

## **Santimbru Open Pit, Harghita County, Design: Spectral Deva**

### ***DESCRIPTION OF MINE AND PREVIOUS ACTIVITY***

- Main activity of Santimbru Open Pit was: Extraction of Hg ore by open pit and by underground methods. It extends on a surface of 12 hectares including mine curtilages, waste tips, tailing storage facilities and other ancillary activities. The activity ceased in 1977.
- Associated with former mining operations there are 1 Waste tips, containing 100 000 cubic meters of mine waste. Tailing dams containing 190000 cubic meters of waste materials.
- The nearest community is Sanraieni Village and Santimbru Bai situated at 100 m from mine, having 1000 inhabitants and local water course is River Olt situated at 100 m from mine boundary.
- Mine water with flow rate of 0.5 – 1 l/sec, and pH of 3.62 flowing from mine works

### ***CULTURAL PROPERTY***

It is not anticipated to be applicable. However, 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 23 buildings and structures, having a total volume of 2860 cubic meters of demolition materials (mainly concrete and bricks) which will be decontaminated and disposed off at waste tips
- Collection of contaminants and contaminated materials and disposed off at 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.
- Filling and capping of 1 shafts. Filling and sealing of 3 adits. Closing of boreholes or minor mine workings connected with surface.
- Excavation and moving of 15000 mc. of material from waste tips, curtilages, benches and slopes.
- Reshape of all mine waste dumps to slope angles below 1/3. Construction of erosion fences and gabion walling to ensure long term stability and erosion control.
- Topsoiling, cultivation and grassing of 7.25 ha, and planting of 1.53 ha with local species of trees or shrubs, including waste dumps.
- Protection of rehabilitated surfaces and affluent river by guard ditches and drainage systems in total length of 300 m.
- Construction of adequate water treatment facilities to comply with 3 l/sec, having pH of 3.39

### ***KEY ENVIRONMENTAL ISSUES DURING THE CONSTRUCTION***

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

**COMMUNITY CONSULTATION (See annex “Consultarea comunitatilor – Obiective scanate”)**

ANNEX 1 – MITIGATION PLAN

SANTIMBRU MINE AND OPEN PIT

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

Phase/Operation	Issue - Mitigation Measure	Cost	Institutional Responsibility / Approval and inspection
	<ul style="list-style-type: none"> <li>- Sprinkling of demolition materials on lorries and at dumping location;</li> <li>- Cover of lorries if the haulage is through inhabited area SANCRAENI Village;</li> </ul>		
<b>B Earth Works</b>			<b>Contractor</b>
<b>(a) Blasting of hard rocks</b>	<ul style="list-style-type: none"> <li><b>i. Noise</b> <ul style="list-style-type: none"> <li>- Restriction of blasting program to 8:00 – 18:00 o'clock, Monday to Saturday;</li> <li>- Informing of the affected community SANTIMBRU BAI Village about blasting program;</li> </ul> </li> <li><b>ii. Vibration</b> <ul style="list-style-type: none"> <li>- Restriction of the explosive quantity for each charge (max. 15Kg/blasting hole and maximum 15 borehole/blasting charge, minimum 1 second delay each other);</li> </ul> </li> <li><b>iii. Dust and smoke over inhabited areas</b> <ul style="list-style-type: none"> <li>- Dust suppression measures (wet blasting);</li> <li>- Restriction of blasting when wind drive dust and smoke over the SANTIMBRU BAI village area;</li> </ul> </li> </ul>	Contract	Engineer of Contract
<b>(b) Excavation and loading of materials</b>	<ul style="list-style-type: none"> <li><b>i. Lubricant and/or fuel spillage;</b> <ul style="list-style-type: none"> <li>- The Engineer monthly should inspect each equipment. Equipment which will not pass the inspection will be removed from the site;</li> </ul> </li> <li><b>ii. Failure of benches or slopes during of works</b> <ul style="list-style-type: none"> <li>- Each work bench for excavators and access roads on excavation place will be constructed to comply with Technical Prescriptions appended (TP – C**), 1997 edition;</li> <li>- Fencing and barriers around of unstable areas;</li> </ul> </li> </ul>	Contract	Engineer of Contract
<b>(c) Haulage/deposition spread/level/place</b>	<ul style="list-style-type: none"> <li><b>i. Noise during the transport on site or public roads;</b> <ul style="list-style-type: none"> <li>- Restriction on haulage program to 8 o'clock 18 o'clock, Monday to Saturday;</li> <li>- Restriction of lorries speed to 30Km/h, or less as agreed with community;</li> </ul> </li> <li><b>ii. Mud and dust on public roads</b> <ul style="list-style-type: none"> <li>- Cleaning of lorries wheel before emerging from loading/unloading location;</li> <li>- Suppress of any spillage from lorries during the transport by sealing off;</li> </ul> </li> <li><b>iii. Noise</b></li> </ul>	Contract	Engineer of Contract

Phase/Operation	Issue - Mitigation Measure	Cost	Institutional Responsibility / Approval and inspection
	- Noise suppressors at the exhaust pipes;		
<b>C Concrete works</b>			<b>Contractor</b>
<b>(a) preparing and placing of concrete in situ</b>	<b>i. Concrete outside of construction areas:</b> - Proper equipment for batching;	Contract	Engineer of Contract
<b>(b) haulage of concrete</b>	<b>i. Pollution of public roads because of concrete spillage during the transport</b> - Using only specialised lorries for haulage of concrete; - Cleaning of site and equipment at the end of each day;	Contract	Engineer of Contract
<b>D General Works</b>			<b>Contractor</b>
<b>(a) Working adjacent over or in water courses or accumulation (OLT River)</b>	<b>i. Surface waters pollution</b> - Working with equipment free of any pollutant in vicinity of river - Fencing or erecting of barriers near river; <b>ii. Rainfall control</b> - Construction of guard ditches to control runoff and to protect river <b>iii. Underground water pollution</b> - Interdiction to use filling material for underground workings which contains deleterious materials	Contract	Engineer of Contract
<b>(b) Cultivating re-vegetation and curing of existing vegetation</b>	<b>i. Pollution with unacceptable pesticides</b> - Using only fertilizers approved by the Engineer; - topsoil, subsoil or natural fertilizer will be tested by laboratory analyses to be free of pesticides heavy metals or any other unaccepted materials; <b>ii. Damage of existing vegetation</b> - 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
<b>(c) Operation of site offices, workshops</b>	<b>i. Pollution of the area adjacent of offices, workshops and storage facilities</b> - 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

Phase/Operation	Issue - Mitigation Measure	Cost	Institutional Responsibility / Approval and inspection
<b>E Hazardous materials</b>			<b>Contractor</b>
<b>(a) Decontamination of buildings and equipments by flotation reactants</b>	<b>i. Accidents involving contaminated materials</b> <ul style="list-style-type: none"> <li>- Storage of hazardous chemicals, in areas approved by the Engineer of the contract;</li> <li>- Collection of contaminated materials still contained in the flotation building and equipment and disposal at open pit;</li> <li>- Washing of flotation equipment and location before to be demolished or decommissioned. The resulted materials will be disposed off at open pit;</li> <li>- Neutralizing of the equipment and their location with lime solution 10% before to be removed or demolished;</li> </ul>	Contract	Engineer of Contract
<b>(b) Storage, handling/ using of explosives</b>	<b>i. Accidents involving explosives</b> <ul style="list-style-type: none"> <li>- Using of proper storage facilities (existing explosive storage facilities);</li> <li>- Using containers and lorries approved by the Engineer of the Contract;</li> <li>- Security of storage, authorized access only</li> </ul>	Contract	Engineer of Contract
<b>(c) Storage using distributing of fuel and lubricants</b>	<b>i Spill of lubricants and/or fuel</b> <ul style="list-style-type: none"> <li>- Using of spillage collection tanks in storage facilities. Cleaning of the storage area every day disposing off any contaminated material.</li> </ul> <b>ii. Fuel/oil spillage during refilling operations</b> <ul style="list-style-type: none"> <li>- construction and operate of fuel/oil repository</li> <li>- using only filling pump installed on refilling tank to refill equipment on site;</li> </ul> <b>iii. Fire on storage facilities</b> <ul style="list-style-type: none"> <li>- construction of fuel storage facilities on location and according an approved by the engineer method of construction;</li> <li>- fire extinguishing equipment as regulation for fire fighting and control asks</li> </ul>	Contract	Engineer of Contract

**ANNEX 2 – MONITORING PLAN  
SANTIMBRU BAI MINE AND OPEN PIT**

Issue	Where is parameter to be monitored	How is parameter to be monitored	Frequency of measurement	Responsible for the measurement
<b>A. CONSTRUCTION</b>				
i. <b>Noise</b> generated by: <ul style="list-style-type: none"> <li>• Blasting;</li> <li>• heavy machinery</li> <li>• lorries</li> </ul>	On site and inhabited area	Noise measurement equipment (dB-meter <sup>1</sup> )	Daily	The Engineer of the Contract
ii. <b>Vibration</b> generated by: <ul style="list-style-type: none"> <li>• Blasting;</li> <li>• heavy machinery</li> <li>• lorries</li> </ul>	near sensitive buildings	Vibrometer	A measurement should be performed to establish level of blasting and transport along the inhabited area	The Engineer of the Contract
iii. <b>Dust</b> generated by: <ul style="list-style-type: none"> <li>• blasting</li> <li>• traffic and equipment and lorry's</li> </ul>	On site and inhabited area	Visual	Daily	The Engineer of the Contract
iv. <b>Smoke</b> generated by: <ul style="list-style-type: none"> <li>• blasting</li> <li>• equipment and lorry's engines</li> </ul>	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. <b>Mud</b> generated by <ul style="list-style-type: none"> <li>• traffic on site and public roads</li> </ul>	On site and inhabited area	Visual	Daily	The Engineer of the Contract
vi. <b>Soil pollution</b> by fuel oil <ul style="list-style-type: none"> <li>• Fuel and lubricants (tank leaks, engines leaks, other operations involving fuel and lubricants)</li> <li>• Cement or concrete</li> </ul>	<ul style="list-style-type: none"> <li>• Where fuel and lubricants are stored;</li> <li>• Where equipment is refilled;</li> <li>• Where equipment is maintained</li> <li>• Where fuel/lubricants are used;</li> </ul>	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
	<ul style="list-style-type: none"> <li>Where concrete is prepared, transported, used</li> </ul>			
<b>vii. Water pollution</b> <ul style="list-style-type: none"> <li>Fuel and lubricants</li> <li>Contaminated water seepage from waste tips</li> <li>Mine Water</li> <li>Suspensions carried out by rain fall</li> </ul>	Where working near or in water course Effluent waters; Monitoring points on receptor stream Oltul River	Laboratory analysis	Monthly during the works or as specified in monitoring program	The Engineer of the Contract
<b>B. POST CLOSURE</b>				
<b>i. water</b> <ul style="list-style-type: none"> <li>heavy metals (Cu, Pb and Hg)</li> <li>pH</li> </ul>	Affluents of Oltul River	Laboratory analysis	Monthly until the parameters become compliant with approved limits by the Governmental Decision 188/2002	Conversmin
<b>ii. soil</b> <ul style="list-style-type: none"> <li>heavy metals</li> <li>pH</li> </ul>	Rehabilitated surfaces	Laboratory analysis	Yearly until the parameters become compliant with approved limits by the Order 756/1997 issued by Ministry of Waters Forestry and	Conversmin

Issue	Where is parameter to be monitored	How is parameter to be monitored	Frequency of measurement	Responsible for the measurement
			Environmental Protection	
<b>iii. vegetation</b> - vegetation density - vegetation	Cultivated and planted surfaces on curtilage, waste tips and tailing storage facilities	Visual	Yearly	Conversmin
<b>iv. stability of waste tips or impoundments</b> - settlement - erosion - seepage line, phreatic surface	Stabilised or deposition areas	Visual and topographic survey standpipes and piezometers	Yearly	Conversmin