Mining Work
Bauxite Redmud Landfill
Viotia
Central Greece

Project
Landfill deposit of bauxite redmud at St. Athanasios area, south of “Aluminium of Greece” industrial facilities

Construction Details
• Design of perimetric drainage ditches
• Design of compacted landfill zones of 50 m maximum width
• Landfill deposit mainly without compaction
• 1:3 Slope formation
• Landfill deposit geometry according to the natural terrain

Construction Cost
Total cost: approx. € 34 m.

Project Schedule
Construction: 2009 - today

Project Description
• Design of five discrete phases of dry landfill deposit of bauxite redmud at a private area
• Total landfill area: ~ 600,000 m²
• Total landfill height: ~ 60 m.
• Total landfill volume: ~ 17 mil. m³
• Total landfill weight: ~ 32 mil. ton
• Landfill deposit approximate time duration: 60 years

Geology
Limestones, loose riverbed deposits, limestones debris

Our Services
• General Final Design of landfill
• Detailed Final Design of landfill
• Alternate solutions investigation during the design phase
• Design of intermediate deposition phases
• Design of Hydraulic works
• Determination of construction sequence
• Technical Description of the intermediate phase works
• Bill of Quantities
• Tender documents

Construction Details
• Landfill deposit geometry according to the natural terrain
• 1:3 Slope formation
• Landfill deposit mainly without compaction
• Design of compacted landfill zones of 50 m maximum width
• Hydraulic design of riverbeds and design of horseshoe shaped culvert
• Design of perimetric drainage ditches

Client
ALUMINIUM OF GREECE S.A.
Mining Work

Positioning and Foundation Pre-Design of Skouries Ore Processing Plant

Stratoni, Chalkidiki
Northern Greece

**Project**
Positioning and foundation pre-design of Skouries ore processing plant and affiliated surface facilities and infrastructures

**Construction Cost**
Total cost: approx. €1.5 m.

**Project Schedule**
Design: 2008 - 2009
Construction: 2012 -

**Project Description**
Positioning of the Skouries ore Processing Plant Complex

**Geology**
Schists, porphyries, alluvial deposits

**Our Services**
- Preliminary geotechnical assessment
- Preliminary determination of the range of the design parameters
- Preliminary assessment of the foundation requirements
- Preliminary design of the required excavations for the construction of the process plant complex
- Preliminary assessment of excavation and backfills based on the various plant elevations included in the revised plant layout
- Preliminary indicative estimation of the geometrical restrictions which may arise from earthworks assessment
- Preliminary indicative estimation of the earthworks volumes produced by the assessment
- Elaboration of the geotechnical investigations program (geophysical surveys, boreholes, in situ and laboratory tests)
- Revision of the proposed geotechnical investigations program and preliminary assessment of excavations geometry

**Client**
HELLAS GOLD S.A.
Mining Work
Tailings Dams in Skouries Mine
Stratoni, Chalkidiki
Northern Greece

Project
Design of Tailings dams in Karatza Lakkos and Lotsaniko streams

Construction Costs
Total costs: approx. €15 m.

Project Schedule
Design: 2010
Construction: 2012 -

Project Description
Karatza Lakkos Dam
• Dam crest length: 533m
• Dam crest width: 15m
• Vertical dam height in the dam axis: 143m
• Cumulative tailings surface area: 714,600 m²
• Cumulative tailings storage volume: 29,2 mil. m³

Lotsaniko Dam
• Dam crest length: 380m
• Dam crest width: 15m
• Vertical dam height in the dam axis: 131m
• Cumulative tailings surface area: 348,200 m²
• Cumulative tailings storage volume: 14,9 mil. m³

Geology
Two-mica silicified at places schists, amphibolitic and chloritic schists, amphibolitic gneisses

Our Services
• Geological – hydrogeological – geotechnical evaluation of the project
• Hydraulic study and hydraulic design of the management outflows in the embankments area
• Pre-study and design of general dams layout
• Risk assessment of potential failure of the two tailings dams due to structural, seismic and overtopping reasons
• Bill of quantities

Client
HELLAS GOLD S.A.
Mining Work

Skouries’ Underground Mine Spiral Decline and Main Access Shaft
Skouries, Chalkidiki
Northern Greece

Project
Design of Skouries’ Underground Mine Spiral Decline and Main Access Shaft

Construction Cost
Total cost: approx. € 80 m.

Project Schedule
Design: 2011
Construction: 2012 -

Project Description
Length of Spiral Decline: 5.445m
Effective Cross Section of Spiral Decline: 21m²
Length of Shaft (vertical): 690m
Effective Cross Section of Shaft: 28m²

Geology
• Biotitic chloritic schists, porphyry
• Underground water

Excavation Method
NATM – Drilling & blasting – mechanical means
Conventional Shaft Sinking

Our Services
Final Technical design for the construction of Skouries’ underground mine spiral decline and main access shaft (according to articles No 4 and 101 of the Greek Mining Regulation)

Client
HELLAS GOLD S.A.
Mining - Hydraulic Tunnel

Kokkinolakkas Diversion Tunnel
Mavres Petres Mine, Chalkidiki
Northern Greece

Project
Design of Kokkinolakkas' diversion tunnel for the protection of dry stacking Tailings Management Facility area, produced at Mavres Petres and Olympiada underground mixed sulphide ore mines

Construction Cost
Total cost: approx. € 6 m.

Project Schedule
Design: 2011
Construction: 2012 –

Project Description
Diversion tunnel: 1,142m total length
Mean longitudinal inclination: 6.5%
Effective cross section: 37.2 m²

Geology
• Amphibolites
• Amphibolitic gneisses

Excavation Method
NATM – Drilling & blasting – mechanical means
Final lining with reinforced concrete

Our Services
Final Technical design for the construction of Kokkinolakkas diversion tunnel (according to articles No 4 and 101 of the Greek Mining Regulation)

Client
HELLAS GOLD S.A.
Mining Work
Underground Mixed Sulfide Ore Mining
Stratoni, Chalkidiki
Northern Greece

Project
Mavres Petres mixed sulfide ore mine

Annual production: approx. 250,000 ton ore

Project Schedule
Design: 2011
Operation: 2011-2018

Project Description
• Design of underground mining
• Exploitation method: overhand cut and fill

Geology
Gneisses, marbles, aplites, iron pyrites, mixed sulfide ore

Our Services
• Technical economical feasibility study for the exploitation of underground deposits
• Final Technical exploitation design according article No 4 and 101 of the Greek Mining Regulation

Client
HELлас GOLD S.A.
Mining Work
Olympias Mine Main Access Tunnel and Secondary Access Tunnel
Olympiada, Chalkidiki
Northern Greece

Project
- Design of main access tunnel in order to serve as the main ore haulage for Olympias mine to the new plant in Madem Lakkos
- Design of secondary access tunnel in order to serve as haulage access until the completion of construction of the main access and haulage tunnel from Olympias Mine to Madem Lakkos New Plant

Construction Cost
Total cost: approx. € 150 m.

Project Schedule
Design: 2011
Construction: 2012 -

Project Description
- Length of main access tunnel: 8,770m
- Mean longitudinal inclination of main tunnel: 10%
- Effective cross section of main tunnel: 37.2 m²
- Length of secondary access tunnel: 1,043m
- Mean longitudinal inclination of secondary tunnel: 9%
- Effective cross section of secondary tunnel: 37.2 m²

Geology
- Amphibolites – amphibolitic gneisses
- Biotitic gneisses
- Pegmatites
- Marbles
- Tectonic breccias
- Mylonitized zones
- Kaolin occurrence zones

Our Services
- Final Technical design for the construction of Olympias mine main access tunnel (according to the articles No 4 and 101 of the Greek Mining Regulation)
- Final Technical design for the construction of Olympias mine secondary access tunnel (according to the articles No 4 and 101 of the Greek Mining Regulation)

Client
HELLAS GOLD S.A.

Plan view of secondary tunnel’s entrance portal
Excavation geometry of secondary tunnel
Typical cross section of excavation and primary support of main tunnel
Open Pit Mine

Bentonite Open Pit Mine in Aggeria area
Milos island, Southern Greece

Project
Open Pit Mine

Construction Cost
Total cost: approx. € 2 m.

Project Schedule
Design: 1998-2002
Construction: 1998-2003

Project Description
Aggeria open pit mine is one of the largest in Europe
Max. width: 650m
Max. depth: 130m
Surface: more than 245000m²

Geology
Volcanic sediments, lavas, bentonite, geothermal underground waters

Our Services
• Design of rehabilitation of a major landslide that caused the movement of approx. 1500000m² of soil materials
• Slope stability analysis – elaboration of slope inclinations

Client
S&B INDUSTRIAL MINERALS S.A.
Mining Work

Surface Mining of a porphyritic deposit

Skouries, Chalkidiki

Northern Greece

Project
Design of an open pit mine, for the exploitation of a porphyritic copper deposit

Construction Cost
Total cost: approx. € 42,5 m.

Project Schedule
Design: 2007-2008
Construction: Expected to begin at 2009-2010

Project Description
Gold & copper mine
Estimated mine depth: approx. 200m – 250m
Estimated surface diameter: approx. 700m
Estimated open pit mine reserve: approx. 65 million tons

Geology
• Subalkalic porphyry with the shape of subvertical pipe, within amphibolitic – biotitic schists & gneisses
• Groundwater

Our Services
• Determination and assessment of the open pit mining input parameters (Pre-design framework)
• Pre-design of the open pit mine
• Design of the infrastructure road works affiliated to the open pit mine
• Transportation & traffic study for the support of the surface exploitation works

Client
HELLAS GOLD S.A.
Mining Work

Parnassos Bauxite Mining Works

Central Greece

Project
Bauxite mines

Construction Cost
Total cost: approx. € 22/tn bauxite

Project Schedule
Design: 2004
Development: 2005 - 2015

Project Description
• Design of mining works in 12-16 sublevels
• Mining method: sublevel caving
• Sublevels connected with the main levels through ramp

Geology
Limestones, bauxite

Our Services
Technical – Economical Mining Design

Client
S&B INDUSTRIAL MINERALS S.A.
Mining Work

Sulphide Ores Mining Works
Stratoni, Chalkidiki
Northern Greece

Project
“Mavres Petres” mixed sulphide mine

Construction Cost
Total cost: approx. € 74/tn bauxite

Project Schedule
Design: 2004
Development: 2005 - 2013

Project Description
• Design of mining works
• Ramps
• Mining method: Cut & fill with widen face during retreat

Geology
Gneisses, marbles, aplites, mixed sulphide ores

Our Services
Technical – Economical Mining Design

Client
HELLAS GOLD S.A.
Mining Work

Mining Processing Waste Deposits
Stratoni, Chalkidiki
Northern Greece

Project
Embankments and relevant works in the area of Kokkinolaka waste deposit

Construction Cost
Total cost: approx. € 3 m.

Project Schedule
Design: 2006
Construction: It has not started yet

Project Description
• Integration extent of waste deposit area: 418 acres
• Waste deposit lining from 2 embankments
  Upstream embankment: - Crown length: 245m
  - Max. height: 42m
  Downstream embankment:
  - Crown length: 690m
  - Max. height: 96m
• Construction of hydraulic tunnel with approx. 1,400m length due to Kokkinolaka deviation, which is coming along the integrated waste deposit area
• Fully sealed waste deposit area with installation of specific webs

Geology
Ground surface deposits, Amphibolites

Our Services
• Geological – hydrogeological – geotechnical evaluation of the project area
• Localization and evaluation study of queries in the project area and selection of construction materials
• Hydraulic study and hydraulic design of the management outflows in the embankment area
• Pre-study and design of the embankments and the relevant works
• Pre-study and design of waterproofing and protection deposit area
• Embankment danger analysis based on geological, geotechnical and structural control measures
• Bill of Quantities – budget

Client
HELLAS GOLD S.A.