conferenceseries.com

4th International Conference on

Petroleum Engineering

August 15-17, 2016 London, UK

Demonstration of crude oil pipeline design using an integrated framework involving mathematical optimization tools and GIS data

Effie Marcoulaki, Alexandros Skretas and Sotiris Gyftakis National Centre for Scientific Research-Demokritos, Greece

In several publications since 2012, Marcoulaki and co-workers developed a systematic optimization framework for the basic design of main pipeline systems used for the transportation of fluids, like natural gas, petroleum or water. This presentation demonstrates the established optimization framework on real scale problems. The selected application involves the design of the Burgas-Alexandoupolis pipeline. The project has been under consideration since the 90's, as an overland route for transporting crude oil from Russia and other countries of the Caspian region to the European markets and a trilateral agreement on the construction of the pipeline was signed between Bulgaria, Greece and Russia on 15 March 2007. The project was frozen in 2011 due to concerns for environmental and safety risks, but interest on the project was recently revived in view of increases in the capacity of the CPC. In our approach, the design problem is formulated mathematically and treated with advanced optimization techniques to derive optimal network structures and pipeline operation strategies, according to given fluid supply/ demand, flowrate and location data, hydraulic equations, equipment cost, reliability, operation and maintenance features, and information on the landscape features and land use. We consider geographic data, including DEM's, the location of SEVESO installations and geological fault lines, as well as the network of cities and roads, lakes and rivers, sites of environmental interest, etc. The solutions generated by our tool conform to various constraints, addressing safety, environmental and political issues, and compares favourably to the design proposed by the TBP Company.

Biography

Effie Marcoulaki is a Primary Researcher at the National Centre for Scientific Research DEMOKRITOS since 2008. She holds an MEng in Chemical Engineering from NTU Athens, and MSc and PhD in Industrial Process Integration from the University of Manchester. Her research activities include quantitative risk assessment, uncertainty evaluation, and development of optimization tools for industrial applications. Her research has been funded by the EC, and the Greek, UK and USA governments. She serves as expert evaluator for EC grant proposals, has over 50 publications in international peer-reviewed journals and conference proceedings and over 550 citations at Google Scholar.

emarcoulaki@ipta.demokritos.gr

Notes: