FUGRO
"CDU/VDU COMPLEX" OF JSC "GAZPROMNEFT-ONPZ" IN OMSK

Project: CDU/VDU Complex
Location: Russian Federation, Omsk, JSC «Gazpromneft-ONPZ» territory
Client: CJSC «TECHNIP RUS»
Period: March – May 2016
Project Value: 10 Mio Rubles

Introduction

Gazpromneft-ONPZ is one of the most modern refineries in Russian Federation. In 2015, JSC «Gazpromneft-ONPZ» refined 20.9 million tons of oil. For this indicator, the Omsk plant - the leader among the Russian oil refining plants. CDU/VDU (crude distillation unit/vacuum distillation unit) primary oil refining structure will be built under the second phase of a large modernization up to 2020.

Purpose

A detailed and complex geotechnical and hydrogeological surveys in accordance with the valid Russian standards and TECHNIP specification was required with the purpose to study the geotechnical and hydrogeological site conditions for development of the detailed design documentation. Reports had to be prepared presenting the investigation results, evaluation and interpretation of the field and laboratory test results, dynamic soil properties and conclusions according to SP 47.13330.2012 and SP 11-105-97 and internationally recognized standards in Russian and English language.

Project location
FUGRO ООО «ГЕОИНЖСЕРВИС» / GEOINGSERVICE LLP with its base in Moscow was commissioned to perform the investigations under specification and strict supervision of TECHNIP’s selected Italian based geotechnical consultancy firm.

Realization

FUGRO ООО «ГЕОИНЖСЕРВИС» / GEOINGSERVICE LLP was selected as the company that was capable to provide sufficient drilling and state-of the art digital Cone Penetration (CPT) and Seismic Dilatometer testing (SDMT) resources and equipment to site short notice and met the high technical and quality demands. 20 t Cone Penetration truck and drilling rig were mobilized right after contract award and shipped from Moscow to site (>2500 km) in just two (2) weeks after contract award.

High quality borehole drilling with full core recovery was carried out using thin wall Shelby sampler. All cohesive samples were tested in the field by pocket penetrometer and torvane to calculate undrained shear strength for immediate determination and classification of soil properties. For determination of geological structure of section top, groundwater level of the upper aquifer and sampling of soils, excavation of trial pits was undertaken.

Seismic Dilatometer Tests

To minimize disturbing of samples and optimize work schedule all samples were delivered to laboratory every day immediately after the end of field works.

Fugro’s in-situ geotechnical testing capabilities such as Resistivity Cone Penetration Testing with pore pressure measurement (RCPTU) and Seismic Dilatometer (SDMT) were of significant benefit to the project, providing early availability of data while drilling was still ongoing. RCPTU and SDMT reached project depth of investigation at all locations and provided full stratum information for site levelling considerations.

To determine the hydraulic properties of the relevant water-bearing layer at site, to gather information on the design ground water level and assess if a surface drainage system will be required four (4) geotechnical boreholes were equipped with PVC and filters and transformed into pumping and observing wells. Two (2) long pumping tests were performed at site. Water level monitoring commenced using digital data loggers prior, during and after pump testing. Ground water samples were taken to analyse the groundwater chemistry and to help assess the corrosive potential for design of concrete and steel structures in contact with the ground water.

Fugro staff worked hand in hand with Main Clients representatives (Gazpromneft-ONPZ) to comply with all HSE requirements at the construction site. No incident was reported.

Carrying out of geotechnical works on the project “CDU/VDU Complex” characterized Fugro as reliable partner throughout the project demonstrating high level of knowledge, training skills and communication with the Clients, prompt solving of unforeseen situations and completion of field works ahead of schedule.
Scope of Work / Overview

- 22 geotechnical boreholes with sampling up to 25 m depth
- 63 Cone Penetration Tests (RCPTU) extending up to 25 m below ground level
- 3 Seismic Dilatometer Tests (SDMT) with S-wave velocity measurement in 0.5 m depth intervals to 25 m depth
- Installation of 2 piezometric boreholes
- 2 long pumping tests
- Ground water level monitoring using digital data loggers during the field work activities
- Excavation of 3 Trial Pits up to 3 m
- > 100 basic geotechnical and classification tests (grain size analysis, Plastic limits, Proctor, water content, organic content, carbonate content, etc.)
- 43 triaxial tests (UU)
- 70 Oedometer and shear tests
- 11 tests for determination of relative collapsibility of soils
- 7 chemical analysis of water and 48 chemical analysis of soil
- Factual geotechnical data report
- Final Geotechnical Report (bilingual English/Russian)