

“Where will our knowledge take you?”

Offshore Dispersion Modelling

Produced waters modelling

The PROTEUS model

BMT Cordah conducts modelling of the dispersion of produced waters using its PROTEUS model.

The PROTEUS model has been developed, enhanced and validated through a number of R&D programs in close collaboration with the oil and gas industry, and is specifically aimed at modelling water-borne contaminants such as produced waters. As well as being used by a number of organisations within the oil industry, it has been used by BMT in numerous consultancy studies of the dispersion of marine discharges such as produced waters.

Input data

Using data defining the outfall configuration (height, diameter, flow rate) and oceanographic data, the effluent dilution can be modelled. PROTEUS is able to predict the three-dimensional transport of the effluent taking into account the dynamics of discharge, plume buoyancy effects and passive transport under the influence of tidal/residual currents. From this simulation the concentration in the plume can be calculated.

Customers will be supplied with a data input form to complete prior to the start of modelling.

Ecotoxicological risk assessment

The PROTEUS ecotoxicological risk assessment module can also be used to determine potential impacts on marine fauna, if required. This typically uses a ‘PEC:PNEC’ approach, comparing predicted concentrations (PEC) of contaminants within the effluent plume with predicted no-effect concentrations (PNECs), determined from suitable species LC50 data.

BMT Cordah is also able to offer other ecotoxicological approaches, including Whole Effluent Toxicity and Critical Body Residue methods. These require additional data or laboratory work to be conducted. If you are interested in using these advanced approaches, please let us know.

Chemical loss mechanisms

PROTEUS includes consideration of chemical loss mechanisms including sediment-water partitioning, evaporation and biodegradation. However, in most cases, customers require a ‘conservative’ modelling approach

to be applied. In these instances these loss mechanisms are not applied, resulting in a worst case scenario.

By default, and unless otherwise stated, loss mechanisms will not be applied during the modelling. Please let us know if you wish to consider these mechanisms in your modelling.

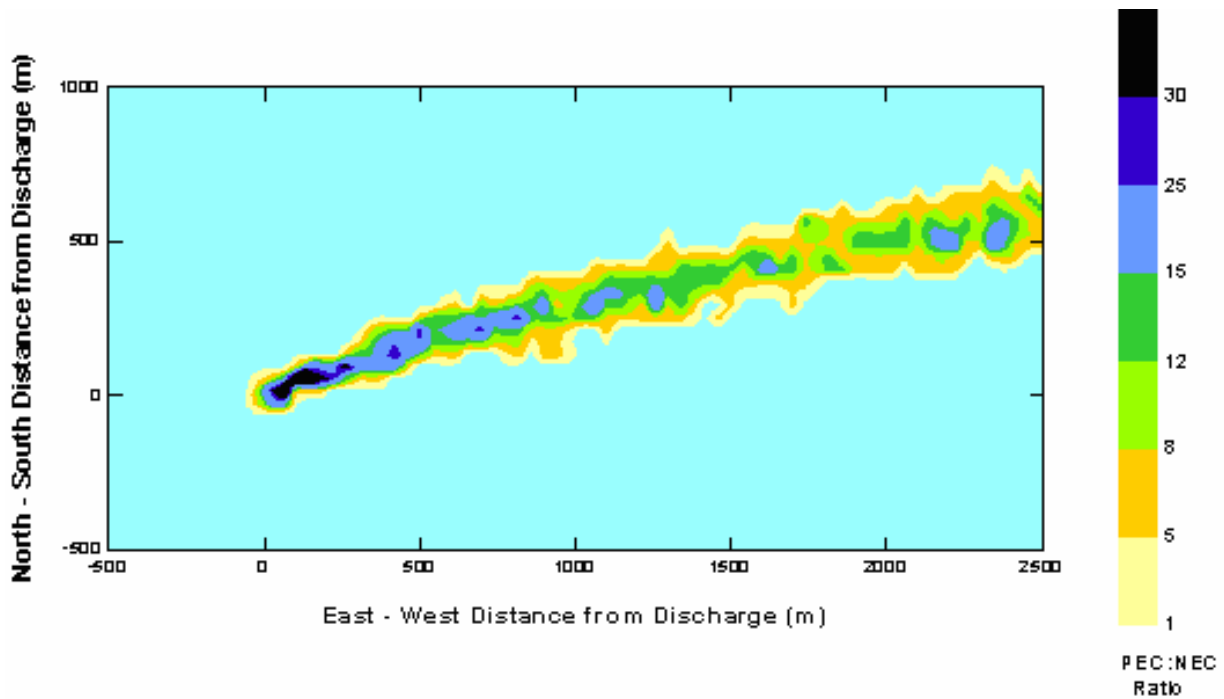
Validation

The PROTEUS produced water models is based on algorithms developed through laboratory studies. These studies specifically considered effluents discharged in offshore environments. PROTEUS model has been validated against 2 major dye tracking experiments conducted from offshore platforms in Indonesia.

Outputs

Produced waters plots are output as contour plots showing the concentrations of the plume or PEC:PNEC ecotoxicological risk ratios (see example above)

Graphs and tables will also be included in the report. Please let us know you have any specific output requirements.



Example of produced waters' results plot showing PEC:PNEC ratio contours

About BMT Cordah

BMT Cordah Limited, a wholly owned subsidiary of BMT, is an international multi-disciplinary environmental consultancy and information systems company. BMT Cordah represents a new approach to the traditional environmental consultancy business, capable of delivering significant, integrated environmental services and solutions in the UK and overseas.

BMT Cordah offers a comprehensive range of consultancy, and software services and products, underpinned by sound science supported by research. Its staff provide a unique fusion of skills in environmental and marine science, capacity development for the environment, environmental and social aspects of development, engineering, chemistry, toxicology, software information systems, and research & development.

The company's major market sectors are oil and gas; the wider energy sector with a particular focus on renewables; marine and coastal environmental management; the maritime sector; industrial and commercial companies; local and national governments; and international funding agencies. Its delivery mechanisms are flexible and responsive, tailored to meet clients' particular needs at either a strategic or a project-specific level.

BMT Cordah's principal business streams are consultancy; information systems, services & products; and research & development. The consultancy portfolio includes impact assessment, environmental management systems & audit, pollution prevention & control, air quality, waste management, advice on legislation, and support in planning, licensing & consent applications.

These services are supported by BMT Cordah's considerable in-

house software development capability, which includes the industry-standard oil spill model OSIS, the maritime search and rescue planning system SARIS, and the production waters model PROTEUS. The information systems and services business provides products and services that compliment the consultancy and modelling capabilities, such as information management, geographic information systems, data visualisation, data processing, and e-learning systems. BMT Cordah also provides expertise in the development of integrated and internet-based systems for environmental data management.

BMT Cordah's internal research and development activity is an essential element of the company's success, and there is a continuing programme of innovation and the development of new products and services.