Calimani Negoiu Open Pit, Suceava County, Design: ICPM Baia Mare

DESCRIPTION OF MINE AND PREVIOUS ACTIVITY

Main activity of Calimani Negoiu Open Pit is: Extraction of Sulphur by Open Pit and underground methods. It extends on a surface of 375 Hectares including mine curtilages, waste tips, tailing storage facilities and other ancillary activities. The activity ceased in 1997

Associated with former mining operations there are 4 waste tips, containing 33900000 cubic meters of mine waste. Waste material's pH range between 3 and 5.5 having high content of Sulphur (1700 - 3100mg/Kg, copper (20mg/Kg) and Manganese (900mg/Kg) 1 Tailing storage facilities with a volume of 2340000 million cubic meters.

The nearest community is Saru Dornei Village situated at 5000 m from mine, having 721 inhabitants and local water course is Neagra Sarului situated at 0 m from mine boundary.

Mine water with flow rate of 116 l/sec, and pH of 4.5 flowing from mine workings.
The site is located into wild mountainous area at elevation of 1500 to 1800m.

CULTURAL PROPERTY

Near the site there is an area containing Pinus Cembrae, a rare and protected specie of pine tree. Inside of open pit there was noticed volcanic caves. During the execution of works these should be protected if discovered. If there is an accidental find of something valuable, the Engineer of the Contract will stop any physical operations until competent authority (County Commission for Historical Monuments or Ministry of Culture and Religious Affairs) provides permission to continue.

PROPOSED WORKS

The mine closure and environmental remediation proposals:

- General site clearance, removing of scrap metal and demolition of 113 buildings and structures, having a total volume of 34900 cubic meters of demolition materials (concrete and bricks) which will be decontaminated and disposed off at waste tips

- Collection of contaminants and contaminated materials and disposed off to a special constructed landfill. The location and size of landfill should be decided by the Engineer of the Contract based on quantity of unaccepted material identified on site. Three isolation layers shall be placed onto the compacted surface: a bentonite mattress 2.5 cm depth, a geomembrane layer of 2.5 mm and a geotextile layer of 5 mm. On completion of the final layer of unacceptable material the surface shall be domed to assist water run off. A gas ventilation pipe shall be placed at the highest point.
- Closing of raises, boreholes or other minor mine workings connected to the surface.
- Excavating and moving of 110000 mc. of material from waste tips, curtilages, benches and slopes.
- Reshape all mine waste dumps and TSF to appropriate slope angle, generally below 1/3. Construction of erosion fences and gabion walling to ensure long term stability and erosion control.
- After the site waste cleaned up by the existent buildings and the works were done for the tailings dams it will be made the revegetation by grass and trees specific species of the area on 95 ha field: 62,5 ha of platform and yards 12.5 ha tailing slopes and 9 ha deposition dam.
- Protection of rehabilitated surfaces and affluent river by guard ditches and drainage systems in total length of 1300 m.

-Construction of adequate water treatment facilities to comply with 116 l/sec, having pH of 4.5 Sulphur, Iron Oxides and Heavy metals

- Rehabilitation of tailing storage facilities by:
- Fencing the lagoon(s)
- Draining off the water still contained in the tailing dam
- Strengthening the retaining structure
- Construction of deep perimeter drain, side and toe drains
- Regrading, capping and revegetation of the dam

KEY ENVIRONMENTAL ISSUES DURING THE CONSTRUCTION WORKS

Based on works, equipment and methods used for execution of works following environmental issues might occur:

Noise, dust and mud generated by earthmoving equipment
Noise, dust, smoke and vibrations generated by blasting operations
Potential land pollution by fuel, oil or lubricants because spillage from earthmoving equipment or lorries
Potential water pollution by fuel and oil because spillage from equipment while working above, adjacent or in watercourses

Potential soil or water pollution by used waters generated by site activities in offices, workshops and messes
Potential underground water pollution by contaminated material used for filling of underground workings
Damage of existing vegetation from or adjacent of site because of negligent driving of equipment or site operations
Damage of public roads because of traffic, equipment or site operations
Potential soil or water pollution by spillage of tailing material from lorries or while working on tailing storage

In order to comply with Park regulation is necessary to:

- Obtaining an agreement to work on Calimani area from National Park Administration based on EMP and Environmental Agrrement;
- Agreement means that the inspectors appointed by the ENVIRONMENTAL PROTECTION AGENCY and the SCIENTIFIC COUNCIL OF CALIMANI PARK will check on comply with EMP and other related to roles for work in the area;
- The area of activity will be delimited with barriers or fenced;

COMMUNITY CONSULTATION (See annex "Consultarea comunitatilor – Obiective scanate")

ANNEX 1 – MITIGATION PLAN
CALIMANI MINE AND OPEN PIT

Phase/Operation	Issue - Mitigation Measure	Cost	Institutional Responsibility / Approval and inspection
1 CONSTRUCTION			
A Demolition Works			**Contractor**
(a) Blasting of buildings and structures	**i. Noise:** - Restriction of blasting program to 8:00 – 18:00 o'clock, Monday to Saturday; - Informing of the affected community Sarul Dornei Village about blasting program; **ii. Vibration:** - Restriction of the explosive quantity for each charge – 0.5 Kg/blasting hole, minimum 1 second delay each other; **iii. Dust and smoke:** - Dust suppression measures (wet blasting)	Contract	Engineer of Contract
(b) Processing of demolition materials	**i. Dust:** - Dust suppressors (wet processing) **ii. Noise:** - Location of the processing facilities not less than 1Km far from inhabited area; - Noise screens around of processing equipment if necessary; **iii. Pollutants on or in demolition materials:** - Selection of the contaminants from demolition materials before being processed. Contaminated materials will be disposed off separately at landfill;	Contract	Engineer of Contract
(c) Haulage/deposition of demolition materials	**i. Mud** - Keeping the lorries clean while working on or outside of the site area; - Establish cleaning pad and tyre washing area at construction zone boundaries; **ii. Dust** - Sprinkling of demolition materials on lorries and at dumping location;	Contract	Engineer of Contract
B Earth Works			**Contractor**

Phase/Operation	Issue - Mitigation Measure	Cost	Institutional Responsibility / Approval and inspection
(a) Blasting of hard rocks	**i. Noise** - Restriction of blasting program to 8:00 – 18:00 o'clock, Monday to Saturday; - Informing of the affected community SARU DORNEI Village about blasting program; **ii. Vibration** - Restriction of the explosive quantity for each charge (max. 15Kg/blasting hole and maximum 15 borehole/blasting charge, minimum 1 second delay each other; **iii. Dust and smoke over inhabited areas** - Dust suppression measures (wet blasting);	Contract	Engineer of Contract
(b) Excavation and loading of materials	**i. Lubricant and/or fuel spillage;** - Each equipment should be inspected[1] by the Engineer monthly. Equipment which will not pass the inspection will be removed from the site; **ii. Spillage of tailing materials during of works on tailing dams** - Access roads will be prepared before to commence any works; - Using of sealed lorries for haulage of tailing material outside of TSF; - Have equipment (sweeping machines or such) on site for tailings spill cleanup; **iii. Failure of benches or slopes during of works** - Each work bench for excavators and access roads on excavation place will be constructed to comply with safety rules; - Fencing and barriers around of unstable areas; - TSF slope construction: use appropriate excavation and support sequence during construction of retaining walls to avoid construction-induced failures;	Contract	Engineer of Contract
(c) Haulage/deposition spread/level/place	**i. Noise during the transport on site or public roads;** - Restriction on haulage program to 8 o'clock 18 o'clock, Monday to Saturday; - Restriction of lorries speed to 30Km/h, or less as agreed with community;	Contract	Engineer of Contract

[1] Inspection is referred to visual to identify possible oil or fuel spillage, level of noise and level of smoke produced by the equipment's engine (fummeter), status of tires and legal status related to periodic Technical Inspection as law asks for. (Note: according with Romanian Law for Public Road Circulation each vehicle should to pass periodic technical inspection. The inspection refers to: brakes efficiency, steering efficiency, emissions in exhaust system, lighting system, horns and noise. The vehicles which pass the inspection receive a licence). For other equipment used on site like Bulldozers, tractors, excavators this is not compulsory

Phase/Operation	Issue - Mitigation Measure	Cost	Institutional Responsibility / Approval and inspection
	ii. Mud and dust on public roads **-** Cleaning of lorries wheel before emerging from loading/unloading location; **-** Suppress of any spillage from lorries during the transport by sealing off; **iii. Noise** **-** Noise suppressors at the exhaust pipes;		
C Concrete works			**Contractor**
(a) preparing and placing of concrete in situ	**i. Concrete outside of construction areas:** - Using only mechanical batching equipment for preparing of concrete; - Location of batching facilities for concrete to be approved by the site Engineer;	Contract	Engineer of Contract
(b) haulage of concrete	i. **Pollution of public roads because of concrete spillage during the transport** - Using only specialised lorries for haulage of concrete; - Cleaning of site at the end of each day;	Contract	Engineer of Contract
D General Works			**Contractor**
(a) Working adjacent over or in water courses or any body of water	**i. Surface waters pollution** - Working with equipment free of any previous pollutant in vicinity of water courses; - Fencing or erecting of barriers near river Puturosu (Neagra Sarului); **ii. Rainfall control** - Construction of guard ditches to control runoff and to protect lakes or rivers **iii. Underground water pollution** - Filling material used for mine workings will be inspected by the Engineer before to be used. Inspection will guarantee that it is free of deleterious materials	Contract	Engineer of Contract

Phase/Operation	Issue - Mitigation Measure	Cost	Institutional Responsibility / Approval and inspection
(b) Cultivating re-vegetation and curing of existing vegetation	**i. Pollution with unacceptable pesticides** - Using only approved fertilizers (standard); - topsoil, subsoil or natural fertilizer will be tested by laboratory analyses to be free of pesticides heavy metals or any other unaccepted materials; **ii. Damage of existing vegetation** - The Engineer will keep the necessary records of number of trees and existing natural grassed areas. The contractor will restore on his own cost any damage on vegetation.	Contract	Engineer of Contract
(c) Operation of site offices, workshops	**i. Pollution of the area adjacent of offices, workshops and storage facilities** - construction of site facilities on approved areas, having all necessary facilities to deal with domestic and industrial waste; - industrial and domestic waste should be disposed off daily at site landfill	Contract	Engineer of Contract
E Hazardous materials			**Contractor**
(a) Decontamination of buildings and equipment by flotation reactants	**i. Accidents involving contaminated materials** - Storage of hazardous chemicals, in areas approved by the Engineer of the contract; - Collection of contaminated materials still contained in the flotation building and equipment and disposal at open pit; - Washing of flotation equipment and location before to be demolished or decommissioned. The resulted materials will be disposed off at open pit;	Contract	Engineer of Contract
(b) Storage, handling/ using of explosives	**i. Accidents involving explosives** - Using of proper storage facilities (existing explosive storage facilities); - Using containers and lorries approved by the Engineer of the Contract	Contract	Engineer of Contract
(c) Storage using distributing of fuel and lubricants	**i. Spill of lubricants and/or fuel** - Using of spillage collection tanks in storage facilities. Cleaning of the storage area every day disposing off any contaminated material. ii. **Fuel/oil spillage during refilling operations**	Contract	Engineer of Contract

[2] Depend on size of storage facilities the fire extinguish equipment and means must be supplied. Fire extinguishers (water, CO_2, foam etc). and hand shovels, picks, hook and 1 cubic meter of sand. For large fuel storage facilities is compulsory a permanent water source and necessary hoses etc.

Phase/Operation	**Issue** - Mitigation Measure	Cost	**Institutional Responsibility /** Approval and inspection
	- construction and operate of fuel/oil repository - using only filling pump installed on refilling tank to refill equipment on site; **iii. Fire on storage facilities** **-** construction of fuel storage facilities on location and according an approved by the engineer method of construction; **-** fire extinguishing equipment as regulation for fire fighting and control asks[2]		

ANNEX 2 – MONITORING PLAN
CALIMANI MINE AND OPEN PIT

Issue	Where is parameter to be monitored	How is parameter to be monitored	Frequency of measurement	Responsible for the measurement
A. CONSTRUCTION				
i. **Noise** generated by: • Blasting; • heavy machinery • lorries	On site and inhabited area	Noise measurement equipment (dB-meter)	Daily	The Engineer of the Contract
ii. **Vibration** generated by: • Blasting; • heavy machinery • lorries	near sensitive buildings	Visual	A measurement should be performed to establish level of blasting and transport along the inhabited area	The Engineer of the Contract
iii. **Dust** generated by: • blasting • traffic and equipment and lorry's	On site and inhabited area	Visual	Daily	The Engineer of the Contract
iv. **Smoke** generated by: • blasting • equipment and lorry's engines	On site and inhabited area	Visual for blasting; Specialised equipment for engines	Monthly and when a new equipment is bring on site	The Engineer of the Contract
v. **Mud** generated by • traffic on site and public roads	On site and inhabited area	Visual	Daily	The Engineer of the Contract
vi. **Soil pollution** by fuel oil • Fuel and lubricants (tank leaks, engines leaks, other operations involving fuel and lubricants) • Cement or concrete	• Where fuel and lubricants are stored; • Where equipment is refilled; • Where equipment is maintained • Where fuel/lubricants are used; • Where concrete is prepared, transported, used	Visual	Daily	The Engineer of the Contract

Issue	Where is parameter to be monitored	How is parameter to be monitored	Frequency of measurement	Responsible for the measurement
• Contaminated material (tailing material, chemicals)	• Tailing storage facilities			
vii. Water pollution • Fuel and lubricants • Contaminated water seepage from waste tips, tailing lagoons (Cu, Pb, Zn,) • Mine Water • Suspensions carried out by rain fall	Where working near or in water course Effluent waters; Monitoring points on receptor stream Oltul River monitoring wells installed in boreholes on Tailing Storage Facilities and open pit	Laboratory analysis for - Copper - Lead - Sulphur - Suspensions	Monthly during the works	The Engineer of the Contract
B. POST CLOSURE				
i. water - heavy metals (Cu, Pb and Zn) - pH	Puturosu stream after the Water Treatment Plant Water treatment plant	Collection of samples and laboratory analysis for Heavy metals and pH	Monthly until the parameters become compliant with approved limits by GD 188/2002	Conversmin
ii. soil - heavy metals - pH	Rehabilitated surfaces	Laboratory analysis for Heavy metals and pH	Yearly until the parameters become compliant with approved limits	Conversmin
iii. vegetation - vegetation density - vegetation	Cultivated and planted surfaces on curtilage, waste tips and tailing storage facilities	Visual	Yearly	Conversmin
iv. stability of waste tips or impoundments, tailing storage facilities - settlement	Stabilised or deposition areas	Visual and topographic survey	Yearly	Conversmin

Issue	Where is parameter to be monitored	How is parameter to be monitored	Frequency of measurement	Responsible for the measurement
- erosion - seepage line, ground water surface		Standpipes and piezometers		