Rankine BOP Modules - Equations

OTSG

High Pressure Turbine

* Steam flow from HP turbine to moisture separator
* HP turbine bleed flow rate to HP feedwater heater
* Enthalpy of steam at moisture separator
* Enthalpy of steam at isentropic endpoints from pressure P\_nc

Low Pressure Turbine

* Steam flow from HP turbine to moisture separator
* LP turbine bleed flow rate
* Enthalpy of steam at LP turbine

Reheater

* Rate of change of volumetric density of steam in the reheater
* Enthalpy of steam in the reheater
* Steam pressure (requires enthalpy and density)
* Steam flow from reheater to LP turbine
* Enthalpy of saturated vapor as a function of reheater pressure
* Flow from reheater to HP feedwater heater
* Heat transfer rate in the reheater
* Temperature of shell side steam in the reheater

Moisture Separator

* Steam flow from moisture separator to HP feedwater heater
* Steam flow from moisture separator to reheater

Condenser

* Water mass inside the condenser
* Water condensation flow rate
* Enthalpy of the outlet water
* Heat duty (Q\_co)
* Heat transfer rate in the condenser
* Enthalpy of saturated water as a function of condenser pressure
* Enthalpy of vaporization as a function of condenser pressure
* Outlet temperature of cooling water
* Pressure inside the condenser
* Temperature of condensate vs pressure

Feedwater Heater (Low Pressure)

* Enthalpy in the LP feedwater heater
* Heat transfer rate in the LP feedwater heater
* Flow rate in the LP feedwater heater

Feedwater Heater (High Pressure)

* Enthalpy in the HP feedwater heater
* Heat transfer rate in the HP feedwater heater
* Flow rate in the HP feedwater heater
* Temperature of the HP feedwater

Nozzle Chest & Steam Valve

* Nozzle chest enthalpy change
* Nozzle chest density change
* Steam flow from NC to HP
* Nozzle chest pressure (requires enthalpy and density)
* Steam quality
* Steam density between NC to HP turbine
* Specific volume of saturated steam as a function of reheater pressure
* Enthalpy of reheater feedwater
* Enthalpy of vaporization

Organization Grouping

Group A

* Nozzle chest & Steam valve

Group B

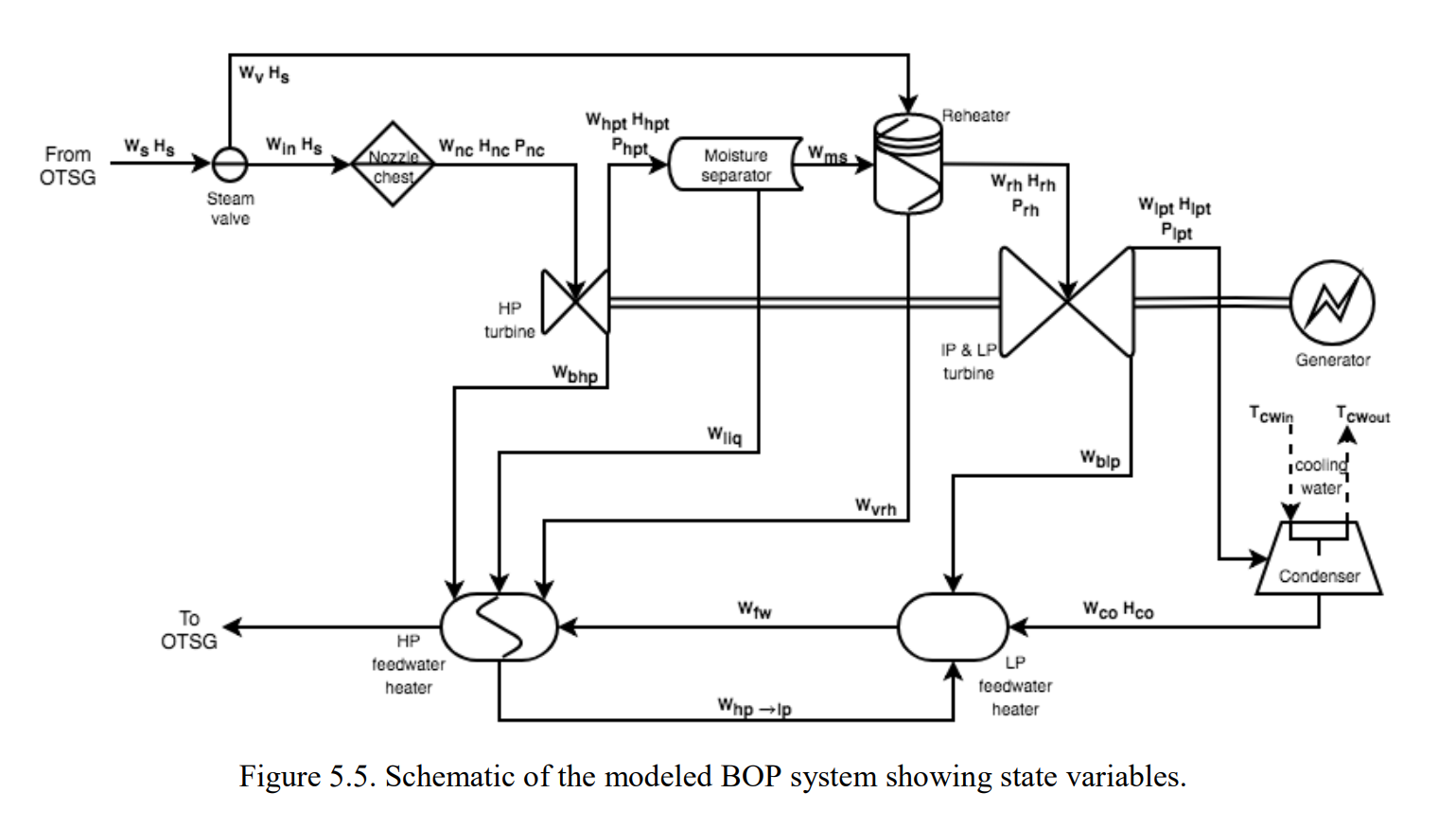
* High Pressure Turbine
* Low Pressure Turbine
* Moisture Separator
* Reheater

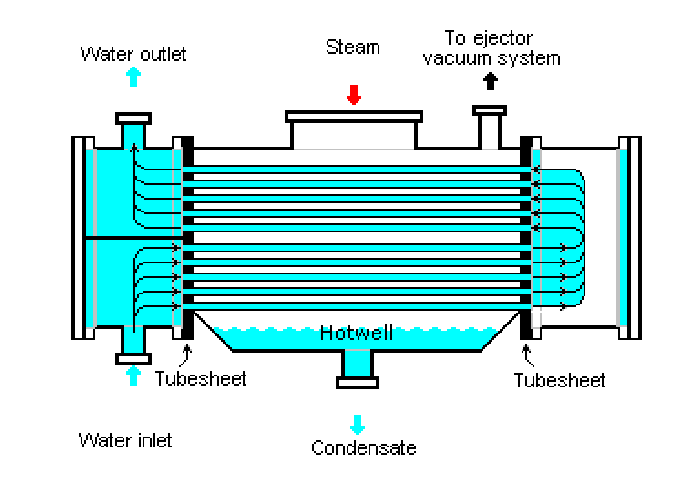
Group C

* Condenser

Group D

* Feedwater Heater (Low Pressure)
* Feedwater Heater (High Pressure)





A diagram of a nuclear power plant

Description automatically generated

