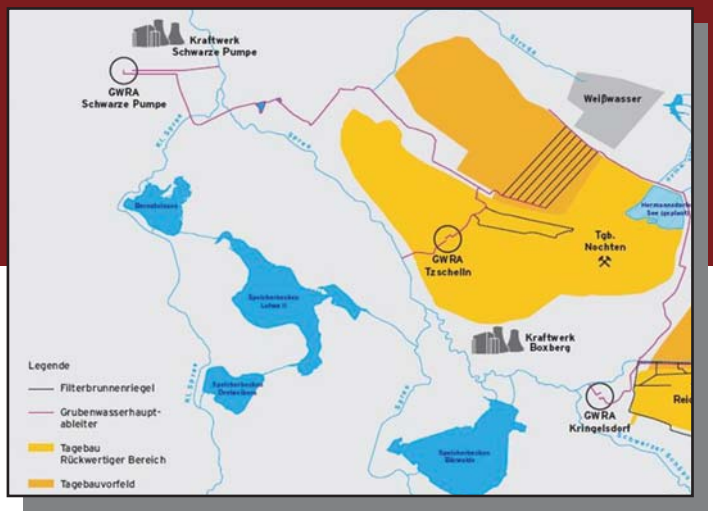
ProMine

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

Nochten (Germany)

October 2010



Nochten is the ProMine model site for the production of Schwertmannite. Derived from the treatment of pumped mine water, the new product can be used as a pigment in colour and coating and in ceramic applications.

Nochten Lignite Mine, Vattenfall Europe Mining AG

Vattenfall Europe Mining AG operates the Nochten mine where lignite is extracted using conveyor bridge technology. The mine is located within the Lusatian mining area of Saxony, eastern Germany. Exploration in the 1950s estimated the lignite resource potential at around 1,400 Million tons, and by 1976 coal production reached full scale. Braunkohlenkombinat Senftenberg operated the mine until 1990, and Vattenfall acquired the majority of shares and control of the mine in 2001. The mine is surrounded by forest, agricultural land and villages. From 2018, lignite mining is expected to move towards the northwest.

Current Situation

Once the surface area is cleared, the groundwater level is lowered using submersible motor pumps. Bucket-wheel excavators remove the overburden which is transported via conveyor belt to already exploited areas for backfilling. Bucket-chain excavators mine the coal in high- and deep-cut, which is then brought up to the surface by conveyor or by rail for onward transfer to the Boxberg power plant. The lignite is crushed and pulverized before going into the combustion chamber where the steam produced is used to drive a turbine to convert thermal to kinetic to electrical energy which feeds into the high-voltage grid of Vattenfall Europe.

Mine water is treated using lime, which is then discharged into rivers, ponds or marshy areas or used as process water for the power plants. Various measures are being planned to reduce the huge water deficit caused by lignite mining. Most of the overburden is used for backfilling of mined-out areas. Exploitable gravel, clay and sand are recovered to meet regional demand. The relocation of people due to the opencast mining operations being unavoidable, Vattenfall Europe Mining AG takes steps in planning and providing alternate housing.

Vattenfall Europe Mining AG employs around 4,500 persons and is by far the largest employer in the area. The current mining area of Nochten covers 4,825 ha. The conveyor bridge is the largest mobile industrial equipment system in the world enabling the transport of excavated overburden across the mine in a 500 m long conveyor belt to the dump site.

Expected Outcome from ProMine Research

To employ an innovative water purification process, based on microbial treatment, to create schwertmannite (ironhydroxysulphates), a new product from pumped mine water, which is expected to be used in the production of pigments.

Some facts

Mine **Nochten**

Owner **Vattenfall Europe Mining AG**

Start of operation 1976 **Expected extension** 2018	**Employees** ~600
Type of Mining Open cast mining/ conveyor bridge technology	**Ore-genetic type** Lignite
Coal production in 2008 ~18.3Mt **Total coal production up to end 2008** ~228Mt	**Total amount of overburden removed in 2008** ~131Mm^3 (15,000m^3/hr)
Average groundwater withdrawal ~220m^3/min or ~120Mm^3/year (~88.1Mm^3 in 2008)	**Lignite to water ratio** 4.8m^3 of water per 1t of coal production
Annual electricity generated by Boxberg Power Plant ~15,600MkWh	**Lignite to land ratio** 10ha of land per 1Mt of coal production
Population density in Lusatia mining area 159inhabitants/km^2	**Distance from nearest town(s)** Weisswasser and Spremberg are respectively around 5 and 12km from the mine
Current mining area/Recultivated area 4,825ha/3,344ha (2006)	**Main activities in region** Agriculture

Core Team at Nochten Model Site

G.E.O.S. Ingenieurgesellschaft MBH (GEOS), Germany
R&D provider, product development

Wola Chemisch-Technische Erzeugnisse GMBH (WOLA), Germany
New product manufacturer

ProMine Partners

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

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

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

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

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

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

IGME ES, INSTITUTO GEOLÓGICO Y MINERO DE ESPAÑA

AGCMP, AGC MINAS DE PORTUGAL UNIPESSOAL LIMITADA
LNEG, LABORATORIO NACIONAL DE ENERGIA E GEOLOGIA, I.P.

SELOR, SELOR EEIG
TU/e, TECHNISCHE UNIVERSITEIT EINDHOVEN
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UNI WAR, THE UNIVERSITY OF WARWICK
BANGOR, BANGOR UNIVERSITY

IRMCo, INTEGRATED RESOURCES MANAGEMENT (IRM) COMPANY LIMITED

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