- The maximum operating requirement
- Net positive suction head available ($NPSH_a$) and NPSH margin

Assessment of the pumps against operational conditions shall follow ANSI/HI Pump Standards 9.6.3 and selection of the pump shall be based on the following:

- During normal operation or frequent operating conditions pump operation point should be located within Preferred Operating Region (POR) as close possible to Best Efficiency Point (BEP).

During the less frequent operating conditions (maximum operating requirement) pump operation point can be located outside POR but within Allowable Operating Region (AOR).. The POR for pumps with a specific speed less than 5200 (4500 U.S units) shall be from 70% to 120% of BEP. For higher specific speeds POR shall be from 75% to 115% of Best Efficiency Point (BEP).

Indicative Operating Regions are shown in Figure 6-3.

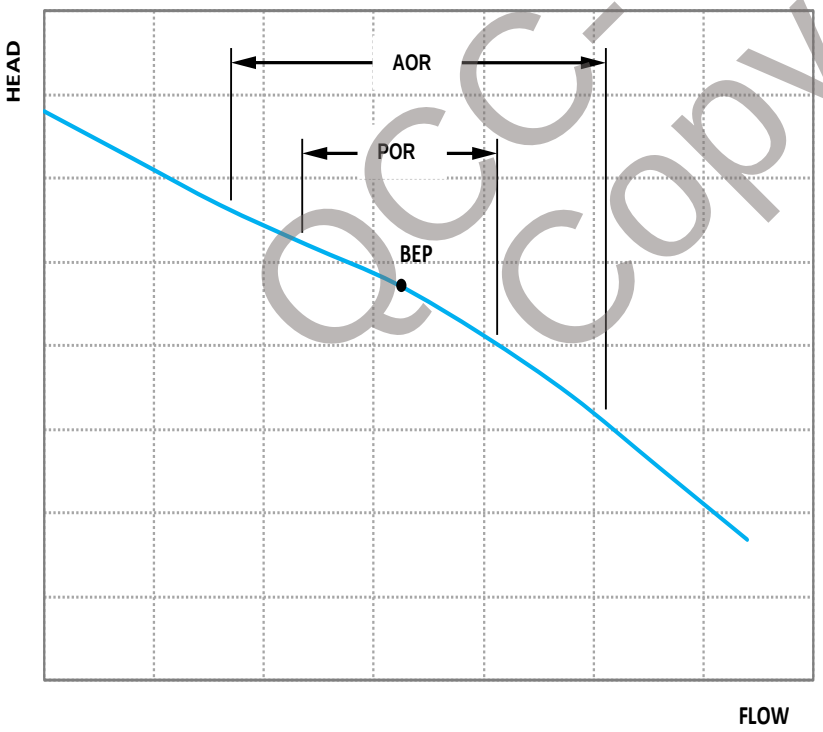

Figure 6-3 – Pump Operating Regions

6.3.6. Net Positive Suction Head NPSH

The Centrifugal pumps will only operate satisfactorily if there is no build-up of vapor (cavitation) within the pump. Therefore the pressure head at the NPSH datum point must exceed the vapour pressure head of the medium handled.

The $NPSH_r$ is the value required by the pump and specified by the manufacturer.

$$NPSH_a \geq NPSHr + 1.5 \text{ m}$$

6.3.7. Number of Pumps

The minimum required number of pumps in each pumping station is two.

For two pump arrangements, pump oversizing to compensate possible pump failure is acceptable – each designed to pump 66 to 100% of the required flow.

For three pump arrangements – each designed to pump 50% of the design flow.