



Factsheet providing a brief summary on one of the model sites in ProMine

Gerakini (Greece)

October 2010

Gerakini is the ProMine model site for the production of nano-silica, developed from olivine extracted from waste rock and used for inkjet printing paper coating and high-performance concrete.



Gerakini Magnesite Mine, Grecian Magnesite S.A.

Grecian Magnesite S.A.'s main deposits and operations are located in the Chalkidiki area in Northern Greece, in the municipality of Polygyros. The company's main offices are located in Athens and its R&D centre is located near Thessaloniki. The mine site itself consists of mine infrastructure, central and secondary open pits, the beneficiation, calcination and processing installations, administrative offices, storage facilities, 4 sites for waste rock, 2 ponds for inert sludge deposition and 2 water reserve ponds. The sparsely populated area around the mine is mainly dedicated to olive grove agriculture, while touristic and recreational lodgings are found along the shoreline.

Current Situation

Ore is extracted near the surface in open pits. Transforming the Run of Mine (RoM) into the final product involves: pre-beneficiation, main beneficiation, calcination/sintering and end-processing. Throughout this lengthy process to arrive at the final product, the material is separated at each of these stages. To this effect laser and camera sorting, Grecco screens, dense-media and magnetic separation are used to sort the material being processed. The Run of Kiln (RoK) Magnesia products can then be crushed and sized according to the customer's requirements.



The beneficiation stages produce waste types that are inert, non-hazardous and non-leachable under normal environmental conditions. Waste rocks are used to rehabilitate exhausted pits or are sold as gravel and construction materials. Wastewater is treated and re-circulated to save on water consumption, whilst exhausted pits have been used to form two sludge pits in which to store sludge. The Gerakini mine is an optimal model site to explore the opportunity to reduce CO₂ emissions that are derived from the decomposition of magnesite and fuel combustion at the site.

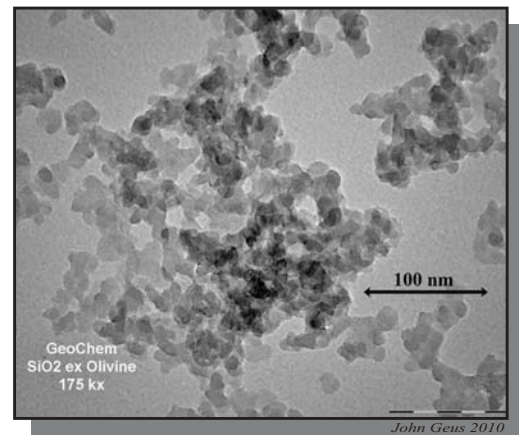
Grecian Magnesite S.A. is a privately owned mining and industrial company that has been operating since 1959. The company ranks among the top producers and exporters of Magnesia (MgO) in the world and is the number one exporter in the European Union.

ProMine Model Site - Greece

More information can be found on promine.gtk.fi

Expected Outcome from ProMine Research

In the high-performance concrete application, olivine concentrate produced from waste rock is reacted with concentrated acid from the processing of polymetallic ore at the Stratonis mining area. In the paper coating application, olivine waste rock is reacted with acids and CO₂ from paper mill off gas. In both applications, waste streams are combined to produce valuable products.



Some facts

Mine Gerakini

Owner Grecian Magnesite S.A. (GM)

Start of operation 1959 Reserves over 30 years for current production	Employees 323
Type of Mining Open pit surface extraction	Host rock Dunite-Serpentine
Ore-genetic type Cryptocrystalline Magnesite (MgCO ₃)	Product applications All applications where magnesia/magnesite is used
Ore tonnage mined (end 2008) Run of Mine: 2,966,570.7t Pre-beneficiated magnesite: 455,068t Annual Production Capacity 200,000t (calcined products) >60,000t (monolithic refractories)	Percentage of recycled input materials 20.4% recycled material feeding the sorters of pre-beneficiation 3.5% recycled material (pelletised dust collected from various production stages) feeding the kilns
Total amounts of overburden, rock, tailings, and sludge No environmental consequences from waste material resulting from production processes	Total volume and percentage of water recycled and reused 6,667,680m ³ (87% of needs)
Land owned and disturbed 225ha	Distance from nearest town(s) 3km from coastal town of Gerakini
Philanthropic contributions to the community 69,500€ (scholarships, awards, endorsement of associations, etc. in 2008)	Main activities in region Olive grove agriculture and tourism

Core Team at Gerakini Model Site

Grecian Magnesite S.A. (GM), Greece

Mine Owner/R&D Provider

Institute of Geology and Mineral Exploration (IGME), Greece

R&D provider, Sampling

HELLAS GOLD S.A. (HG), Greece

Mine owner/R&D provider

CALDURAN Kalkzandsteen BV, The Netherlands

New product manufacturer

SELOR eeig, The Netherlands

R&D provider, Process Development

Technische Universiteit Eindhoven (TU/e), The Netherlands

R&D provider, Modelling

Valtion Teknillinen Tutkimuskeskus (VTT), Finland

R&D provider, Process Development

Geologian Tutkimuskeskus (GTK), Finland

R&D provider

ProMine Partners



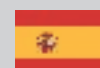
GTK, GEOLOGIAN TUTKIMUSKESKUS
PMO, PYHÄSALMI MINE OY
VTT, VALTION TEKNILLINEN TUTKIMUSKESKUS
MIRKA, KWH-MIRKA



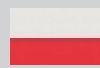
BRGM, BUREAU DE RECHERCHES GÉOLOGIQUES ET MINIÈRES
INPL, INSTITUT NATIONAL POLYTECHNIQUE DE LORRAINE



BOLIDEN, BOLIDEN MINERAL AB
KEMAKTA, KEMAKTA KONSULT AB
LTU, LULEÅ TEKNISKA UNIVERSITET



IGME ES, INSTITUTO GEOLÓGICO Y MINERO DE ESPAÑA



CUPRUM, KGHM CUPRUM SP ZOO
CENTRUM, BADAWCZO-ROZWOJOWE
ECOREN, KGHM ECOREN S.A.
IMN, INSTYTUT METALI NIEZELAZNYCH



AGCMP, AGC MINAS DE PORTUGAL UNIPessoal Limitada
LNEG, LABORATORIO NACIONAL DE ENERGIA E GEOLOGIA, I.P.



GEOS, G.E.O.S. INGENIEURGESELLSCHAFT MBH
TU BAF, TECHNISCHE UNIVERSITÄT BERGAKADEMIE FREIBERG
WOLA, WOLA CHEMISCH-TECHNISCHE ERZEUGNISSE GMBH



SELOR, SELOR EEIG
TU/e, TECHNISCHE UNIVERSITEIT EINDHOVEN
CALDURAN, CALDURAN KALKZANDSTEEN BV



HG, HELLAS GOLD S.A.
IGME GR, INSTITUTO GEOLOGIKON KAI METALLEFTIKON EREVNON
GM, ELLINIKI LEFKOLITHI ANONYMOS METALLEFTIKI VIOMIHANIKI NAFTILIAKI KAI EMPORIKI ETERIA



UNI WAR, THE UNIVERSITY OF WARWICK
BANGOR, BANGOR UNIVERSITY



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