HP/HT Subsea Cooling System

Front End Engineering Design (FEED) of a subsea system to reduce both pressure and temperature coming from the capping stack of a blow-out high-pressure (HP) and high-temperature (HT) well

Client: Marine Well Containment Company (MWCC) **Time**: 2017

Location: Gulf of Mexico, USA

For rapid response to an uncontrolled subsea hydrocarbon leak, a joint industry task force of world's major operators established a non-profit organization – the Marine Well Containment Company (MWCC) – to develop, maintain and operate a Marine Well Containment System (MWCS). As part of the MWCS, the Single Ram Capping Stack (SRCS) is the one suited to both high pressure (HP) (15ksi) and high temperature (HT) (350°F). However, the existing flowback system is only rated to 10ksi and 250°F. As such, an engineering concept is required to step down both temperature and pressure from HP/HT wells to acceptable levels before entering the flowback system.

Neptune Subsea Inc, a Houston-based subsidiary of Neptune Subsea Engineering, developed a design for a Subsea Cooling System to reduce the pressure and temperature of fluids coming from the SRCS in the case of a blowout of a HP/HT well. The system can be mobilised within 24 hours of an incident and fully deployed within a few weeks. It can also be relocated quickly in case of an emergency evacuation or extreme weather event (e.g. hurricane). The system has the capability to be deployed into deep water (i.e. 10,000ft) in the Gulf of Mexico (GoM) and to pass 100,000 BOPD of production fluid to the Marine Capture Vessel (MCV) via a series of manifolds, Pipeline End Termination (PLET) and flexible jumpers. The design requires minimal modification to existing MWCS hardware.

As part of a funded FEED study, ***Neptune*** also developed four out-of-the-box alternative designs. All the four concept designs were developed to an appropriate level to enable critical assessments. Each concept was assessed against a variety of criteria including low upfront costs, low design/manufacturing costs, low operating/maintenance costs, short deployment time and high design simplicity. Based on this comparative study, an optimum design was achieved and proposed for the next engineering stage.

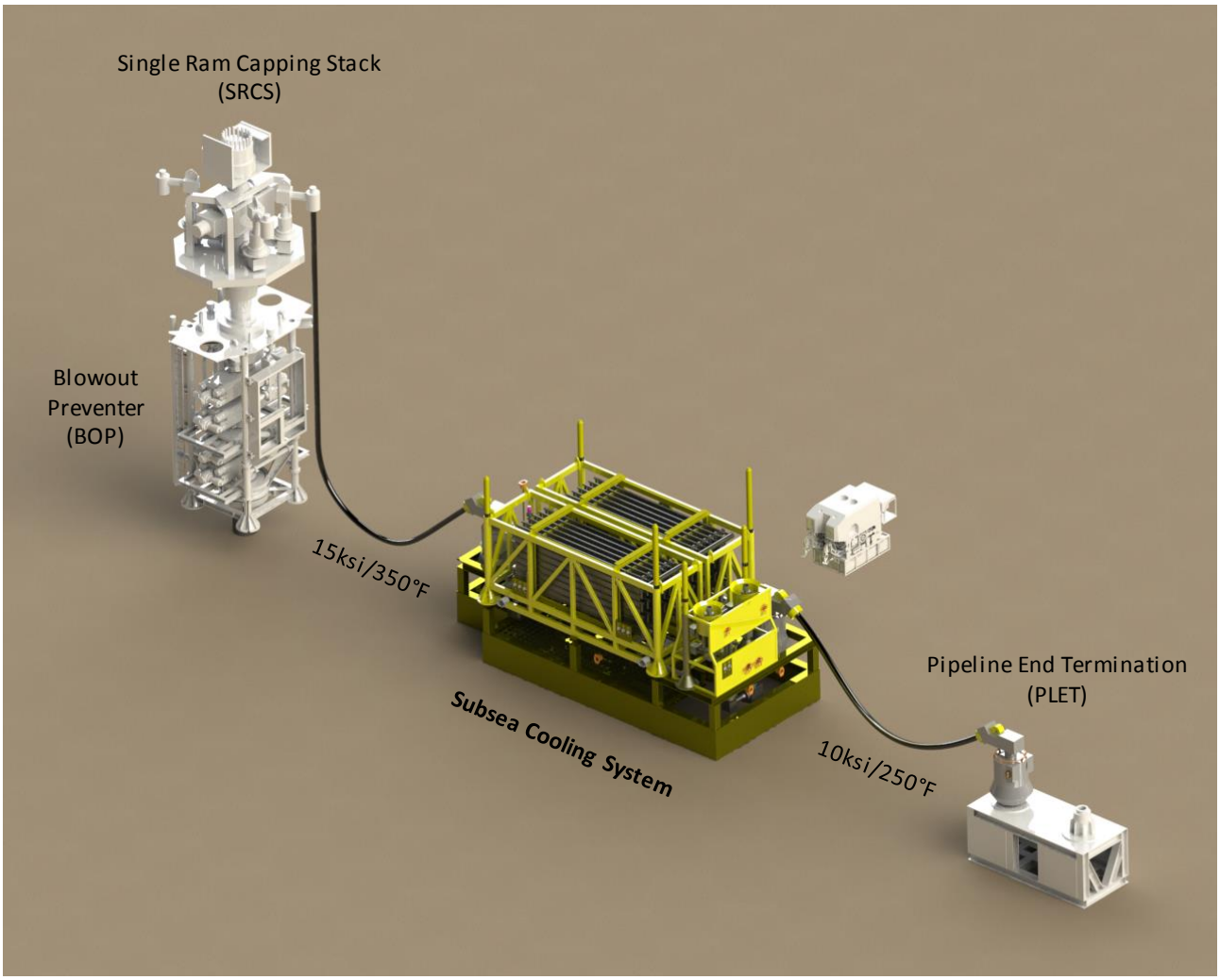

Figure 1: Neptune-engineered Subsea Cooling System to reduce fluid pressure and temperature from a blowout well from 15ksi/350°F down to 10ksi/250°F before entering the flowback line.