

Background and objectives of the Project

This document has been prepared to provide a non-technical summary of the Environment and Social Impact Assessment report. Mongolyn Alt Corporation (MAK) propose to mine copper and molybdenum ore at Tsagaan Suvarga and produce a metal concentrate for shipment to buyers who will further process the concentrate into metal.

MAK is Mongolia's largest national mining company, and they have approached EBRD regarding financing for development of this project.

Legislative Framework

The Tsagaan Suvarga Project has been defined as Category A by EBRD according to the current Policy definition which stipulates that such a categorization would result where the Project '*... could result in potentially significant and diverse adverse future environmental and/or social impacts and issues which, at the time of categorization, cannot readily be identified or assessed ...*'. Category A Projects require a formalized and participatory environmental and social assessment taking the form of an Environmental and Social Impact Assessment that meets the requirements of Mongolian legislation and also is consistent with the requirements of the EU Environmental Impact Assessment Directive.

The Mongolian mining development approval and permitting processes include pre-feasibility and feasibility studies, engineering and construction, mining and closure stages. Mongolia regulations requires permits for geological survey, mining, land tenure and natural resource use require certain environmental procedures, namely, Initial Environmental Examination (IEE), General Environmental Impact Assessment (GEIA), Detailed Environmental Impact Assessment (DEIA), economic valuation, and detailed planning and cost estimates for rehabilitation. A number of Mongolian permits are likely to be required.

In addition to complying with Mongolian laws, the Project will need to comply with international environmental treaties and conventions that have been signed and ratified by Mongolia, and also the requirements of the financial institutions, including EBRD who will provide funding for the Project.

This ESIA report has been developed in line with the guidance and requirements outlined in the EBRD's Environmental and Social Policy (2008). EBRD requires that Projects apply a systematic approach to environmental and social risk management to achieve good international practice related to sustainable development. To this end, the Bank has defined specific Performance Requirements (PRs) to provide guidance in the development of Projects. The key elements of EBRD policy and procedure in relation to environmental and social risk management are outlined below.

The EBRD is committed to promoting "*environmentally sound and sustainable development*" in the full range of its investment and technical cooperation activities pursuant to its constituent treaty, the Agreement Establishing the EBRD.

EBRD Policy covers both the environmental and social dimensions of sustainable development. For the purposes of this Policy, the social dimension encompasses (i) labor standards and working conditions including occupational health and safety and (ii) community impacts such as public health, safety and security, gender equality, impacts on Indigenous Peoples and cultural heritage, involuntary resettlement, and affordability of basic services.

Public Disclosure

EBRD Environmental Health and Safety requirements are set forth in the Environmental and Social Policy (2008). As set forth in that document, A category projects require an Environmental and Social Impact Assessment (ESIA) to be prepared and disclosed in the public domain for consideration and comment. In the case of private sector projects, the ESIA “package” must be disclosed for a minimum of 60 days prior to the project being submitted for consideration by the Board of Directors. This disclosure must be in the local language, and must be done in such a manner that potentially affected people can access the information.

Project Description

The Tsagaan Suvarga deposit is relatively small by world standards, but is a valuable resource both to Mongolia and MAK. Apart from 1.3 million tones of copper, the site has smaller reserves of molybdenum, silver and gold.

The Tsagaan Suvarga project will operate as a traditional open cut mine, with the following key processes:

- digging of an open pit approximately 2 km long by 1 km wide, by using explosives and large scale digging machinery;
- trucking of copper-containing rock to the processing area;
- trucking of waste rock to a dump about the same size as the pit;
- fine crushing of sulphide ore and physical separation of copper concentrate;
- pumping of waste (tailings) from the processing plant into a dam that covers 960 hectares;
- potential chemical (acid leaching) or physical concentration of metals from the oxide ore.

To run the mine, the following will also need to be built and/or operated:

- a powerline from Baganuur through Choyr (being installed as part of the national grid)
- a small airstrip;
- a worker camp on site;

- a bore field at Tsagaan Tsav (although there maybe an option to use the Narangiin Khooloi bore field);
- a pipeline from the bore field to the mine and a clean water treatment plant;
- a sewage treatment plant;
- minor repairs and improvements to an existing a road to Sainshand and Zuunbayan and associated quarries; and
- a rail loader at Sainshand.

The mine will have about 1080 employees (on rotation so that at any time, around half will be at the mine) during mining, and about 90% of these are expected to be Mongolian nationals. MAK expects that up to 860 contractors will be required for construction.

Power for the Project is to be sourced from the Mongolian National Grid with a dedicated 220 kV line to be constructed from Choyr the north-east to the Project Site. Approval for supply of power has been granted by the Mongolian Government. The power supply will be sized as advised by the Mongolian Government to support provision of supply to other consumers.

Environmental Impacts and Mitigation Measures

Summary

A detailed analysis of the potential impacts associated with this project is presented in the ESIA and a summary is provided below.

Impact category	Potential impact from Project
Topography and landscape	A permanent change in the local landscape due to the pit, waste rock dump and tailings storage facility. While this is a significant local impact, in the greater landscape, these changes will be masked by distance.
Geology	A permanent removal of a copper bearing deposit.
Climate	A minor incremental increase in greenhouse gases from consumption of electricity and combustion of diesel fuel.
Air quality	An increase in dust levels around the mine and the concentrate haulage route. Initial screening modelling (in accordance with IFC guidance) suggests that Mongolian standards might be exceeded in some instance, but the significance of this on local human communities has yet to be quantified. The predicted impact of increased dust on biodiversity is expected to be minimal.

Noise	An increase in noise levels around the mine and haul route. Initial modelling suggests that the daytime Mongolian criterion will be met by the mine, although the much stricter night time criteria is unlikely to be met for some distance from the mine.
Surface water resources	Diversion of ephemeral watercourses around the mine site and permanent filling of a valley with the tailings dam. This diversion and loss is relatively minor given that it is a small proportion of the total catchment area.
Groundwater resources	Consumption of a non-renewable water resource from Tsagaan Tsav.
Soils and pasture	Permanent removal of more than 1300 hectares of soil and pasture.
Flora	Approximately 1300 hectares of a range of vegetation communities will be permanently removed by the project. A single elm and approximately 20 poplar trees will be removed. The predicted residual impact after replanting trees, is minor.
Fauna	A number of IUCN threatened, endangered and data deficient species occur in and around the mine. The impact of the project on these ranges from minor to moderate, with specific mitigation measures required.
Waste	Production and permanent disposal of large volumes of waste rock, tailings and minor quantities of construction and general waste.

Detail

Details follow on the key environmental impacts of:

- air quality;
- noise;
- surface water resources;
- groundwater resources;
- soils and pasture;
- flora;
- fauna: and
- waste.

Air quality

A preliminary estimate of dust from mining was determined using a computer simulation (USEPA's SCREEN3 model). Computer simulations or models are essentially a string of mathematical calculations to estimate the likely outcome of a project. In this case, dust was estimated based on a 25 mtpa production rate at the mine. Expected concentrations of dust in the air show that maximum concentrations could exceed Mongolian national ambient air quality standards. Further, refined modelling will be undertaken in accordance with the Dust Management Plan.

Noise

Major noise is expected to be generated from:

- construction at the mine site, at the road/rail facility at Sainshand, and along the pipeline, the bore field, the powerline and section of access road that require improvement;
- operations at the mine site;
- transport along the roadway; and
- dispatch at the road/rail receipt facility at Sainshand.

Minor noise can be expected from operations at the TSF and the bore field from pumps and maintenance activities.

Construction noise is difficult to reduce but will be temporary.

The mine will be heard for several kilometres away. Mongolian standards is 60 decibels (dBA) during the day and 45 dB(A) at night. Following conclusion of resident resettlement negotiations, the nearest ger or winter shelter is expected to be several kilometres from the mine site, although the exact figure is currently unknown.

An initial screening calculation shows that the Mongolian daytime limit of 60 dB(A) can be met from around 800 meters from the pit. The night time criteria of 45 dB(A) can be met at 4,500m from the pit.

Initial calculations show that blasting is not likely to cause a nuisance for anyone more than 1000 metres from the pit edge.

Truck haulage to and from Sainshand and Zuumbayaan will also generate noise although there are few residents along the roadways although calculations show that the Mongolian night time standard will be met at any gers more than 100 metres from the road.

Water resources

While the project is located in a desert, there are several fossil aquifers in the area and they can provide the water needs of the project. Two aquifers have been identified as possible sources, the Narangiin Khooloi (approximately 15km from the site) and the Tsagaan Tsav (approximately 60 km from the site). The original plans called for use of the Narangiin Khooloi aquifer, as this is closer. However, there is a spring (Narangiin Bulag) located in the vicinity of Narangiin Khooloi which is important for the local ecology and according to EBRD Policy is considered critical habitat, and therefore the Tsagaan Tsav aquifer has been investigated as the possible water supply. Over the next few months as part of final design for the project, these possible sources will be investigated in more detail in order to select the best environmental solution while ensuring adequate supply for the mine. MAK will not develop the Narangiin Khooloi aquifer unless they can ensure No Net Loss to Narangiin Bulag water supply or its biodiversity.

Several surface water channels will require diversion around the mine site, pit and tailings dam. This will lead to some loss of water flowing into areas downstream, as some will be diverted for mine use.

Soils and Pasture

The estimated soil disturbance from the mine is 1,322 ha, most of which will be either long term or permanent, although rehabilitation will reduce some of these impacts. Final closure around the plant and waste rock dump will partially restore soil profiles, although productive pasture growth is unlikely. The pit and tailings pond, which are the largest areas of impact, will be rehabilitated to a safe and stable landform, but not with topsoil, so productive pasture growth or functioning ecosystems cannot be expected. From an agricultural perspective, the likely case is that the entire area of disturbance (1,322 ha) will remain out of measurable production permanently. This area compares to 0.1% of the total Mandakh Soum land area of 1,266,000 hectares. The area to be permanently disturbed by mining has been calculated to have an ecological-economic value of 3,023,019 Million MNT, or \$2.5 Million USD in accordance with standard Mongolian calculation.

Construction of the bore field pipelines will require staged trenching and backfilling of a long thin corridor, approximately 30 km long by 10 meters wide (allowing for disturbance either side of the pipe trench), and while a substantial area will be disturbed, selective topsoil stripping and replacement, and seeding with native grasses will ensure that such impacts are minor and temporary.

Construction of the 220 kv powerline from Baganuur will likewise disturb a long thin corridor, approximately 280 km long. It is expected that a permanent access track will remain under or close to the powerline alignment for conductor and insulator checks as well as routine maintenance. This access road will be a permanent but a minor impact on the region's soil resource.

Flora

The mine will remove about 1300 ha of local vegetation communities, including one elm tree and 20 poplars. These communities support a range of stock and wildlife.

The plants that dominant the landscape that will be removed are found throughout the East Gobi, and their removal will be a minor impact following replanting of the elms and poplar trees that need to be removed.

There are some plant species on the site that are important in Mongolian and international lists, and a small number of some of these will be removed.

Fauna

The only protected zone in the vicinity of the project facilities is the small area around the aforementioned spring. No other specially designed or protected areas are present within 100 km of the site. The following animals are known from the project area and are listed in the IUCN as threatened, endangered or data deficient:

- migratory ungulates (Khulan, Goitered Gazelle, Mongolian Gazelle, Argali, and Siberian Ibex);
- mammalian carnivores (Grey Wolf, Red Fox, Corsac Fox, Marbled Pole Cat, Wild Cat and Manul);
- bat (Grey big-eared bat);
- small mammals (Gobi jerboa, Saturnin's Jerboa, and Thick-Tailed Pygmy Jerboa);
- birds (Cinereous Vulture, Houbara Bustard and Saker Falcon).

The project is predicted to have:

- a minor impact on migratory ungulates;
- a minor impact on mammalian carnivores;
- a minor impact on bats;
- a minor impact on the jerboas;
- a minor impact on the Cinereous Vulture if final designs of the powerline account for the risk of strike and accidental electrocution;
- a moderate impact on the Houbara Bustard if final designs of the powerline account for the risk of strike and accidental electrocution; and
- a minor impact on the Saker Falcon if final designs of the powerline account for the risk of strike and accidental electrocution.

The planned measures to mitigate impacts of the project on migratory ungulates include:

- preparation of a Biodiversity Management Plan;

- animal proof fencing of the TSF;
- trapping of jerboas prior to ground breaking;
- avoidance of night trucking on the road to Sainshand and Zunnbayaan.

The planned measures to mitigate impacts of the project on mammalian carnivores include:

- preparation of a Biodiversity Management Plan;
- implementing a strict no hunting policy for mine employees and contractors;
- fitting GPS transmitters to trucks;
- education of drivers; and
- policing the no-hunting policy.

The planned measures to mitigate impacts of the project on small mammals include:

- preparation of a Biodiversity Management Plan;
- animal proof fencing of the TSF;
- trapping and relocation of jerboas prior to ground breaking; and
- avoidance of night trucking on the road to Sainshand and Zunnbayaan.

The planned measures to mitigate impacts of the project on birds include:

- preparation of a Biodiversity Management Plan;
- reduction in illegal hunting by mine staff, by fitting GPS transmitters to trucks, education of drivers and policing on no-hunting policy by soum rangers;
- planting offset vegetation to replace losses at the mine site;
- managing remnant patches of saxual forests and elms;
- design of powerline conductor spacings and cross arm insulation; and
- monitoring of vulture, falcon and bustard populations in the project area.

Waste

MAK is committed to implementing proper waste management practices in order to avoid, minimise and/or mitigate possible impacts associated with waste associated

with this project. The simple solution (and the one often used on large scale international projects) is reliance on existing infrastructure, either public or privately owned/operated. This is not an option for this project as there is no existing infrastructure for waste handling within at least 150 km of the site.

The project has made the decision to rely upon an on-site landfill for the waste management solutions, for both hazardous and non hazardous wastes. While the landfill has not yet been designed, the project has committed to construction of a non hazardous landfill compliant with EU landfill directive, Mongolian requirements and other pertinent international standards. This includes provision of adequate liner, leachate collection system, monitoring of nearby groundwater, implementation of a waste manifest and document control system, surface covering to prevent windblown migration, etc.

In parallel with preparation of the design of the landfill, the project will be preparing a detailed Waste Management Plan.

Social Impacts

Summary

Table 1 summarizes the predicted positive and negative social impacts due to the project.

Table 1. Potential Social Impact Summary

Impact category	Potential impact from Project	
	Positive impact	Negative impact
Local People		
Education	Yes	
Health and Safety		Yes
Livelihood	Yes	Yes
Employment	Yes	
Lifestyle and customs		Yes
Crime and Conflict		Yes
Physical Cultural Resources		
Protected Areas		Yes
Cultural Resources	Yes	Yes
Associated Issues (Induced development issues)		
Population Influx	Yes	Yes
Economic development	Yes	Yes
Infrastructure development	Yes	Yes

Detail

The Project plans to employ 860 people during construction and 1,080 people on a rotational basis during operations. MAK is targeting approximately 30% Mongolian nationals during construction and 90% during operations.

Project generated employment has the potential to have a small, direct positive impact at the soum level. As seen among other Gobi mine projects, employment opportunities are not the issue, rather a lack of local level skills. The majority of mine-related jobs require specific technical skills that most the families living in

Mandakh soum do not have as they are herders. Considerable investment in education and training will be required in order for people from Mandakh soum to fill more Project positions.

Herding, the region's traditional livelihood, continues to be an important source of family food and income. This livelihood option, however, may become less viable should livestock population pressures contribute to the overgrazing of lands in Mandakh soum. Given that a large proportion of people in the Mandakh soum are considered poor - with average monthly incomes below the national average (386,000MNT) - they are particularly vulnerable to impacts from informal service economies. It is critical that population influx and capacity of social infrastructure is monitored to address any negative impacts or trends. The local economy, and to a lesser extent the regional and national economy, will be impacted positively by the Project, provided that sound management procedures and measures are in place.

At the local level, impacts to the economy will occur through salaries paid to local workers who in turn spend their income in the community. However, this can generate increase prices for goods and services.

Taxes and payment of royalties allocated to the soum government, will provide additional contributions. There is a risk that revenue may lag slightly behind the demand for public services. It will be important to work with local governments to manage these short-term economic effects.

The Project will pay salaries, expend capital and pay royalties, import taxes, other taxes, tariffs, and fees. Impacts to the economy in Mandakh soum will arise primarily from the effects of taxes and fees to the local government. There will be some expenditure by workers which would be a positive indirect impact associated with the Project, however the extent of this may be limited as many workers will be based at the mine site and not necessarily living in Mandakh soum centre.

Taxes and fees on land and water use will also contribute directly to the soum budget. To some extent, food demand for construction workers will encourage sales of meat and dairy products from herders. Small and medium size businesses may be accessed if they provide a variety of necessities for construction activities.

The Project's total annual impacts to the economy could exceed \$180 million, compared to an annual country budget of approximately \$2.4 billion.

Population influx from job seekers and operations workers who bring may their families to live in Mandakh soum could have both positive indirect impacts (i.e. economic development) and negative indirect impacts such as increased pressure on infrastructure, price inflation or increased drinking, prostitution and crime.

Based on surveys less than 10 herder households are likely to be physically displaced by the Project, and further consultation will identify the exact number of households and determine compensation and relocation.

The winter shelter of one herder household will need to be re-located from the tailings storage facility. The level of physical or economic displacement for the 6 other families living and owning permanent structures within 3km of the project site will need to be determined based on future assessments.

10-30 households may be economically displaced by the Project. The 6 other families living within 3km of the Project area will experience some level of economic displacement as their access to pasture and wells will be reduced.

To ensure that these unquantified potential impacts are fully considered, MAK has committed to a range of additional studies and measures such as:

- detailed noise modelling;
- detailed dust modelling;
- additional soil surveys;
- development of management plans for soils, surface water, groundwater, air quality, biodiversity, waste,

Social Mitigation Measures

The ESIA has been unable to make clear judgements on a number of social issues, and to ensure that these unquantified potential impacts are fully considered, MAK has committed to a range of additional studies and measures such as

Employment, labor, and working conditions mitigation measures include:

- improving employment opportunities for soum residents;
- establishing safe construction and operational camp in compliance with EBRD requirements;
- Investment in skills training;
- Work with local vocational schools to qualify students to supply for the mining industry;
- Encouraging worker feedback and grievance procedures;

Mitigation measures around economic changes include to:

- Promote sustainable local small business development.

- Support local capacity building initiatives for local government.
- Partner with local government on community investments.
- Submit sustainable exit strategies to local authorities to allow them to be managed after project.

Land acquisition and displacement mitigations include to:

- Conduct physical displacement in accordance with internationally recognized standards
- Compensate for economic displacement in accordance with internationally recognized standards
- Make continued investments in social infrastructure.
- Use local procurement, where possible, to enhance herder livelihoods.
- prepare a Resettlement Action Plan and Livelihoods Plan;

Community health, safety and security mitigation measures include to:

- Provide appropriate traffic safety training to all drivers
- Use grievance mechanism and other means to monitor driver conduct;
- Continue to support traffic police controls on copper haul road;
- Implement and comply with the Community, Health and Safety Management Plan
- provide Specific HIV/AIDS prevention program
- Enforce and monitor the zero tolerance alcohol policy for workers during working hours;
- Develop a code of conduct for security staff.
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Cultural heritage mitigation measures include:

- Implementing chance find procedures; and
- Complying with the Mongolian law;

- Consulting with local community members to identify and map of sacred areas prior to construction and to avoid disruption to these wherever possible;
- Provide cultural heritage training to MAK staff and contractors.

The development of the MAK project (as with the development of any mine) will have an impact on the environment. The mitigation hierarchy has been applied throughout the design of the project, and will continue to be applied throughout detailed design, to avoid possible impacts, and to minimise and mitigate those that can not be avoided. The resulting predicted impacts that will be experienced by the development of this project are estimated to be minor and acceptable. An ongoing program of adaptive management will be employed by MAK, with strict control of contractors and to ensure that the impacts are indeed minor and as predicted as part of the ESIA.