

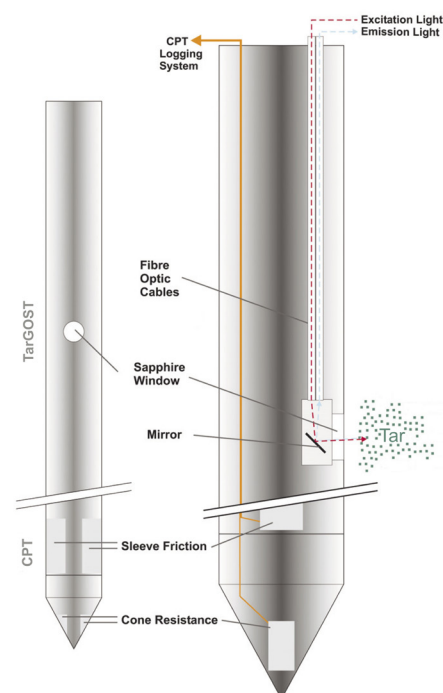


FUGRO TARGOST®-CPT-CONE

Fugro deploys dedicated laser cones from its Cone Penetrometers to detect and rapidly delineate tar and heavy oil pollution in the subsurface.

Turning a brownfield from industrial to residential or commercial use has been a trend in recent years. Even more so when land has become valuable, like many of the former manufactured gas plants (MGP) which lie in today's hearts of the cities. Prior to landuse alternation, land contamination assessment is required in order to ensure that health and environmental risks to receptors are in compliance with legal regulations. When potential tar contamination is suspected or found, environmental site investigation and remediation would be performed. Conventional investigation and confirmation sampling involves extensive

digging, drilling and excavation which is costly and time-consuming, with severe disturbance to the subsurface. Fugro is using advanced in-situ Cone Penetration Testing (CPT) equipped with a tar-specific green laser sensor (TarGOST®) for rapid subsurface tar investigation, saving time and cost and increasing data accuracy and reliability. CPT is widely applied for determining physical soil properties and strata in geotechnical engineering. With only a push, instead of extensive drilling and excavation followed by laboratory results for weeks, this technology acts as a mobile geotechnical and chemical laboratory.



TarGOST®-CPT layout.

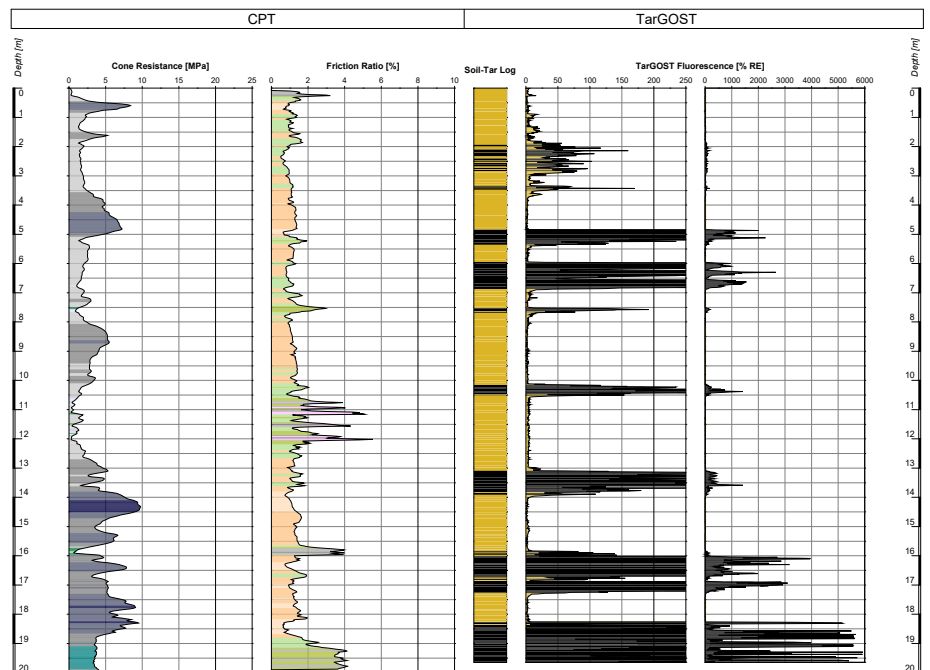
The TarGOST®-CPT cone can be used in combination with all standard Fugro CPT-equipment readily available worldwide. The system can easily be handled and shipped by air cargo, which allows for short reaction times and flexible use within a varying course of a project or site investigation.

The acquired field data is available in real-time and can be interpreted already on site during the investigation. This allows for a quick adaptation of the investigation strategy and supports dynamic probing and sampling grids enabling full site assessment in a single mobilization according to the U.S. EPA TRIAD approach.

With respect to work safety the use of this direct-sensing technology is superior to most traditional ways of site investigation since no contaminated soil and groundwater is raised from the ground which prevents any direct contact of potentially hazardous material to field or site personnel.

Frequently unexploded ordnance (UXO) is an issued when it comes to the investigation of industrial sites with long historic use. The TarGOST®-CPT cone assembly can be combined with an magnetometer (MagCone®) which allows for an in-situ UXO detection simultaneously to the TarGOST®-CPT data acquisition. This supports flexible relocation of planned investigation locations and a continuous and safe field campaign.

Fugro processes and interprets the data and delivers the client 3D distribution models of the tar contaminant body, calculates clean-up soil volumes and contaminant mass, leading to reliable remediation method selection and cost estimates.



Resulting logs of an TarGOST®-CPT investigation.

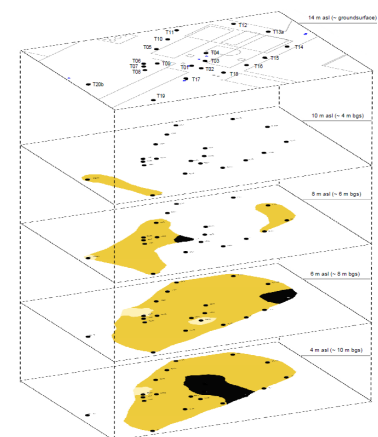
BENEFITS OF THE TARGOST®-CPT-CONE

- Minimal invasive investigation of the subsurface
- Data acquisition and interpretation in real-time
- Quick adaptation of the investigation strategy based on acquired data
- Simultaneous acquisition of geotechnical data by CPT
- UXO clearance by combined MagCone® (optional)
- safe work environment without generation of contaminated soil cuttings or groundwater
- Fast approach for a reliable and economic site screening

TarGOST® is a registered trademark of Dakota Technologies, Inc., in the U.S. and other countries.



TarGOST®-CPT investigation with a track truck during winter.



3D presentation of the results of a TarGOST®-CPT investigation.

