Project Objective

The primary objective of this project was to identify the branches connected to the main petroleum product transmission lines. To achieve this, geophysical data acquisition was carried out using Ground Penetrating Radar (GPR) in the area of Poshteh Isin village, located north of Bandar Abbas.

Methodology

In this project, geophysical surveys were conducted using the PinPointR GPR device manufactured by ImpulseRadar, Sweden (Figure 1). This device is one of the most advanced ground-penetrating radar models available on the market. Introduced in recent years by ImpulseRadar, it incorporates cutting-edge technologies in its design. The most significant advantage of this device is its dual-frequency antenna, operating simultaneously at 400 and 800 MHz. Compared to older single-frequency models, this feature allows for a broader and deeper penetration range as well as improved resolution. Another key benefit is its ability to connect to a multi-frequency GPS unit, which greatly enhances the accuracy of GPR-based studies (Figure 2).

Figure 1 – View of the PinPointR device and the project site.

Figure 2 – ImpulseRadar PinPointR GPR device with multi-frequency GPS.

Design and Execution of Operations

In this project, data acquisition was carried out at locations specified by the client. The survey profiles were designed to align with the main petroleum product transmission lines. Following initial data processing, anomalous points were identified, and at those locations, supplementary profiles were collected at one-meter intervals along the main profile. The length of the survey profiles ranged from approximately 150 to 200 meters, and a total of 8 kilometers of data was collected within the project area. Figure 3 shows a field expert during the data acquisition process, while Figure 4 presents an example of a recorded profile overlaid on a satellite image, highlighting the detected anomalies.

Figure 3 – Specialist conducting GPR data acquisition.

Figure 4 – Display of Profile No. 4 on the satellite image. The marked points indicate the locations of anomalies identified after initial data processing.

Conclusion

In this project, GPR data acquisition was carried out at locations designated by the esteemed client. The survey profiles were designed and executed along the petroleum product transmission lines. At suspected anomaly sites, supplementary profiles were collected at one-meter intervals from the main profiles. Ultimately, more than 90 profiles were gathered, and after initial processing, the data was delivered to the client for further analysis.

For projects of this nature, the use of ground-penetrating radar-due to its non-destructive nature and rapid data collection-enables swift identification of critical targets, which in turn helps to significantly reduce operational costs.