

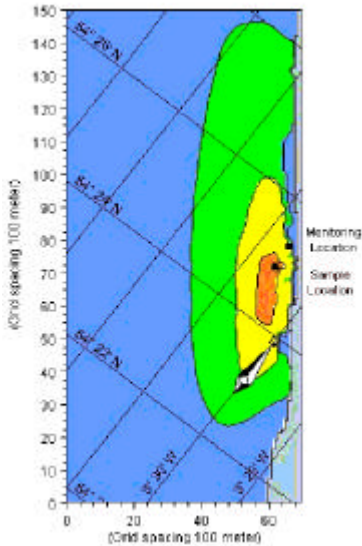
**Project:** Particle transport from decommissioned and operational pipelines.  
**Client:** British Nuclear Group Sellafield Limited & NNC Limited

### The Challenge

The clients were involved in decommissioning an effluent discharge pipeline. The plan was to cut the pipeline into small sections and then remove them to a barge for transfer and disposal at the Drigg repository. In cutting the pipeline, there was concern that contaminated sediment within the pipeline would become resuspended within the water column and could potentially impact upon local beaches. The clients needed a modelling tool to predict where sediment could be dispersed under a variety of weather and tidal conditions.

### The Solution

A simple 2D model for the local coastal area was set up to investigate the transport and movement of particles from the pipeline cutting site during a range of tidal and weather conditions. This resulted in an atlas of potential impact scenarios for local beaches and a tool the operators could use to determine the most appropriate cutting regime, which would have the least impact for particle re-suspension and deposition on local beaches.



*Maximum concentration over six tidal cycles for a pulse discharge during spring tides*

The model was also applied for:

- Investigating the impact of extreme storm events on pipeline sections within the barge; and
- Simulation of emergency discharges from operational pipelines

Using the initial model set-up, a more complex particle-tracking model was then derived to investigate the probability of particle deposition on the local beaches for historic discharges from an operational pipeline. The results of this work were used to design a focused sampling campaign for the investigation of near-field deposition of particulate material that could be discharged from the pipeline.

### The Benefits

- The client was able to use the particle tracking atlas to determine the weather conditions which would result in lowest probability for beach impacts of resuspended particles and hence the best times for pipeline cutting operations
- The client has access to a sediment-specific model suitable for investigation of both historic and emergency discharges from operational pipelines.



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