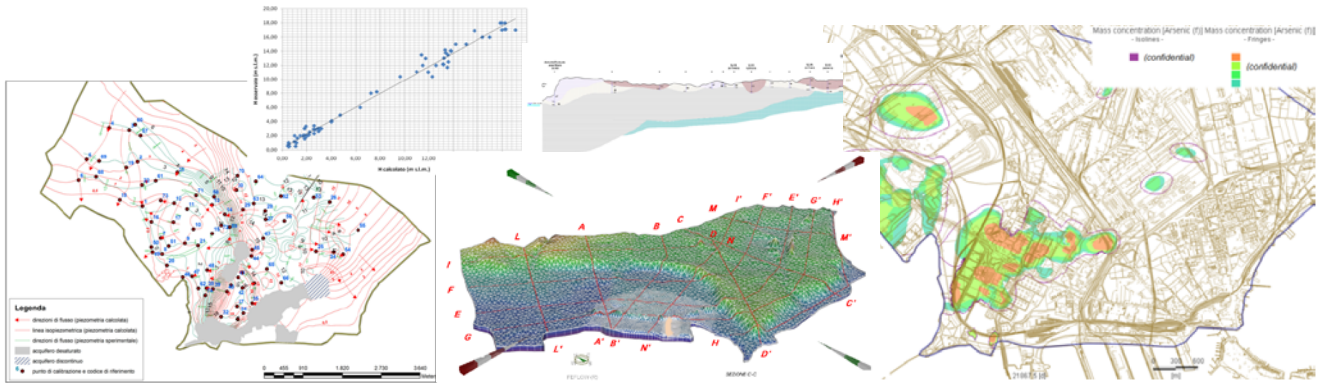


Localization: Taranto

Client: SOGESID S.p.A. , Italian Ministry of Environment



Description

The area of Taranto is one of the main polluted Italian sites, classified by national regulations as "SIN" ("Sito di Interesse Nazionale" - Site of National Interest), where the recovery project are carried out under the direct coordination of the Ministry of Environment, as first priority, due to pollution levels and human risk.

Taranto SIN is a coastal area around 7.5 kms wide around the town harbour, where some of the largest Italian industrial sites are located. It represents one of the main European environmental emergencies, considering that the area is just beside the town of Taranto.

A characterization project, according to Italian regulations, has been previously carried out by SOGESID - Ministry of Environment, by means of more than 650 soundholes, soils and groundwater analysis, leading to a good level of reconstruction of the stratigraphic and hydrogeological frame.

FEFLOW has been applied at two different scales. A local model has been realized to support the emergency project of isolation of an internal area (former "Yard-Belleli" site) by means both of physical barriers and hydraulic barriers ("pump and treat" system). This project has been included in a numerical modeling study in late 2010 and the system is now in the final phase of construction.

A wider scale model has been realized to support both risk analysis and the preliminary design of the recovery actions, aiming to isolate by hydraulic barriers the whole contaminated area, avoiding pollutants transfer toward the urban area.

The modeled aquifers have a very complex structure being partially formed by thick lenses (12-15 m) of industrial waste (foundry sands),

overlying coastal deposits and calcarenites. Particularly the industrial waste deposits has deeply modified the original coast line, up to 500-600 meters towards the sea.

With reference to flow, no other model than FEFLOW could have been used to reproduce these extreme heterogeneities. Particularly, a previous finite difference model had been realized by Ministry of Environment highlighting significant limits in such a complex contest, where only finite element grid based on supermesh elements allowed a correct schematization.

Referring to transport, the multispecies option has been used, leading to a single model to simulate transport of a wide range of pollutants, both metal and organic contaminant: Aluminium, Arsenic, Chrome VI, Iron, Nickel, Lead, Benzene, Benzo(a)anthracene, Benzo(a)pirene, Benzo(k) Fluoranthene, Tricloroethane, Tricloromethane 1,2 Dichloropropane, Dibromocloromethane.

This approach allowed to the calibration within an unique FEM model, avoiding the dramatically time consuming calibration of single contaminants models, with separate runs.

Models and related projects has been fully approved in December 2011 by Italian Ministry Environment. The use of FEFLOW has been greatly appreciated by Ministry technicians, for the higher flexibility when compared to other finite difference models.