

Pipeline Leakage Detection for Crude Oil

Mittelplate Island, Germany

*Mittelplate is **Germany's largest oilfield** and is **located in the ecologically-sensitive Wadden Sea (a national park)**. The highest level of safety standards needs to be met to monitor 2 specialty pipelines between the island and the mainland. The operators selected a Distributed Temperature Sensing (DTS) solution from AP Sensing for **monitoring and leakage detection**.*

A single AP Sensing DTS device was installed to monitor the full **8 kilometers of pipeline** between the island and the mainland. The route is connected by a series of floating excavation platforms.

The DTS unit was securely installed in a remote control room on the offshore platform.

The fiber optic **sensor cable** was installed along the length of the transport pipeline. The crude oil has a temperature of around 65 °C when it is first removed and around 35 °C when it arrives at the mainland station, with seasonal differences.



Pipeline route



*Mittelplate Island offshore platform,
Germany*

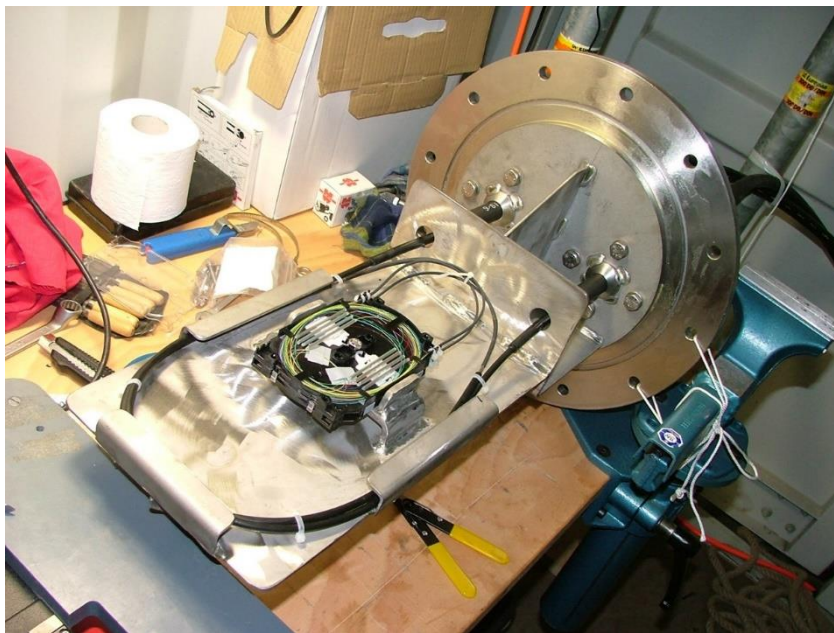
At the beginning and end of the installation the pipeline runs through **specially-prepared trenches**.

Most of the rest of the **route sections were realized with horizontal direction drilling (HDD)**, which had a length of up to **1400 m** each.



Floating excavation platform

After the installation was completed, the pipeline was **buried in the mud flats at a depth of 5 m** near the construction trenches and up to **20 m** in the HDD areas.



Joint construction and splicing preparation



Joints for the mud flats, also shown in their construction trenches

The **sensor cable itself** was pulled through 5 HDD sections, therefore a **highly robust sensor cable** was selected with **double-plated armor protection**. This not only ensured a safe installation, it also **ensures continuous operation in case the pipeline rolls or shifts**, which can alter the cable's position e.g., from the top to the bottom of the pipeline.



Robust double-plated sensor cable

Intelligent alarming algorithms are included in the database and alarming software. Configuring these algorithms to the pipeline conditions make it possible to **detect even very small leaks quickly and to accurately identify their location**.



Pulling knob for pipeline installation including sensor cable



Laying the pipeline including sensor cable

Valuable assets and a highly sensitive environmental region are protected, thanks to AP Sensing's distributed fiber optic sensing solution and the expert design, integration and commissioning of this **complex pipeline leakage project**.