MERIT

Mongolia:
Enhancing Resource
Management through
Institutional Transformation

MINING

Taking metal out of the ground

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SESMIM

The Strengthening Extractive Sector Management in Mongolia Project presentation provides a detailed description of mining in Mongolia.

The four part series is available from SESMIM

This presentation is a very simplified, short version of the SESMIM information

Mining Metals

Metals are found in ore - the rock that contains the metal.

The metal ore is dug up, processed into “concentrate”, then shipped to a smelter.

In the smelter, the concentrate is processed again to get the metal out of the concentrate.

The metal is then shipped to a factory where it is used to make items or added to other metals which are then made into items.

Metals in Mongolia

Metals found in Mongolia are:

- Copper
- Fluorite
- Gold
- Iron
- Lead
- Molybdenum
- Oil phosphates
- Tin
- Tungsten (wolfram)
- Uranium

Gold

Gold is the metal that is often found as pure gold, not in ore.

Gold nuggets and gold dust are usually obtained by using water to separate the gold from gravel – placer mining.

No chemicals, but lots of water is used in placer mining.

Steps to Mining

There are many expensive steps to finding ore, building a metal mine and reclaiming a mine site.

Prospecting

Exploration, advanced exploration

Mine building

Mining

Reclamation

Step One - Prospecting

Looking for the metal takes more time and has more failures than most steps in mining.

Hundreds of thousands of hectares are prospected before finding a few that have some metal.

Some places have some metal, but not enough to mine.

MAPS and Reports

Prospecting begins in a library – a geological library that has maps and reports of what other prospectors and exploration companies found, or did not find. There are also core libraries where rock samples are stored.

Most prospectors spend more time searching in geological libraries than searching on the ground.

Found some Metal

When prospectors find some metal in the ground or find something on a map or in a report that makes them think there is metal in the ground, they start Exploration.

EXPLORATION

Exploration is when a mining company digs trenches in the ground, drills holes in the ground.

The trenches may be a metre or two deep, sometimes deeper.

Drills may be used to search hundreds of metres into the ground and retrieve “core samples” from very deep in the rock.

Trenches & Core Samples

Machines may be used to dig long trenches. Sometimes people using shovels and picks dig the trenches.

Drills are used to drill deep into the ground and then bring “core samples” to the surface.

Drill Core Samples

Core samples are long cylinders of rock, a sample of what type of rock is deep in the ground.

The cores are often put in core libraries and studied by prospectors and mine developers.

Advanced Exploration

When an exploration project finds a reasonable amount of metal ore, an advanced exploration project begins.

Advanced exploration is when lots of drilling is done to find out how large an area contains ore and how deep the metal ore area is.

If the advanced exploration finds enough ore, a mine is planned.

Most exploration projects do no lead to a mine development.

Mine Planning

When advanced exploration finds a large metal ore body and the metal is selling at a high enough price, a mine is planned.

The best mining technique is identified – open pit or underground or a combination of both.

The mining company looks for investors to help pay for the mine development.

Government permits and licences are applied for, community development agreements are negotiated.

Mine Site Planning

Many things are considered when planning the mine site.

Where is the ore, how big will the open pit be, where will access to the future underground tunnels be, where is the best place to put the ore processing buildings, where will waste rock be placed, where is the best place to put the camp for employees, where is the water source, where should the equipment storage and repair areas be placed, are there any special environmental or cultural areas near-by,

Environmental concerns

Mining causes a major disruption of the environment.

An important part of mining is minimizing, mitigating and when needed, compensating for negative environmental effects.

Environmental concerns are included in the very early stages of mine development planning.

Environmental Effects

Some of the environmental effects of a mine can be:

- reduced areas for herders
- use of local water for ore processing
- acid mine drainage (acid released into the environment from mine waste rock
- dust
- roads
- mine camp garbage and sewage
- contamination of local water supply
- coal fueled power plant for mine
- chemical spills during transportation or at chemical storage or ore processing buildings

Social effects

There may be positive and negative effects on the local community.

Some positive effects are employment, increased local income, improvements to local infrastructure, increased government budget.

Some negative effects may be increased number of new people in the community, increased children in schools, increased use of local medical services, increased crime, conflicts between local people and mine workers

Economic effects

There may be positive and negative effects on the local community.

Positive effects may be increased jobs, increased income, increased training opportunities, increased sales of local goods.

Negative effects may be increased costs to the local government for more teachers in the school, more medical staff, more security/police,

Community Development Agreements

Community Development Agreements (CDA) are one way of increasing the benefits of a local mine and decreasing the negative effects of the mine.

The CDA may include a requirement for the mine company to give the government money to hire more teachers for the school and medical staff.

Money from the mining company may pay for local infrastructure improvements – roads, electricity lines, community buildings.

The CDA may include employment and local product purchase requirements.

Mine Operation

When the mine has been planned and the permits, licences obtained and the community development agreement completed and the mine built, it begins to operate.

An important part of mine operation is mine plan implementation monitoring, environmental monitoring, community development agreement monitoring.

Implementation Monitoring & Reporting

Monitoring implementation of plans, agreements, permits and licences is as important as good planning.

Environmental effects monitoring and community development agreement monitoring should include regular reporting to the community.

Mine Reclamation

The mine site reclamation plan should be part of the mine development plan.

A good mine development plan minimizes the work needed for mine site reclamation.

Placement of waste rock piles, placement of overburden, placement of new roads, placement of garbage pits, etc are all important parts of good mine site planning to reduce reclamation costs and tasks.

Long term effect of mine on the community

There will be negative and positive effects of a mine on a community after the mine is closed.

Hopefully the local benefits will be greater than the negative effects.

Its important that negative effects do not persist after the mine is closed (local water supply drained, pollution of water or ground, reduced grazing areas, etc). These should be considered when planning the mine.

Participation

Participation in the mine licencing, mine planning, mine building, mine operation, mine reclamation, overall monitoring and in completing and monitoring implementation of the community development agreement is very important.

This will help increase local benefits and reduce local negative effects of the mine.

The SESMIN presentation provides much more detail.