



PROJECT DESCRIPTION

Sempra Energy LNG contract Coldwater Consulting Ltd. to investigate and assess three alternative designs for a new terminal to be constructed at a site in the Sabine-Neches Waterway (SNWW), just south of Port Arthur, TX. For each scheme, Coldwater evaluated the overall erosion and deposition rates for the berth area and adjacent shorelines and recommended shore revetment and scour protection for the three terminal designs.

DESIGN APPROACH

A key element of the project was the determination of a water level regime for the area. The study included reviews of subsidence and relative sea level rise and hurricane-induced surges. However, vessel-induced currents and drawdown play the most significant role in the erosion of the SNWW shoreline. Coldwater’s proprietary Ship-Generated Hydrodynamics (SGH) numerical model was used to determine vessel-generated water surface fluctuations and current velocities over the entire modelling area. The SGH model allows the input of detailed channel geometry, specific vessel hull shapes, and variable sailing paths in the channel for both existing (without project) and proposed conditions. In addition to drawdown and wakes, SGH can also model flows from multiple propellers and/or bow-thrusters using a coupled jet-flow module.

The hydrodynamics generated by the SGH simulations were input into Coldwater’s Particle Tracking Model (PTM), which was used to model scour and bed downcutting from passing vessel-induced flows and propwash from manoeuvring vessels. Although most often used for Lagrangian sediment fate predictions, PTM also contains Eulerian sediment transport routines that drive sediment continuity and bed change modules. The model handles both cohesive and non-cohesive sediments and also incorporates the effects of seabed slope on sediment mobility and transport. Feedback between changes in depth due to erosion or deposition and changes in flow conditions is included by velocity scaling.

Coldwater’s provided recommendations for shore revetment and scour protection for the three designs were based on the hydrodynamics and scour predictions.

CLIENT

Sempra Energy LNG

LOCATION

Port Arthur, TX

DATE

2009