Leak Detection & TPI for a 72 km CO₂ Injection Pipeline  
United Arab Emirates

The operators of a 72 km CO₂ pipeline wanted a fast and accurate system for leakage detection and Third Party Interference (TPI) monitoring. AP Sensing’s solution uses Distributed Temperature Sensing (DTS) for pipeline leakage detection and Distributed Vibration Sensing (DVS) for TPI, ensuring maximum protection of this valuable infrastructure.

The pipeline transports CO₂, pressurized at roughly 278 bar, which travels through the eight-inch pipeline with a flow rate of 16 MMSCFD (one million standard cubic feet per day).

The installation uses a singlemode fiber optic cable, double-sheathed and steel armored. The cable is then employed for leakage detection, the TPI system, and Ethernet and Synchronous Digital Hierarchy (SDH) connections.
The leakage detection system is based on three AP Sensing DTS interrogators. Should a leak occur, a cold spot forms quickly along the pipeline, due to the **Joule-Thomson effect**. The pressurized gas achieves the ambient pressure, the rapid decrease in temperature is detected by the DTS system, and the system triggers an alarm. The DTS (thermal) based leak detection method is particularly known for its outstanding Probability of Detection (POD) and low Nuisance Alarm Rate (NAR).

The two DVS units recognize pre-defined acoustic and ultrasonic patterns. The DVS system detects and issues alarms when acoustic patterns indicate **TPI events such as manual or machine digging**. When PIG maintenance occurs, the DVS tracks its progress through the pipeline.
The main server for the leak detection system is located at the remote de-gassing station. SmartVision manages all of the temperature and vibration alarms. Using its TCP/IP-based client architecture, SmartVision enables the SCADA/DCS platform to access the system and alarm status information.

With the AP Sensing solution – both DTS and DVS – independent technologies are integrated into one screen, ensuring that the CO₂ is reliably transported to the BAB Far North Flanks.

AP Sensing’s experienced Project Management and Project Engineering team played a key role in managing the installation, commissioning and sensor cable splicing activities onsite.