 1-30-79
OTHER: BK 1-30-79

CHANGE CLASSIFICATION: CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER
PROJECT ENGINEER: Martin 1-30-79
MANUFACTURING ENG: [illegible] 1-16-79
PRODUCTION CONTROL: [illegible] 1-12-79
QUALITY
CUSTOMER

COST RESPONSIBILITY

CUSTOMER: X
DIVISION:

FOR MANUFACTURING ONLY

PRODUCTION EFFECTIVITY: S/N 001 & ON

DISPOSITION OF PARTS

REWORK: ☐ N/A ☐ SCRAP: ☐ USE AS IS: ☐

MD 196

E-SYSTEMS
Montek Division

DOCUMENT TITLE	SNUBBER ASSY TO [illegible]
DOCUMENT NUMBER	152007
CHANGE IDENTIFICATION	G1
PROGRAMS AFFECTED	[illegible] SNUBBER
OTHER DOCUMENTS AFFECTED	152916
REASON FOR CHANGE	[illegible]
ISSUE DATE	2-17-77
CONTROL NUMBER	00-111.2-77
EFFECTIVITY	[illegible]

DESCRIPTION OF CHANGE

1) SHEET 7

ADDED 152007-12.8C AND REQUIREMENTS

2.) SHEET 14 (ZONE C-7)

	DWG. Nº	A DIA	ADJUSTMENT
(SAME) →			
(ADD) →	152007-12.8C	12.8	±3.00

3. SHEET 15 (ZONE D-6) (NOW) 152122-[illegible]-005 -012 OR -013
(WAS) 152122-001 THRU -005 OR -012.

(ZONE A-4)

	DASH No.	B DIA Min	C THRD	D DIA +.0004 −.0000
(SAME) →				
(ADD) →	152122-013	2.73	2¾-30N-2A	2.9994

NOTES.

1. THIS CHANGE DOES NOT AFFECT THE VALIDITY OF QUALIFICATION TESTS
2. REQUIRED SIZE REPRO & (2) MICROFILMABLE COPIES OF SHTS 14 & 15 PLUS (3) COPIES OF 'A' SIZE SHEETS TO J. HOVALL

QTY	ZONE	ITEM	NOMENCLATURE	PART NO	MATERIAL OR NOTES

INTERCHANGEABILITY AFFECTED
YES ☐ NO ☒

SIGNATURE APPROVALS

PREPARED BY	[illegible]
CHECKED	[illegible] 2-16-77
MECH/STRESS ENG	[illegible]
ELECTRICAL	[illegible]
CONFIGURATION CONTROL	[illegible]
OTHER	[illegible] 2-17-77

CHANGE CLASSIFICATION
CLASS I ☐ CLASS II ☒ RECORD ☐

SIGNATURE APPROVALS

PROGRAM MANAGER	
PROJECT ENGINEER	[illegible] 2-16-77
MANUFACTURING ENG	[illegible] 2-16-77
PRODUCTION CONTROL	[illegible] 2-16-77
QUALITY	[illegible] 2-16-77
CUSTOMER	

COST RESPONSIBILITY

CUSTOMER	X
DIVISION	

FOR MANUFACTURING ONLY
PRODUCTION EFFECTIVITY
Immediate Delivery

DISPOSITION OF PARTS
REWORK ☐ SCRAP ☐ USE AS IS ☐ N/A

MD 198

ATTACHMENT 3

EQUIPMENT QUALIFICATION INSPECTION PLAN
SITE ENGINEERING - ENGINEERING AND CONSTRUCTION
HOPE CREEK GENERATING STATION

INTRODUCTION

An inspection of the Class 1E equipment in a Harsh Environment shall be performed during October, 1985 as committed in NRC Equipment Qualification Audit July 15-18, 1985 Action Item No. 8 (Reference 1 & 2). The purpose of this Inspection Plan is to provide a description of the elements necessary to assure that a comprehensive inspection will be performed.

SCOPE

This inspection will include a field verification of a representative number of Class 1E equipment in a Harsh Environment, as listed in FSAR Table 3.11-5, to confirm location, conformance with installation requirements and tag numbers are consistent with Environmental Qualification parameters for the equipment.

METHOD

The inspection will be performed on a sampling basis with consideration of the following:

1. The sampling size is calculated by using EQ.13-7 from Reference 3.

$$\text{EQ.13-7} \quad N = \frac{Z^2 PQ}{E^2}$$

N: Sample size
P: The proportion of a given event of the population
Q: 1 - p
E: Sampling error
Z: Boundary of distribution area under normal curve

Let sampling error E = 5% and confidence interval = 95%. The estimate defective rate is 5% and because of sampling error, P = 4% is used. With 95% confidence Z = 1.96 (From Table 6 of Reference 1).

$$N = \frac{1.96^2 \times 0.04 \times (1-0.04)}{0.05^2} = 59 \simeq 60$$

2. Sixty (60) components will be inspected. The components shall be randomly selected based on a proportional distribution from all purchase orders. Electrical cable, splices, etc. will not be included in this inspection. Attachment 1 is the list (by tag number) of the components to be inspected.

3. Components previously inspected during the July 15-18, 1985 NRC Audit will not be re-inspected.

4. The 1E Equipment Field Inspection Check List (Attachment 2) shall be used to verify and document the as-built condition for each component.

5. A Polaroid picture shall be taken of each component and included with the completed checklist.

6. Following the field inspection, the checklist for each of the sixty (60) components shall be evaluated by the equipment qualification coordinator to assess the adequacy of the program. Deficiencies identified as a result of this inspection shall be corrected and factored into the overall program as required.

REFERENCES

1. Letter from PSE&G's R. L. Mittl to Mr. Walter Butler, Director of Nuclear Reactor Regulation dated July 31, 1985.

2. Summary of July 18, 1985 Environmental Qualification Audit Exit Meeting (Docket 50-354) from David Wagner, NRC dated August 12, 1985.

3. "Statistics for Business and Economics," 3rd Edition, by Stephen P. Shao, published by Charles E. Merrill Publishing Company.

Prepared by J. A. Lim Date 10/25/85

Approved by C. W. [illegible] Date 10/25/85

EQUIPMENT QUALIFICATION INSPECTION LIST

	EESS NUMBER	I.D. NUMBER	DESCRIPTION
1.	E135-PEN-001	1AW204	WESTINGHOUSE LOW VOLTAGE POWER AND CONTROL ELECTRICAL PENETRATION
2.	J201-HS-001	1EG-HS-2517A	MICROSWITCH SELECTOR SWITCH
3.	J301-T-001	1BB-LT-3682A	TOBAR INSTRUMENT TRANSMITTER
4.	J301-T-002	1EG-FT-2511A	TOBAR INSTRUMENT TRANSMITTER
5.	J359-VAR-001	1GS-PSH-5081A	H_2O_2 PANEL ANALYZER - PRESSURE SWITCH HIGH
6.	J359-VAR-001	1GS-SV-5086B2	H_2O_2 PANEL ANALYZER SOLENOID VALVE
7.	J483-LS-001	1EG-LSH-2359A	FCI LIQUID LEVEL SENSOR
8.	J556-TE-001	1SB-TE-3647L	WEED THERMOCOUPLE
9.	J603-SV-001	1RC-SV-0707B	VALCOR SOLENOID VALVE
10.	J800-XE-002	1AB-XE-4507D	NDT ACCELEROMETER
11.	M001-TE-004	1SK-TE-N023M	PYCO TEMPERATURE ELEMENT
12.	M001-TE-004	1SK-TE-N029A	PYCO TEMPERATURE ELEMENT
13.	M001-PT-005	1BC-PT-N057	ROSEMOUNT PRESSURE TRANSMITTER
14.	M001-SV-008	1BF-SV-F163A	VALCOR SOLENOID VALVE
15.	M001-PT-009	1BB-PT-N403F	ROSEMOUNT PRESSURE TRANSMITTER
16.	M001-LS-010	1BF-LS-N013H	MAGNETROL INDICATING SWITCH
17.	M001-LT-012	1BH-LT-N010A	GOULD DIFFERENTIAL PRESSURE TRANSMITTER
18.	M001-HPCI-22	1FD-PDSH-4910	HPCI TURBINE DIFFERENTIAL PRESSURE SWITCH
19.	M001-LS-024	1BF-LS-N013F	MAGNETROL LEVEL SWITCH
20.	M001-XMIT-028	1BB-LT-N080C	ROSEMOUNT PRESSURE TRANSMITTER
21.	M001-XMIT-028	1AB-PDT-N088D	ROSEMOUNT PRESSURE TRANSMITTER
22.	M001-XMIT-028	1BB-PT-N094A	ROSEMOUNT PRESSURE TRANSMITTER
23.	M001-XMIT-028	1BD-PT-N050	ROSEMOUNT PRESSURE TRANSMITTER
24.	M001-EAM-027	1SE-EAM-K002A	GE VOLTAGE PREAMPLIFIER
25.	M001-LS-031	1AB-ZS-F028A	NAMCO MSIV LIMIT SWITCH
26.	M047A-MOT-001	1BV215	RELIANCE 460 V MOTOR
27.	M048-PS-003	1KL-PSL-5130A	ASCO PRESSURE SWITCH
28.	M048-SV-005	1KL-SV-5164B	VALCOR SOLENOID VALVE
29.	M082-MOT-001	1AP228	WESTINGHOUSE MOTOR
30.	M711-MOT-001	1AVH210	RELIANCE MOTOR
31.	M713-ACT-002	1GU-FD-9377A	ITT ELECTRO-HYDRAULIC ACTUATOR
32.	M717-ACT-001	1GU-PD-9435A1	ASCO ELECTROMAGNETIC ACTUATOR
33.	M717-ACT-001	1GU-PD-9436A1	ASCO ELECTROMAGNETIC ACTUATOR
34.	M717-ZS-002	1GU-ZS-9435B1	NAMCO LIMIT SWITCH
35.	M717-ZS-002	1GU-ZS-9433A1	NAMCO LIMIT SWITCH
36.	M728-SV-001	1GU-SV-9450A	ASCO SOLENOID VALVE
37.	M780-FSL-004	1GR-FSL-9383B1	DWYER DIFFERENTIAL PRESSURE SWITCH
38.	M780-FSL-004	1GU-PDSH-9428-1	DWYER DIFFERENTIAL PRESSURE SWITCH
39.	M780-TE-005	1GR-TE-9384G	WEED TEMPERATURE ELEMENT
40.	M780-TE-005	1GU-TE-9429-2	WEED TEMPERATURE ELEMENT
41.	M780-TS-007	1GR-TS-9382A	UNITED ELECTRIC TEMP. CONTROLLER
42.	M780-HS-008	1GR-HS-9384A	MICRO SWITCH SELECTOR SWITCH
43.	M780-TRNS-009	IN PANEL 1AC281	HEVI-DUTY TRANSFORMER
44.	P301-SV-001	1EG-SV-2290A	ASCO SOLENOID VALVE

EQUIPMENT QUALIFICATION INSPECTION LIST

	EESS NUMBER	I.D. NUMBER	DESCRIPTION
45.	P301-ZS-002	1EC-ZS-4678	NAMCO LIMIT SWITCH
46.	P301-HV-005	1BE-HV-F031A	LIMITORQUE A. C. MOTOR OPERATOR
47.	P301-HV-005	1BC-HV-F007A	LIMITORQUE A. C. MOTOR OPERATOR
48.	P301-HV-005	1GS-HV-5050A	LIMITORQUE A. C. MOTOR OPERATOR
49.	P301-HV-005	1GB-HV-9532-1	LIMITORQUE A. C. MOTOR OPERATOR
50.	P302-HV-003	1AE-HV-F032A	LIMITORQUE A. C. MOTOR OPERATOR
51.	P302-HV-004	1BJ-HV-F012	LIMITORQUE D. C. VALVE ACTUATOR
52.	P302-ZS-005	1BC-ZS-F065C	NAMCO LIMIT SWITCH
53.	P303A-HV-001	1AB-HV-F067A	ROTORK VALVE ACTUATOR
54.	P303A-HV-003	1GS-HV-4984B	LIMITORQUE A. C. MOTOR OPERATOR
55.	P303A-HV-003	1EG-HV-2321A	LIMITORQUE A. C. MOTOR OPERTAOR
56.	P303A-HV-003	1KL-HV-5162	LIMITORQUE A. C. MOTOR OPERATOR
57.	P303A-SV-004	1KL-SV-5154	ASCO SOLENOID VALVE
58.	P303A-ZS-005	1KP-ZS-6055A	NAMCO LIMIT SWITCH
59.	P305-HV-002	1EG-HV-2314A	LIMITORQUE A. C. MOTOR OPERATOR
60.	P305-ZS-005	1GS-ZS-5029	NAMCO LIMIT SWITCH

HOPE CREEK GENERATING STATION

CLASS 1E EQUIPMENT FIELD INSPECTION

CHECKLIST

Component Tag Number _____

Component Description _____

EESS Number _____

FIELD INSPECTION

1. Does the as-installed condition agree with EESS information?

	Yes	No	N/A
A. Tag Number _____	☐	☐	☐
B. Room Number _____	☐	☐	☐
C. P.O. Number _____	☐	☐	☐
D. Manufacturer _____	☐	☐	☐
E. Model No. _____	☐	☐	☐

NOTES: _____

_____

_____

(Describe any unacceptable conditions such as missing hardware or damage found)

2. Describe the installation orientation of the component if mounted other than vertical: _____

_____

3. Interfaces

	Yes	No
A. Is a moisture intrusion device required?	☐	☐
B. Device Type _____		
C. Is the device installed?	☐	☐

NOTES: _____

_____

_____

4. Location Relative to Flood Level.

	Yes	No
A. Is equipment located in flood zone (see DITS D7.5 P.82-85)	☐	☐
B. Flood depth _____		
C. Height above floor _____		
D. If component located in flood zone is the component qualified for flooding.	☐	☐

NOTES: _____

_____

_____

5. Final Evaluation.

	Yes	No
Is the overall field installation consistent with the associated environmental supporting documentation (EESS)?	☐	☐

NOTES: _____

_____

_____

_____ _____

Inspected By Date

_____ _____

Verified By Date

JL:lec
Disk #14
10/23/85