Project Description

Nizhnekamsk

O J S C Refining & Petrochemical Complex Project

Location
Nizhnekamsk, Republic of Tatarstan, Russia

Client
FLUOR DANIEL OVERSEAS, INC.

Period
June 2008 – June 2009

Purpose

The Nizhnekamsk Refinery is located approximately 800 km east of Moscow, in the Russian Republic of Tatarstan. The current production levels of 125,000 barrels per day will rise to a capacity of 7 million tons per year upon completion of an upgrade program, making it one of the world’s largest petroleum refineries. Construction and expansion of the plant is expected to be completed by the end of 2009. Total project costs are approximately $3.3 billion.

FUGRO was asked to develop geotechnical engineering recommendations to assist Fluor and their subcontractors in the design and construction of foundations to support the proposed structures associated with the OJSC Refining & Petrochemical Complex Project. The Nizhnekamsk Refinery Project represented an unprecedented challenge for Fugro Consult, Germany, who as project leaders worked in close cooperation with Fugro companies in Russia and the U.S.A. The project team, working in multiple offices over three countries, faced enormous logistical difficulties, extremely cold conditions, as well as a very tight project schedule.

During a period of ten months Fugro successfully coordinated earth works, on-site construction, drilling and cone penetration testing, provided quality control and supervised civil and piling subcontractors. This enabled the site investigation results to flow directly into the clients’ design process. Up to ten Fugro personnel were on site at peak times. Parallel to the site investigation, Fugro engineers in Houston and Berlin, carried out geotechnical analysis for pile and foundation design according to Russian SNiP & GOST standards. An interactive web portal provided the latest information on site investigation activities simultaneously in both Russian and English.
In order to complete the project, a major translation program was undertaken to translate documents between Russian and English. A total of around 500 boreholes, 300 CPTs, geophysical survey data, lab test results and factual field data reports for eight different project sites were translated. During this process, Fugro developed specialized routines and software tools to handle the huge amount of incoming data and to meet the urgent requests from the clients design teams in Houston, U.S.A. and New Delhi, India.

Fugro was able to both complete this challenging project on time to the client’s full satisfaction, and exceeded the client’s expectations by providing an unparalleled level of international service and expertise.

Scope of work / Overview

- Supervision of drilling and CPT site investigation
- Translation of field investigation and laboratory testing results
- Geotechnical analysis for pile and foundation design according to Russian standards SNiP and GOST including:
  - Deep foundation design recommendations
  - Axial and lateral pile capacity charts
  - Settlement of pile foundations
  - Shallow foundation design recommendations
  - Allowable net bearing pressure analysis
  - Load-bearing capacity analysis
  - Deformation analysis
- Preparation of geotechnical studies for 15 different project areas within the proposed future refinery
- Site supervision, including monitoring of pile driving and earthwork activities, development of pile testing regime and testing supervision
- Data management with the in-house software solution GeODin® and provision of the data from the site investigations as well as from site supervision activities in interactive web-portal solutions
- Development of software for geotechnical analysis and translation of borehole and CPT logs between Russian and English.