

**INVESTIGATION INTO THE SOURCE OF  
HYDROCARBONS PRESENT IN SEDIMENT  
SAMPLES FROM MILFORD HAVEN  
WATERWAY**

**FUGRO ERT 2425**

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## **1. INTRODUCTION**

The tanker Sea Empress ran aground off Milford Haven on 15 February 1996 and over the course of six days released approximately 72000 tonnes of Forties Crude oil and 360 tonnes of heavy fuel oil. The coastline within the Milford Haven estuary was heavily oiled as a result of the spill with further areas of coastline outside the Haven also impacted. In all, approximately 200 km of coastline was affected by oil.

Prior to, and following, the Sea Empress spill the Milford Haven Waterway has experienced a regular input of hydrocarbons of petrogenic and non-petrogenic origin as a busy commercial harbour. In the 1960 to 1970s BP, Elf/Murco, Esso, Gulf and Texaco opened refineries and terminals to handle and process crude oil at sites in and around Milford Haven. The Esso refinery, was decommissioned in 1983 and is now the site of ExxonMobil's South Hook LNG terminal. In addition to an extensive petrochemical industry, the area has a long history in the mining and exporting of coal, a significant source of polycyclic aromatic hydrocarbons (PAHs).

In November 2009 an enquiry was made to ERT (Scotland) Limited (now Fugro ERT a division of Fugro GeoConsulting) regarding the analysis of sediments and oils for the purpose of establishing, if possible, the differing sources of hydrocarbons in the Milford Haven Waterway. In September 2010 the project was approved and in late November 2010, the first of the sediment and oil samples arrived at the Fugro ERT (FGCERT) laboratory. In early December 2010, a further two sediment cores arrived at the laboratory for inclusion in the analytical programme.

A full list of the sediment and potential hydrocarbon source samples received is provided in Table 1.1 while the list of additional reference oils analysed is provided in Table 1.2.