

**Problem 1: Production system layout of a subsea satellite field;**

**Field Description**

Volund is a subsea oil field, at 130 m water depth, located about 10 kilometers south of the Alvheim FPSO in the central part of the North Sea (see figure). The field, with reservoir depth of 2000 m, is developed as a subsea Satellite field to the Alvheim FPSO (Floating Production, Storage and Offloading vessel) and is tie-back to floating vessel.

Volund will have three horizontal subsea oil production wells producing to a subsea production manifold on a manifold template. The wells are satellite to the template and the subsea wellhead are located a short distance from the template. The wellhead/Christmas trees are connected to the template by short pipes sections (Jumpers).

The well-streams of Volund are commingled in the production header on the subsea template and routed through a pipeline and a flexible riser to the Alvheim FPSO for separation, processing and export. The oil is exported via an offshore buoy-loading to a shuttle tanker (not shown in the figure). The associated rich gas is separated from the condensate liquid and stripped from the NGL (Natural Gas Liquid) on the FPSO. The condensate and stripped liquids are recombined with the exported oil. The dry/lean gas is transported from the Alvheim FPSO to gas pipeline leading to the UK.

As part of preparing the field development plan you need to prepare a simplified P&I diagram of the subsea template for an arrangement where the testing of wells in Volund is done by a single multiphase meter (MFM) in the subsea test manifold.

