| TROUBLESHOOTING SCENARIOS | |
|---|---|
| F0RM NO | **GRE004**. *(Scenario 15)* |
| SCENARIO NAME | AB water level Low – Problem with Automatic Feed Pump or Feed water Control Valve |
| SYSTEM NAME | Marine boiler steam and water system |
| Max Time | 4 min |
| SYSTEM DESCRIPTION | Initially the water is in the feed tank. Through a pump (Feed Pump) it is transferred to the water chamber of the Boiler after it has been preheated. Then through pump (Gas Boiler Pump) the water is transported to the highest point of Gas Boiler where it is preheated to a very close vaporization temperature. It is then transported to the middle point of Gas Boiler where liquid steam is produced. The specific liquid steam is transferred to the steam chamber of the Boiler and from there it finally passes to the superheater, where due to the maximum temperature of the exhaust gases of the main propulsion engine, the steam becomes superheated and of high pressure with the final direction being the steam turbine of the generator. After the above process is completed, a part of the steam will be transferred to the Boiler outlet for use in fuel, lubricants, and other sanitary parts of the ship and most of the low pressure steam will enter a cooler (Condenser) where the steam will become condensate and through a pump (condensate pump) the same process will follow (feedback).<br>As we understand, there will be a cash deficit for the next cycle. This is achieved with the boiler feed control valve which gives a signal to start or stop the feed pump by controlling the level of $H_2O$ in the boiler. The mixture of $H_2O$ liquid and steam in the boiler should have a constant ratio to achieve the required pressure and temperature. |
| Describe the problem | The $H_2O$ level in the boiler drops below the manufacturer's limit (for our ship the limits are the lowest 190cm and the highest 210cm). |
| ALARM TYPE<br>As a result of the problem mentioned above, alarms to be triggered | When the AB water level is <190cm activated following alarms and changes will be triggered:<br>● Alarm lights up at AB water level low.<br>● The water station indicator column will flash. |

| | |
|---|---|
| SCENARIO CHRONOLOGY | 1. Low Alarm sound and Signal light column for machinery alarm is illuminated.<br>2. Message on ECR computer panel will appear: Auxillary boiller water level with the current value of $H_2O$ with red letters.<br>3. We will have to press ACKNOWLEDGE BUTTON in ECR computer panel (Does it means just a mute alarm)<br>4. The alarm horn will SILENT (not power off, just Silent). The letters on message on ESC MOP-A change color to yellow letters.<br>5. We check the volume supply, the pressure of the depression and the temperature if it is within the limits that should work (volume suply must be about 6000 lt/h, the pressure must be 6 – 8 bar and the temperature < 60 $^oC$)<br>6. We close the feed pump #1 (off position) and open the feed pump #2 in the on position while monitoring the $H_2O$ level indicator.<br>7. If the $H_2O$ level rises then we leave feed pump #2 in the on position until the $H_2O$ level reaches the desired limit (200cm). We then turn feed pump #2 to auto and send a crew to repair or replace pump #1.<br>8. Messages on ECR computer panel will DELETE<br>9. If the $H_2O$ level does not rise then the Feed water control valve is stuck closed which is controlled by two PLCs (flow indicator controller (fic) and level indicator controller (lic)).<br>10. We open the valve manually and check the two PLCs (fic and lic) if they work correctly. We replace if there is a reason.<br>11. FINISHED SCENARIO |
| QUESTIONS | What is boiler water level?<br>What is the value of steam pressure?<br>What happen/might happen if the $H_2O$ level does not rise? |
| OUTCOMES | To understand boiler water level and operation of feed water pumps.<br>To ensure that student can understand alarm messages.<br>To start another feed pump if there is a reason. |