FPSO

Description of FPSO process

It stands for floating production storage and offloading (FPSO).

- Production refers to the processing of oil and gas. Hydrocarbons are produced in seabed wells and this is transported to the FPSO via flowlines and risers.
- Storage: Once the oil has been processed, it is transferred to cargo tanks in the double hull of the vessel.
- Offloading refers to transferring the gathered contents to additional transfer conduits. Crude oil that is stored in the vessel is then transferred to tankers and pipelines heading ashore.

The ships themselves are outfitted with processing equipment for separating, storing, and discharging oil and gas from subsea oil wells and platforms. When oil and gas are processed, they are safely held in the FPSO until they can be offloaded into a tanker or pipeline and transported onshore. More details in Figure 1

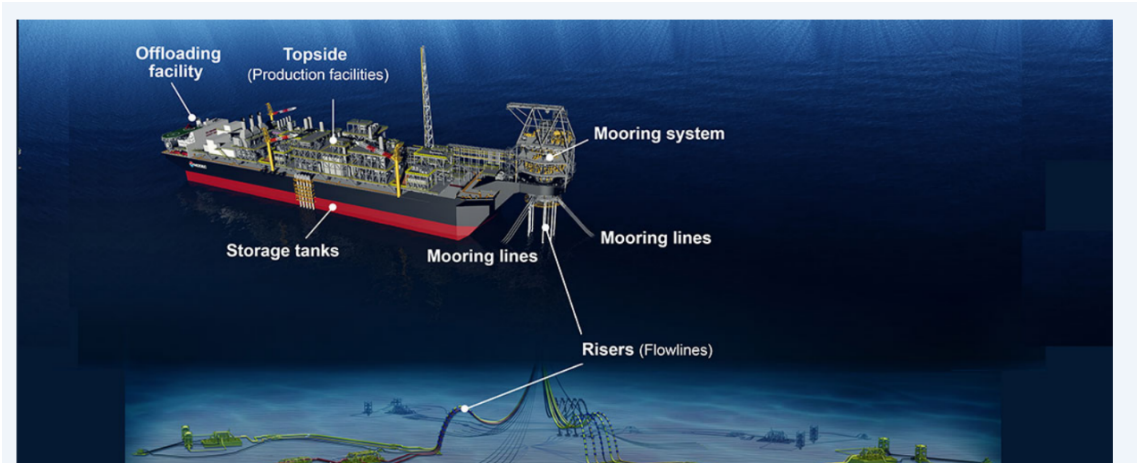

Figure 1: FPSO in the system

A typical FPSO Process Flow Diagram

An FPSO is a floating production system that receives fluids (crude oil, water and a host of other things) from a subsea reservoir through risers, which then separate fluids into crude oil, natural gas, water and impurities within the topsides production facilities onboard. Crude oil stored in the storage tanks of the FPSO is offloaded onto shuttle tankers to go to market or for further refining onshore. More details in Figure 2

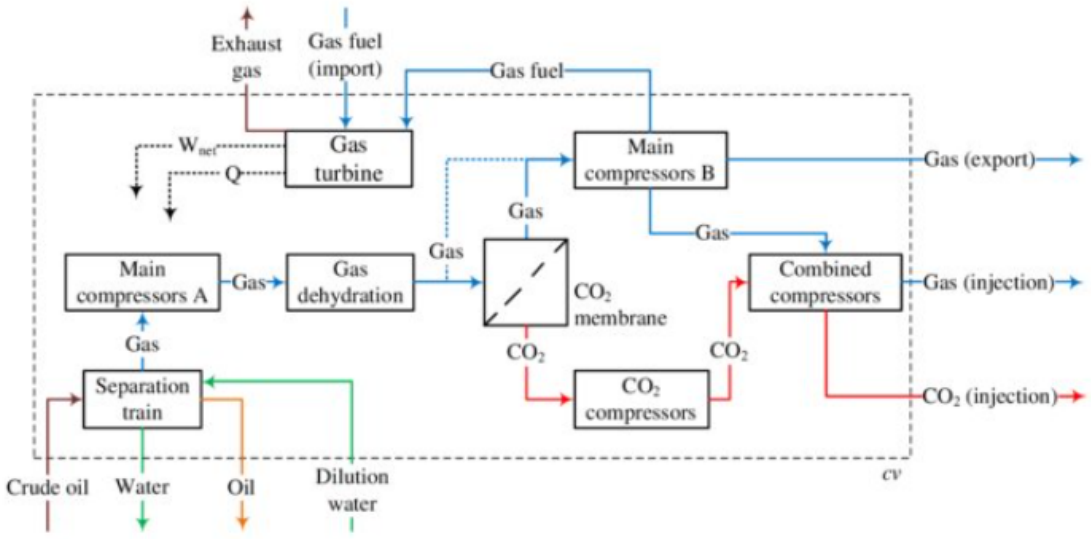

Figure 2: Simplified FPSO process flow in the system

The produced gas in the separation train is compressed in the first compression train (main compressors A) and then it is treated in the gas dehydration system by means of molecular sieves. Dehydrated gas is then sent to the CO2 removal process or it may be by-passed when all or part of gas must be injected. Main compressors B can be used to increase the gas pressure for three operational alternatives: gas exportation, gas fuel, and gas injection. Combined compressors are used to increase the pressure for gas and CO2 injection processes. The CO2 separated in the membrane is compressed in the CO2 compression train and in the combined compression train in order to be injected. Injection of gas and CO2 in the wells is useful to enhance the recovery operation. Imported gas fuel is only necessary when all gas is injected in the wells.

Typical mooring process control for FPSO

Mooring systems are the equipment that hold FPSOs in place against the forces of waves, wind and currents. Typically, the mooring lines and the hull of FPSOs are connected by the Turret system, which is connected to the hull via giant rotating bearings.

In areas where sea conditions are moderate, a catenary anchor leg mooring (CALM) buoy system, which is used for tanker loading and unloading in the gulf, is used, or a multi-point mooring system called Spread Mooring in which multiple mooring cables are used to directly secure the ship without a turret, is used.You can see the mooring process in Figure 3

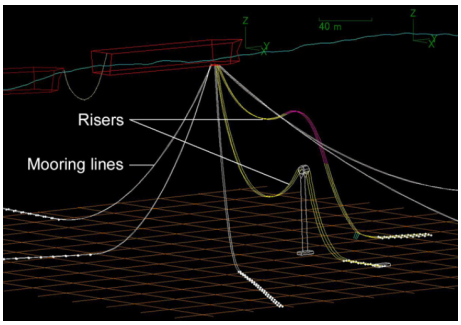

Figure 3: Mooring lines and risers

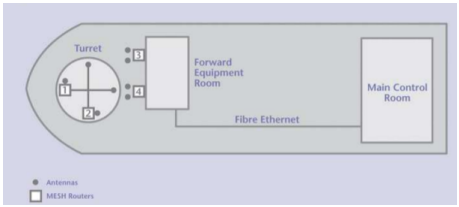

Figure 4: MESH Ethernet in FPSO

Wireless latest network technology of FPSO

MESH Ethernet architecture in Figure 4 with two dual radio nodes on the Turret with each radio configured to a different frequency and with antennas installed 180 degrees opposite each other.Two other dual radio nodes are installed on a nearby wall of a local equipment room with antennas facing the Turret. With this configuration at least one antenna on the Turret will always have line of sight to the wall mounted nodes and with a self organising MESH the optimal signal paths are used when available and can be aggregated together offering up to 48Mbps data throughput.

Real examples of FPSO

There are many different types of FPSO systems, of which the most appropriate system is selected to match the environmental conditions. An internal turret in Figure 5, which is located inside the hull, is often used in waters where cyclones are frequent and marine conditions are very severe such as the waters to the northwest of Australia and off Hong Kong. Disconnectable turrets are sometimes used so that FPSOs can be detached from their mooring systems and evacuated to a safe location in the event of an approaching cyclone.

Figure 5: Internal Disconnectable Turret(left) and External Turret(right)