SLOOP Description

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Date: 14 August 2021

Status: Draft

# SLOOP Description

Operational modelling is the building of a high level model of a complete system and relevant operations to predict how it can be expected to perform under the influence of real world conditions such as severe weather conditions while addressing planned and unplanned maintenance. It forms a valuable part of any economic evaluation by providing information on probable revenue and on operational expenses.

SLOOP was developed to model and evaluate oil and gas operations in harsh environments such as the North Sea and the Gulf of Mexico. The SLOOP simulation tool has been developed in-house at BMT and used in support of strategic operations and economic planning by leaders in the oil & gas industry over the past 25 years.

Features of SLOOP enable the simulation of complex field development and operating systems accounting for:

* Well production rates
* Well failures
* Subsea equipment and riser failures
* Well intervention and other subsea maintenance tasks (including weather dependence and need to charter particular vessels)
* Production system failures and maintenance, and weather dependent operation
* Storage and export system reliability and weather dependence
* Shuttle tanker operations including weather dependence of loading operation and passage to destination port.

Key to modelling expected performance is a realistic representation of the environmental conditions. For the Gulf of Mexico the following data is typically used:

* Wind and wave data: BMT has extensive long duration hindcast statistical data for Gulf of Mexico offshore locations.
* Hurricane warnings: Making an operation hurricane safe and, if necessary, evacuating a platform may require a number of days. Therefore, interruptions to operation are triggered by advanced warnings of possible hurricanes, which are more frequent than occurrence of actual hurricane conditions at the site. Statistical techniques are used to represent hurricane warnings based upon historical tracks data.
* Loop current eddies: Historical data on loop eddy currents is used to derive statistics of eddy events. Longer duration time series are then derived based upon these statistics.

Field appraisal, development, and operational performance is simulated through drilling/completions, installations and field/well systems maintenance operations which are described as sequences of tasks. Each task has:

* Resources that may need to be mobilised to perform the task
* An expected (fair weather) duration distribution
* Environment limits within which the task can commence
* Environment limits which if exceeded cause the task to be suspended or abandoned
* Additional work needed to resume a suspended or abandoned task
* The possibility of requiring additional tasks to resume an operation following abandonment.

Production modelling in SLOOP is influenced by:

* New wells being developed
* Production profile of each well, either as a function of time or of quantity of product produced
* Attenuation of production due to current or outstanding failures or interventions required
* Limitations in export capacity (e.g. tank topping or pipeline failure).

Product export by either shuttle tanker or pipeline may be modelled. SLOOP may also be used to model the receiving end including environment limits, berth availability, and storage capacity.