SOP-NAUT-003 Auxiliary Plant Operations

1.0 Introduction

This Standard Operating Procedure (SOP) describes the vessel's auxiliary mechanical systems and their basic operations. Details of auxiliary system operations are detailed in the manufacturer's manuals. The following systems are identified as auxiliary on board the *Nautilus*.

- Fuel oil transfer pumps
- Engine room ventilation fan
- Oil water separator
- Fuel oil purifier
- Air compressors
- Reverse osmosis water maker plant
- Bow thruster
- Generators
- Sewage treatment plant

2.0 Responsibility

The Chief Engineer is responsible for the operation, inspection and maintenance of all auxiliary systems. The Chief Engineer will delegate various inspection and maintenance duties to the engineering staff.

3.0 Procedures

Brief operating instructions for auxiliary plant systems are as follows.

3.1 Fuel Oil Transfer Pump (FOTP)

Start Up

- Take soundings on each tank involved in operation
- Open the appropriate valves on the fuel oil manifold
- Press start button on the FOTP
- Continuously monitor each tank by soundings
- To fill the starboard side day tank
  - Take sounding on each tank involved in operation
  - Open appropriate valves on the fuel oil manifold
  - Monitor each tank by Manual Soundings
- Once the desired amount of fuel has been transferred, secure the system and shut down the FOTP

Shut Down

- Press stop button on FOTP
- Secure all valves opened at fuel oil manifold
- Record in appropriate engineering logs and fuel oil logs

3.2 Engine Room Ventilation Fans- Port and Starboard

Start Up

- Ensure that the main breaker in the main switch board is turned on
- Switch on the main switch board
- On the main switch board
  - Monitor Kw meter to verify normal parameters

Shut Down

- Switch off on blower control boxes in engine room

3.3 Oil Water Separator (OWS)

Start Up

- Ensure all manual valves leading to and from the OWS are open
- Place the power switch to the on position
  - The clean water inlet solenoid valve should open and fill the separator with clean water
- Set the operation switch to the run position
  - Run position is normal operating condition
- When desired level in bilge is reached set the operation switch to off
- Clean system by back flushing
  - Set operation switch to the flush position
  - Let the system back flush for 30 minutes
  - System is ready to shut down

Shut Down

- Set operations switch to the off position
- Close all manual valves leading to and from the OWS

3.4 Fuel Oil Purifier (FOP)

Start Up

- Check oil level in crank case
- Open delivery valves to port side and starboard side day tanks
- Start FOP
- Once FOP reaches normal speed
  - Open fresh water prime valve and prime FOP
  - Open suction valve from required FO storage tank
  - Regulate the inlet valve on FOP to control flow from fuel tank
- Adjust outlet pressure at 2 bar by outlet valve.
- Check flow meter to verify amount going to day tank

Shut Down

- Close inlet valve and all suction valves opened at the beginning of this procedure

- Stop FOP at FOP local control box

3.5 Air Compressors #1, 2

Start Up
- Set local control box switch to on
- Work in auto mode
  - Pressure switches regulate tank pressure

Shut Down
- Set local control box switch to off

3.6 Reverse Osmosis Water Maker Plant

Start Up
- Set all valves as per manual start up positions
- Open raw water inlet valve
- Start the LP boost pump
- When flow through the reject discharge flow meter appears to be free of air bubbles, slowly turn the HP by-pass valve in a clockwise direction until reaching 800 PSI, do not permit the unit to exceed 850 PSI
- Periodically monitor the control panel
  - Adjust as needed to maintain correct pressure and flow
- Once RO has produced the desired amount of potable water, shut down

Shut Down
- Release pressure on the system by turning the HP by-pass valve counterclockwise
- Secure the HP pump by pressing the LP pump stop button
- Set all valves as per manual stand-by positions

3.7 Bow Thruster

Start Up
- Check oil level of hydraulic tank.
- Start locally Hydraulic Pump and Cooling Pump

- From ECR Start Bow Thruster
- Give control to the Bridge

Shut Down
- Take Control from Bridge
- Stop Bow Thruster
- Stop Hydraulic Pump and Cooling Pump

3.8 Generator

Start Up
- Check oil level in crankcase
- Check water level of expansion tank
- Make sure fuel valves are in line
- Start in Local
- Warm up engine
- Once engine is warm rise RPM to 1800 with Excitation
- On main switch board
  - Set synchronizer selector switch to incoming generator
  - Monitor synchroscope speed and direction
  - Adjust speed dial to achieve proper direction (clockwise) and speed (very slow) of synchroscope
  - When synchroscope is at 12 o'clock position switch on the breaker for the incoming generator
- Incoming generator is now in parallel with the outgoing generator
- On main switch board
  - Monitor voltage at 480
  - Monitor cycles at 60 Hz

Shut Down
- To Disconnect a generator from the Main Switchboard reduce the load using a potentiometer
  - Once the minimum load has been reached, proceed with opening the breaker with the red handle
  - Switch off the excitation
  - Cool down engine
  - Stop engine

3.9 Sewage Treatment Plant – MSD Type ACO CLARIMAR MF 1

Start Up

The MSD plant is fully automatic. Therefore, verify the below.

- Ensure effluent pump discharge valve is in the “OPEN” position
- Ensure on main unit panel Blower, Effluent Pump , in the “AUTO” position, UV toggle switches are in “ON” position, desludging pump “OFF” position
- Unit is ready to use