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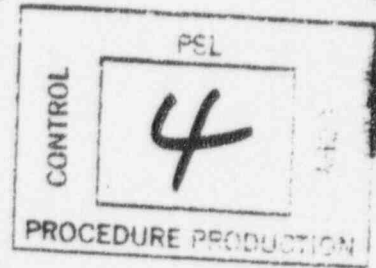
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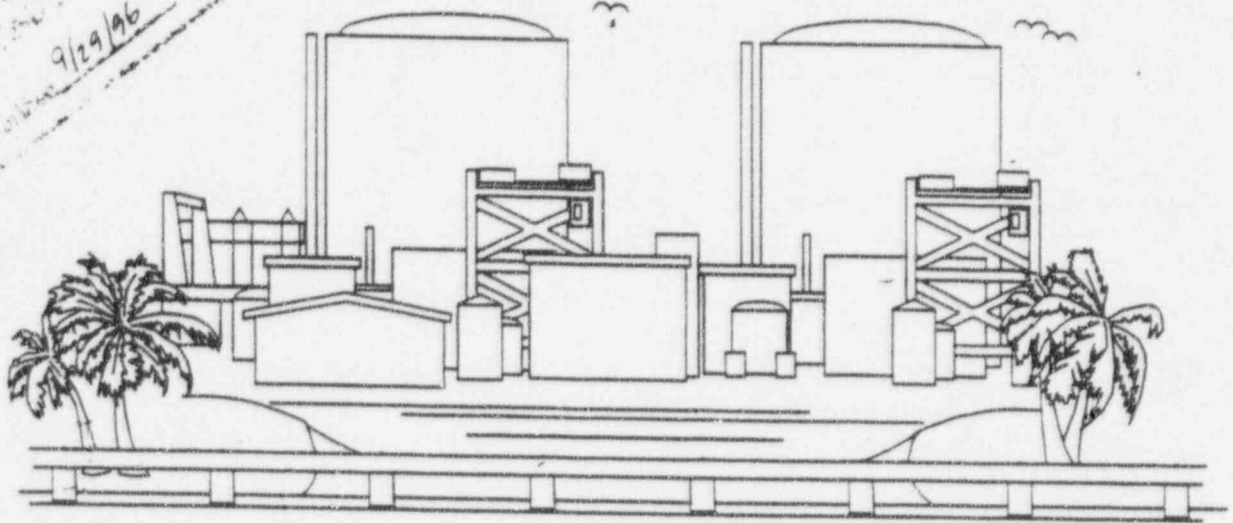
ST. LUCIE PLANT

UNIT NO. 1

1-MMP-09.02
REVISION 5



9/29/96
Initials Scarola
1-MMP-09.02-05



AUXILIARY FEEDWATER PUMP 1C DISASSEMBLY, INSPECTION AND REASSEMBLY

COPY

MECHANICAL MAINTENANCE PROCEDURE

REVISION	REVIEWED BY FRG ON	APPROVED BY	DATE
0	<u>1/9/92</u>	<u>G. J. Boissy</u> Plant General Manager	<u>5/13/92</u>
5	<u>12/7/95</u>	<u>J. Scarola</u> Plant General Manager	<u>12/7/95</u>

Responsible Department: MECHANICAL MAINTENANCE

BMG 01-22-96

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1.0 TITLE.

AUXILIARY FEEDWATER PUMP 1C DISASSEMBLY, INSPECTION AND REASSEMBLY

2.0 PURPOSE:

2.1 This procedure provides the instructions necessary for the general disassembly, inspection and reassembly of the 1C Auxiliary Feedwater Pump.

2.2 This procedure functions to consolidate equipment maintenance information into a single controlled document.

3.0 REFERENCES:

3.1 Plant Procedures

1. St. Lucie Plant Operating Procedure No. 0010122, "In Plant Equipment Clearance Orders."
2. St. Lucie Plant General Maintenance Procedure No. M-0019, "Plant Rotating Equipment Alignment Guidelines."
3. St. Lucie Plant General Maintenance Procedure No. GMP-02, "Use of M & TE by Mechanical Maintenance."
4. St. Lucie Plant Quality Instruction Procedure No. QI 13-PR/PSL-2, "Cleanliness Control Methods."
5. St. Lucie Plant Administrative Procedure No. 0010433, "St. Lucie Site Rigging Controls and Rigging Considerations."
6. St. Lucie Plant General Maintenance Procedure No. M-0039, "Threaded Fasteners on Pressure Boundaries and Structural Steel."
7. St. Lucie Plant Quality Instruction Procedure No. QI-17-PR/PSL-1, "Quality Assurance Records."
8. St. Lucie Plant Operating Procedure No. 1-0700028, "Auxiliary Feedwater Turbine Mechanical and Electrical Overspeed Trip Tests."

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3.0 REFERENCES: (continued)

3.2 Vendor Technical Manuals

1. Byron Jackson Technical Manual for Horizontal Double-Bearing Pumps, PSL File No. 8770-6130.
2. Technical Manual 8770-6702, Turbine Driver for AFW Pump.

4.0 PREREQUISITES:

4.1 The pump shall be valved out, depressurized, drained and tagged for maintenance in accordance with Operating Procedure No. 0010122, "In Plant Equipment Clearance Orders."

4.2 Electrical Clearance Information:

1. Auxiliary Feedwater Pump 1C (Breaker); location: Auxilliary Building Electrical Equipment Room 125 VDC switchgear 1AB.
2. Breaker 60308, Auxiliary Feedwater 1C Turbine Control
3. Breaker 60310, Auxiliary Feedwater 1C Turbine Control
4. Breaker 60321, for Steam Valve MV-08-13
5. Breaker 60323, for Steam Valve MV-08-14

5.0 PRECAUTIONS/LIMITATIONS:

- 5.1 All rigging must be done from appropriate structures as per Administrative Procedure No. 0010433, "St. Lucie Site Rigging Controls and Rigging Considerations."
- 5.2 Tape and/or cover all open piping, fittings and flanges, etc.
- 5.3 All mating surfaces shall be clean and free of nicks and burrs prior to assembly.

6.0 RECORDS REQUIRED:

Appropriate sections of this procedure shall be maintained as part of the NPWO package in the plant files in accordance with QI 17-PR/PSL-1, Quality Assurance Records."

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7.0 MATERIALS OR EQUIPMENT REQUIRED:

7.1 Material

1. Premium RB Grease
2. Lint-free rags
3. Loctite

7.2 Equipment

1. Mechanic's Toolbox
2. Coupling and bearing puller
3. Rigging, strapping, shackles
4. Laser Alignment Kit
5. Hydraulic torque wrench
6. Temp sticks (250°F and 600°F)
7. M & TE micrometers
8. Oxy-Acetylene torch with rosebud tip
9. N-5000
10. Dow Corning 55M
11. WD-40, JB-80, Spray Graphite

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8.0 INSTRUCTIONS:

INITIAL

NOTE

1. Prior to disassembly of any components, be certain to MATCH MARK, bag and tag, or otherwise identify all parts and provide separate marked bags for all small parts.
2. Only applicable portions of this procedure need to be accomplished to suit the work scope. Steps may be performed out of sequence at the discretion of the Maintenance Supervisor or Technical Support personnel (TS). Each step must be initialed upon completion. Mark optional steps N/A if not performed and initial after N/A.
3. Verify that clearance is hung for the 1C Auxiliary Feedwater Pump.
4. Light lubricants such as WD-40, JB-80, graphite spray, etc. may be used as necessary to aid in disassembly and reassembly of components. These lubricants should be used sparingly and removed as best as possible after use.
5. TS is to evaluate and then initial and date for concurrence and acceptability of all exceptions to the guidelines (i.e. diametrical running clearance, runout) of this procedure. For example, if the As-Left wear ring clearance for a particular stage was greater than the diametrical running clearance specified in this procedure, then TS is required to evaluate and then initial and date the as-left clearance in the body of the procedure.
6. Numbers in this procedure in parenthesis refer to item numbers in the technical manual, the parts list and the pump cross sectional drawing.
7. Numbers in this procedure in parenthesis that begin with the letter S refer to the mechanical seal components. Refer to Figure 2, AFW Pump 1C Mechanical Seal Components, for additional information.

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8.1 General Disassembly (Reference Figures 1, 1A, 1B, 1C, and Appendix A):

1. Remove coupling guard.

JK

NOTE

1. The laser alignment method is the preferred technique for performing alignments on the 1C Auxiliary Feedwater Pump.
2. Technical Manual 8770-6702, Turbine Driver for AFW Pump, provides the following guidance for alignment targets due to thermal expansion of the Terry Turbine:
 - turbine shaft should be 0.010" lower than the pump shaft
 - coupling should be open 0.002" to 0.003" more at the top than at the bottom

Note that these alignment targets are only provided as guidance for cold machines. Contact TS for disposition of as-found alignment values outside this criteria.

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8.0 INSTRUCTIONS: (continued)

INITIALS
AS-Found
Non Rec
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8.1 (continued)

2. Take any initial alignment readings per General Maintenance Procedure No. M-0019 for reference, as required.

NOTE

The pump to motor shaft coupling is a Fast Model B, Size 2-1/2 with spacer and provision for limiting end float. The pump coupling hub to motor coupling hub separation (coupling gap) is 1/8".

3. Match mark the coupling hubs and the spool piece. TK
4. Remove the coupling bolts and slide the sleeves back for removal of the spool piece. TK

NOTE

Bolts, nuts, sleeves, and splines should be free of any objectionable or detrimental grooves, cuts, wear, or corrosion.

5. Clean out grease and inspect bolts, nuts, sleeves and splines for wear. TK
6. Check and record As-Found end play below.
(Nominal End Play = 0.005" - 0.007")
End Play 1.006 TK
7. If necessary, remove the pump coupling nut (251) setscrew. N/A P. Decker
8. Remove the coupling nut (251). Remove all burrs and dirt from the shaft (167). N/A P. Decker
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NOTE

1. Heat may be required for removal of the pump coupling. Do not exceed 300°F without TS approval. If a temperature in excess of 300°F is required, TS will document the required temperature in the journeymans work report.
2. The pump coupling hub and pump shaft (167) are tapered fits with a taper of 3/4" per foot. /R5

9. As required, heat and remove the pump coupling and the coupling key (676-4) with an appropriate puller. N/A P.D.
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8.0 INSTRUCTIONS: (continued)

INITIALS

8.1 (continued)

10. Remove all auxiliary piping that will interfere with disassembly. Tape the ends and mark for identification.

TK

11. Drain oil from the thrust and radial bearing housings (277 and 278) *Radial is N/A DE 10/24/96*

TK

12. Remove the self-tapping screws to remove the radial and thrust bearing fan covers (023 and 023-1).

TK

13. Remove the setscrews to remove the radial and thrust bearing fans (289 and 289-1).

TK

14. Release the deflector setscrews and move the inboard deflectors (241) up the pump shaft (167) if possible.

TK

15. Detach the cover-to-housing cap screws to remove the coupling end bearing cover (281) and the thrust bearing end cover (279).

TK

16. Lift up and remove the radial and thrust bearing oil rings (310).

TK

8.2 Thrust Bearing Disassembly:

1. Remove and tag location of dowels.

TK

2. Unbolt the four thrust bearing housing (277) to bottom half case (001-1) socket head capscrews.

TK

NOTE

In order to remove the inboard bearing cover (280) to thrust bearing housing (277) capscrews, it may be necessary to alternately loosen the capscrews and move the thrust bearing housing (277) forward to provide clearance until the capscrews can be completely disengaged.

3. Detach the inboard bearing cover (280) to thrust bearing housing (277) capscrews from the inboard side of the thrust bearing housing (277).

TK

4. Remove the thrust bearing housing (277).

TK

8.0 INSTRUCTIONS: (continued)

INITIALS

8.2 (continued)

5. If applicable, remove the oil ring retainer (319) setscrew. TK
6. Remove the oil ring retainer (319). TK
7. Remove the thrust bearing lock nut (249) and lockwasher (673). TK
8. If necessary, use a puller to remove the thrust bearings (654) from the pump shaft (167). TK
9. Remove the shaft locating ring (257), inboard bearing cover (280) and inboard deflector (241). TK
10. Clean the thrust bearing housing (277) and associated parts with alcohol and lint free rags. TK

8.3 Radial Bearing Disassembly:

1. Remove and tag location of dowels. D/A
2. Unbolt the four radial bearing housing (278) to bottom half case (001-1) socket head capscrews. |

NOTE

In order to remove the inboard bearing cover (280) to radial bearing housing (278) capscrews, it may be necessary to alternately loosen the capscrews and move the radial bearing housing (278) forward to provide clearance until the capscrews can be completely disengaged.

3. Detach the inboard bearing cover (280) to radial bearing housing (278) capscrews from the outboard side of the radial bearing housing (278). |
4. Remove the radial bearing housing (278). |
5. Remove the radial bearing sleeve setscrew (795). |
6. Remove the radial bearing sleeve (346) and place it in a jig or fixture. |

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8.0 INSTRUCTIONS: (continued)

INITIAL

8.3 (continued)

7. Remove the radial bearing locknut (250) and lockwasher (673-1).
8. Use a puller to press the radial bearing (655) off the radial bearing sleeve (346).
9. Remove the inboard bearing cover (280) and inboard deflector (241).
10. Clean the radial bearing housing (278) and associated parts with alcohol and lint free rags.

p/k

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8.4 Mechanical Seal Disassembly (Reference Figure 2):-

NOTE

1. The following steps in Section 8.4 are applicable to both mechanical seals (inboard and outboard ends).
2. The shaft sleeve (S-1) is located by the spacer ring (S-82) and the retaining ring (056). The spacer ring can be installed at either end of the shaft sleeve (S-1) to achieve a seal setting dimension (S) of $1-5/32" \pm 1/32"$ as shown on Figure 2.

	Inboard End	Outboard End
1. Depress and remove the shaft sleeve retaining ring (056).	<i>p/k</i> _____	<i>TK</i> _____
2. If applicable, remove the spacer ring (S-82).	_____	<i>TK</i> _____
3. Remove the seal flange stud nuts to remove as a unit the seal flange assembly (S-11) and the entire stationary sub-assembly.	_____	<i>TK</i> _____
4. Remove the stationary face (S-14), seat gasket (S-13) and bushing (S-24) from the seal flange (S-11).	_____	<i>TK</i> _____
5. Remove the rotating face (S-15) and the u-cup (S-4) from the shaft sleeve (S-1). Protective wrap and store the seal faces pending inspection.	_____	<i>TK</i> _____

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8.0 INSTRUCTIONS: (continued)

INITIALS

8.4 (continued)

	Inboard End	Outboard End
6. Take hold of the shaft sleeve (S-1) and remove as a unit the remaining rotating components.	<u>N/A</u>	<u>TK</u>
7. If applicable, remove the second spacer ring (S-82).	<u>N/A</u>	<u>N/A</u>
8. Disassemble the individual sub-component parts of the mechanical seal. Protective wrap reusable parts and store in a safe area until they are required for reassembly.	<u>N/A</u>	<u>TK</u>

8.5 Pump Casing Disassembly, Rotor Removal and Inspection

NOTE

1. The pump case is of the axially split, double volute design. The joints of the case are sealed by a gasket and retained by heat treated studs and cap nuts. The suction and discharge nozzles are integral with the bottom half case (001-1). This allows removal of the top half case (001) and rotating element without disturbance of the main piping.
2. Use fabric slings and a chainfall to remove the rotating element. Choke the element in such a manner as to not bind or pinch the 1st and 5th (outside) stage impeller/wear ring assemblies.

1. Remove and tag location of the top half case (001) to bottom half case (001-1) dowels.	<u>N/A</u>
2. Remove the case stud cap nuts and washers.	
3. Use jacking bolts in the taps provided to break the gasket joint of the case halves.	
4. Lift up and remove the top half case (001).	
5. Remove the top half of the split center stage piece (009-2).	

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8.0 INSTRUCTIONS: (continued)

INITIAL

8.5 (continued)

6. Visually inspect the rotating element, top half case (001) and bottom half case (001-1) for obvious signs of corrosion, deterioration, damage and other abnormal conditions. Prior to proceeding, contact the foreman and TS if any of these conditions exist.

P/A /R5

7. Rig and remove the rotating element.

8. Remove the following components from the rotating element:

- Throttle bushing (232)
- Balance stage piece (009-3)
- 5th stage case wear ring (205-2)
- Throat bushing (230)
- 1st stage case wear ring (205-1)

9. Remove the bottom half of the split center stage piece (009-2).

10. Place the rotating element in a clean, safe working area, preferably on precision rollers or V blocks.

NOTE

Honing the top half case (001-1) and the bottom half case (001) mating flanges is acceptable, but should be kept to an absolute minimum as this practice removes the surface finish that is necessary to achieve a satisfactory leak tight joint.

11. Remove the case gasket. Clean the mating surfaces with an approved solvent and wire brush as necessary.

NOTE

TS is to determine the extent of rotating element disassembly. Generally, rotating element disassembly is not required unless there is reason to believe an anomaly exists in one of the sub-components or a condition exists that would warrant further disassembly.

12. Contact TS for direction regarding further rotating element disassembly instructions.

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8.0 INSTRUCTIONS: (continued)

INITIAL

8.5 (continued)

NOTE

1. The 1C Auxiliary Feedwater Pump is an eight stage centrifugal pump. The 1st stage impeller (176-1) is furthest inboard with its suction facing the radial bearing (655). The 5th stage impeller (176-5) is furthest outboard with its suction facing the thrust bearing (654).
2. Removal of shrink-fitted impellers (176-1) through 176-8) or balance sleeve (218) requires application of heat. A balance sleeve requires approximately 1-1/2 minutes of heating, while an impeller requires the same amount of heating at first its eye side and then its hub side. Do not exceed 300°F without TS approval. If a temperature in excess of 300°F is required, TS will document the required temperature in the Journeyman's Work Report.
3. All impellers (176-1 through 176-8) with the exception of the 8th stage impeller (176-8) have split rings (256). The balance sleeve (218) is also retained by a split ring.
4. If the impeller (176-1 through 176-8) or balance sleeve (218) is retained by a split ring as well as its drive key, the impeller or balance sleeve must be properly heated and then pushed in the direction away from the split ring, which permits removal of the split ring, the impeller or balance sleeve and the drive key.
5. During rotating element disassembly, ensure each stage impeller, split ring and key is clearly bagged and tagged or otherwise identified.

/R5

13. Remove the balance sleeve split ring, balance sleeve (218) and balance sleeve key (676-2). p/A
14. Starting at the 5th stage impeller (176-5), carefully remove the case wear ring (205-2), the split ring (256), the impeller (176-5), the stage piece (009-1) and the impeller key (676). n/A

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8.0 INSTRUCTIONS: (continued)

INITIAL

8.5 (continued)

15. Repeat step 8.5.14 for the remaining impellers in the following order. Initial each block as each piece is removed.

	Case Wear Ring (205, 205-1, 205-2)	Split Ring (256)	Impeller (176-1 through 176-8)	Stage Piece (009, 009-1)	Impeller Key (676)
6th Stage					
7th Stage					
8th Stage		N/A			
1st Stage					
2nd Stage					
3rd Stage					
4th Stage					

8.6. Inspection/Sub-Component Replacement:

NOTE

1. Depending on extent of rotating element disassembly, some dimensions and clearances may not be able to be measured or calculated.
2. Diametrical running clearances, runouts, etc. defined in this procedure do not constitute acceptance criteria. These values provide guidelines for the acceptability of a particular component. Deviation from these values are acceptable provided they can be evaluated by TS.
3. Contact TS for disposition of running clearances, runouts, etc. outside the limits of those specified in this procedure.

/R5

1. Visually inspect all parts for damage and wear. Report all findings to TS and the foreman.

/R5

2. Pump Shaft (167):

- A. Clean and polish the pump shaft (167). Remove any burrs at location of impellers, bushings or split rings.

N/A
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8.0 INSTRUCTIONS: (continued)

INITIALS

8.6 (continued)

2. (continued)

- B. Check the runout on the pump shaft (167). Runout should not exceed 0.001" for the entire length of the shaft. Replace the pump shaft as directed by TS. Record the As-Found and As-Left pump shaft runouts below.

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N/A /R5

	As-Found Runout (TIR)	As-Left Runout (TIR)
Pump Shaft (167)	<i>N/A</i>	<i>N/A</i>

TS Review of Shaft Runout *N/A* Date / /

/R5

3. Radial and Thrust Bearings (655 and 654):

- A. The radial and thrust bearings (655 and 654) shall be replaced with new bearings.
Radial bearings are N/A, see below
- B. Measure, at two locations 90 degrees apart, the as-found and as-left Radial Bearing (655) data and record in the table below.

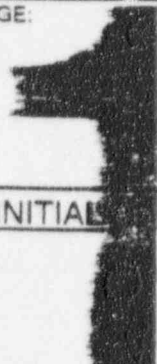
JK
Dated 10/23/96
English
N/A

	As-Found		As-Left		Diametrical Running Clearances/Design Dimensions
	90°	180°	90°	180°	
Radial Bearing Sleeve (346) OD at Radial Bearing (655) Location					2.7553" to 2.7559"
Radial Bearing (655) ID					2.7553" to 2.7559"
Radial Bearing Sleeve (346) to Radial Bearing (655) Fit					0.0006" clearance to 0.0006" interference
Radial Bearing Housing (278) ID					4.9213" to 4.9223"
Radial Bearing (655) OD					4.9206" to 4.9213"
Radial Bearing Housing (278) to Radial Bearing (655) Fit					0.0000" to 0.0017" clearance

TS Review of Data *N/A* Date / /

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N/A
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8.0 INSTRUCTIONS: (continued)

INITIALS

8.6 (continued)

3. (continued)

C. Measure, at two locations 90 degrees apart, the as-found and as-left thrust bearing (654) data and record in the table below.

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	As-Found		As-Left		Diametrical Running Clearances/Design Dimensions
	90°	180°	90°	180°	
<i>n/c m-51-5A</i> <i>m-51-3</i>					
Pump Shaft (167) OD at Thrust Bearing (654) Location	<i>2.1653</i>	<i>2.1653</i>		<i>→</i>	2.1648" to 2.1654"
Thrust Bearing (654) ID	<i>2.165</i> <i>2.165</i>	<i>2.165</i> <i>2.165</i>	<i>2.165</i> <i>2.165</i>	<i>2.165</i> <i>2.165</i>	2.1648" to 2.1654"
Pump Shaft (167) to Thrust Bearing (654) Fit	<i>.005</i>	<i>.005</i>	<i>.005</i>	<i>.005</i>	0.0006" clearance to 0.0006" interference
Thrust Bearing Housing (277) ID	<i>4.7255</i>	<i>4.7255</i>	<i>4.7255</i>	<i>4.7255</i>	4.7244" to 4.7253"
Thrust Bearing (654) OD	<i>4.724</i> <i>4.724</i>	<i>4.724</i> <i>4.724</i>	<i>4.724</i> <i>4.724</i>	<i>4.724</i> <i>4.724</i>	4.7238" to 4.7244"
Thrust Bearing Housing (277) to Thrust Bearing (654) Fit	<i>.0015</i>	<i>.0015</i>	<i>.0015</i>	<i>.0015</i>	0.0000" to 0.0015" Clearance

TS Review of Data *Decker* Date *10/15/96*

/R5

8.0 INSTRUCTIONS: (continued) INITIAL

8.6 (continued)

4. Impeller ID/Shaft OD Data:

A. Measure, calculate and record below the as-found impeller ID and shaft OD critical dimensions and clearances.

As-Found Impeller ID/Shaft OD Data

	Impeller ID		Shaft OD at Impeller		Interference Fit		Diametrical Running Clearances
	90°	180°	90°	180°	90°	180°	
1st Stage (176-1)							0.0015" to 0.003" Interference Fit
2nd Stage (176-2)							
3rd Stage (176-3)							
4th Stage (176-4)							
5th Stage (176-5)							
6th Stage (176-6)							
7th Stage (176-7)							
8th Stage (176-8)							

TS Review of Data _____ Date ____/____/____

/R5

B. If an impeller and/or the pump shaft (167) was replaced, then measure, calculate and record below the as-left impeller ID and shaft OD critical dimensions and clearances. If both an impeller and the pump shaft (167) were not replaced, then N/A and initial that row.

N/A
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8.0 INSTRUCTIONS: (continued)

INITIAL

8.6 (continued)

4. (continued)

B. (continued)

As-Left Impeller ID/Shaft OD Data

	Impeller ID		Shaft OD at Impeller		Interference Fit		Diametrical Running Clearances
	90°	180°	90°	180°	90°	180°	
1st Stage (176-1)							0.0015" to 0.003" Interference Fit
2nd Stage (176-2)							
3rd Stage (176-3)							
4th Stage (176-4)							
5th Stage (176-5)							
6th Stage (176-6)							
7th Stage (176-7)							
8th Stage (176-8)							

TS Review of Data _____ Date ___/___/___

/R5

5. Case Wear Ring ID/Impeller OD Data:

A. Measure, calculate and record below the as-found case wear ring ID and impeller OD critical dimensions and clearances. If the rotating element is not completely disassembled, the use of feeler gauges may be used to measure the as-found case wear ring ID to impeller OD clearance.

R/A
 R. Decker
 9/29/96

8.0 INSTRUCTIONS: (continued) INITIAL

8.6 (continued)

5. (continued)

A. (continued)

As-Found Case Wear Ring ID/Impeller OD Data

	Case Wear Ring ID		Impeller OD		Clearance		Diametrical Running Clearances
	90°	180°	90°	180°	90°	180°	
1st Stage (205-1)							0.011" to 0.013"
2nd Stage (205)							
3rd Stage (205)							
4th Stage (205)							
5th Stage (205-2)							
6th Stage (205-2)							
7th Stage (205-2)							
8th Stage (205-2)							

TS Review of Data _____ Date ____/____/____ /R5

B. If a case wear ring and/or an impeller was replaced on the same stage, then measure, calculate and record below the as-left case wear ring ID and impeller OD critical dimensions and clearances. If both a case wear ring and an impeller on the same stage were not replaced, then N/A and initial that row.

N/A

R. Decker
9/27/96

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8.0 INSTRUCTIONS: (continued)

INITIALS

8.6 (continued)

5. (continued)

B. (continued)

As-Left Case Wear Ring ID/Impeller OD Data

	Case Wear Ring ID		Impeller OD		Clearance		Diametrical Running Clearances
	90°	180°	90°	180°	90°	180°	
1st Stage (205-1)							0.011" to 0.013"
2nd Stage (205)							
3rd Stage (205)							
4th Stage (205)							
5th Stage (205-2)							
6th Stage (205-2)							
7th Stage (205-2)							
8th Stage (205-2)							

TS Review of Data _____ Date ____/____/____

/R5

6. Stage Piece ID/Impeller OD Data:

A. Measure, calculate and record below the as-found stage piece ID and impeller OD critical dimensions and clearances. If the rotating element is not completely disassembled, the use of feeler gauges may be used to measure the as-found stage piece ID to impeller OD clearance.

*P/A
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9/29/96*

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8.0 INSTRUCTIONS: (continued)

INITIAL

8.6 (continued)

6. (continued)

A. (continued)

As-Found Stage Piece ID/Impeller OD Data

	Stage Piece ID		Impeller OD		Clearance		Diametrical Running Clearances
	90°	180°	90°	180°	90°	180°	
1st Stage (009)							0.011" to 0.013"
2nd Stage (009)							
3rd Stage (009)							
4th Stage Center Split Stage Piece (009-2)							
5th Stage (009-1)							
6th Stage (009-1)							
7th Stage (009-1)							
8th Stage Center Split Stage Piece (009-2)							

TS Review of Data _____ Date ___/___/___

/R5

B. If a stage piece and/or an impeller was replaced on the same stage, then measure, calculate and record below the as-left stage piece ID and impeller OD critical dimensions and clearances. If both a stage piece and an impeller on the same stage were not replaced, then N/A and initial that row.

N/A
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9/29/96

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8.0 INSTRUCTIONS: (continued)

INITIAL

8.6 (continued)

6. (continued)

B. (continued)

As-Left Stage Piece ID/Impeller OD Data

	Stage Piece ID		Impeller OD		Clearance		Diametrical Running Clearances
	90°	180°	90°	180°	90°	180°	
1st Stage (009)							0.011" to 0.013"
2nd Stage (009)							
3rd Stage (009)							
4th Stage Center Split Stage Piece (009-2)							
5th Stage (009-1)							
6th Stage (009-1)							
7th Stage (009-1)							
8th Stage Center Split Stage Piece (009-2)							

TS Review of Data _____ Date ___/___/___

/R5

7. Balance Stage Piece (009-3) ID/Balance Sleeve (218) OD Data:

A. Measure, Calculate and record below the as-found balance stage piece (009-3) ID and balance sleeve (218) OD critical dimensions and clearances.

As-Found Balance Stage Piece ID/Balance Sleeve OD

Balance Stage Piece (009-3) ID		Balance Sleeve (218) OD		Clearance		Diametrical Running Clearances
90°	180°	90°	180°	90°	180°	
						0.010" to 0.012"

n/a
7. Nelson
9/29/96

TS Review of Data _____ Date ___/___/___

/R5

8.0 INSTRUCTIONS: (continued)

INITIAL

8.6 (continued)

7. (continued)

- B. If the balance stage piece (009-3) and/or the balance sleeve (218) was replaced, then measure, calculate and record below the as-left balance stage piece (009-3) ID and balance sleeve (218) OD critical dimensions and clearances. If both the balance stage piece (009-3) and the balance sleeve (218) were not replaced, then N/A and initial that row.

N/A

As-Left Balance Stage Piece ID/Balance Sleeve OD

Balance Stage Piece (009-3) ID		Balance Sleeve (218) OD		Clearance		Diametrical Running Clearances
90°	180°	90°	180°	90°	180°	
N/A	N/A	N/A	N/A	N/A	N/A	0.010" to 0.012"

TS Review of Data N/A R. Decha Date 9/29/96

/R5

8. Shaft Locating Ring (257):

- A. Using a micrometer measure the thickness (axial dimension) of the shaft locating ring (257) at four locations 90 degrees apart. All four dimensions should be within 0.001" of each other. Record these dimensions in the table below.

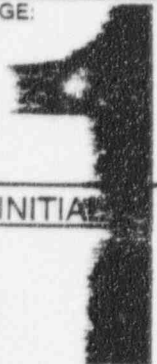
TK

As-Found Shaft Locating Ring (257) Data

<u>M-51-1A</u>	Locating Ring Thickness
0°	.436
90°	.436
180°	.436
270°	.436

TS Review of Data N/A Date / /

/R5

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8.0 INSTRUCTIONS: (continued)

INITIALS

8.6 (continued)

8. (continued)

B. If the acceptance criteria is not met contact TS for direction as a new shaft locating ring (257) may need to be machined.

N/A /R5

8.7 Pump Assembly (Reference Figures 1, 1A, 1B, 1C and Appendices A and B):

1. Discard all old gaskets and O-rings. Use new gaskets and O-rings for reassembly.

N/A

2. As necessary, wash all parts thoroughly in isopropyl alcohol (or other approved solvent). If required, dry the parts with air or clean, lint free rags.

3. Discard all parts that are worn, corroded or suspect. Provide replacements.

4. Determine that the pump shaft (167) is free of dirt and burrs.

5. Thoroughly clean the top and bottom half cases (001 and 000-1).

6. Wash out with isopropyl alcohol and air blast dry the volutes in both the top and bottom half cases (001 and 000-1).

7. Fabrication of New Casing Gasket:

NOTE

1. The preferred casing gasket material for the 1C AFW pump is 1/64" thick Garlock style G-9920 compressed flexible graphite.

2. The following steps provide one method of cutting an AFW pump casing gasket. Other methods are acceptable and may be used provided the result is a neat and accurate casing gasket.

A. Place a sheet of gasket material on the flange face of the top half case (001) and outline the bolt holes with a pen or pencil.

R. Hecker
9/29/96
↓

8.0 INSTRUCTIONS: (continued)

INITIALS

8.7 (continued)

7. (continued)

- B. Remove the gasket and use a razor blade, hole punch or equivalent tool to cut out for all the bolt holes.
- C. Place the gasket on the top half case (001), insert a dowel pin in each of the four corner bolt holes to prevent the gasket from shifting, and mark the outline of the inner and outer configuration of the top half case (001).
- D. Remove the gasket and cut out for the inner and outer outlines with a razor blade or similar sharp-instrument.

8.8 Rotating Element Reassembly:

NOTES

1. Replacement of a shrink-fitted impeller (176-1 through 176-8) or a balance sleeve (218) requires that these pieces be heated to approximately 300°F. Use a temp-stick to maintain proper temperature.
2. Proper heating of an impeller (176-1 through 176-8) or a balance sleeve (218) requires a slow, even heat distribution to obtain uniform expansion. Use of an oven for heating of these components is recommended.

1. Install the impeller center key (676-1) in position on the pump shaft (167).
2. Starting at the 4th stage impeller (176-4) carefully heat the impeller in accordance with the notes provided above.
3. Slide the 4th stage impeller (176-4) on the pump shaft (167) far enough to permit installation of the split rings (256).
4. Install the split rings (256) on the pump shaft (167).
5. Slide the 4th stage impeller (176-4) toward the suction end until the impeller bottoms out on the split rings (256).

*W/A
L. Becker
3/29/96*

8.0 INSTRUCTIONS: (continued) INITIAL _____

8.8 (continued)

6. Install the 4th stage case wear ring (205).
7. Repeat steps 8.8.1 through 8.8.6 for the remaining impellers in the following order. Initial each block as each piece is installed.

	Case Wear Ring (205, 205-1, 205-2)	Split Ring (256)	Impeller (176-1 through 176-8)	Stage Piece (009, 009-1)	Impeller Key (676)
3rd Stage					
2nd Stage					
1st Stage					
8th Stage		N/A			
7th Stage					
6th Stage					
5th Stage					

8. Install the balance sleeve key (676-2) in position on the pump shaft (167). _____
9. Carefully heat the balance sleeve (218) in accordance with the notes provided above. _____
10. Slide the balance sleeve (218) on the pump shaft (167) far enough to permit installation of the split rings. _____
11. Install the split rings on the pump shaft (167). _____
12. Slide the balance sleeve (218) toward the outboard end until the sleeve bottoms out on the split rings. _____
13. Install the following components on the rotating element. _____

Throat bushing (230)
Balance stage piece (009-3)
Throttle bushing (232)

N/A
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9/29/96

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8.0 INSTRUCTIONS: (continued)

INITIAL

8.9 Pump Assembly:

1. Place the bottom half of the split center stage piece (009-2) in position in the bottom half case (001-1). Ensure that the anti-rotation lug is engaged.

NOTES

1. Use fabric slings and a chainfall to install the rotating element. Choke the element in such a manner as to not bind or pinch the 1st and 5th (outside) stage impeller/wear ring assemblies.
2. All anti-rotation lugs MUST be 100% engaged before the top half case (001) is installed. This should be accomplished by a single individual working from one end of the rotating element to the other, systematically engaging each anti-rotation lug as he/she proceeds, then making a final pass as many times as necessary to ensure that the rotating element is properly seated before continuing.

2. Visually inspect the rotating element for detrimental or unacceptable conditions prior to installation.
3. Lower the rotating element into the bottom half case (001-1).
4. Ensure that all anti-rotation lugs are properly oriented and engaged PRIOR to proceeding to the next step.

n/a
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9/29/96

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8.0 INSTRUCTIONS: (continued)

INITIALS

8.9 Pump Assembly:

Q.C. HOLDPOINT
STEP 8.9.5

Prior to pump reassembly, Q.C. shall verify cleanliness of the pump casings and rotating element. Gasket mating surfaces and casing bolting greater than or equal to 1" shall be inspected for cleanliness and degradation.

ACCEPTANCE CRITERIA:

1. Q.C. shall verify the pump casings, rotating element, and bolting greater than or equal to 1" meet QI 13-PR/PSL-2, Class C cleanliness requirements, which state: The surfaces shall appear metal clean and show no evidence of visual contamination except a uniform rust bloom which can be removed by brushing or wiping is acceptable and a tightly adherent oxide film or a light red oxide rust coating is permissible.
2. Q.C. shall inspect the gasket mating surfaces for signs of degradation, i.e. gouges, nicks, corrosion, erosion or cracks.
3. Q.C. shall inspect bolting greater than or equal to 1" (removed) and insure that all bolts and studs are free from physical damage such as necking, cracks in the shank area, head and flange bearing surfaces are free from laps, wear, gouges, nicks, corrosion, erosion due to movement, and deformation or bending.

VERIFIED BY _____ DATE ____/____/____

QC Hold Point N/A because this page for complete assembly. David English 10/2/96

5. Verify that the casing gasket fits cleanly and precisely at all wear ring mating surfaces and that the bolt/dowel pin areas are clean. _____

6. Place the top half of the split center stage piece (009-2) in position on top of the rotating element. _____

7. Install the top half case (001). _____

8. Install dowels, washers, bolting and cap nuts. _____

*N/A
David English
9/29/96*

8.0 INSTRUCTIONS: (continued)

INITIAL

8.9 (continued)

Q.C. HOLDPOINT
STEP 8.9.9

Q.C. shall verify final torque of the main parting flange bolting.

INSPECTION CRITERIA:

- Q.C. shall verify proper quality level and traceability of new bolting material (if applicable) by the R.I.R. and/or P.O. Number on the ROS in the NPWO package.
- Q.C. shall verify M&TE of torque apparatus is per GMP-02.

Torque Wrench/ _____	Machine/ _____	Multiplier Number _____
-------------------------	-------------------	----------------------------

Cal Date: ___/___/___

Due Date: ___/___/___

- Q.C. shall witness the final torque of main flange bolting greater than or equal to 1". Verify final torque values are in accordance with General Maintenance Procedure M-0039 and Appendix B.

VERIFIED BY _____ DATE ___/___/___

QA/QC Hold point N/A because complete pump assembly not required. David English 10/2/96

9. Torque case bolting in three consecutive passes to 45,000 psi stress in accordance with General Maintenance Procedure M-0039 and Appendix B. Record the final torque value used below.

Final Torque Value _____

*N/A
R. Decker
9/29/96*

8.0 INSTRUCTIONS: (continued)

INITIAL

8.10 Axial Setting

NOTES

1. After installation of the rotating element in the pump casing and before final installation of the mechanical seal and bearing components, it is necessary to determine that the shaft locating ring (257) centers the rotating element axially and that the thrust bearing end cover (279) permits the correct amount of end play. The recommended inspection procedure requires the use of a machinist's scale (approximately 1/2" wide), a method of marking the shaft (scribe) and a dial indicator.
2. The finished shaft locating ring (257) must locate the pump shaft (167) at its center of travel ($\pm 1/64"$), must have its faces parallel within 0.001" and must have a 1/32" radius at each end of its bore.

1. To inspect the axial location of the rotating element, take a position at the inboard (coupling) end of the pump. _____
2. Place the scale on the pump shaft (167) with one edge against the pump casing. _____
3. Move the pump shaft (167) as far as possible inboard, and, at the outside edge of the scale, mark the shaft to indicate Position A (the limit of inboard travel). _____
4. Move the pump shaft (167) all the way outboard and mark the shaft to indicate Position B. (the limit of outboard travel) _____
5. Distance A - B indicates the total pump shaft (167) travel. Select one-half of the total pump shaft (167) travel and mark Position C to indicate the center of pump shaft (167) travel. Use the table below to record the information. _____

Calculation for Center of Pump Shaft (167) Travel

Distance
A - B

(A - B) / 2 =
Position C

Handwritten:
2.5
R. Decker
9/29/96

8.0 INSTRUCTIONS: (continued)

INITIAL

8.10 (continued)

NOTE

Old or dummy bearings should be used instead of new bearings for axial setting of the rotating element. The old or dummy bearings are to be removed from the pump shaft (167) after the axial setting process is complete.

6. Temporarily install the following thrust bearing components to permit measurement and adjustment of the pump axial setting.

Inboard bearing cover (280)
 Bearing cover gasket (744)
 Shaft locating ring (257)
 Old or dummy thrust bearing (654)
 Thrust bearing lockwasher (673)
 Thrust bearing locknut (249)

7. Tighten the thrust bearing locknut (249).

8. Install the thrust bearing housing (277) using the dowels and the four socket head capscrews which secure the housing to the bottom half case (001-1).

9. Bolt the inboard bearing cover (280) to the thrust bearing housing (277).

10. Move the pump shaft (167) inboard as far as possible.

11. Place the scale on the pump shaft (167) with one edge against the pump and mark position D.

NOTE

The difference between position C and position D is the amount of shaft locating ring (257) deviation.

12. Measure the distance, if any, between Position C and Position D.

*R/S
 R. Secher
 9/29/96*

8.0 INSTRUCTIONS: (continued)

INITIALS

8.10 (continued)

13. If Position D falls inboard of Position C, machine off the shaft locating ring (257) a distance equal in thickness to Distance C - D. If Position D falls outboard of Position C, discard the shaft locating ring (257) and provide a replacement that is equal in thickness to the original plus Distance C - D. Use the table below to record the information.

Calculation for Shaft Locating Ring (257) Deviation

C - D = _____

Check One:

D Inboard of C

D Outboard of C

Position D = Position C

14. The rotating element is axially centered. _____
15. Remove the following thrust bearing components. _____

- Thrust bearing housing (277)
- Thrust bearing locknut (249)
- Thrust bearing lockwasher (673)
- Old or dummy thrust bearing (654)
- Shaft locating ring (257)
- Bearing cover gasket (744)
- Inboard bearing cover (280)

N/A
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8.0 INSTRUCTIONS: (continued)

INITIAL

8.11 Mechanical Seal Installation (Reference Figure 2)

NOTE

1. This section is applicable for both the inboard and outboard mechanical seals.
2. Mark N/A in the appropriate space(s) if new components or seal(s) are to be installed, and initial after N/A.
3. The shaft sleeves (S-1) are located by the spacer rings (S-82) and the retaining rings (056). The spacer rings can be installed at either end of the shaft sleeves (S-1) to meet the requirements of step 8.11.1.A.

Inboard Outboard
End End

1. Complete the following steps for both the inboard outboard stationary components.

A. With the pump shaft (167) located as far as possible inboard, temporarily install the shaft sleeves (S-1) and determine and record below the required thickness for each of the four spacer rings (S-82) to achieve the following requirements:

1. Seal setting dimension (S) of $1-5/32"$ $\pm 1/32"$ as shown on Figure 2A
2. Spacer rings (S-82) must securely lock shaft sleeves (S-1) in place on the pump shaft (167)

N/A
R. Secher
10/2/96

Spacer ring (S-82) thickness (A = most inboard and D = most outboard):

A: _____
B: _____
C: _____
D: _____

TS Concurrence _____ Date ____/____/____ /R5

8.0 INSTRUCTIONS: (continued)

INITIAL

8.11 (continued)

1. (continued)

	Inboard End	Outboard End
B. Machine the spacer rings (S-82) as necessary.	<u>MR</u>	<u>MA</u>
C. Place coil spring (S-16) in the spring holder (S-17)		<u>TK</u>
D. Compress the coil spring (S-16) into the spring holder (S-17) with seal drive (S-2) and place drive keys (S-3) through holes in the seal drive (S-2) and out through slots in the spring holder (S-17).		<u>TK</u>
E. Place this unit on the shaft sleeve (S-1) ensuring that the drive pin keys (S-3) fit into slots provided in the back of the shaft sleeve.		<u>TK</u>
F. Lubricate the U Cup (S-4) with Dow Corning 55M.		<u>TK</u>

NOTE

Ensure that the U Cup (S-4) seats on the spring holder (S-17) correctly and that the lips of the U Cup (S-4) do not curl under when sliding on the shaft sleeve. (S-1)

G. Place the U Cup (S-4) over the shaft sleeve (S-1) and onto the spring holder (S-17).

R. Becker
9/29/96

TK

8.0 INSTRUCTIONS: (continued) INITIAL

8.11 (continued)

NOTE

Ensure that the rotating face (S-15) is clean and free of scratches before installation on the shaft sleeve (S-1). Lubrication of the lapped seal faces is not recommended. Clean lint free rags and alcohol may be used as necessary to clean the lapped faces of the rotating and stationary faces (S-15 and S-14).

	Inboard End	Outboard End
H. Slide the rotating face (S-15) over the U Cup (S-4) ensuring that the rotating face ears engage the slots in the spring holder (S-17).	<u>N/A</u>	<u>TK</u>
I. Lubricate with Dow Corning 55M, and install sleeve gaskets (S-19) onto the shaft sleeve (S-1).	<u> </u>	<u>TK</u>
J. Install the spacer ring (S-82) onto the pump shaft (167).	<u> </u>	<u>N/A</u>
K. Install the shaft sleeve (S-1) with assembled components onto the pump shaft (167) until the sleeve bottoms out against the lip on the shaft.	<u> </u>	<u>TK</u>
L. Visually inspect the stuffing box to ensure that the casing gasket is properly trimmed and the area is clear.	<u> </u>	<u>TK</u>
M. Press the bushing (S-24) into the seal flange assembly (S-11)	<u> </u>	<u>N/A</u>
N. Lightly lubricate the seat gasket (S-13) with Dow Corning 55M and install it on the stationary face (S-14).	<u> </u>	<u>TK</u>
O. Slide the stationary face (S-14) with seat gasket (S-13) installed into seal flange assembly (S-11).	<u> </u>	<u>TK</u>

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8.0 INSTRUCTIONS: (continued)

INITIALS

8.11 (continued)

NOTE

Ensure that the stationary face (S-14) is clean and free of scratches. Lubrication of the lapped seal faces is not recommended. Clean lint free rags and alcohol may be used as necessary to clean the lapped faces of the rotating and stationary faces (S-15 and S-14).

Inboard	Outboard
End	End

P. Lubricate with Dow Corning 55M and place flange gasket (S-18) in groove provided in the seal flange assembly (S-11).

<u>PK</u>	<u>TK</u>
-----------	-----------

CAUTION

During seal assembly, bring the seal faces together as soft as possible to prevent damage.

Q. Place the seal flange assembly (S-11) along with the stationary face assembly into position on the shaft.

_____	<u>TK</u>
-------	-----------

R. Bolt the seal flange assembly (S-11) to the pump casing ensuring that the seal flange assembly (S-11) is not cocked to one side.

_____	<u>TK</u>
-------	-----------

S. Torque the 1/2" seal flange nuts in a criss-cross pattern in three consecutive passes to 15, 30 and 45 ft. lbs.

_____	<u>TK</u>
-------	-----------

T. Install the spacer ring (S-82) and the retaining ring (056).

_____	<u>TK</u>
-------	-----------

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8.0 INSTRUCTIONS: (continued)

INITIALS

8.12 Radial (Inboard) Bearing Installation
(Reference Figures 1, 1A, and 1C)

NOTE

If heat is required for radial bearing (655) installation, use a temp stick to ensure that a temperature of 250°F is not exceeded. Use of an oven or induction heater is recommended.

1. Press the radial bearing (655) onto the radial bearing sleeve (346).

p/s

NOTE

Tighten the radial bearing locknut (250) using a spanner wrench and hammer, or punch and hammer, until a solid metal to metal sound is heard and/or felt.

2. Install the radial bearing lockwasher (673-1) and locknut (250) and tighten the locknut (250).
3. After the radial bearing (655) has cooled to ambient temperature, retighten the radial bearing locknut (250) and bend down the tab on the lockwasher (673-1).
4. Slide the inboard deflector (241) and the inboard bearing cover (280) on the pump shaft (167).
5. Install the radial bearing sleeve (346) on the pump shaft (167) and tighten the radial bearing setscrew (795). Stake the setscrew (795) upon completion.
6. Install the bearing cover gasket (744) and the radial bearing housing (278).
7. Install and tighten the four hex head capscrews which secure the inboard bearing cover (280) to the radial bearing housing (278).

↓
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 9/29/96

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8.0 INSTRUCTIONS: (continued)

INITIAL

8.12 (continued)

8. Install the radial bearing housing (278) to bottom half case (001-1) dowels and four socket head capscrews.
9. Torque the four socket head capscrews in three consecutive passes to 45,000 psi stress in accordance with General Maintenance Procedure M-0039. Record the final torque value used below.

R/S

Final Torque Value _____

NOTE

The oil ring (310) must be free of damage, must lay properly in place on the radial bearing sleeve (346) and must be concentric for correct rotation/sliding.

10. Install the oil ring (310).
11. Install the coupling end bearing cover (281) and bearing cover gasket (744) with capscrews. Torque the capscrews in three consecutive passes to 45,000 psi stress in accordance with General Maintenance Procedure M-0039. Record the final torque value used below.

Final Torque Value _____

12. Install the radial bearing fan (289) and tighten the setscrews.
13. Install the radial bearing fan cover (023) with self-tapping screws.

R. Decker
9/29/96

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8.0 INSTRUCTIONS: (continued)

INITIALS

3.13 Thrust (Outboard) Bearing Installation
(Reference Figures 1, 1B and 1C)

1. Slide the inboard deflector (241), inboard bearing cover (280) and the shaft locating ring (257) onto the pump shaft (167).

TK

NOTES

1. If heat is required for thrust bearing (654) installation, use a temp stick to ensure that a temperature of 250°F is not exceeded. Use of an oven or induction heater is recommended.
2. Thrust bearings (654) are mounted on the pump shaft (167) in a face to face (DF) configuration. Refer to figure 1B for additional information.

2. Install the thrust bearings (654) on the pump shaft (167) in accordance with the notes above.

TK

3. Apply a small amount of N-5000 to the threads on the pump shaft (167) and the thrust bearing locknut (249).

TK

NOTE

Tighten the thrust bearing locknut (249) using a spanner wrench and hammer, or punch and hammer, until a solid metal to metal sound is heard and/or felt.

4. Install the thrust bearing lockwasher (673) and the thrust bearing locknut (249) and tighten the locknut (249).

TK

5. After the thrust bearing (654) has cooled to ambient temperature, retighten the thrust bearing locknut (249).

TK

6. If necessary, advance the thrust bearing locknut (249) tighter until it matches with a tab on the thrust bearing lockwasher (673).

TK

7. Knock a tab from the thrust bearing lockwasher (673) down into the thrust bearing locknut's (249) slot ensuring that it is squarely and cleanly seated.

TK

8. Install the oil ring retainer (319). Tighten the setscrew and stake it upon completion.

TK

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8.0 INSTRUCTIONS: (continued)

INITIALS

8.13 (continued)

9. Install the bearing cover gasket (744) and the thrust bearing housing (277). TK
10. Install and tighten the four hex head capscrews which secure the inboard bearing cover (280) to the thrust bearing housing (277). TK
11. Install the thrust bearing housing (277) to bottom half case (001-1) dowels and four socket head capscrews. TK
12. Torque the four socket head capscrews in three consecutive passes to 45,000 psi stress in accordance with General Maintenance Procedure M-0039. Record the final torque value used below. TK

Final Torque Value 150 m-27

NOTE

The oil ring (310) must be free of damage, must lay properly in place on the oil ring retainer (319) and must be concentric for correct rotation/sliding.

13. Install the oil ring (310). TK
14. Install the thrust bearing end cover (279) and bearing cover gasket (744) with the capscrews. Torque the capscrews in three consecutive passes to 45,000 psi in accordance with General Maintenance Procedure M-0039. Record the final torque value used below. TK

Final Torque Value 45 LBS

15. Install the thrust bearing fan (289-1) and tighten the setscrews. TPK
16. Install the thrust bearing fan cover (023-1) with self-tapping screws. TPK

8.0 INSTRUCTIONS: (continued)

INITIAL

8.14 Thrust Bearing End Play (Ref: Figures 1, 1B and 1C):

NOTES

1. Thrust Bearing (654) End Play should be between 0.005" to 0.007".
2. Repeat Steps 8.14.1 through 8.14.3 as many times as necessary to ensure consistent and accurate dial indicator readings.

1. Place the dial indicator in contact with the inboard end of the pump shaft (167). *1st check OK*

TK

2. Move the pump shaft (167) inboard as far as possible and zero the dial indicator. *1st check OK*

TK

3. Move the pump shaft (167) outboard as far as possible and note the indicated travel. Record thrust bearing (654) end play below. *1st check OK .018*

TK

Thrust Bearing (654) End Play .018
removal of .008 by machinist Required when new gasket of .006 used

4. Adjust thrust bearing (654) end play with one of the two options listed below as the conditions require:

A. If the indicated thrust bearing (654) end play is greater than recommended, machine the upper inside face of the thrust bearing end cover (279) (i.e. the thrust bearing end cover (279) bolt circle flange) to remove an amount of material equal in thickness to the recorded difference. *OK*

B. If indicated thrust bearing (654) end play is less than recommended, either increase the thickness of the bearing cover gasket (744) (not to exceed a total gasket thickness of 0.010"), or machine the lower inside face of the thrust bearing end cover (279) (i.e. the thrust bearing end cover (279) fingers) by an amount equal in thickness to the recorded difference. *OK*

5. Repeat steps 8.14.1 through 8.14.4 until thrust bearing (654) end play is satisfactory. Record as-left end play reading below.

TPK

As-Left Thrust Bearing (654) End Play .0045

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8.0 INSTRUCTIONS: (continued)

INITIAL

8.14 (continued)

6. Move the radial and thrust bearing housing inboard deflectors (241) into place (0.010" to 0.012" axial clearance) and tighten the setscrews.

JPK

8.15 Coupling Installation (Reference Figures 1, 1A and 1C):

1. As necessary, have Operations run the turbine uncoupled to perform an overspeed trip test in accordance with Operations Procedure No. 1-0700028, "Auxiliary Feedwater Turbine Mechanical and Electrical Overspeed Trip Tests".

N/A
R. Decker
9/29/96

NOTES

1. The turbine to pump coupling is a Fast model B, size 2-1/2 with spacer and provision for limiting end float. This type coupling requires 4 oz. of grease for each of the two coupling hubs. Only the specified quantity of grease shall be used in the coupling. No additional grease needs to be added through the lube plugs after the coupling is assembled. Overfilling can result in improper lubrication flow, wear and overheating.
2. The pump coupling hub and pump shaft (167) are tapered fits with a taper of 3/4" per foot. The coupling manufacturer suggests that for shafts with a 3/4" per foot taper, the coupling hub should be installed such that a 0.0005" per inch of shaft diameter interference fit is obtained. There are two different methods to accomplish this as detailed below. Either method is acceptable.
3. As per Byrn Jackson Dwg. 2E-2233 of Technical manual 8770-6130, the appropriate distance between the end of the pump shaft (167) (or coupling nut (251)) and the end of the turbine shaft is 7.00". Coupling hubs should be flush with the end of their respective shafts. TS is to disposition deviations in the shaft gap in the journeymans work report.

/R5

2. Install the coupling key (676-4) on the pump shaft (167).
3. Apply a small amount of N-5000 to the threads on the pump shaft (167) and the coupling nut (251).

N/A

N/A

R. Decker
9/29/96

8.0 INSTRUCTIONS: (continued)

INITIALS

8.15 (continued)

4. Install the coupling hub and sleeve on the pump shaft (167) using one of the two methods described below:

A. Heat the hub to approximately 200°F maximum and install on the pump shaft (167) applying pressure manually.

N/A

B. Mount the cold hub hand tight on the pump shaft (167) and rap with a soft mallet to establish an initial snug fit. Draw the hub up an additional 0.027" using the coupling nut (251).

N/A
R. Archer
9/29/96

5. Install and tighten the coupling nut (251).

N/A

6. If applicable, install and tighten the coupling nut setscrew.

N/A

7. Measure and record below the shaft-to-shaft dimension and spool piece length.

TPK

Shaft-to-Shaft Dimension 6.992

Spool Piece Length 6.827

TPK

8. Measure out two bags of Premium RB grease, each weighing approximately 4 oz.

TPK

9. Coat the splines of the hubs and sleeves with Premium RB grease.

TPK

10. Pull sleeves up and hand pack the remainder of the grease between the hubs and sleeves.

TPK

11. Wipe the gasket faces clean and install the spool piece with gaskets between each sleeve and the spool piece. Ensure that match marks are aligned.

TPK

12. Insert coupling bolts, lockwashers and nuts.

TPK

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8.0 INSTRUCTIONS: (continued)

INITIAL

8.15 (continued)

13. Torque the coupling bolting to 23 ft.-lbs. in a standard criss-cross pattern.
14. Ensure the lube plugs are tight. No specific torque is required.

TPK

TPK

NOTE

1. The laser alignment method is the preferred technique for performing alignments on the 1C auxiliary feedwater pump.
2. Technical manual 8770-6702, Turbine Driver for AFW Pump, provides the following guidance for alignment targets due to thermal expansion of the Terry Turbine:
 - turbine shaft should be 0.010" lower than the pump shaft
 - coupling should be open 0.002" to 0.003" more at the top than at the bottom

Note that these alignment targets are only guidance for cold machines. Contact TS for disposition of as-left alignment values.

/R5

15. Perform a final alignment in accordance with General Maintenance Procedure M-0019.

SAT.
Randy Becker
10/24/96

16. Install the coupling guard.

TPK

8.16 Final Assembly (Reference Figures 1, 1A, 1B, 1C and 3):

1. Reconnect all auxiliary piping and components which were previously removed.
2. Reinstall the radial and thrust bearing housing sight glasses in accordance with Figure 3.

TPK

TPK

NOTE

Use teflon tape or PRI-102N as a pipe thread sealant.

3. Clean the threads on the bearing housing drain plug and hole.
4. Install the drain plug using thread sealant. Tighten the plug wrench tight.

TPK

TPK

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8.0 INSTRUCTIONS: (continued)

INITIALS

8.16 (continued)

5. Clean the vent cap on top of the bearing housing and ensure the vent path is clear of paint or other debris. TPK
6. Fill the radial and thrust bearing housings (278 and 277) with Texaco Regal R&O 32 oil to their proper level as indicated by the oil level mark on the housing. TPK
7. Clean up any oil that was spilled. TPK
8. Verify that all bolting and components are secure. TPK
9. Make a final inspection and check. TPK
10. Coordinate with Operations to get the pump in operation for a brief period of time. Recheck fluid levels after the pump is stopped and oil has settled. Refill oil to proper level with Texaco Regal R&O 32 oil if low, and repeat this step as necessary. TPK

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APPENDIX A
TECHNICAL DATA AND CHARACTERISTICS

Pump Size and Type	3 X 6 X 9E, eight stage type DVMX, having fan cooled ball thrust and radial bearings.
Serial Number	711-N-0677, One Pump
Service	Auxiliary Steam Generator Feed Pump
Rotation (as viewed from coupling end)	Clockwise
Driver	Terry® Steam Turbine, Type GS-2, 575 HP; 2000 RPM
Driver-to-Pump coupling	Fast Model B Size, No. 2-1/2 with spacer and provision for limiting end float
Shaft Seal	The pump is supplied with two Borg-Warner Mechanical Seals, Model UK-3000
Bolting Material (Pump)	For the hold down bolts, use ASME SA-307 Gr. B; for the dowels, use ASME SA-193 Gr. B7.
End Play	0.005" - 0.007"
Deflector Clearance	0.010" - 0.012"

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5

PROCEDURE TITLE:

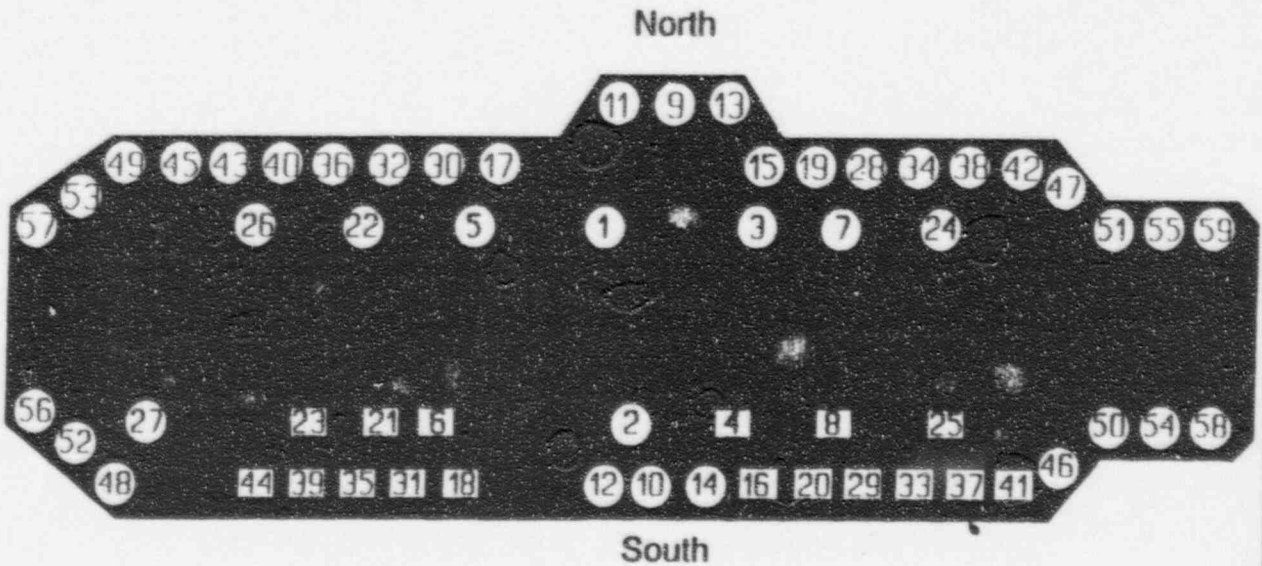
AUXILIARY FEEDWATER PUMP 1C DISASSEMBLY,
INSPECTION AND REASSEMBLY
MECHANICAL MAINTENANCE PROCEDURE
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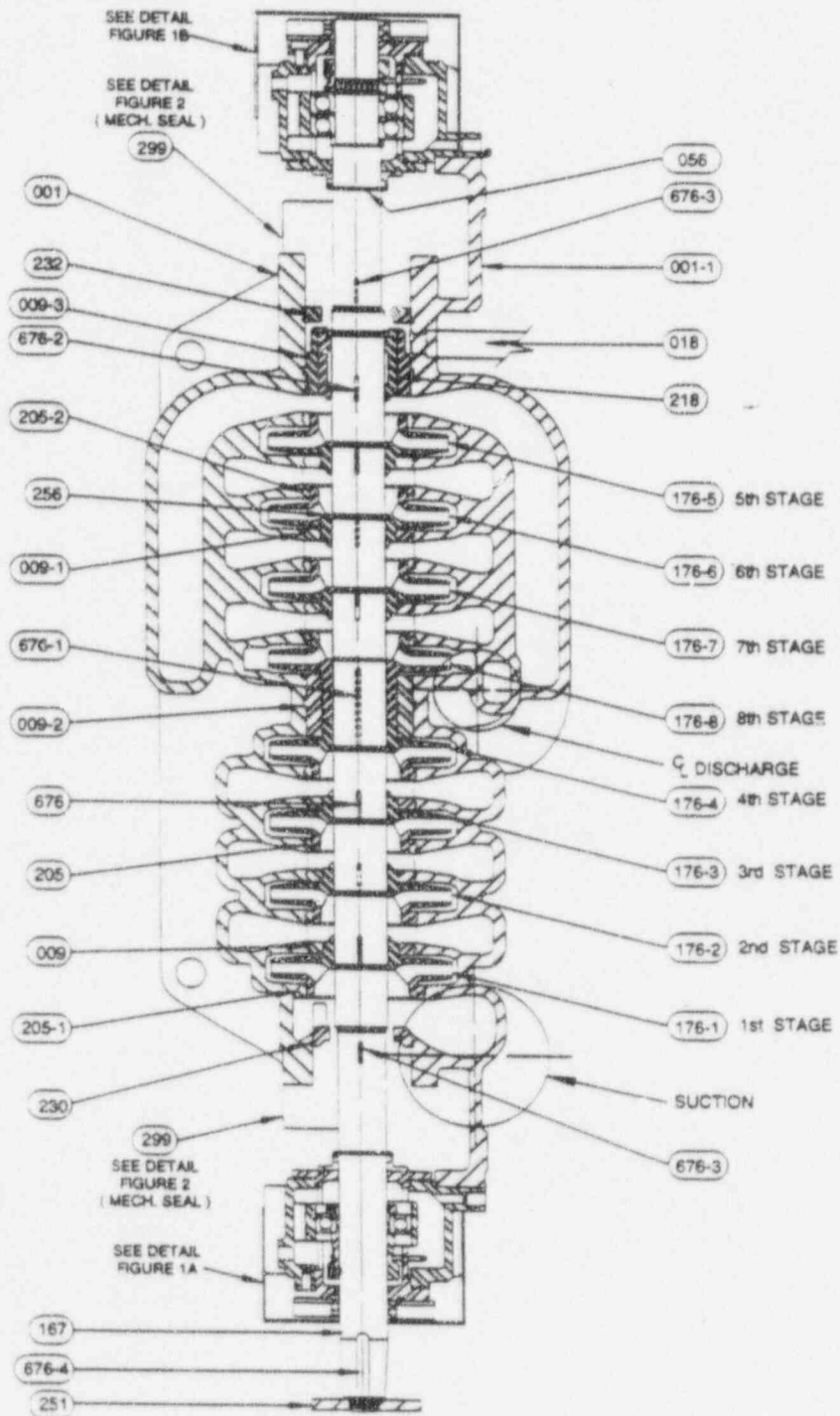
APPENDIX B
AFW PUMP 1C TORQUE SEQUENCE



- = Bolting on Top
- = Bolting Underneath

(MMP0902A.WPG)

FIGURE 1
PUMP CROSS-SECTION
AUXILIARY FEEDWATER PUMP 1C
(Eight Stage DVMX Pump)

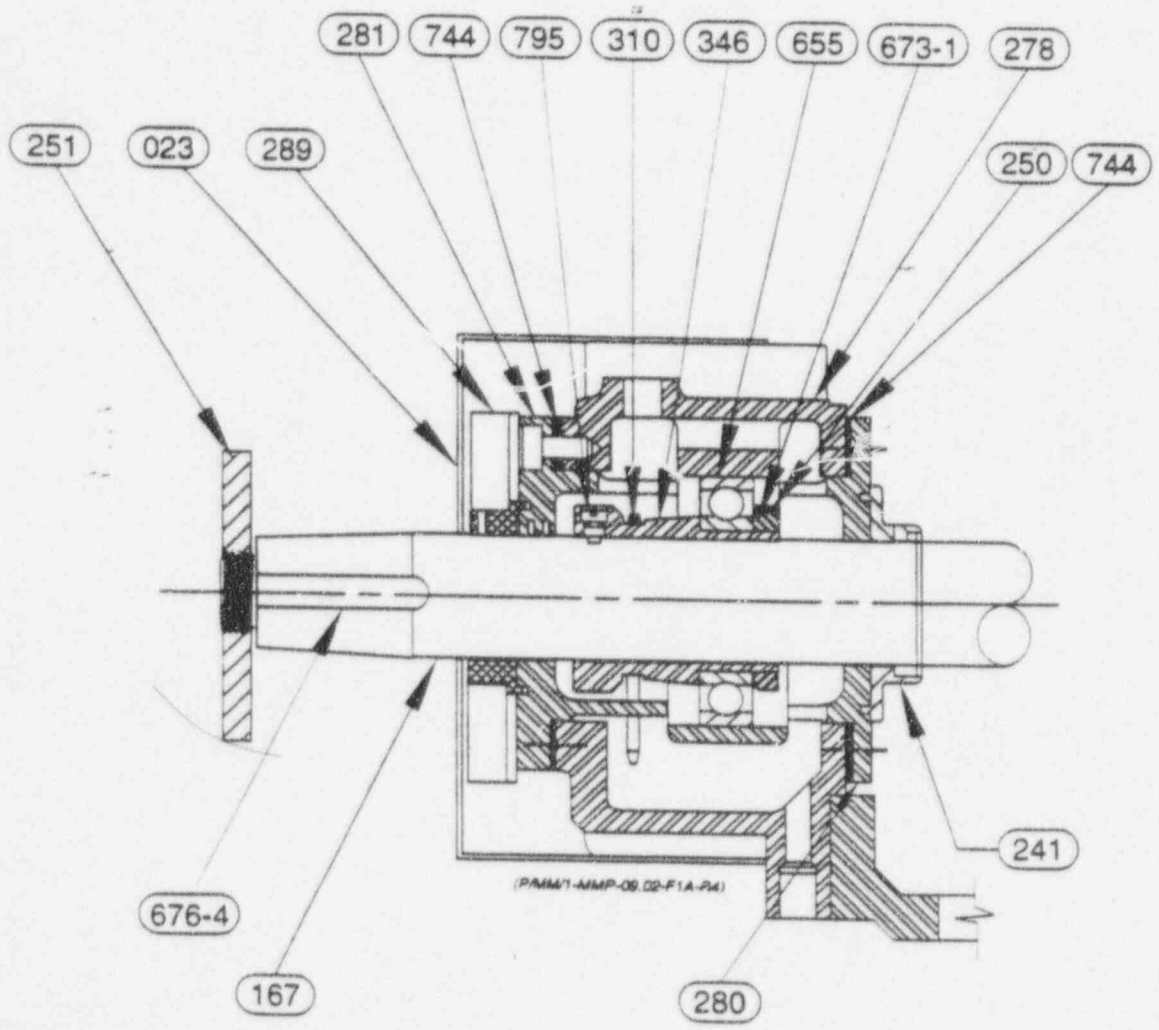


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FIGURE 1A
INBOARD (RADIAL) BEARING ASSEMBLY



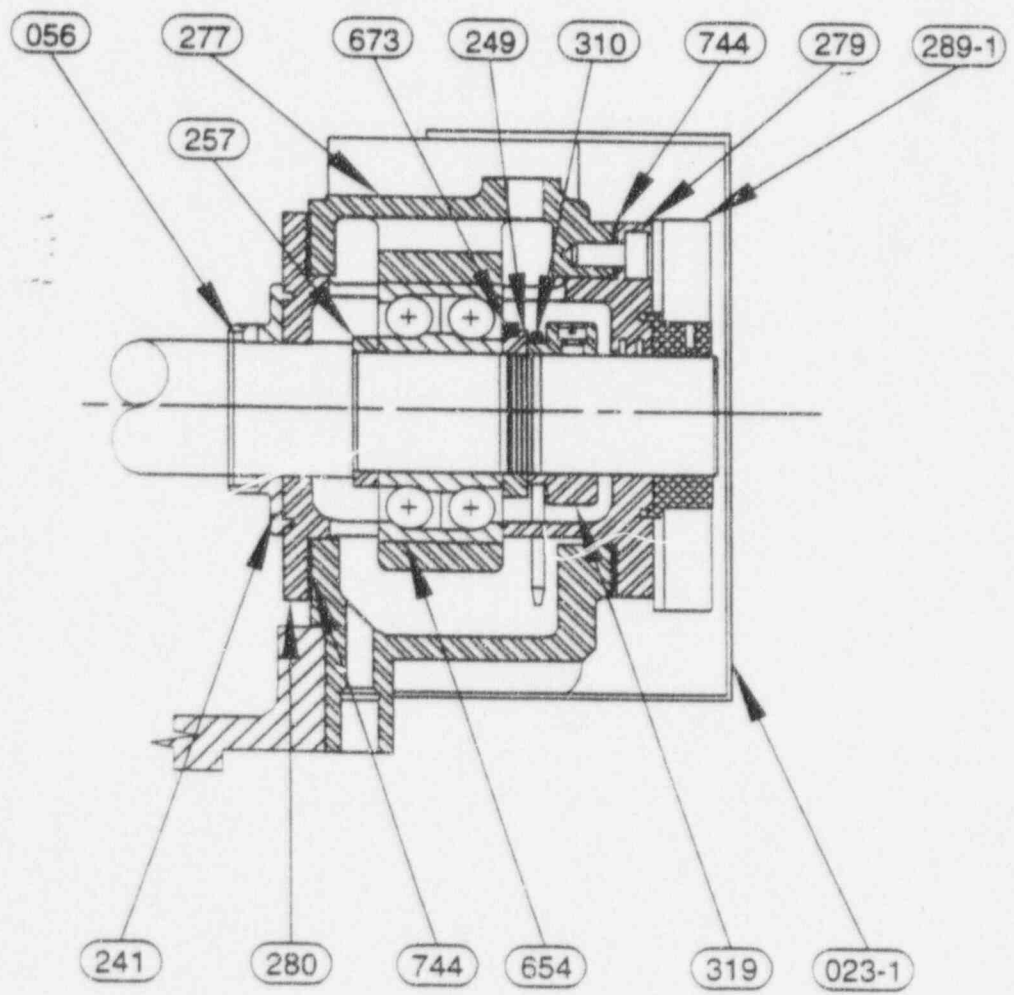
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FIGURE 1B
OUTBOARD (THRUST) BEARING ASSEMBLY

NOTE
The thrust bearings (654) are mounted on the pump shaft (167) in a face to face (DF) configuration. In a DF configuration the contact angles converge inside the bearings as shown below. In this configuration the stamped faces of the inner races are together and the unstamped faces of the outer races are together.



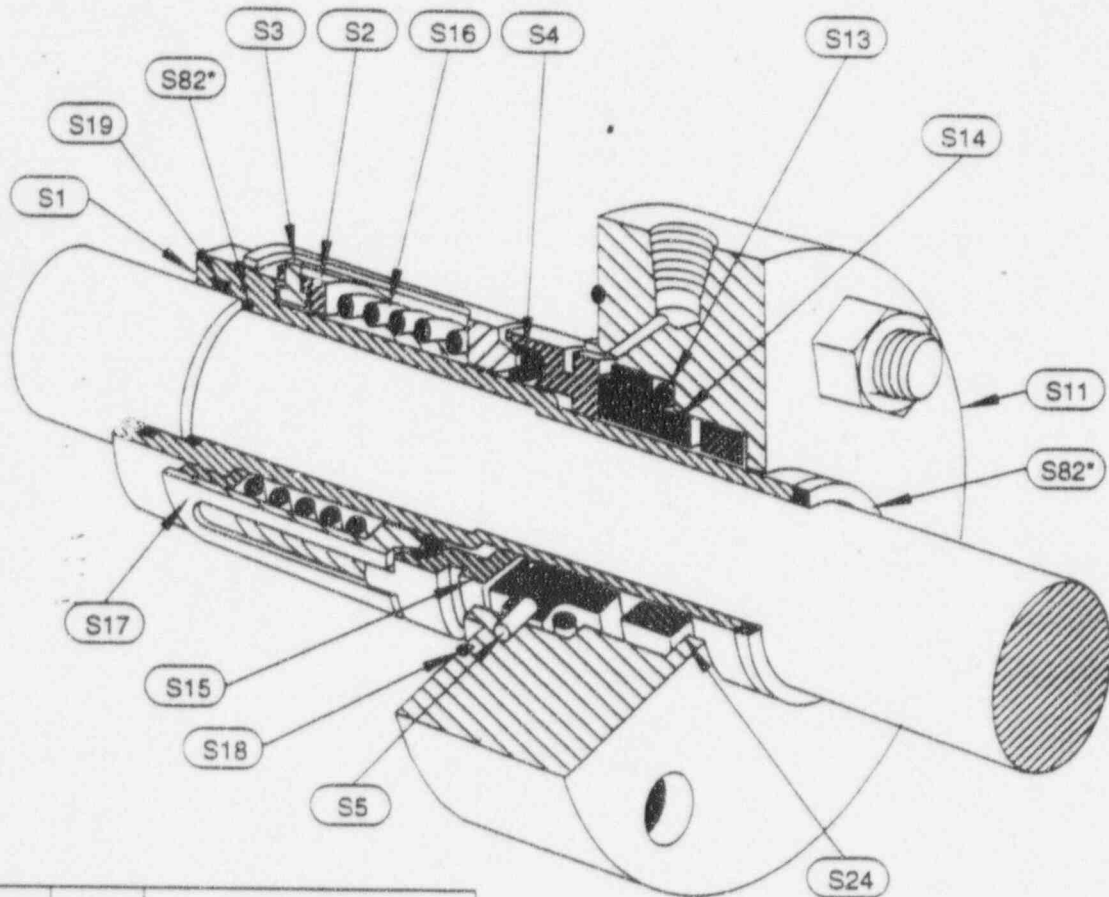
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FIGURE 1C
PARTS LIST

<u>Ref. Number</u>	<u>Name</u>	<u>Material Specification</u>
001	Case - Top Half	ASME SA-351, Grade CF-8
001-1	Case - Bottom Half	ASME SA-351, Grade CF-8
009	Stage Piece - Stages 1 thru 3	ASTM A-362, Grade CA-40 Type 420, H.T.R/C 47-50
009-1	Stage Piece - Stages 5 thru 7	ASTM A-362, Grade CA-40 Type 420, H.T.R/C 47-50
009-2	Stage Piece - Center - Split	ASTM A-362, Grade CA-40 Type 420, H.T.R/C 47-50
009-3	Stage Piece - Balance	ASTM A-362, Grade CA-40 Type 420, H.T.R/C 47-50
018	Balance Line	ASME SA-312, Type 304
023	Fan Cover - Radial Bearing	18 Gauge Steel
023-1	Fan Cover - Thrust Bearing	18 Gauge Steel
056	Ring - Retainer	PM 15-7 Moly, AISI 632 Stainless Steel
167	Shaft - Pump	ASME SA-479, Type 410, H.T.R/C 22 min.-
176-1 to 176-8	Impeller - Stages 1 thru 8	ASME SA-351, Grade CA-15
205	Wear Ring - Case - Stages 2 thru 4	ASTM A-362, Grade CA-40 Type 420, H.T.R/C 47-50
205-1	Wear Ring - Case Eye 1st Stage	ASTM A-362, Grade CA-40 Type 420, H.T.R/C 47-50
205-2	Wear Ring - Case - Stages 5 thru 8	ASTM A-362, Grade CA-40 Type 420, H.T.R/C 47-50
218	Sleeve - Balance	ASTM A-276, Type 420, T.H.R/C 34-36
230	Bushing - Throat	ASTM A-362, Grade CA-40 Type 420, H.T.R/C 37-50
232	Bushing - Throttle	ASTM A-362, Grade CA-40 Type 420, H.T.R/C 37-50
241	Deflector - Inboard	ASTM B-144, Alloy 3B
249	Lock Nut - Bearing Thrust	N-09
250	Lock Nut - Bearing Radial	N-13
251	Nut - Coupling	ASTM A-107, Grade 1018
256	Split Ring	ASTM A-362, Grade CA-15 Type 410 H.T.R/C 26-34
257	Ring - Shaft Locating	ASTM A-107, Grade 1018
277	Housing - Thrust Bearing	ASTM A-276, CL.40 Phosphated
278	Housing - Radial Bearing	ASTM A-276, CL.40 Phosphated
279	Cover - End - Thrust Bearing	ASTM A-48, CL.30
280	Cover - Inboard Bearing	ASTM A-48, CL.30
281	Cover - Coupling End Bearing	ASTM A-48, CL.30
289	Fan - Radial Bearing	Aluminum
289-1	Fan - Thrust Bearing	Aluminum
299	Mechanical Seal	
310	Oil Ring	ASTM B-135, Alloy 2
319	Oil Ring Retainer	ASTM A-576, Grade 1018
346	Radial Bearing Sleeve	ASTM A-576, Grade 1018
654	Bearing - Thrust	MRC 7409 D
655	Bearing - Radial	MRC 213 S
673	Lockwasher - Bearing - Thrust	W-09
673-1	Lockwasher - Bearing - Radial	W-13
676	Key - Impeller Series	ASTM A-276, Type 304
676-1	Key - Impeller Center	ASTM A-276, Type 304
676-2	Key - Balance	ASTM A-276, Type 304
676-3	Key Sleeve Shaft	ASTM A-276, Type 304
676-4	Key - Coupling	ASTM A-107, Grade 1018
744	Gasket - Cover - Bearing	Garlock 7021
795	Set Screw - Sleeve - Radial Bearing	ASTM A-276

**FIGURE 2
MECHANICAL SEAL
AFW PUMP 1C**



(PMM/1-MMP-09 02-F2-R4)

QTY.	PART #	DESCRIPTION
2	S1	SHAFTSLEEVE
2	S2	SEAL DRIVE
4	S3	DRIVE KEY
2	S4	U-CUP
2	S5	LOCK PIN
2	S11	SEAL FLANGE ASSEMBLY
2	S13	SEAT GASKET
2	S14	STATIONARY FACE
2	S15	ROTATING FACE
2	S16	COIL SPRING
2	S17	SPRING HOLDER
2	S18	FLANGE GASKET
2	S19	SLEEVE GASKET
2	S24	1 BUSHING
2	S82	SPACER RING

* A spacer ring may be used to achieve the proper seal setting dimension as shown on Figure 2A.

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FIGURE 2A
AFW PUMP 1C MECHANICAL SEAL

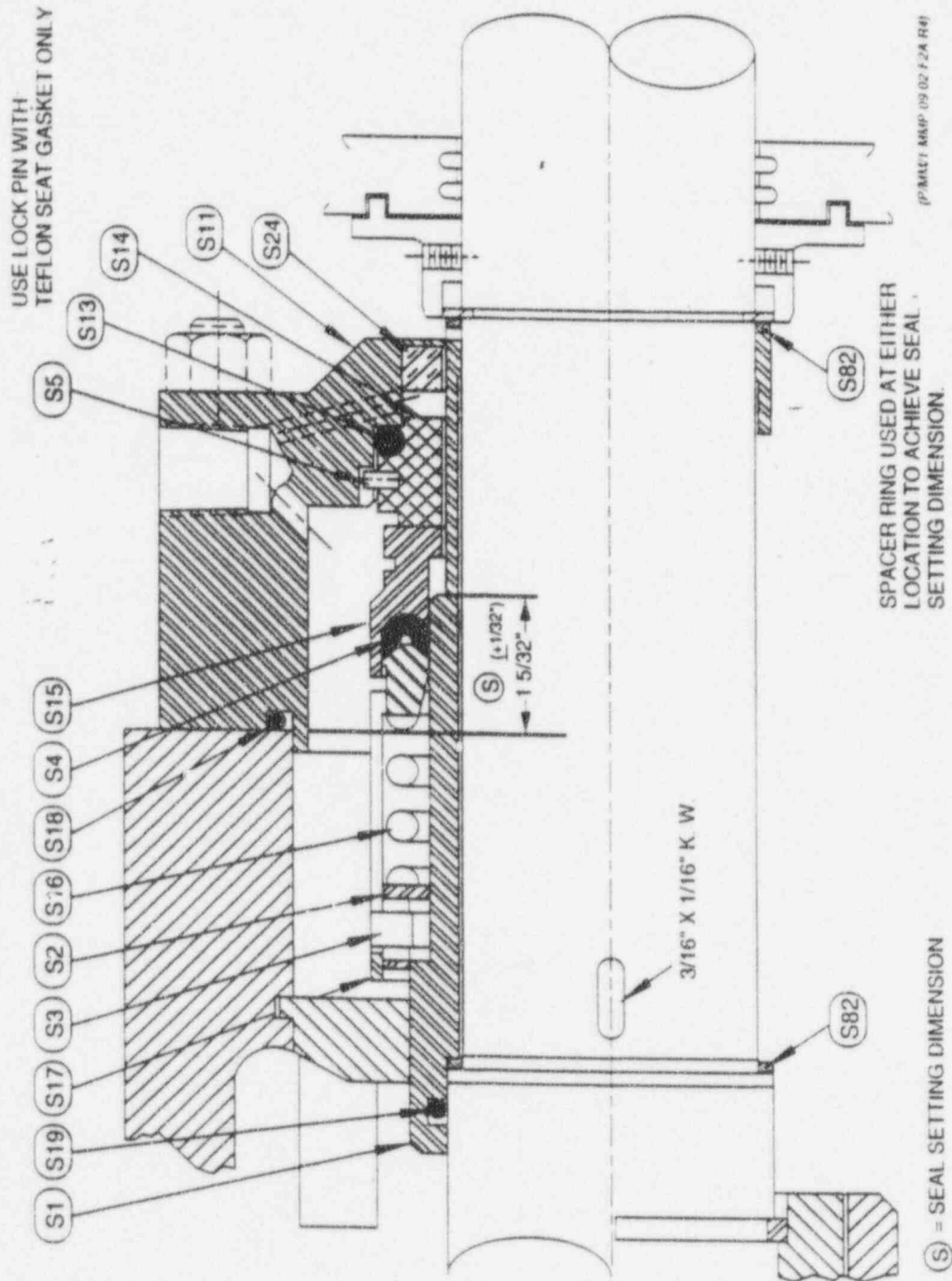
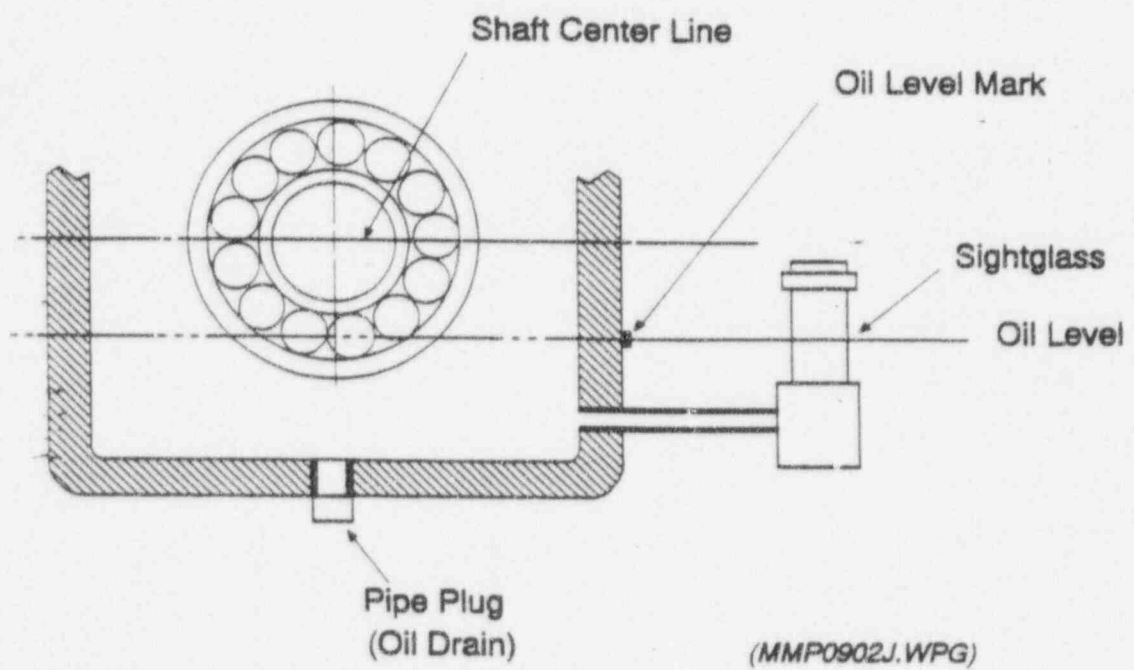


FIGURE 3
SIGHTGLASS PIPING CONFIGURATION



- NOTE**
1. Pipe nipple and drain plug to be fabricated from carbon steel.
 2. Quality level to be PC1, 2, or 3.
 3. Teflon tape or PRI-102N acceptable as a thread sealant.

ST. LUCIE PLANT
ADMINISTRATIVE PROCEDURE NO. 0005763, REVISION 19
INDUSTRIAL SAFETY PROGRAM

ATTACHMENT 5
HAZARD ASSESSMENT

Supervisors and foremen shall conduct tailboard meetings (job briefings) with employees before the start of each job. If the work or operations to be performed during the work day or shift are repetitive and similar, at least one job briefing shall be conducted before the start of the first job of each day or shift. Additional job briefings shall be held if significant changes occur during the course of the work which might affect the safety of the employees performing the job.

Brief Description of Job Replace Mech Seal 1C AFWPa

Initial

DE

Equipment Clearance:

Has clearance been signed on? Has clearance been walked down?

DE

Hazards associated with this job:

What are the illness/injury risks associated with this job? What can go wrong? What actions can be taken to minimize those risks?

DE

Work Procedures involved in this job:

What, when, who, and how you are going to do the job? Are there safety aspects associated with the tools, material, machines, equipment or work processes?

DE

Special Precautions:

Are you using products covered under the Hazard Communication Standard? Are you familiar with any precautions covered on the MSDS? Refer to ADM-10500. Are you entering an enclosed or confined space? Refer to ADM-10505. Is special area protective equipment needed (danger or caution tape, temporary shields, non-sparking tools, flotation devices, air moving equipment, etc.) Is this area a Heat Stress Area? Refer to ADM-10506. Hot work permit refer to ADM-10434.

DE

Energy source Controls:

Have you identified potential sources of energy in the work zone? Electrical, mechanical or stored energy.

DE

Personal Protective Equipment:

What PPE is required? (Hard hats, eye and face protection, hearing protection, proper foot wear, fall protection, respiratory protection, cool vests) Is it in good repair and is it being used properly? Are employees' personal tools and equipment in safe condition? They must be checked by employees daily. If any problems are encountered, the Foreman, Chief or Supervisor shall be notified.

DE

Emergency Procedure:

Physical Location, Method of obtaining assistance. (Phone, radio, page, etc.) Is a rescue plan required?

DE

Qualifications:

Are the employees qualified for the job they are performing?

Signature: Dated English

Foreman/Chief/Supervisor

Attendees: Kalet
HOARE
SWAN
English

Astrup
CRUMP
Krouskov
PASTOR

*Julie DE
9/24/96*

ST. LUCIE PLANT
ADMINISTRATIVE PROCEDURE NO. 0010460, REVISION 8
CRITICAL MAINTENANCE MANAGEMENT

DATA SHEET 2
NPWO PRE-JOB CHECKLIST FOR CRITICAL MAINTENANCE
(Page 1 of 2)

NOTE
This Checklist should be adequately completed prior to commencing work/requesting job clearance. The schedule for the completion of any remaining signoffs should be agreed to by Operations.

NPWO No. 8193

CMM No. _____

Job Scope: Replace W AFW Pumping Mech Seal

Description/Requirement	Complete
1. Work package instructions clear and of sufficient detail to correctly complete the job.	<u>DE</u>
2. Job site walkdown required/performed	<u>DE</u>
3. Material staged (contingency material available)	<u>DE</u>
4. Equipment/tools ready.	<u>DE</u>
5. Scaffold erected	<u>DE N/A</u>
6. Confined entry permit issued	<u>N/A DE</u>
7. Rigging required and ready.	<u>N/A DE</u>
8. Hot Work Permit issued	<u>DE N/A DE</u>
9. Crane support required and available	<u>N/A DE</u>
10. RWP issued and HP briefing complete/schedule (if required)	<u>N/A DE</u>
11. Weld travelers issued	<u>N/A DE</u>
12. Temporary power/lighting ready/available	<u>N/A DE</u>

COPY

10/23/16 DE

ST. LUCIE PLANT
ADMINISTRATIVE PROCEDURE NO. 0010460, REVISION 8
CRITICAL MAINTENANCE MANAGEMENT

DATA SHEET 2
NPWO PRE-JOB CHECKLIST FOR CRITICAL MAINTENANCE
(Page 2 of 2)

NOTE
Supplemental training may be appropriate for maintenance personnel in order to properly effect the planned maintenance.

- 13. Qualified manpower available DE
- 14. Special equipment protection required and ready DE n/a
- 15. Security support required and available n/a DE
- 16. Consumables (gas, etc.) available DE
- 17. Supporting departments notified and able to support:
 - A. Electrical DE
 - B. Instrument & Control N/A DE
 - C. Mechanical Maintenance DE
 - D. Health Physics N/A DE
 - E. Operations DE
 - F. Construction Services N/A DE
 - G. Asbestos Abatement M/M N/A DE
 - H. Other _____ N/A DE
- 18. M&TE required/available DE
- 19. Heat Stress guidelines addressed N/A DE
- 20. Tailboard meeting conducted DE

COPY

If the above items have been adequately satisfied in the Supervisor/Department Head's judgement, then work can proceed.

Reviewed/Approved David English Date 10/23/96
Supervisor/Department Head

TIBIA66

Facility : PSL
 Warehouse : 1 Charge Location: 915 300 000
 ROS : 50060081 Task: 01
 Work Order: 96019215 Task: 01
 PWO : 8193
 ER : 61
 EAC : 676
 Planner : B. BLASCHKE
 Task Title: OUTBOARD PUMP SEAL HAS EXCESSIVE L
 W/O Shift : Crew: Dept: OPS

COMPLETE Y
 ISSUE TICKET
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 4377901
 =====

PRINTED 10/24/96
 11:23 AM
 PAGE: 1

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Deliver To:

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Stock Code	Location	Description	Qty	UI
0067856 3	1 H 19 046 000	SCREW, SET, HEX SOCKET, HALF D	2	EA

UTC Number:
 Trace:

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Issued By : C. SUMMERS
 =====
 Issue Date : 10/24/96 Time: 11:23
 =====
 Received By: J. MILTON
 =====
 Badge No. : JWM00PC
 =====

TIBIA66

Facility : PSL
Warehouse : 1 Charge Location: 915 300 000
Work Order: 96019215 Task: 01

COMPLETE Y
ISSUE TICKET

=====
4376836
=====

PWO : 8193
ER : 61
EAC : 676
Planner : B. BLASCHKE
Task Title: OUTBOARD PUMP SEAL HAS EXCESSIVE L
W/O Shift : Crew: Dept: OPS

PRINTED 10/02/96
10:03 AM
PAGE: 1

=====
Deliver To:
=====

Stock Code	Location	Description	Qty	UI
0068152 1	1 H 21 051 000	BEARING, BALL, THRUST UTC Number: 0000383869 Trace: U 3PB-2408	2	EA
0068262 3	1 H 23 042 000	GASKET, BEARING COVER, GARLOCK UTC Number: Trace:	1	EA
0068303 1	1 H 19 033 D00	KEY, SHAFT SLEEVE, ASTM A-276, UTC Number: 0000384734 Trace: U 15000-66452 IT.#12	1	EA
0068493 3	1 H 27 024 000	SEAL, BASIC, (MECHANICAL SEAL UTC Number: Trace:	1	EA

=====
Issued By : C. OWENS
=====
Issue Date : 10/02/96 Time: 10:02
=====
Received By: W. HOARE
=====
Badge No. : WXHOSWH
=====

TIBIA66

Facility : PSL
 Warehouse : 1 Charge Location: 915 300 000
 ROS : 50058881 Task: 01
 Work Order: 96019215 Task: 01
 PWO : 8193
 ER : 61
 EAC : 676
 Planner : B. BLASCHKE
 Task Title: OUTBOARD PUMP SEAL HAS EXCESSIVE L
 W/O Shift : Crew: Dept: OPS

COMPLETE Y
 ISSUE TICKET
 =====
 4376864
 =====

PRINTED 10/02/96
 02:12 PM
 PAGE: 1

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 Deliver To:
 =====

Stock Code	Location	Description	Qty	UI
0095957 3	1 N 07 060 000	O-RING, BUNA N (NITRILE), 5-3/ UTC Number: 0000375448 Trace: U 5F0922	1	EA

=====
 Issued By : S. PINKSTON
 =====
 Issue Date : 10/02/96 Time: 14:11
 =====
 Received By: T. KALETA
 =====
 Badge No. : TPKODHR
 =====

TIBIA66

Facility : PSL
 Warehouse : 1 Charge Location: 915 300 000
 ROS : 50058867 Task: 01
 Work Order: 96019215 Task: 01
 PWO : 8193
 ER : 61
 EAC : 676
 Planner : B. BLASCHKE
 Task Title: OUTBOARD PUMP SEAL HAS EXCESSIVE L
 W/O Shift : Crew: Dept: OPS

COMPLETE Y
 ISSUE TICKET

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 4376849
 =====

PRINTED 10/02/96
 11:06 AM
 PAGE: 1

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 Deliver To:
 =====

Stock Code	Location	Description	Qty	UI
0068524	2 1 H 27 015 000	SLEEVE, SHAFT MATERIAL 416, UTC Number: 0000387299 Trace: U 88929-91919	1	EA
0096017	3 1 N 07 033 B00	O-RING, BUNA N (NITRILE), 2-3/ UTC Number: Trace:	1	EA

=====
 Issued By : J. BRACK
 =====
 Issue Date : 10/02/96 Time: 11:06
 =====
 Received By: W. HOARE
 =====
 Badge No. : WXH0SWH
 =====

TIBIA66

Facility : PSL
 Warehouse : 3 Charge Location: 915 300 000
 ROS : 50060051 Task: 01
 Work Order: 96019215 Task: 01
 PWO : 8193
 ER : 61
 EAC : 676
 Planner : B. BLASCHKE
 Task Title: OUTBOARD PUMP SEAL HAS EXCESSIVE L
 W/O Shift : Crew: Dept: OPS

COMPLETE Y
 ISSUE TICKET
 =====
 4377883
 =====
 PRINTEL 10/24/96
 07:57 AM
 PAGE: 1

=====
 Deliver To:
 =====

Stock Code	Location	Description	Qty	UI
0042681 3	2 E 28 093 000	GASKET MATERIAL, VEGETABLE FIB	1	EA

UTC Number:
 Trace:

=====
 Issued By : P. POULO
 =====
 Issue Date : 10/24/96 Time: 07:57
 =====
 Received By: W. HOARE
 =====
 Badge No. : WXHOSWH
 =====

TIBIA66

Facility : PSL
Warehouse : 3 Charge Location: 915 300 000
Work Order: 96019215 Task: 01

COMPLETE Y
ISSUE TICKET

=====
4377873
=====

PWO : 8193
ER : 61
EAC : 676
Planner : B. BLASCHKE
Task Title: OUTBOARD PUMP SEAL HAS EXCESSIVE L
W/O Shift : Crew: Dept: OPS

PRINTED 10/24/96
04:19 AM
PAGE: 1

=====
Deliver To:
=====

Stock Code	Location	Description	Qty	UI
0021321 4	2 F 33 066 000	WIPER, WHITE, 100% COTTON, (15 UTC Number: Trace:	1	BX

=====
Issued By : G. RICHARDS
=====
Issue Date : 10/24/96 Time: 01:07
=====
Received By: J. ASTRUP
=====
Badge No. : JCA0IMC
=====

REVISION NO. 14	PROCEDURE TITLE USE OF M & TE BY MECHANICAL MAINTENANCE	PAGE 16 of 20
PROCEDURE NO. GMP-02	GENERAL MAINTENANCE PROCEDURE ST. LUCIE PLANT	

APPENDIX C
TORQUE WRENCH CALIBRATION CHECK FORM
(Page 1 of 2)

NPWO/Procedure-ER# 8193, 61

Tester Transducer M&TE # M-2#1031

Cal Due Date 11/8/96

Torque Wrench Calibration Check

Torque Wrench Cal Due Date 3/16/97

Pre-use Calibration Check

Torque Wrench M&TE # M-27

Date <u>10-24</u> <u>96</u>	20%	40%	60%	80%	100%
Expected Reading	<u>35</u>	<u>70</u>	<u>105</u>	<u>140</u>	<u>175</u>
Actual Reading	<u>33.8</u>	<u>68.4</u>	<u>101.9</u>	<u>136.8</u>	<u>171.1</u>
Percent Error	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>

Sat Unsat

Cal. Checked by L. PASTOR

Post Use Calibration Check

Date <u>10/24</u> <u>96</u>	20%	40%	60%	80%	100%
Expected Reading	<u>35</u>	<u>70</u>	<u>105</u>	<u>140</u>	<u>175</u>
Actual Reading	<u>35.8</u>	<u>71.3</u>	<u>105.6</u>	<u>140.8</u>	<u>179.7</u>
Percent Error	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>

Sat Unsat

Cal. Checked by [Signature]

Required accuracy is +/- 4% of expected torque reading from 20% to 100% of The Operating Scale of Torque Wrench

Adapter

Effective Length of M & TE (Dimension A)* _____ Effective Length of Adapter(Dimension B)* _____

Desired Torque Value _____

Torque Wrench Reading _____

Date _____ Information Verified By _____

*Refer to section 8.1.4 (Definitions) for an explanation of dimensions A & B For Calculations

Hydraulic Torque Wrench / Torque Wrench & Multiplier Calibration Check

Pre-use Calibration Check

Hydraulic Wrench Model # / Torque Wrench M&TE# _____ Tester Transducer M&TE# _____

M & TE Gauge # / Multiplier # _____ Transducer Cal Due Date _____

Torque Value Required _____

Gauge Pressure Reading(Hydraulic) _____

Torque Wrench Reading (Multiplier) _____

Date _____ Torque Verified by _____

Attach a Restricted Use sticker (s) to the M&TE Gauge/Torque Wrench specifying Reading Relationship for the required torque

Post -Use Calibration Check Hydraulic Torque Wrench

Date _____ Tester Transducer M&TE# _____ Cal Due Date _____

*M&TE Gauge Value Required _____

Actual Torque Reading _____

Percent Error _____ % _____ % _____ % _____ % _____ %

** Sat Unsat

Torque Verified by _____

**Post-use Accuracy of torque is +/- 4% of the Pre-Use Calibration check Torque Value Required. Refer to section 8.3.4

If the results of a Pre-use/Post-use/periodic calibration is UNSAT, attach a Rejected sticker and initiate an Out-of-Calibration Report for Corrective Action follow-up.

Out-of-Calibration Report initiated by: _____

DOCUMENT, REQUIRES VERIFICATION AND SIGNOFFS
REV DATE VERIFIED 9/16/96 INITIAL H.P.C.

REVISION NO: 14	PROCEDURE TITLE: USE OF M & TE BY MECHANICAL MAINTENANCE	PAGE 16 of 20
PROCEDURE NO: GMP-02	GENERAL MAINTENANCE PROCEDURE ST. LUCIE PLANT	

APPENDIX C
TORQUE WRENCH CALIBRATION CHECK FORM
(Page 1 of 2)

NPWO/Procedure-ER# 8193.61

Tester Transducer M&TE # M-2#1031

Torque Wrench Calibration Check

Cal Due Date 11/8/96

Torque Wrench Cal Due Date 3/16/97

Pre-use Calibration Check

Torque Wrench M&TE # M-311-1

Date 10/23/96

	20%	40%	60%	80%	100%
Expected Reading	36	52	68	84	100
Actual Reading	<u>35.9</u>	<u>51.4</u>	<u>68.0</u>	<u>84.4</u>	<u>101.3</u>
Percent Error	<u><4%</u>	<u><4%</u>	<u><4%</u>	<u><4%</u>	<u><4%</u>

Sat. Unsat.

Cal. Checked by [Signature]

Post Use Calibration Check

Date 10/24/96

	20%	40%	60%	80%	100%
Expected Reading	36	52	68	84	100
Actual Reading	<u>36.5</u>	<u>51.4</u>	<u>67.4</u>	<u>85.4</u>	<u>100.4</u>
Percent Error	<u><4%</u>	<u><4%</u>	<u><4%</u>	<u><4%</u>	<u><4%</u>

Sat. Unsat.

Cal. Checked by [Signature]

Required accuracy is +/- 4% of expected torque reading from 20% to 100% of The Operating Scale of Torque Wrench

Adapter

Effective Length of M & TE (Dimension A)* _____ Effective Length of Adapter(Dimension B)* _____

Desired Torque Value _____

Torque Wrench Reading _____

Date _____

Information Verified By _____

*Refer to section 8.1.4 (Definitions) for an explanation of dimensions A & B For Calculations

Hydraulic Torque Wrench / Torque Wrench & Multiplier Calibration Check

Pre-use Calibration Check

Hydraulic Wrench Model # / Torque Wrench M&TE# _____

Tester Transducer M&TE# _____

M & TE Gauge # / Multiplier # _____

Transducer Cal Due Date ____/____/____

Torque Value Required _____

Gauge Pressure Reading(Hydraulic) _____

Torque Wrench Reading (Multiplier) _____

Date ____/____/____

Torque Verified by _____

Attach a Restricted Use sticker (s) to the M&TE Gauge/Torque Wrench specifying Reading Relationship for the required torque.

Post -Use Calibration Check Hydraulic Torque Wrench

Date ____/____/____

Tester Transducer M&TE# _____

Cal Due Date ____/____/____

*M&TE Gauge Value Required _____

Actual Torque Reading _____

Percent Error _____%

_____%

_____%

_____%

_____%

_____%

** Sat. Unsat.

Torque Verified by _____

**Post-use Accuracy of torque is +/- 4% of the Pre-Use Calibration check Torque Value Required Refer to section 8.3.4

If the results of a Pre-use/Post-use/periodic calibration is UNSAT, attach a Rejected sticker and initiate an Out-of-Calibration Report for Corrective Action follow-up.

Out-of-Calibration Report initiated by: _____

DOCUMENT REQUIRES VERIFICATION AND SIGNOFFS
REV DATE VERIFIED 9/16/96 INITIAL H.P.C.

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PROCEDURE NO GMP-02	GENERAL MAINTENANCE PROCEDURE ST. LUCIE PLANT	

APPENDIX C
TORQUE WRENCH CALIBRATION CHECK FORM
(Page 1 of 2)

NPWO/Procedure-ER# 8193,61

Tester Transducer M&TE # M-2#1031

Cal Due Date 11/8/96

Torque Wrench Calibration Check

Torque Wrench Cal Due Date 3/16/97

Pre-use Calibration Check

Torque Wrench M&TE # M-136

Date <u>10/23/96</u>	20%	40%	60%	80%	100%
Expected Reading	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>
Actual Reading	<u>10.4</u>	<u>20.5</u>	<u>30.3</u>	<u>40.3</u>	<u>49.2</u>
Percent Error	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>

Sat. Unsat.

Cal. Checked by [Signature]

Post Use Calibration Check

Date <u>10/24/96</u>	20%	40%	60%	80%	100%
Expected Reading	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>
Actual Reading	<u>10.4</u>	<u>20.4</u>	<u>30.8</u>	<u>39.5</u>	<u>49.0</u>
Percent Error	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>	<u>< 4 %</u>

Sat. Unsat.

Cal. Checked by [Signature]

Required accuracy is +/- 4% of expected torque reading from 20% to 100% of The Operating Scale of Torque Wrench

Adapter

Effective Length of M & TE (Dimension A)* _____ Effective Length of Adapter(Dimension B)* _____

Desired Torque Value _____

Torque Wrench Reading _____

Date _____ Information Verified By _____

*Refer to section 8.1.4 (Definitions) for an explanation of dimensions A & B For Calculations

Hydraulic Torque Wrench / Torque Wrench & Multiplier Calibration Check

Pre-use Calibration Check

Hydraulic Wrench Model # / Torque Wrench M&TE# _____ Tester Transducer M&TE# _____

M & TE Gauge # / Multiplier # _____ Transducer Cal Due Date _____

Torque Value Required _____

Gauge Pressure Reading(Hydraulic) _____

Torque Wrench Reading (Multiplier) _____

Date _____ Torque Verified by _____

Attach a Restricted Use sticker (s) to the M&TE Gauge/Torque Wrench specifying Reading Relationship for the required torque.

Post -Use Calibration Check Hydraulic Torque Wrench

Date _____ Tester Transducer M&TE# _____ Cal Due Date _____

*M&TE Gauge Value Required _____

Actual Torque Reading _____

Percent Error _____ % _____ % _____ % _____ %

** Sat. Unsat.

Torque Verified by _____

**Post-use Accuracy of torque is +/- 4% of the Pre-Use Calibration check Torque Value Required. Refer to section 8.3.4

If the results of a Pre-use/Post-use/periodic calibration is UNSAT, attach a Rejected sticker and initiate an Out-of-Calibration Report for Corrective Action follow-up.

Out-of-Calibration Report initiated by: _____

DOCUMENT REQUIRES VERIFICATION AND SIGNOFFS
REV DATE VERIFIED 9/16/96 INITIAL H.P.C.

REVISION NO 14	PROCEDURE TITLE USE OF M & TE BY MECHANICAL MAINTENANCE GENERAL MAINTENANCE PROCEDURE ST. LUCIE PLANT	PAGE 18 of 20
PROCEDURE NO GMP-02		

**APPENDIX D
NON-TORQUE WRENCH USE ONLY**
(Page 1 of 1)

Calibration Check Upon Removal From M&TE Locker

	0%	50% (if required)	100% (if required)
Expected Reading	<u>0.000</u>	_____	<u>1.000</u>
Actual Reading	<u>0.000</u>	_____	<u>1.000</u>

Removed Date 10/23/96 Calibration Checked by H.R. [Signature] Cal Due Date 3/6/97

NPWO # 8193/6 M&TE # M-51-1A Type M&TE OD MIC

M&TE Number of Standard Used M 52-1 Standard Cal. Due Date 12/3/97

Calibration Check Upon Return to M&TE Locker

	0%	100% (if required)
Expected Reading	<u>0.000</u>	<u>1.000</u>
Actual Reading	<u>0.000</u>	<u>1.000</u>

M&TE Number of Standard Used M-52-1 Standard Cal. Due Date 12/3/97

Date Returned 10/24/96 Calibration Checked by [Signature]

Acceptance Criteria:

1. Micrometers measuring to .0001 shall check to $\pm .0001$ " at 0% and 100% of their full range, using applicable micrometer standards.
2. Micrometers measuring to .001" shall be checked in the same manner (as in Step 1) to $\pm .001$ " at 0% and 100% of their full range.
3. Depth dial indicators are to be checked using gauge blocks and a surface plate when M-267, dial indicator tester, is unavailable.
4. Depth micrometers are checked only at 50% range, except the 0 to 1 in. range, which is checked by zeroing the mic to check for thimble scale accuracy and then check at .500.

**DOCUMENT REQUIRES VERIFICATION
AND SIGNOFFS**
REV. DATE VERIFIED 10/9/96 INITIAL H.P.C.

REVISION NO. 14	PROCEDURE TITLE USE OF M & TE BY MECHANICAL MAINTENANCE	PAGE 18 of 20
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**APPENDIX D
NON-TORQUE WRENCH USE ONLY**
(Page 1 of 1)

Calibration Check Upon Removal From M&TE Locker

	0%	50% (if required)	100% (if required)
Expected Reading	<u>1.000</u>	_____	<u>2.000</u>
Actual Reading	<u>1.000</u>	_____	<u>2.000</u>
Removed Date <u>10/23/96</u>	Calibration Checked by <u>[Signature]</u>	Cal. Due Date <u>3/6/97</u>	
NPWO # <u>8193/61</u>	M&TE # <u>M-51-2</u>	Type M&TE <u>OD Mic</u>	
M&TE Number of Standard Used <u>M-52-1 & M-52-2</u>	Standard Cal. Due Date <u>12/3/97</u>		

Calibration Check Upon Return to M&TE Locker

	0%	100% (if required)
Expected Reading	<u>1.000</u>	<u>2.000</u>
Actual Reading	<u>1.000</u>	<u>2.000</u>
M&TE Number of Standard Used <u>M-52-1 & M-52-2</u>	Standard Cal. Due Date <u>12/3/97</u>	
Date Returned <u>10/24/96</u>	Calibration Checked by <u>[Signature]</u>	

Acceptance Criteria:

1. Micrometers measuring to .0001 shall check to $\pm .0001$ " at 0% and 100% of their full range, using applicable micrometer standards.
2. Micrometers measuring to .001" shall be checked in the same manner (as in Step 1) to $\pm .001$ " at 0% and 100% of their full range.
3. Depth dial indicators are to be checked using gauge blocks and a surface plate when M-267 dial indicator tester, is unavailable.
4. Depth micrometers are checked only at 50% range, except the 0 to 1 in. range, which is checked by zeroing the mic to check for thimble scale accuracy and then check at .500.

**DOCUMENT REQUIRES VERIFICATION
AND SIGNOFFS**
REV. DATE VERIFIED 10/9/96 INITIAL H.P.C.

REVISION NO 14	PROCEDURE TITLE USE OF M & TE BY MECHANICAL MAINTENANCE	PAGE
PROCEDURE NO GMP-02	GENERAL MAINTENANCE PROCEDURE ST. LUCIE PLANT	18 of 20

**APPENDIX D
NON-TORQUE WRENCH USE ONLY**
(Page 1 of 1)

Calibration Check Upon Removal From M&TE Locker

	0%	50% (if required)	100% (if required)
Expected Reading	<u>2.000</u>	_____	<u>3.000</u>
Actual Reading	<u>2.000</u>	_____	<u>3.000</u>

Removed Date 10/23/96 Calibration Checked by J.P. Chesser Cal. Due Date 3/6/97
 NPWO # 8193/61 M&TE # M-51-3 Type M&TE OD Mic
 M&TE Number of Standard Used M-52-2 & M-53-3 Standard Cal. Due Date 12/3/97

Calibration Check Upon Return to M&TE Locker

	0%	100% (if required)
Expected Reading	<u>2.000</u>	<u>3.000</u>
Actual Reading	<u>2.000</u>	<u>3.000</u>

M&TE Number of Standard Used M-52-2 & M-52-3 Standard Cal. Due Date 12/3/97
 Date Returned 10/24/96 Calibration Checked by J.P. Chesser

Acceptance Criteria

1. Micrometers measuring to .0001 shall check to ± 0001 " at 0% and 100% of their full range, using applicable micrometer standards.
2. Micrometers measuring to .001" shall be checked in the same manner (as in Step 1) to ± 001 " at 0% and 100% of their full range.
3. Depth dial indicators are to be checked using gauge blocks and a surface plate when M-267, dial indicator tester, is unavailable.
4. Depth micrometers are checked only at 50% range, except the 0 to 1 in. range, which is checked by zeroing the mic to check for thimble scale accuracy and then check at .500.

**DOCUMENT REQUIRES VERIFICATION
AND SIGNOFFS**
REV. DATE VERIFIED 10/9/96 INITIAL H.P.C.

REVISION NO. 14	PROCEDURE TITLE USE OF M & TE BY MECHANICAL MAINTENANCE	PAGE
PROCEDURE NO. GMP-02	GENERAL MAINTENANCE PROCEDURE ST. LUCIE PLANT	18 of 20

**APPENDIX D
NON-TORQUE WRENCH USE ONLY**
(Page 1 of 1)

Calibration Check Upon Removal From M&TE Locker

	0%	50% (if required)	100% (if required)
Expected Reading	<u>4,000</u>	_____	<u>5,000</u>
Actual Reading	<u>4,000</u>	_____	<u>5,000</u>
Removed Date <u>10/23/96</u>	Calibration Checked by <u>[Signature]</u>	Cal. Due Date <u>3/6/97</u>	
NPWO # <u>8/93/61</u>	M&TE # <u>M-51-5A</u>	Type M&TE <u>OD MIC</u>	
M&TE Number of Standard Used <u>M-52-4 & M-52-5</u>	Standard Cal. Due Date <u>12/3/97</u>		

Calibration Check Upon Return to M&TE Locker

	0%	100% (if required)
Expected Reading	<u>4,000</u>	<u>5,000</u>
Actual Reading	<u>4,000</u>	<u>5,000</u>
M&TE Number of Standard Used <u>M-52-4 & M-52-5</u>	Standard Cal. Due Date <u>12/3/97</u>	
Date Returned <u>10/24/96</u>	Calibration Checked by <u>[Signature]</u>	

Acceptance Criteria:

1. Micrometers measuring to .0001 shall check to $\pm .0001$ " at 0% and 100% of their full range, using applicable micrometer standards.
2. Micrometers measuring to .001" shall be checked in the same manner (as in Step 1) to $\pm .001$ " at 0% and 100% of their full range.
3. Depth dial indicators are to be checked using gauge blocks and a surface plate when M-267, dial indicator tester, is unavailable.
4. Depth micrometers are checked only at 50% range, except the 0 to 1 in. range, which is checked by zeroing the mic to check for thimble scale accuracy and then check at .500.

**DOCUMENT REQUIRES VERIFICATION
AND SIGNOFFS**
REV. DATE VERIFIED 10/9/96 INITIAL H.P.C.

REVISION NO: 14	PROCEDURE TITLE: USE OF M & TE BY MECHANICAL MAINTENANCE	PAGE: 18 of 20
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**APPENDIX D
NON-TORQUE WRENCH USE ONLY**
(Page 1 of 1)

Calibration Check Upon Removal From M&TE Locker

	0%	50% (if required)	100% (if required)
Expected Reading	<u>6.000</u>	_____	<u>7.000</u>
Actual Reading	<u>6.000</u>	_____	<u>7.000</u>
Removed Date <u>10/24/96</u>	Calibration Checked by <u>[Signature]</u>		Cal. Due Date <u>3/6/97</u>
NPWO # _____	M&TE # <u>M-51-7</u>	Type M&TE <u>OD MIC</u>	
M&TE Number of Standard Used <u>M-52-7 & M-52-8</u>		Standard Cal. Due Date <u>12/3/97</u>	

Calibration Check Upon Return to M&TE Locker

	0%	100% (if required)
Expected Reading	<u>6.000</u>	<u>7.000</u>
Actual Reading	<u>6.000</u>	<u>7.000</u>
M&TE Number of Standard Used <u>M-52-7 & M-52-8</u>		Standard Cal. Due Date <u>12/3/97</u>
Date Returned <u>10/24/96</u>	Calibration Checked by <u>[Signature]</u>	

Acceptance Criteria:

1. Micrometers measuring to .0001 shall check to $\pm .0001$ " at 0% and 100% of their full range, using applicable micrometer standards.
2. Micrometers measuring to .001" shall be checked in the same manner (as in Step 1) to $\pm .001$ " at 0% and 100% of their full range.
3. Depth dial indicators are to be checked using gauge blocks and a surface plate when M-267, dial indicator tester, is unavailable.
4. Depth micrometers are checked only at 50% range, except the 0 to 1 in. range, which is checked by zeroing the mic to check for thimble scale accuracy and then check at .500.

**DOCUMENT REQUIRES VERIFICATION
AND SIGNOFFS**
REV. DATE VERIFIED 10/9/96 INITIAL H.P.C.

REVISION NO. 14	PROCEDURE TITLE USE OF M & TE BY MECHANICAL MAINTENANCE	PAGE
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**APPENDIX D
NON-TORQUE WRENCH USE ONLY**
(Page 1 of 1)

Calibration Check Upon Removal From M&TE Locker

	0%	50% (if required)	100% (if required)
Expected Reading	<u>7.000</u>	_____	<u>8.000</u>
Actual Reading	<u>7.000</u>	_____	<u>8.000</u>
Removed Date <u>10/24/96</u>	Calibration Checked by <u>[Signature]</u>	Cal. Due Date <u>3/6/97</u>	
NPWO # <u>B193/61</u>	M&TE # <u>M-51-8A</u>	Type M&TE <u>OD MIC</u>	
M&TE Number of Standard Used <u>M-52-7 & M-52-8</u>	Standard Cal. Due Date <u>12/3/97</u>		

Calibration Check Upon Return to M&TE Locker

	0%	100% (if required)
Expected Reading	<u>7.000</u>	<u>8.000</u>
Actual Reading	<u>7.000</u>	<u>8.000</u>
M&TE Number of Standard Used <u>M-52-7 & M-52-8</u>	Standard Cal. Due Date <u>12/3/97</u>	
Date Returned <u>10/24/96</u>	Calibration Checked by <u>[Signature]</u>	

Acceptance Criteria:

1. Micrometers measuring to .0001 shall check to $\pm .0001$ " at 0% and 100% of their full range, using applicable micrometer standards.
2. Micrometers measuring to .001" shall be checked in the same manner (as in Step 1) to $\pm .001$ " at 0% and 100% of their full range.
3. Depth dial indicators are to be checked using gauge blocks and a surface plate when M-267, dial indicator tester, is unavailable.
4. Depth micrometers are checked only at 50% range, except the 0 to 1 in. range, which is checked by zeroing the mic to check for thimble scale accuracy and then check at .500.

**DOCUMENT REQUIRES VERIFICATION
AND SIGNOFFS**
REV. DATE VERIFIED 10/9/96 INITIAL H.P.C.

REVISION NO. 14	PROCEDURE TITLE USE OF M & TE BY MECHANICAL MAINTENANCE	PAGE
PROCEDURE NO. GMP-02	GENERAL MAINTENANCE PROCEDURE ST. LUCIE PLANT	18 of 20

**APPENDIX D
NON-TORQUE WRENCH USE ONLY**
(Page 1 of 1)

Calibration Check Upon Removal From M&TE Locker

	0%	50% (if required)	100% (if required)
Expected Reading	<u>2.000</u>	_____	<u>3.000</u>
Actual Reading	<u>2.000</u>		<u>3.000</u>

Removed Date 10/2/96 Calibration Checked by [Signature] Cal. Due Date 3/6/97
 NPWO # 8193/61 M&TE # M-9-3 Type M&TE OD MC
 M&TE Number of Standard Used M-8-2 & M-8-3 Standard Cal. Due Date 10/11/96

Calibration Check Upon Return to M&TE Locker

	0%	100% (if required)
Expected Reading	<u>2.000</u>	<u>3.000</u>
Actual Reading	<u>2.000</u>	<u>3.000</u>

M&TE Number of Standard Used M-8-2 & M-8-3 Standard Cal. Due Date 10/11/96
 Date Returned 10/2/96 Calibration Checked by [Signature]

Acceptance Criteria:

1. Micrometers measuring to .0001 shall check to $\pm .0001$ " at 0% and 100% of their full range, using applicable micrometer standards.
2. Micrometers measuring to .001" shall be checked in the same manner (as in Step 1) to $\pm .001$ " at 0% and 100% of their full range.
3. Depth dial indicators are to be checked using gauge blocks and a surface plate when M-267, dial indicator tester, is unavailable.
4. Depth micrometers are checked only at 50% range, except the 0 to 1 in. range, which is checked by zeroing the mic to check for thimble scale accuracy and then check at .500.

**DOCUMENT REQUIRES VERIFICATION
AND SIGNOFFS**
REV. DATE VERIFIED 9/6/96 INITIAL H.P.C.

REVISION NO. 14	PROCEDURE TITLE USE OF M & TE BY MECHANICAL MAINTENANCE	PAGE 18 of 20
PROCEDURE NO. GMP-02	GENERAL MAINTENANCE PROCEDURE ST. LUCIE PLANT	

**APPENDIX D
NON-TORQUE WRENCH USE ONLY**
(Page 1 of 1)

Calibration Check Upon Removal From M&TE Locker

	0%	50% (if required)	100% (if required)
Expected Reading	<u>4.000</u>	_____	<u>5.000</u>
Actual Reading	<u>4.000</u>	_____	<u>5.000</u>
Removed Date <u>10/2/96</u>	Calibration Checked by <u>ATChern</u>	Cal. Due Date <u>3/6/97</u>	
NPWO # <u>8163/61</u>	M&TE # <u>M-9-5</u>	Type M&TE <u>OD MIC</u>	
M&TE Number of Standard Used <u>M-8-4 & M-8-5</u>	Standard Cal. Due Date <u>10/4/96</u>		

Calibration Check Upon Return to M&TE Locker

	0%	100% (if required)
Expected Reading	<u>4.000</u>	<u>5.000</u>
Actual Reading	<u>4.000</u>	<u>5.000</u>
M&TE Number of Standard Used <u>M-8-4 & M-8-5</u>	Standard Cal. Due Date <u>10/4/96</u>	
Date Returned <u>10/2/96</u>	Calibration Checked by <u>ATChern</u>	

Acceptance Criteria:

1. Micrometers measuring to .0001 shall check to $\pm .0001$ " at 0% and 100% of their full range, using applicable micrometer standards.
2. Micrometers measuring to .001" shall be checked in the same manner (as in Step 1) to $\pm .001$ " at 0% and 100% of their full range.
3. Depth dial indicators are to be checked using gauge blocks and a surface plate when M-267, dial indicator tester, is unavailable.
4. Depth micrometers are checked only at 50% range, except the 0 to 1 in. range, which is checked by zeroing the mic to check for thimble scale accuracy and then check at .500.

**DOCUMENT REQUIRES VERIFICATION
AND SIGNOFFS**
REV. DATE VERIFIED 9/6/96 INITIAL H.P.C.

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT
GENERAL MAINTENANCE PROCEDURE NO. M-0019
REVISION 13



1.0 TITLE:

PLANT ROTATING EQUIPMENT ALIGNMENT GUIDELINES

2.0 REVIEW AND APPROVAL:

Reviewed by Facility Review Group _____ 3/9 1984

Approved by D.A. Sager Plant General Manager _____ 3/17 1984

Revision 13 Reviewed by FRG _____ 12/12 1995

Approved by J. Scarola Plant General Manager _____ 12/12 1995

3.0 PURPOSE:

3.1 This instruction describes the requirements, acceptance criteria and general guidelines for alignment of all St. Lucie Plant Rotating Equipment.

3.2 This procedure functions to consolidate equipment maintenance information into a single controlled document. This procedure meets or exceeds the requirements of the following forcing documents: NuReg guide 1.33 Appendix A section 9, NuReg 0737, ANSI N18.7-78, St. Lucie Plant QI-5-PR/PSL-1. St. Lucie Plant Tech. Spec. 6.8.1.

4.0 PRECAUTIONS AND LIMITATIONS:

4.1 Safety Related Alignments & T.I.Rs shall be performed using dial indicators under control of the site M&TE programs or the Optalign laser alignment equipment.

4.2 All shims shall be manufactured from a suitable carbon steel material, or have been manufactured and supplied by a vendor for specific use as a shim.

COPY

10-2-96 JAK
10/23/96 [Signature]

S__OPS	
DATE	_____
DOCT	PROCEDURE
DOCN	M-0019
SYS	_____
COMP	COMPLETED
ITM	13

ST. LUCIE PLANT
 GENERAL MAINTENANCE PROCEDURE NO. M-0019, REVISION 13
PLANT ROTATING EQUIPMENT ALIGNMENT GUIDELINES

ATTACHMENT C
 (FIGURE 1)

Alignment Of Horizontal Machines 1.

Equipment: AC AUX PA PWID: 8193 61 Date: 10-24-96

For Inch Mode

ON OFF ENT DM

inch

1	12.29	EXT
2	25	EXT
3	76.78	EXT
4	6.77	EXT
5	10	EXT

Enter Target Values Here.
(Record On Sheet 1a.)

	VO	HO	VA	HA
1.	7.59	7.3	78.2	72.5
2.	7.54	0	78.2	21

1/100 mm 1/100"

	FRONT SHIM	BACK SHIM	FRONT MOVE	BACK MOVE
1.	7.5	7.39	74.5	715.5
2.	7.5	7.325	74.0	714.5

(PAR-0019-F1-A8)

TURBINE
 STATIONARY MACHINE

TURBINE - CASING
 COLD

NOTE

1. Safety related component alignments are to be verified and approved by TS.
2. Alignment verification must be performed with the alignment tooling on the equipment.

/R13

Alignment Performed By: JIA KALITA

Alignment Verified By: Andy Secher 10/24/96 3pm

NOTE: Use Attachments in this Appendix for VALVES. Do NOT use this Test Sheet.

APPENDIX B
 TEST SHEET
 (Page 1 of 2)

NPWO #: 8193 WO #: 96019215
 Component Tag # HFW HP IC PSL Unit 01
 Plant Location TRSL
 Equipment Name HUX FW Pump IC
 Description of Work Replace Outboard seal
 (After testing, route to Maintenance Supervisor)

IST If IST component, then SP review required
 SP Lead or Designee: John G. Hinkel

Place (X) if Required	Responsible Testing Group	Specific Tests	Minimum Acceptance Criteria	Circle Item or Actual Results	Testing Dept. Initials
1	OPS	Diesel Start OP 2200050 Loaded/Unloaded	ANPS/NPS to specify portion in remarks	SAT / UNSAT	
2	<input checked="" type="checkbox"/> SP	ASME Code Pump Head Flow Sec XI (IST Program)	Per applicable pump. Data sheet AP 0010125, Ref AP 0010132	Data Sheet Complete Sheet # C-F 01-0700050	JH
3	<input checked="" type="checkbox"/> SP	ASME Code Pump Vibration Sec XI (IST Program)	Per applicable pump. Data sheet AP 0010125, Ref AP 0010132	Data Sheet Complete Sheet # C-F 01-0700050	JH
5	<input checked="" type="checkbox"/> SP	ASME Code Pump Seal Leakage Sec XI (IST Program)	No External Leakage Unless Permitted by Vendor or technical support	SAT / UNSAT	PS
6	OPS	Pumps/Compressors Test Run (Non-ASME Sec XI IST Prgm)	Run sufficient time to determine if it performs intended function.	SAT / UNSAT	
7	OPS	Pumps/Compressors Seal Leakage (Non-ASME Sec XI IST Prgm)	No External Leakage (Mech Seal/ Packing) Unless Permitted by Vendor	SAT / UNSAT	
16	OPS	Leak Test - RCS	Per OP 0120022	SAT / UNSAT	
17	<input checked="" type="checkbox"/> SP/OPS/ or QC	Leak Test - Non RCS	*No Leakage @ Normal Operating Press. Sec XI Components may require VT-2	SAT UNSAT	PS
18	SP/MAINT/ or QC	Hydro - New Welds	No Leakage @ Hydro Pressure (____ PSIG) for (____ Min)	SAT / UNSAT	
19	ISI/MAINT.	Snubber Functional Test or Visual Test	Notify ISI	Notification Complete	
20	OPS/CHEM	Ventilation Test (Notify Chemistry Prior)	Per Appl. Tech Spec. 4.7.7 & 4.7.8	Test Complete	
22	MAINT.	Heat Exchanger Tube Leak Test	No Leakage @ Test Pressure (____ PSIG) for (____ Min)	SAT / UNSAT	

/R34

* Leakage is allowed when evaluated by OPS for continued Operation.

COPY

10/2/96 De

Component Tag # AFW PP 1C PSL Unit 01

APPENDIX B
 TEST SHEET
 (Page 2 of 2)

Place (X) if Required	Responsible Testing Group	Specific Tests	Minimum Acceptance Criteria	Circle Item or Actual Results	Testing Dept. Initials
	OPS	Terry Turbine (C - AFW) Performance	Test as Per OP 0700050 or OP 0700028	SAT / UNSAT	
	OPS	ECCS System Venting	Vent Charging to Aux HPSI HDR Line U-1 OP 1-0410020. Tech Spec 3.5.2 (U-2)	Venting Complete	
	OPS	Fan Test Run	Run sufficient time to determine if it performs intended function.	SAT / UNSAT	
	SP	Containment Personnel Equipment and Emergency Hatches	Pre & Post Test Required. Notify SP	Pre - SAT / UNSAT Post - SAT / UNSAT	
X	SP	Other Tests (Discretion of SP)	List Specific Test & Acceptance Criteria Below	SAT / UNSAT	SM
		Bearing temperatures due to oil drawing on outboard bearings			

ADDITIONAL SP TEST REQUIREMENTS & ACCEPTANCE CRITERIA

PRE-Work Review
 Planned By Janet English for Brian Blake Date 10/2/96
 SP Review James D. Foltz Date 10/2/96
 NPS/ANPS Review _____ Date 10/23/96

POST - Work Review
 Testing deferred MM Supv/Foreman: _____ Date: / /
 List tests deferred and blanket NWPO _____

Test results accepted by MM Supv or PMT Lead (if deferred) James D. Foltz Date: 10/28/96
 If any test is UNSAT, NPWO / WO / WR (Circle One) For Rework _____
 Equipment Returned to Service
 NPS/ANPS/NWE James D. Foltz Date 10/24/96
 Comments _____

Help Data Print Roadmap Exit

Facility = PSL Unit = 01 Status= COMPLETE Status Date: _____
 PC/M No. = _____ Plant Apvd Rev: _____ Latest Sup.: _____ PC/M Type= _____ Sub= _____
 Title : _____

Orig Doc Fac= _____ Type= _____ No _____
 Dthr Doc Fac= _____ Type= _____ No= _____
 CDO : _____ Disc.: _____ Resp Eng : _____
 Spnsr Dpt: _____ Hold = _____ Affect SRD/POD : _____
 Expr Date: _____ Safety Class: _____ Outage Related : _____ Outage/Cycle= 14 _____
 Cap/O-M : _____ Rev Pending?: _____ Safety Eval Rqd: _____ QC Required : _____
 ISMOD No.: _____ Security Inf: _____ NRC Commitment : _____ Implmnt Dept= _____

===== MILESTONE DATES =====
 Initial Value: _____ PNSC/FRG Approved : _____ Plant Approved : _____
 Work Complete: _____ SATS Complete-PTN : _____ To Finl Updt-PSL: _____
 Draw.Up.Cmplt: _____ Audit Complete : _____ Vault Received : _____
 =====

Nos Doc ADs SDC Nts Att PLS Phs TOS Rev CRNs

Contents: - - - - -

CURSOR ON + IN "CONTENTS" AREA & F9 DISPLAYS DETAIL PANEL, F10 ON PHS/TOS/CRNS.
 F1=Help F4=Prompt F5=Search F6=Refresh F10=Perform Msg F12=Cancel

EE/4/4

TIME01S

PC/M SEARCH

10/22/96 09:27

Help Data Print Roadmap Exit

* Fac	PC/M No.	Status	Type	Sub	Title	W/O #	Task
PSL	83255	COMPLETE	FAIL		PAULSON AND FARRIS SAFETY RELIEF		
PSL	91097	COMPLETE	ARP		F&P 55GL1154 POWER SUPPLY REPLACM		
PSL	91123	COMPLETE	MEP		DC LOAD SEQUENCING RELAY REPLACEM		
PSL	91186	COMPLETE	MEP		PIPE SUPPORT ISH-10 MODIFICATION		
PSL	92193	COMPLETE	ARP		CEA COIL POWER PROGRAMMER PWR SUP		
PSL	92200	COMPLETE	ARP		4.16 & 6.9 KV GROUND RELAY ALTERN		
PSL	93228	COMPLETE	EP		PERMANENT REACTOR CAVITY SEAL/SHI		
PSL	94112	COMPLETE	MEP		REACTOR VESSEL CLOSURE HEAD ONE P		
PSL	94120	COMPLETE	MEP		EDG VOLTAGE FREQUENCY & SPEED PER		
PSL	94144	COMPLETE	EP		RCS FLOW TRANSMITTERS DAMPENING B		
PSL	95082	COMPLETE	EP		HP TURBINE BLADE RING CHANGEOUT		
PSL	95115	COMPLETE	EP		SAFETY RELIEF VALVE V3412 SETPOIN		
PSL	95157	COMPLETE	MEP		DIESEL GENERATOR COOLANT RELIEF V		
PSL	95166	COMPLETE	MEP		LCV-11-1881 1B HEATER DRAIN PUMP		
PSL	95171	COMPLETE	MEP		DIESEL GENERATOR 1A1 & 1A2 COOLAN		
PSL	95177	COMPLETE	MEP		DG 1A & 1B PROTECTIVE TRIPS		

LOOK AT DWGS 9 SD.59 (FOR EFFECTS
-IF ANY-ON EDG LOADING

DWGS

More: *

*S=SELECT RECORD(S) AND PRESS ENTER TO VIEW.

F1=Help F2=Tutorial F3=Exit F7=Bkwd F8=Fwd F11=Help Index F12=Cancel

→ 96034-4438

* Fac	PC/M No.	Status	Type	Sub	Title	W/O #	Task
PSL	95180	COMPLETE	MEP		DG 1A & 1B FIRE CONTROL PANEL ALA		
PSL	95182	COMPLETE	MEP		SWITCHYARD BREAKER FAILURE UPGRAD		
PSL	95199	COMPLETE	MEP		FEEDWATER REGULALTION SYS 120V AC		
PSL	95224	COMPLETE	MEP		MAIN TRANSFORMER CABINET MODS		
PSL	95233	COMPLETE	MEP		PCV-12-50 TRIM SIZE MODS		
PSL	95236	COMPLETE	EP		DISCONNECTION OF ICW/CCW PUMP LOC		
PSL	96002	COMPLETE	MEP		REPLACE CONTINUOUS MONITORING EQU		
PSL	96014	COMPLETE	EP		SHUTDOWN COOLING RELIEF VALVE V34		
PSL	96017	COMPLETE	MEP		REMOVAL OF UNDERVOLTAGE ALARMS @		
PSL	96018	COMPLETE	MEP		MSCV DISC STUD ANTI-ROTATION PIN		
PSL	96024	COMPLETE	MEP		REPLACEMENT OF SECONDARY SIDE LEV		
PSL	96026	COMPLETE	MEP		HJTC CHANNEL A/B 40 PIN CONNECTOR		
PSL	96027	COMPLETE	MEP		REMOVAL OF POSITION INDICATORS ON		
PSL	96028	COMPLETE	MEP		FCV-07-1A/1B MODIFICATIONS		
PSL	96029	COMPLETE	MEP		BEACON CORE SYSTEM MOD		
PSL	96030	COMPLETE	MEP		EDG RELAY & MOUNTING SOCKET REPLA		

DNGPS

More: --

*S=SELECT RECORD(S) AND PRESS ENTER TO VIEW.

F1=Help F2=Tutorial F3=Exit F7=Bkwd FB=fwd F11=Help Index F12=Cancel

* Fac	PC/M No.	Status	Type	Sub	Title	W/O #	Task
PSL	96031	COMPLETE	MEP		BRANCH CONNECTION ON 24"-CS-3 @ R		
PSL	96032	COMPLETE	MEP		CEA MG SET CONTROL CIRCUIT UPGRAD		
PSL	96034	COMPLETE	MEP		RX HEAD VENT GAS SYS (RCGVS)		
PSL	96035	COMPLETE	MEP		ATMOSPHERIC DUMP VALVES SEAT RING		
PSL	96038	COMPLETE	MEP		REMOVAL OF ICW SUPPORT 8770-CW-10		
PSL	96039	COMPLETE	MEP		PERSONNEL AIR LOCK LEAK RATE TEST		
PSL	96040	COMPLETE	MEP		PZR CODE SAFETY VALVE REPLACEMENT		
PSL	96041	COMPLETE	MEP		1A1 RCP CCW LINE VIBRATION		
PSL	96042	COMPLETE	MEP		ZERO TURBINE SPEED MONITOR REPLAC		
PSL	96045	COMPLETE	MEP		FCV-9011 & 9021 MFRV CONTROLLER C		
PSL	96047	COMPLETE	MEP		RX STUD TENSIONER HOIST MOD		
PSL	96048	COMPLETE	MEP		PDS-22-122 & 123 PRESSURE SWITCH		
PSL	96050	COMPLETE	MEP		DEH SYSTEM POLISHING FILTER DRIFI		
PSL	96055	COMPLETE	MEP		REMOVAL OF RX TRIP SWGR ALARM REL		
PSL	96058	COMPLETE	MEP		CONTROL ROOM ANNUNCIATOR HORN REP		
PSL	96060	COMPLETE	MEP		LCV-11-24A1 & B1 ACTUATOR MOD		

DWGS

DWGS + TA - TEDB FOR VENDOR ETC

More: --

*S=SELECT RECORD(S) AND PRESS ENTER TO VIEW.

F1=Help F2=Tutorial F3=Exit F7=Bkwd F8=Fwd F11=Help Index F12=Cancel

* Fac	PC/M No.	Status	Type	Sub	Title	W/O #	Task
---	PSL 96062	COMPLETE	MEP	---	REPLACEMENT OF EDG CONTROL PANEL	---	---
---	PSL 96064	COMPLETE	EP	---	DELETION OF EDG AUTOMATIC START O	---	---
---	PSL 96067	COMPLETE	MEP	---	EDG HIGH POINT VENTS	---	---
---	PSL 96071	COMPLETE	MEP	---	INSTALLATION OF FLANGES IN LINES	---	---
---	PSL 96072	COMPLETE	MEP	---	SB13306 OPERATOR ENHANCEMENT	---	---
---	PSL 96073	COMPLETE	MEP	---	REMOVABLE MAN-WAY FOR ACCESS TO E	---	---
---	PSL 96074	COMPLETE	MEP	---	ADDITION OF EDG UNLOADER MANUAL I	---	---
---	PSL 96075	COMPLETE	MEP	---	PRESSURIZER UPPER HEAD INSULATION	---	---
---	PSL 96076	COMPLETE	EP	---	INSTALLATION OF TWO PROPORTIONAL	---	---
---	PSL 96080	COMPLETE	MEP	---	INSTALLATION OF VENT VALVES ON 1A	---	---
---	PSL 96084	COMPLETE	EP	---	REACTOR VESSEL O-RING REPLACEMENT	---	---
---	PSL 96085	COMPLETE	EP	---	RWT VORTEX SUPPRESSOR	---	---
---	PSL 96086	COMPLETE	MEP	---	REPLACE SAFETY RELATED SMALL BORE	---	---
---	PSL 96090	COMPLETE	MEP	---	V08163 PLUG REPLACEMENT	---	---
---	PSL 96092	COMPLETE	MEP	---	MODIFY GUIDE BUSHING FOR HCV-3657	---	---
---	PSL 96094	COMPLETE	MEP	---	MODIFY V4111 THRUST RING	---	---

DNGS 50.59
 |
 none

*S=SELECT RECORD(S) AND PRESS ENTER TO VIEW.

F1=Help F2=Tutorial F3=Exit F7=Bkwd F8=Fwd F11=Help Index F12=Cancel

Fac	PC/M No.	Status	Type	Sub	Title	W/O #	Task
PSL	96095	COMPLETE	MEP		EQ DOC PAC UPDATE		
PSL	96097	COMPLETE	MEP		SUPPORT ASSEMBLY MODIFIED FOR UNI		
PSL	96098	COMPLETE	MEP		RCB POLAR CRANE GROUND DETECTOR		
PSL	96106	COMPLETE	MEP		PCV-18-5 VENT VALVE ADDITION		
PSL	96111	COMPLETE	MEP		REPLACE DAMAGED CABLE ON TE-1112C		
PSL	96112	COMPLETE	MEP		REDUCTION OF STEM TRAVEL TO INCKE		
PSL	96113	COMPLETE	MEP		REACTOR HEAD LIFT RIG ACCESS STAI		
PSL	96114	COMPLETE	MEP		INSTALLATION OF TRANSIENT SUPPRES		
PSL	96115	COMPLETE	MEP		AUX FW PUMP TC TACHOMETER CIRCUIT		
PSL	96116	COMPLETE	MEP		ACOUSTIC BARRIERS FOR AUXILIARY F		
PSL	96117	COMPLETE	MEP		RCS HOT LEG TEMPERATURE ALARM SETP		
PSL	96118	COMPLETE	MEP		MFRV INSTRUMENT AIR BACK-UP REGUL		
PSL	96119	COMPLETE	MEP		SETPOINT CHANGE TO AFAS		
PSL	96120	COMPLETE	MEP		REPLACEMENT OF MV-09-11 THERMAL O		
PSL	96121	COMPLETE	MEP		REPLACE ROSEMOUNT MODEL 104VC RTD		

~~PSL 96116~~ DWG 4 TEDB
 none entered

More:

*S=SELECT RECORD(S) AND PRESS ENTER TO VIEW.

F1=Help F2=Tutorial F3=Exit F7=Bkwd F8=Fwd F11=Help Index F12=Cancel

Component:
Associate:
Name: FIRE EXTINGUISHERS

Sys: 15 Train:
Assign Priority: A2
Work Type: 7

Fac: PSL Unit: 00
MASTER
WORK ORDER TASK

Location: UNIT 1 AREA

LMD: 1

96023877 01

Defect/Request: 001PM15-254 PM - INSPECTION

ER/PWO: 69 / 5505
Chg Loc: 929
PAGE 1 of 3



Detailed Explanation:

PM ID:
DUE BY DT: 10/08/96 EARLY DT: 10/01/96 LATE DT: 10/15/96

Work Request: Def Tag: Loc: More:
Trbl/Brkdown: LCO:
NPRDS: N Fail Date: Time: Det: Unit Cond Req:
Originator: Date: Stat: Symp:
Approve By: Date: Dept:

Task Determination Data:

IST Required : N NCR/CR : N/A Safety Class: NNS
PMT Required : N PCM : N/A Q Group : D
10 CFR 50.49 : N EQ Doc Pkg : N/A Assign To : M/S 1
Reg Guide 1.97 : N Seismic Cat : N Est M/H : 4.00
ASME XI (ISI) Req'd : N Scaffold Req : N Crew Qty : 1
Security Clearance: N Fire Prot Req: N Insul Rem : N
Clearance Required: N Clearance No :
RWP Required: N RWP No: RCA M/H: L1: L2: L3:

QC Requirements: QC Required : Y
QL-A

More:

Work Order Task Description:

PERFORM PREVENTIVE MAINTENANCE JOB #254 PER ATTACHED INSTRUCTIONS.

ATTACHED REQUIRES VERIFICATION AND SIGNOFF:
GEN MAINT PROC 1-M-0018F APPX. 'A' FILE 254

More:

Planned By : DRCOX24 HOWIE D Date: 09/10/96
Pkg Appr By : PRE-APPR Date: 09/10/96 Time: 21:48
QC Approval : PRE-APPR Date: 09/10/96

***** OPERATIONS APPROVAL TO START *****
* NPS Start Permission: [Signature] LCO (Y/N): ✓
* Start Date/Time : 10-7-96 0911

NPS Completion Notif: [Signature] Major Failure: _____
Compl. Date/Time: 10/14/96 0750 Major Action : _____
Deficiency Tag Removed (Y/N): _____

EE/45

Component: Sys: 15 Train:
 Associate: Assign Priority: A2
 Name: FIRE EXTINGUISHERS Work Type: 7
 Location: UNIT 1 AREA LMD: 1
 Defect/Request: 001PM15-254 PM - INSPECTION

Fac: PSL Unit: 00
 MASTER
 WORK ORDER TASK
 96023877 01
 ER/PWO: 69 / 5505
 Chg loc: 929
 PAGE 2 of 3

JOURNEYMANS WORK REPORT

Actual Start Date:	Time:	Actual Completion Date:	Time:
10-7-96	0930	10-11-96	1500

Note: Journeyman shall sign and date text after their entries.

Trouble Found:

This Section is NOT Applicable for PMS or other planned jobs

Work Performed:

performed p.m. 254 Inspected fire
 extinguishers.

Roger M Anderson

Roger M Anderson
 10-7-96

Inspected fire extinguishers.

Roger M Anderson

Roger M Anderson
 10-8-96

Continued on Additional Sheets: Y N
 Suggestions For Future Planning/Variance Reason:

Supv/Foreman/Chief	Date	Supervisor	Date	QC Inspector	Date
Ed Gaskill	10/14/96	M. Gaskill	10/15/96	QC Routed	
Ed GASKILL					

Component:
Associate:
Name: FIRE EXTINGUISHERS

Sys: 15 Train:
Assign Priority: A2
Work Type: 7

Fac: PSL Unit: 00
MASTER
WORK ORDER TASK

Location: UNIT 1 AREA

LMD: 1

96023877 01

Defect/Request: 001PM15-254 PM - INSPECTION

ER/PWO: 69 / 5505
Chg loc: 929
PAGE 3 of 3

Continuation of Trouble Found/Work Performed:

Inspected fire extinguishers.

Roger M Anderson

Roger M Anderson

10-9-96

Inspected fire extinguishers.

Roger M Anderson

Roger M Anderson

10-10-96

Completed pm 254. T-18 is going
to be re-mounted by win team. All
fire extinguishers had no obstructions
to access or visibility.

Roger M Anderson

Roger M Anderson

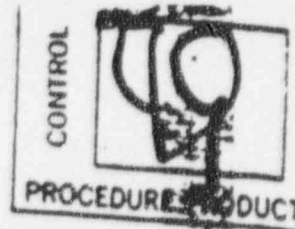
10-11-96

OK Bm

10/14/96

Continued on Additional Sheets: Y N

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 1
GENERAL MAINTENANCE PROCEDURE NO. 1-M-0018F
REVISION 23



1.0 TITLE:

MECHANICAL MAINTENANCE SAFETY-RELATED PREVENTIVE MAINTENANCE PROGRAM (FIRE PM'S)

2.0 REVIEW AND APPROVAL:

Reviewed by Facility Review Group _____ 9/9 1986

Approved by D. A. Sager Plant General Manager _____ 10/10 1986

Revision 23 Reviewed by FRG _____ 11/2 1995

Approved by J. Scarola Plant General Manager _____ 11/2 1995

3.0 PURPOSE:

This procedure provides the necessary instructions to perform preventive maintenance (PM's) on Fire Protection equipment.

4.0 PRECAUTIONS & LIMITS:

- 4.1 The PM files in this procedure can only be performed under direction of an approved NPWO in accordance with Administrative Procedure AP 0010432, "Nuclear Plant Work Orders."
- 4.2 Clearances shall be established for the equipment on which the PM is to be performed prior to any work in accordance with 0010122, "In-Plant Equipment Clearance Orders."
- 4.3 The frequency of performance of PM files is subject to the Fire Protection Plan the performance history and vendor recommendations. Frequencies for the attached PM's are maintained in the PM planners scheduling program and may only be changed upon approval of the M/M Technical Support Supervisor.
- 4.4 Refer to the individual PM attachments to this procedure.

DOCUMENT REQUIRES VERIFICATION
AND SIGNOFFS
Rev. Date Verified 10-7-96 Initials RA

S_1_OPS
DATE _____
DOCT PROCEDURE _____
DOCN 1-M-0018F
SYS _____
COMP COMPLETED _____
ITM 23

ST. LUCIE UNIT 1
 GENERAL MAINTENANCE PROCEDURE NO. 1-M-0018F, REVISION 23
MECHANICAL MAINTENANCE SAFETY-RELATED PREVENTIVE MAINTENANCE
PROGRAM (FIRE PM'S)
 APPENDIX A

PM 254
 (Page 2 of 9)

2.0 Procedure: (continued)

2.2 Instructions

- 2.1 Locate each extinguisher and inspect in accordance with check list and sketches provided.
- 2.2 Verify that the type of extinguisher specified on the check list is on station. If not, replace with the proper type.

/R23

NOTE

A location map and check list that identifies each fire extinguisher location will be attached by the planner as provided by the fire prevention supervisor. Inspection should be conducted per attached list.

2.3 Acceptance Criteria/Inspection Guidelines/Corrective Action

1. Fire Extinguishers:

A. Acceptance Criteria:

Fire extinguishers must be located in designated place.

B. Inspection Guidelines:

Inspect that the fire extinguishers are located in designated place.

C. Acceptance Criteria:

If acceptance criteria is not met, then relocate to designated place.

RELOCATED?	INITIAL & DATE
YES	NO

COMMENTS: T-18 Column has been removed EXT is being remounted by WIN TEAM in the same area. unable to access HM-1 - Haz-mat Bldg. Due to relocation of Building. Ext. will be checked as soon as Bldg is placed, secured and relocated. Bm

ST. LUCIE UNIT 1
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APPENDIX A

PM 254
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2.0 Procedure: (continued)

2.3 (continued)

2. Fire Extinguishers Access/Visibility

A. Acceptance Criteria:

Must be clear of obstruction to access or visibility.

B. Inspection Guidelines:

Inspect that the fire extinguishers have no obstruction to access or visibility.

C. Corrective Action:

If acceptance criteria is not met, then clear obstruction.

OBSTRUCTION CLEARED OR REMOVED?		INITIAL & DATE
YES	<u>NO</u>	RA 10-11-96

COMMENTS: Acceptance Criteria met.

3. Fire Extinguishers Operating Instructions:

A. Acceptance Criteria:

Operating instructions on name plate must be legible and facing outwards.

B. Inspection Guidelines:

Fire Extinguishers operating instructions on name plate is legible and facing outwards.

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PROGRAM (FIRE PM'S)
APPENDIX A

PM 254
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2.0 Procedure: (continued)

2.3 (continued)

3. (continued)

C. Corrective Action:

If acceptance criteria is not met, then replace operating instruction name plate properly.

TAGS CORRECTED & FACING OUT?		INITIAL & DATE
YES	NO	RA 10-11-96

COMMENTS: Acceptance criteria met.

4. Fire Extinguishers Seals

A. Acceptance Criteria:

Seals (tamper indicators) must not be broken or missing.

B. Inspection Guidelines:

Inspect the fire extinguisher seals (tamper indicators) that they are not broken or missing.

ST. LUCIE UNIT 1
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PM 254
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4.0 Additional Information

4.1 Location map of fire extinguishers

4.2 List of fire extinguishers

PM COMPLETED

Name (print & sign) Roger M Anderson Roger M Anderson

Date 10/11/96

Florida Power & Light Company
ST. LUCIE PLANT

PLANT PSL	UNIT NO. 1	FREQUENCY	FILE NO.
EQUIPMENT NAME Fire ext. Turbine deck, Control Room and RAB 19.5' elev		JOB DESCRIPTION	
MANUFACTURER		SERIAL NO./MODEL	DATE OF REVISION
TECH. MANUAL NO.		WRITTEN BY	APPROVED BY

EXTIN- GUISHER NO.	LOCATION	PAGE #	CONDITION APPEARS		FULL DISCHARGED		TYPE	CHECK BY
			SAT	UNSAT	F	D		
T-33	Turbine Deck	15	✓		✓		ABC	RA
A-50	Elev Cubicle	17	✓		✓		ABC	RA
T-50	Turb. Crane	15	✓		✓		ABC	RA
#1	Control Room	17	✓		✓		water	RA
#2	"	17	✓		✓		"	RA
A-48	"	17	✓		✓		CO 2	RA
A-51	"	17	✓		✓		CO 2	RA
A-47	"	17	✓		✓		CO 2	RA
A-46	"	17	✓		✓		CO 2	RA
A-45	"	17	✓		✓		CO 2 ABC	RA
A-52	"	17	✓		✓		ABC	RA
A-53	east wall of C/R outside	17	✓		✓		ABC	RA
A-49	T.S.C.	17	✓		✓		ABC	RA
A-59	"	17	✓		✓		CO 2	RA
A-58	"	17	✓		✓		CO 2	RA
A-23	R.A.B. 19.5'	18	✓		✓		CO 2	RA
A-27	"	18	✓		✓		ABC	RA
A-28	"	18	✓		✓		CO 2	RA
A-22	First Aid Rm	18	✓		✓		ABC	RA
A-21	R.A.B. 19.5'	18	✓		✓		CO 2	RA
A-24	"	18	✓		✓		ABC	RA