Construction of a mine water treatment plant at a coal mine in Vang Danh (Vietnam)

RAME Research Association Mining and Environment in Vietnam

Project location

Client
VINACOMIN, VITE
Environmental construction

Term of project
Sep 2007 to Dec 2012

Funding

SPONSORED BY THE
Federal Ministry of Education and Research

[Gesamtefördersumme]

Project executing organisation

Costs for Construction and Equipment
1.700.000 Euro

Costs for planning services
180.000 Euro

Initial situation

Untreated mine drainage water from an anthracite coal mine owned by the Vietnamese mining company VINACOMIN was released into the Vang Danh River. The polluted water then discharges into the Ha Long Bay which is classified by the UNESCO as World Heritage Site. The mine water contains high concentrations of iron, manganese and suspended coal particles. In Vietnam an conflict situation is arising between expanding mining activities, the increasing environmental awareness, tourism and farming. Moreover a limiting value catalogue for industrial wastewaters was adopted by the Vietnamese government in the year 2005.

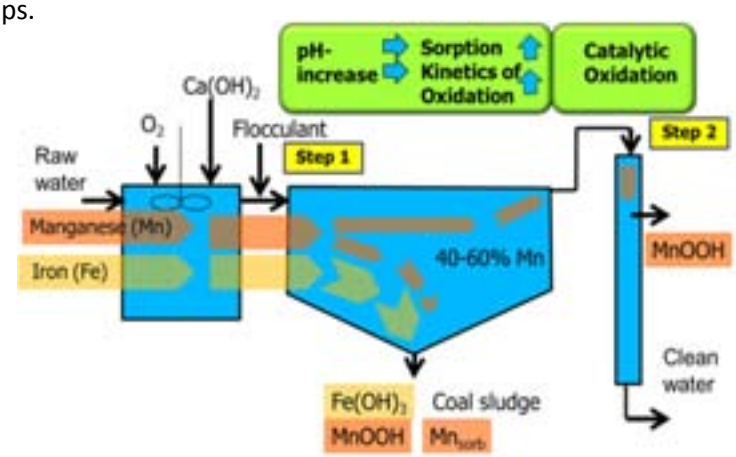
Research project

Three German project partners developed, planned and built a mine water treatment plant in Vang Danh together with the Vietnamese project partner VINACOMIN. The necessary fundamental research and process development was funded by the German Ministry of Education and Research. The first of three modules of the treatment plant was designed for a capacity of 800 m³/h. Prerequisites for the treatment process were a low demand of chemicals and the implementation of the plant on a limited construction area. The RAME project is going on until 2015, but the sub project “Mine water treatment” will be completed successfully in December 2012.

Treatment technology

The treatment technology was designed for the removal of iron, manganese and suspended solids. The challenging process of manganese removal consists of two subsequent treatment steps.

The final demanganization step was realized by a catalytic sand filter system with special filter material. The mine water treatment plant in Vang Danh is regarded as showcase for further plants in Vietnam.



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Operating parameters

Average INFLOW water quality and design values for the mine water treatment plant	Target parameters according to Vietnamese regulations for industrial waste waters (TCVN 5945-B)
pH: 5.8	pH: 5.5 - 9
Fe_{tot}: 50 mg/l	Fe_{tot}: < 5 mg/l
Mn: 10 mg/l	Mn: < 1 mg/l
TS: 500 - 1500 mg/l	TSS: < 100 mg/l
COD: 140 mg/l	COD: < 80 mg/l
BOD_5: 70 mg/l	BOD_5: < 50 mg/l

Construction

The mine water treatment plant was designed for a capacity of 800 m³/h and shall be enlarged to 2400 m³/h. The construction was done by the Vietnamese project partners (VITE and the Environmental Company of VINACOMIN). The technical equipment was provided under supervision of the Vietnamese companies SETFIL and PECOMVN.

Development of an innovative treatment process for mine waters

- suitable for high Mn-concentrations (combination of two treatment steps)
- catalytic surfaces are used for Mn-removal
- low demand of additional chemicals
- modern technology
- low demand of area
- easy to control and to regulate
- designed for long-term operation
- the treatment capacity can be enlarged easily