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.
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.

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.
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.

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.

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.