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MC-1

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SERVICE WATER PUMP ROTATING
ASSEMBLY REMOVAL AND INSTALLATION

1.0 PURPOSE

To describe the steps necessary to remove and reinstall the rotating assembly of the Service Water Pump.

2.0 RESPONSIBILITY

The Maintenance Engineer shall be responsible for ensuring the proper implementation of this procedure.

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3.0 DISCUSSION

3.1 The service water pumps (1P41*P-203A/B/C/D) are 2 stage, vertical, centrifugal wet-pit type pumps driven by individual electric motors. They are located at El. 20 ft - 0 in. in the Screenwell. The pumps take a suction on the intake canal and discharge through strainers to supply cooling water to the turbine building closed loop cooling water, residual heat removal, and reactor building standby ventilation system, control room air conditioning and main ventilation chilled water chiller condensers, and the circulating water pump bearing and emergency diesel generator coolers.

3.2 The following procedures are provided to ensure proper maintenance of the service water pumps (excluding motors) and are intended to be used either as independent procedures or together:

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4.0 PRECAUTIONS

4.1 Care should be taken when pump internals are exposed or when the screenwell pit is open to prevent foreign material from entering the pump casing or screenwell pit and which could be left there after maintenance is complete.

4.2 After the service water pump is removed from the screensell, the pump hole should be covered with wood (or suitable cover) to prevent personnel from falling through the opening.

4.3 Care should be taken when lifting the pump to ensure that no strain is put on it. Jerking or dropping the pump may effect pump alignment. When lifting the pump and moving it from vertical to horizontal positions, ensure that there is adequate support for the bowls and column to prevent bending of the pump.

5.0 PREREQUISITES

5.1 Maintenance Work Request

5.2 Station Equipment Clearance Permit

5.3 Laydown space for the motor and rotating element of the pump should be available around the screenwell building.

5.4 In order to disconnect and reconnect the pump column and bowl seismic restraints within the service water pit, the associated screenwell pit will have to be dewatered.

5.5 Equipment History Form SPF31.002.01-40D, Vertical Centrifugal Pumps.

- 5.6 Rigging equipment (cranes, slings, etc.) should be inspected to ensure that they are in a safe condition for use.
- 5.7 Cleanliness requirements shall be established in accordance with SP 12.023.01, Station Housekeeping.

6.0 LIMITATIONS AND ACTIONS

- 6.1 Allowable pump out of service time shall be in accordance with Reference 11.1.

7.0 MATERIALS OR TEST EQUIPMENT

- 7.1 Mobile crane capable of the following:

Lift capacity - 12 tons with a radius of later ft.
Lift height above screenwell roof - 32 ft.

- 7.2 Wire rope slings (matched)

- 7.3 Shackles

- 7.4 Universal dial indicator set 0-50-0

- 7.5 Wood blocks and materials on which to set the motor and pump parts during disassembly.

- 7.6 Two - 3 ton chain hoists

8.0 PROCEDURE

Component ID No. _____ MWR/PM No. _____

Initials

Pump Serial No. _____ Motor Serial No. _____

Conducted by: _____ Date _____

8.1 Packing Replacement and Adjustment

- 8.1.1 Ensure the prerequisites of Section 5.0 have been met, and the appropriate materials or test equipment in Section 7.0 are available.

- 8.1.2 Replacement of packing and adjustments should be performed in accordance with the Stuffing Box Assembly Section of Reference 11.2.

- 8.1.3 Coat the packing studs with a small amount of grease or

lubricant after maintenance to prevent them from becoming fouled or corroded.

- 8.1.4 If no other maintenance is to be performed and work has been recorded on the Equipment History form, notify the Maintenance Foreman that maintenance is complete.

8.2 Driver Removal

- 8.2.1 Ensure the prerequisites of Section 5.0 have been met, and the appropriate materials or test equipment on Section 7.0 are available.
- 8.2.2 Remove the following electrical leads from the service water pump motor and tag them for identification and location during reassembly:
1. Motor power leads to main terminal box.
 2. Power leads to space heater.
 3. Bearing temperature detector leads.
 4. Stator RTD leads.
 5. Vibration monitor lead(s).
- 8.2.3 Disconnect the motor ground cable.
- 8.2.4 Record the "As Found" pump coupling clearance between the pump-end adjusting nut and the motor driving half and disconnect the pump coupling. Record "As Found" alignment data on the Equipment History Form.
- 8.2.5 Remove the bolts attaching the motor to the motor support head and any alignment pins that may be installed.
- 8.2.6 Attach rigging to the lifting lugs mounted on the top of the motor housing, and remove the motor from the support head.
- 8.2.7 Set the motor in an upright position on suitable blocking.

CAUTION: The motor shaft extends 7 in. below the mounting surface. Ensure that blocking is high enough to prevent damage to the shaft.

8.3 Driver Installation

- 8.3.1 Replace motor on the support head in accordance with the sections of Reference 11.2 which cover motor installation

and coupling installation.

8.3.2 Reconnect and align the pump coupling in accordance with Reference 11.2 sections which cover the flanged coupling and alignment. Record final alignment data on the Equipment History Form.

8.3.3 Replace the following electrical leads on the service water pump. Ensure proper replacement of leads by matching tags:

1. Motor power leads to the main terminal box.
2. Power leads to the space heater.
3. Bearing temperature detector leads.
4. Stator RTD leads.
5. Vibration monitor lead(s)

8.3.4 Replace the motor ground cable.

8.3.5 Check for proper power lead placement using a motor rotation tester. Rearrange leads for proper rotation if necessary.

8.3.6 Notify the Maintenance Foreman or his assigned alternate that all work is completed and that Section 8.5 may be conducted.

8.4 Pump Rotating Element Disassembly and Reassembly

8.4.1 Ensure prerequisites of Section 5.0 have been met, and the appropriate materials or test equipment in Section 7.0 are available.

8.4.2 The service water pump motor has been removed in accordance with Section 8.2.

8.4.3 Disconnect the discharge and seal water piping.

8.4.4 With the screenwell dewatered, remove the seismic restraints on the pump pipe column and bowls.

8.4.5 Remove pump from the screenwell pit and locate in laydown area for further disassembly per Reference 11.2.

8.4.6 After the pump has been removed, the pump mounting plate opening should be covered to prevent equipment and/or debris from entering the screenwell pit and adequate personnel safety precautions taken.

8.4.7 Disassemble the pump and rotating element in accordance with the appropriate sections of Reference 11.2. Record the "As-Found" conditions on the Maintenance History

Form.

- 8.4.8 Conduct necessary rework to the pump parts and or replace parts as required. If necessary, perform repairs in accordance with SP 31.017.01, Special Repairs and Testing.
 - 8.4.9 Reassemble the pump rotating assembly and pump case in accordance with Reference 11.2.
 - 8.4.10 Reinstall pump into the screenwell pit reassemble the stuffing box and replace the pump motor per 8.3.
 - 8.4.11 Replace the seismic restraints on the pump pipe column and bowls and reconnect the discharge and seal waterpiping.
 - 8.4.12 After the pump and motor have been reinstalled and the Equipment History Form is completed, notify the Maintenance Foreman that Section 8.5 may be conducted.
- 8.5 Returning the Pump to Service
- 8.5.1 Check the screenwell pit clear of foreign material if dewatered or the pump was removed.
 - 8.5.2 Check the motor thrust bearing oil levels and fill to the proper level, if required.
 - 8.5.3 Turn the pump shaft by hand, using a strap wrench, to ensure freedom of rotation.
 - 8.5.4 Check that the motor housing ventilatin ports are clear.

- 8.5.5 Return the screenwell pit to its normal operating condition.
- 8.5.6 Momentarily energize motor to check direction of rotation. Switch motor leads if necessary to achieve proper direction of rotation.
- 8.5.7 Check the pump packing gland and adjust for proper leakoff after the pump is operating.

9.0 ACCEPTANCE CRITERIA

9.1 Measured clearances are within the following limits:

- 1. Coupling Alignment = .002"
- 2. Pump and Motor Float = 1/2 total float
- 3. Wear Ring Clearances = .025" max.
- 4. Shaft Runout = .0005" per ft.

10.0 FINAL CONDITIONS

- 10.1 Remove tools, rigging, and trash from the work area.
- 10.2 Equipment History Form and procedure submitted to Maintenance Engineer for review and filing in accordance with SP 31.002.01, Maintenance Record System.
- 10.3 Station equipment clearance tags removed.
- 10.4 Maintenance Engineer Review _____ Date _____

11.0 REFERENCES

- 11.1 Technical Specifications, 5/21/76, Section 3.7.1
- 11.2 Bingham-Williamette Company, Type VM Size 16 x 26c, Multi-Stage Vertical Pumps, Wet Pit VCM & VTM, Installation, Operation, and Maintenance Procedures, File Code 1P41.110.

12.0 APPENDICES

N/A