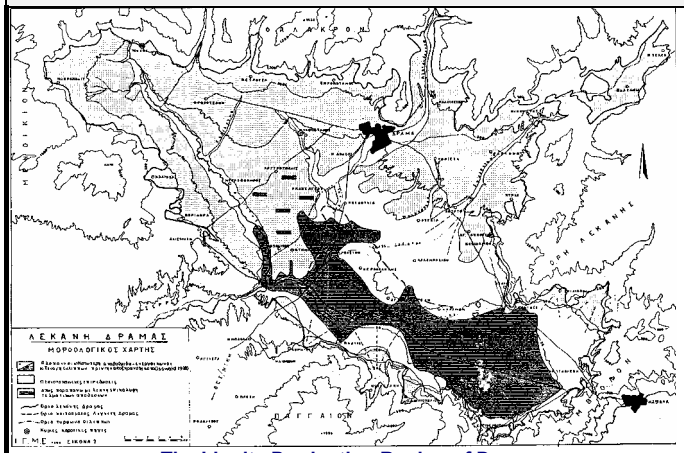
6 EXPERIENCE

Acronym: DEH-DRAMA Project No: C-9407/2000	Project Title: GROUNDWATER RESOURCE IMPACTS: PPT-DRAMA LIGNITE EXTRACTION PRACTICES							
Name of legal entity	**Country**	**Overall project value [in Million €]**	**% carried out by EPSILON**	**No. of staff provided**	**Name of Client**	**Origin of Funding**	**Dates [start/end]**	**Name of partner(s) [if any]**
EPSILON	GREECE	0,5	70 %	5	Hellenic Power Corporation	Hellenic Power Corporation	01.02.2000 30.12.2001	EPSILON (GR) NTUA (GR), AUT (GR) PbS (D)

Project Description



The Lignite Production Region of Drama

The Hellenic Power Corporation, DEH, is operating a lignite extraction filed in the Region of Drama, Northern Greece (map). The surface mine has an area of approximately 6km^2, and is impacting both, surface and ground water resources of the region, since during rainy periods the surface mine is flooded with large volumes of water (figure) which infiltrate into the shallow groundwater and runs-off to adjacent steams and ditches. Although the groundwater is not being used for human conception, it is being used for industrial purposes; Thus, the PPT has an obligation for its protection.

Under contract to the PPT, a study has been accomplished by EPSILON in cooperation and association with the PPT, National Technical University of Athens, NTUA, the Aristoteleion University of Thessalonica, AUT, and the Planungsbüro PBS of Germany. It has been aimed to: (i) design a monitoring programme for the water resources of the region, both surface (figure) and groundwater, (ii) model the groundwater via both, the SESOIL (USEPA) and the MODFLOW model (USGS), (iii) propose mitigation measures for the protection mainly of the groundwater and secondarily of the surface waters.

A preliminary modelling with existing data (e.g., available piezometric tests, soil and geology information) produced the environmental baseline of the regions, based on which additional filed and monitoring tasks have been proposed. Based on this information, the groundwater aquifer (15X35km) has been modelled in both quantity (piezometric performance under extraction practices) and quality (constituents). The modelling effort has been supported (i.e., calibration, verification, validation) with available information from the Hellenic Geology Institute and other sources. (ii) Modelling results have been used to accessing current and future impacts (scenario simulations under various extraction practices) and resulted to a management practices for the years to come. The overall effort will be duplicated for an adjacent river basin, where groundwater is used for geothermal energy.

Type of Services Provided [Outlined]

Services-Deliverables

- Environmental baseline analysis
- Aquifer mathematical modelling
- Aquifer management plan
- Regional water resources impacts analysis
- Report and training programme in model use
- Database & GIS application
- Model extension plan

Achievements-Innovation

- Combined surface and groundwater analysis
- Aquifer analysis under pond-pressure
- Model application under extreme boundary conditions

Key Words

PPT, DEH, Drama, groundwater management plan, lignite surface mine, MODFLOW, N. Greece

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