Ausenco Sandwell

Case Study
Tanker Loading Unit (TLU)

Mating topside to substructure

Pile based TLU substructure

Single Point Mooring Structure

Sakhalin Energy Investment Company Ltd. (SEIC) is the operator of the Sakhalin II Project located in eastern Russia. This project involves the development of offshore oil and gas fields located on the Sakhalin Island Shelf in the Sea of Okhotsk.

The Project includes a Tanker Loading Unit (TLU) which is installed 4km offshore in Aniva Bay at the south of Sakhalin Island, in a water depth of approximately 30m. Crude oil and condensate is delivered to the TLU via a 30" subsea pipeline. Electrical power is provided by a subsea cable.

The TLU consists of a single point mooring (SPM) structure allowing visiting tankers to weathervane according to the combined influence of wind, current, waves and ice. The TLU is equipped with a mooring hawser and boom supported loading hose to accommodate crude oil tankers up to 150,000 DWT in size, throughout the year.

Working directly for SEIC, Ausenco Sandwell initially carried out the Front End Engineering and Design of a gravity based TLU substructure. Later working for the EPC contractor, Nippon Steel Corporation, We were responsible for the detailed design of the pile based TLU substructure, with SBM of Holland responsible for the design of the rotating head structure.

The TLU substructure is designed to resist significant ice, wave, wind, seismic and vessel collision loads. Wave loadings were computed using the in-house program WAVE3D. Advanced finite element non-linear models were used to analyze the TLU for the various load cases using the commercial programs SAP2000 and ABAQUS. Detailed design of the plated elements to the substructure was carried out to Canadian offshore codes and DNV using the in-house program SPPANEL.

The set down of the structure was completed in October 2005.

Project
Tanker Loading Unit

Location
Aniva Bay, Russia

Business line
Process Infrastructure
Arctic and Offshore

Clients
Sakhalin Energy Investment Company Ltd. and Nippon Steel Corporation

Timeframe
2005

Scope
Detailed design of the steel substructure

Services
Preparation of FEED documents, detailed structural and electrical design, construction support services, permitting support and Russian translation for EPC contract