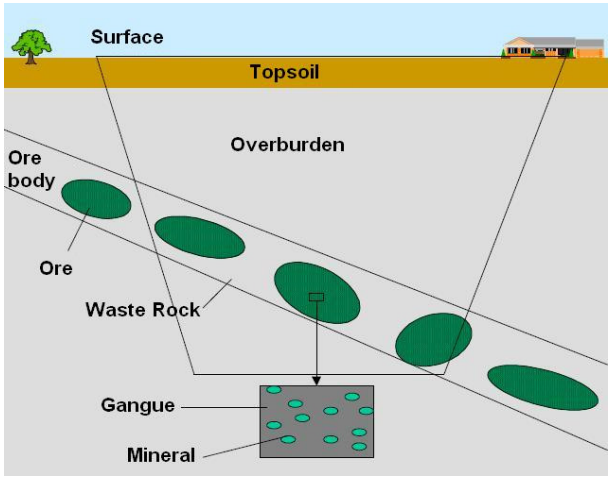
European Bank
for Reconstruction and Development

Sub-sectoral Environmental and Social Guidelines: Mining Open Cast

PROCESS DESCRIPTION

This guideline covers the open cast mining of ore bearing rock including coal. It excludes quarrying and open cast extraction of construction materials, stone and rock. (The processing of ore after extraction is covered in the Mineral Processing guideline as this is common to both open cast and underground mining operations.)

Open cast mining involves the removal of ore from seams relatively near the surface by means of an open pit (see figure below). These mines often occupy a large area of land for excavation of the ore and disposal of the overburden (the waste rock lying over the ore).



This kind of mining operation typically involves the following 4 stages:

1. Exploration – site investigations involving access roads and drilling;

2. Operation:

   - Clearance of vegetation and soil stripping;
   - Breakage of both overburden and ore prior to excavation;
   - Excavation of the overburden and stockpiling of this material either outside or within the excavation area. Earth "bunds" can be temporary or permanent but minimum environmental damage in the long term is achieved by the progressive backfilling of worked out areas. However, this form of overburden management is not possible at all sites;
   - Dewatering or sump pumping of the excavation is carried out to maintain dry working conditions;
   - Excavation of the ore;
   - Treatment of mine waters often involving basic settlement in large settlement lagoons and/or treatment with flocculant materials.

3. Mine closure and decommissioning:

   - Demolishing buildings and infrastructure;
   - Closing open pits;
   - Reclamation and rehabilitation of the main void, slopes and disturbed areas;
   - Ensuring water draining from site and waste deposits are not a risk to human health and the environment.

4. Post-closure care to ensure minimal (acceptable) risk to public health and the environment:

   - Active Care: Ongoing operation, maintenance and monitoring of the site and surrounds;

- Passive Care: Ongoing occasional monitoring and periodic maintenance.

The principal components of a mine include:

- Open cast pit;
- Waste storage areas;
- Rock and ore stockpiles;
- Plant and processing facilities;
- Water management infrastructure(e.g. treatment ponds, ditches, piping, dams);
- Other infrastructure (e.g. roads, power, rail and, potentially, facilities for workers, including worker camps).

KEY ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Water Use & Quality

Mines can use large quantities of water in processing plants (see Mineral Processing guideline) and for dust suppression. Abstraction at high volume is likely to require licensing from government authorities (either at the local, regional or national level).

Mine and mineral processing operations may cause major degradation of water resources either by drawdown of groundwater levels leading to the drying up of wells, diversion or damming of surface watercourses, and contamination of waters by uncontrolled site discharges. Lowering of the water table may affect supplies of water to industrial abstractors of groundwater and sensitive environments such as rivers and wetlands.

Groundwater rebound (rising groundwater levels) may result from the cessation of pumping operations when mining operations cease leading to discharge of potentially contaminated minewater at the surface. Such water may be acidic in nature and contain high concentrations of dissolved metals due to mineral oxidation and dissolution within the excavation backfill and adjacent dewatered strata.

Storm water must be carefully managed to:

- Minimise run-off;
- Avoid erosion of exposed ground surfaces;
- Avoid sedimentation of drainage systems;
- Minimise exposure of polluted areas to stormwater;
- Separate clean and dirty water.

Leachate

Stockpiles of coal and spoil may contain heavy metals and mineral oxidation products. Any run-off or leakage may contain high concentrations of these elements and be of acid pH. This run-off may pose a threat to an aquatic environment.

Wastes

Top Soil & Overburden

Large quantities of soil and overburden or waste rock may need to be removed to expose the target mineral. This should be stored in pre-planned designated areas as "earth bunds", and designed according to the geotechnical properties of the material. Overburden material should be used as infill during mine progression. Topsoil must be stored for future site rehabilitation.

Tailings

Tailings are the materials left over after the process of separating the valuable fraction from the worthless fraction of an ore (also known as gangue). Environmental impacts include:

- Groundwater and surface water contamination due to acidic run-off/leachate;
- Sedimentation of drainage networks;
- Dust;
- Geotechnical failure.

A tailings management strategy complying to best practice specifications e.g. ICOLD [1]or internationally recognised standards should be adopted.

Disposal of tailings in rivers, lakes, lagoons or shallow marine areas is not an acceptable practice. Deep sea disposal may be acceptable subject to detailed feasibility, environmental and social assessment of alternatives if the impact assessment demonstrates that there are unlikely to be any significant adverse impacts on the environment or local communities.

Hazardous Wastes

Hazardous wastes e.g. waste oils and chemicals, should be handled by specialised licensed providers of dedicated hazardous waste management facilities. If such services are unavailable within a feasible distance then the mine should establish its own waste facility with the necessary permits.

Waste oils may be usable as a supplementary fuel for power generation.

Land Use & Biodiversity

The land area required for the open pit excavation, dumping of waste materials external to the pit itself and other surface infrastructure such as buildings, roads, construction camps, towns and access corridors could destroy surface features of economic, cultural and nature conservation value.

Consultation with key stakeholders will be required to understand any conflicting land use requirements, the communities' dependency on natural resources and any conservation requirements.

Habitat alteration should be minimised to the extent feasible and critical habitats must be protected and preserved. The implementation of a Biodiversity Action Plan and biodiversity offset projects may be required by the regulatory authorities.

Dust

Mining operations create large amounts of dust that can be hazardous to health when inhaled. Occupational asthma is common in the mining industry.

Dust is generated in mining and extraction by:

- Blasting;
- Excavation;
- Moving equipment;
- Traffic on unsealed roadways;
- Loading and unloading operations;
- Stockpile stacking;
- Land reclamation operations;
- Beneficiation (crushing, grinding, compaction and drying).

Radioactive particles may also be present in dust that can pose a risk to humans if ingested.

Dust can be controlled by regular watering with mobile water trucks or fixed sprinkler systems.

[1] International Commission on Large Dams

Otherwise, where water is limited, surface binding agents, the sealing of heavily used access ways and the covering of stockpiles should be implemented.

Collision

Large vehicles and moving equipment are core to the operation of a opencast mine. Accidents with vehicles colliding with people are a common occurrence both within the perimeter of the mine and on access roads.

Fire & Explosion

- The storage and use of explosives creates a safety liability and risk.

- Spontaneous combustion of coal stockpiles and spoil heaps may occur if coal residues are present in the heaps.

Geotechnical Stability

All structures such as open pits, waste dumps, tailing dams and containment facilities should be planned, designed and operated to minimise the risk of landslides, rockfalls, face slumping or land collapse. These structures must be managed during the mine lifecycle to protect health, safety and the environment as the geotechnical properties will change as the material weathers. Additional levels of safety should be applied in active seismic areas and those exposed to extreme weather events. Systematic monitoring and review of geotechnical stability data is required.

Permitting Requirements

- Within the EU, the screening criteria for determining whether an environmental impact assessment must be conducted before an opencast mine can be opened are set nationally. However, these generally require an EIA for all developments except new small-scale ancillary buildings. Similar requirements will exist in non-EU countries. Because of the potential extent of environmental and social impact, and the requirement for consultation, the process of gaining planning permission in some circumstances may be protracted taking several years.

- The Mining Waste Directive (2006/21/EC) specifies a number of requirements to ensure protection of the environment and human health, depending on the risks posed by the type of waste. Operators are required to provide a waste management plan for the minimisation, treatment, recovery and disposal for all extractive waste regulated by the directive.

- Some opencast mining operations may be or may have been associated with backfilling with waste materials. The operation may need n additional permit or the existing permit may need to cover both mining and waste management activities.

OTHER ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Manual Handling

Many injuries from mining are associated with handling, lifting and carrying heavy or unconventional shaped objects.

Trips and Falls

Slips, trips and falls are regular occurrences in the mining industry and result in many injuries.

Typically, these are because of uneven ground and poor housekeeping.

Energy Consumption

The most significant energy consuming activities are transport, excavation and physical ore processing. The correct sizing of motors and pumps used in excavation, ore moving and crushing will conserve energy.

Security

There are security and safety liabilities associated with access to the site and especially with the storage of explosives.

Electrical Hazards

High voltage electrical supplies may be required to operate machinery such as crushers, conveyors and coal screening equipment.

Noise & Vibration

Noise and vibration will be generated by drilling and blasting operations, from excavation activities, loading and unloading of rock, crushing and conveying operations, and vehicle movements may reach levels that are hazardous to health. Careful control of blasting is required to reduce noise and vibration. Blasts should be timed to minimise noise and vibration disturbance. Good occupational health systems are required to monitor and control employee exposure to vibration.

Polychlorinated Biphenyls (PCBs) and Asbestos

- PCBs are a group of substances which are good electrical insulators. Typically, PCBs may be present as constituents of hydraulic oils or dielectric fluids in electrical switchgear, transformers and fluorescent light starters. PCBs are extremely toxic and become concentrated within the food chain. Any products that may contain PCBs must be disposed of by licensed contractors in accordance with national regulations.

- Asbestos was used on a large scale for many years as a fire proofing and insulation materials and may be encountered in a wide range of forms within the fabric of older mine buildings. Asbestos fibres, which are extremely hazardous when inhaled (causing mesothelioma and fibrous thickening in the lungs), may be released when the asbestos containing material is disturbed during maintenance or demolition.

Particular attention should be given to buildings constructed before the 1980s.

Extreme Weather

Workers are typically outside on an open cast site and are susceptible to variations in weather: i.e. sun, extreme heat and cold, wind, rain etc.

Remote Site Health

Mining operations may be located in extremely remote areas with little or no access to emergency or general medical services. A programme of illness prevention through education, sanitation measures and vector[2] control should be adopted.

[2] A vector is an organism that does not cause disease itself but serves as a transmission route conveying pathogens from one host to another

KEY SOCIAL, LABOUR AND COMMUNITY RISK/LIABILITY ISSUES

Human Rights, Local Communities & Indigenous Peoples

Rural communities and indigenous peoples often lack legal title to their lands, even though they may have occupied the same lands for many generations. Consequently, they may be vulnerable to eviction when a mining lease is granted, and the eviction may be imposed without prior consultation, meaningful compensation, or the offer of equivalent lands elsewhere. These are human rights violations and are not acceptable practice. Those that remain may experience a loss of revenue due to the environmental damage to the resources on which they rely for agriculture, such as water or loss of traditional livelihoods.

Where resettlement takes place, companies need to ensure that living standards are not diminished, that community and social ties are preserved, and that they provide fair compensation for loss of assets and economic opportunity among others. Roles and responsibilities for ensuring the long-term well-being of resettled communities need to be defined and monitored. Meaningful community participation in projects" is required through consultation to obtain "free, prior, informed consent" for all operations which may impact communities.

Governance

With good governance the exploitation of mineral resources can generate large revenues to foster growth and reduce poverty. However when governance is weak, it may result in poverty, corruption, and conflict. The Extractive Industries Transparency Initiative (EITI) aims to strengthen governance by improving transparency and accountability in the extractives sector. The EITI sets a global standard for companies to publish what they pay and for governments to disclose what they receive.

Community Health & Welfare

The opening of a mine leads to an influx of migrant workers, their family members and service workers. Unless carefully managed, through proactive and sustained intervention, this frequently leads to an increase in the transmission of communicable diseases such as sexually transmitted infections including HIV and respiratory diseases which may transfer to local communities. It may also lead to increased alcoholism, prostitution, drug use, and other crime.

Migrant Workers & Contractor Management

Mining typically attracts a large number of casual/short term workers, many of whom may be internal or foreign migrant workers. They may be hired directly or more usually by labour agents or sub-contractors. These factors make these workers more vulnerable to discriminatory treatment and/or exploitation. There must be binding legal requirements on these sub-contractors to adhere to the company's commitments on the environment, health, safety, social issues and overall management.

Worker Accommodation

If temporary accommodation is provided it shall be appropriate for its location and must be clean, safe and, at a minimum, meet the basic needs of workers. It should comply with all national legislation and meet international good practice standards. Workers freedom of

movement to and from the employer-provided accommodation shall not be unduly restricted.

Financial Dependency

Mine sites often provide infrastructure for miners and mineral distribution. In remote locations, settlements are developed around the mine and are therefore wholly dependent on the mine. Such communities can become financially and politically unstable once the mine has closed.

Mine Closure and Site Rehabilitation

Mine closure and rehabilitation should be considered as early as possible in mine planning and design. Funding for closure and post-closure activities must be included in the feasibility analysis for the mine. A draft closure and rehabilitation plan should be prepared before production commences, including allocated and sustainable funding for its implementation. It should include both physical and socio-economic considerations ensuring that:

- Future public health and safety is not compromised
- Beneficial and sustainable after-use for the affected communities
- Beneficial socio-economic effects are maximised and adverse ones are minimised.

The plan should be updated in line with changes to the site, environmental and social conditions. The plan should include aftercare and monitoring of potential impacts for a duration determined on a risk basis but for not less than 5 years and frequently much longer.

Emergency Preparedness & Response

An emergency response plan should be prepared in accordance with the guidance of United Nations Environment Programme (UNEP) APELL[3] for Mining.

Visual Impact

Surface mining operations have a negative visual impact particularly with respect to tourism or recreation. Mining operations should seek to prevent and minimise this impact through consultation with local communities about post-closure land use. Potential mitigation measures include use of screening materials such as trees, as well as the appropriate placement of ancillary facilities and access roads.

Water Abstraction

Mines can use large quantities of water in processing plants (see separate guideline) but also in dust suppression. Consultation with key stakeholders including the local community is necessary to understand potentially conflicting demands and/or conservation requirements. Lowering of the water table may affect supplies of water to industrial abstractors of groundwater, farmers and sensitive environments such as rivers and wetlands.

Contamination of water sources may occur indirectly through population in-migration.

Geotechnical Instability

The natural topography surrounding the site as well as mine infrastructure may be vulnerable to

[3] Awareness and Preparedness for Emergencies at the Local Level

instability particularly where the soils are deeply weathered or where there is high precipitation. These conditions can be hazardous for settlements and housing related to mining activities.

Settlement of, and potential methane generation within excavation backfill can place constraints and liabilities on future developments.

Additional levels of safety should be applied in active seismic areas and those exposed to extreme weather events. Systematic monitoring and review of geotechnical stability data is required.

OTHER SOCIAL, LABOUR AND COMMUNITY RISK/LIABILITY ISSUES

Mine Security

Mines could be targets for criminal or terrorist attack and therefore appropriate security measures must be implemented to minimise this hazard. Security personnel should adhere to the Voluntary Principles on Security and Human rights.

Fitness for Work

Fatigue or impaired fitness for work in some roles within the mining industry may substantially increase the risk of serious injury, equipment damage or environmental impact. Potential mitigation measures include: shift-pattern adjustment; medical examinations; drug and alcohol policies.

Noise

Noise and vibration will be generated by drilling and blasting operations, from excavation activities, loading and unloading of rock and vehicle movements. Environmental noise and vibration issues will be dependent on the proximity of receptors, e.g. proximity to roads, railways or housing may place restrictions on blasting operations.

Vector and Water Related Diseases

Water storage dams may become mosquito breeding sites increasing the risk of malaria or breeding sites for other diseases.

Transport

Disturbance from traffic may arise due to the transfer of minerals between extraction and processing sites or from the extraction site to the nearest port, inland waterway or railway station.

FINANCIAL IMPLICATIONS

- Compensation may possibly be required by regulatory authorities for loss of natural resources such as agricultural land and forestry; for resettlement and economic displacements;
- Protest by local population and non-government organisations to defend existing surface features can lead to delays in the permitting process, reduction in extent of resource that can be exploited and increase in mine operational costs;
- Failure to follow the legal process for an EIA or SIA , including appropriate public consultation, may affect the start of the project or lead to a legal challenge;
- Major increases in operation and investment costs could be necessary where outdated facilities at the site need to be replaced to satisfy a more stringent regulatory

environment. Poor environmental performance may accelerate the demands for a more stringent regulatory environment;

- It is good financial practice, and indeed may be a legal requirement, for provisions to be set aside for site decommissioning and rehabilitation costs, including areas possibly affected by past activities. It is necessary to understand the company's portfolio and interests (operational, contractual, legal) in closed as well as active mines;.

- Failure of the pit wall, spoil heaps or tailings dam has the potential to cause loss of life with associated financial liabilities. It may lead to valuable minerals becoming unworkable;

- Exposure of employees to occupational hazards may result in health compensation claims;

- Fees and fines will be applied by regulatory authorities for discharges to air and waters above statutory levels;

- Groundwater rebound may cause ground instability with potential for flooding of properties several miles by the resurgence and discharge of contaminated minewater and potential mobilisation of contaminants previously above the level of the water table. This may lead to compensation claims;

- Groundwater rebound may increase the operating costs of other mines in the area and, potentially, lead to compensation claims.

IMPROVEMENTS

Environmental, Health and Safety Improvements

These may take the form of management practices and systems, technology employed, competence and know-how, including training.

- Control operations by having a permit to work system which covers environment, health, safety and operational areas;

- Ensure the findings from the EIAs and SIAs and any other agreements are appropriately incorporated in to the operational programme for the mine;

- Environment, health and safety training for all employees and contractors;

- Control **dust** emissions by:

  - Use of dust suppression techniques on site roads, e.g. water sprinkling, speed controls, all-weather surfaces;

  - Covering vehicle loads with sheeting before transport from the site;

  - Dedicated parking areas for employees' vehicles;

  - Fitting crushing and screening machinery with filter systems;

  - Fitting stockpiles with sprinkler systems or dust caps.

- Reduce **noise and dust** emissions by:

  - Use of stockpiles and pit walls as sound barriers/screening bunds to protect sensitive areas;
  - Use of conveyors in place of dump trucks;
  - Enclose noisy machines to isolate people from the noise where practicable;
  - Locating potential sources away from receptors,
  - Tree planting in shelter belts.
- Reduce exposure times for people working near noisy machinery;
- Use and maintain effective filters in vehicle cabs to keep air free of dusts and fumes;
- Careful control of blasting to reduce noise and vibration, e.g. timing and proximity to receptors;
- Provide personnel training on explosives handling and safety management. Only certified blasters or explosives experts should conduct blasts;
- **Visual impact**. Reduce visual impact by techniques such as
  - minimising the area of overburden stripped prior to coal excavation,
  - progressive restoration of worked out areas,
  - screening or concealed location of processing plant and haulage routes.
- **Water management**. Improve water management by developing a sustainable water supply management plan;
- Ensure clean and dirty waters are segregated. Dirty water will require treatment prior to discharge depending on the nature of the contaminants;
- Reduce sediment loading of drainage ditches by:
  - Reducing exposure of soil and rock to wind or water, e.g. by revegetating exposed surfaces;
  - Use of settling ponds, silt fences etch to prevent sediment transport;
  - Establishing streamside vegetation;
  - Mine design and construction techniques to minimise runoff, e.g. countering, terracing, slope reduction, drainage installation.
- Control acid leachate production and run-off by preparing and implementing ore and waste management programs for monitoring and preventative actions;
- **Geotechnical stability**. Implement systematic monitoring and regular review of geotechnical stability data on all structures;
- **Storage of materials and pollution control**. Bulk containment (e.g. oil storage tanks) must be:
  - inspected regularly to prevent leakage;
  - provided with secondary spill containment;

  - installed with automatic alarms and shut off systems.

- Provision of personal protective equipment (PPE) that is fit for the task to prevent injury and maintain hygiene standards. Staff should be trained in the correct selection, use and maintenance of PPE.

- Separate people from vehicles and machinery were practicable:

  - Ensure drivers and users are properly trained to operate the machinery and equipment;

  - Fit vehicles with rollover protective structures;

  - Use mechanical lifting devices where possible;

  - Ensure that machinery is adequately guarded to reduce likelihood of entrapment.

- **Emergency response**. Introduce accident, fire and explosion precautions and emergency response procedures;

- Ensure security of storage areas to prevent third parties misusing chemicals (or their containers);

- **Aftercare and mine closure**. Aftercare should cover both rehabilitation of restored land (if that is the end use) and proposals to monitor and control pollution;

- Develop (or review) a Mine Reclamation and Closure Plan which includes post closure monitoring. Ensure that a sustainable source of funding is allocated sufficient to implement the plan. This may be mandatory in some countries.

Social, Labour and Community Improvements

- Consult with key stakeholders (e.g. government, civil societies and potentially affected communities) to:

  - Assess the potential for adverse impact due to in-migration;

  - Understand conflicting land use demands and community dependency on natural resources;

  - Obtain "free, prior and informed consent";

  - Prepare an emergency response plan;

  - Develop the Mine Reclamation and Closure Plan.

- Tailor pre-placement medical examinations to the requirements of the role;

- Implement a drugs and alcohol policy for the operation;

- Undertake health awareness and education programmes in collaboration with local community organisations;

- Provide preventative treatment and vector control to site workers and families, e.g. immunisation; spraying, health monitoring. Consider extending to local community;

- Implement a grievance/dispute resolution mechanism for workers and members of the community to raise issues with the Company;

- Unsightly landscapes and noise pollution can be improved by maintaining buffer zones, planting greenbelts, constructing barrier fences or earth barriers;
- Prompt rehabilitation of disturbed areas that are most visible can reduce the visual impact and improve relations with the local community;
- Consider whether any upgrades to site security arrangements are required.

GUIDE TO INITIAL DUE DILIGENCE SITE VISITS

It may not be possible to inspect all of the site due to its size and due to restricted access to areas being actively worked. The success of the site visit also depends largely on the co-operation and availability of appropriate site personnel. Emphasis must always be placed, however, on the necessity to visually inspect areas considered important.

Valuable sources of information are the agreements with regulatory authorities with respect to approval of planning applications and discharge consents. The information on environmental controls is often contained in an 'Environmental Passport' document. Review of this information enables identification of the site specific environmental issues at the mine.

General

- Confirm how the mine will be operated. Is it joint venture between different organisations and which organisation has operational control? Also understand the type and number of contractors likely to be employed and that environment, health and safety systems will also apply to contractors;
- Confirm organisational responsibilities and systems for environment, health and safety;
- Look for signs of poor housekeeping such as signs of spillages and high numbers of empty drums. Particularly note any recent spills;
- Check the condition of any assets, facilities, equipment, production areas – look for wear and tear, and poor maintenance;
- Discuss emergency response to accidents and major incidents etc;
- Assess the level of health and safety awareness at the works, are staff wearing PPE appropriate for the task, e.g. safety boots, hard hat, high-visibility vests, gloves, ear-defenders, safety glasses etc. Review the health and safety statistics for the operation;
- Check signage around the site;
    - Does it convey the health and safety risks?
    - Are fire exits clearly marked?
    - Are routes for pedestrians and vehicles segregated?
- Is fire fighting and first aid equipment available and are people competent in the use of the equipment and procedures and appropriately trained?

Active Excavation Areas

- Is water present on the pit floor, any evidence of contamination of this water, and where is the water pumped to? Where is the water from the dewatering discharged to? Does it lead to wastewater treatment systems or discharge directly to surface waters and

note the colour and appearance of adjacent water courses;

- Are there other arrangements for dewatering the pit such as pumping from peripheral boreholes?
- If wells are also located near the site is any monitoring of the water levels in these wells carried out?
- If originally clean, is it contaminated by discharge onto 'dirty' areas of the site before entering natural surface/groundwaters?

Disposal of Waste Rock

- Is the pit progressively backfilled with inert on site material or materials from off site sources? Are these off site materials potentially hazardous? If the latter, are there any indications that this is not necessary?
- Are the eath bunds constructed in terraces to promote stability and possible future revegetation or are excessively steep slopes produced?
- Is waste rock dumped near surface water courses or over areas of possible cultural or nature conservation value?
- Are the dumps surrounded by surface drains to collect sediment loaded surface run-off and so protect water courses?
- Do the dumps appear to be heavily eroding and slumping?

Stockpile Areas

- How are these organised?
- Does the area look well managed or are excessive areas of land used and contaminated?
- Is the area located near any water body or other surface feature which creates unnecessary risk of contamination?
- Is surface runoff from the areas collected and where is it discharged?
- Does any discharge look as though it is heavily contaminated by solids? What colour is it?

Fuel and Bulk Material Storage Arrangements

- What fuels and materials are stored in bulk on site?
- To gauge the potential for spillages and leaks consider the following:
    - Are there any underground storage tanks?
    - Are surface storage tanks and usage areas hard surfaced and bunded? Are these in good condition or are cracks present? Are these regularly tested for leakages?
    - Is the size of the bunding adequate for the volume of the materials stored?
    - Are the bunds regularly cleaned out to avoid loss of capacity due to holding rainwater etc.?

Sensitive Receptors

- The presence of other mines, human settlements (including indigenous populations), other economic activities

(including forestry and agriculture), and wildlife habitats in the area which may be sensitive to the effects of the mine;

- The proximity and sensitivity of aquatic environments;
- Are there any users of water downstream from the site which might be affected by contamination of the water or lowering of water levels caused by the mine?
- Noise and vibration levels at the site and proximity to sensitive receptors such as schools, and housing.

Social, Labour and Community

- Does the organisation engage in regular formal consultation with key stakeholders including the local community?
- Check that labour standards, contracting and remuneration are in line with national law and are consistent with the average for the sector;
- Check that hours worked, including overtime, are recorded and staff should receive written details of hours worked and payment received;
- Has the Company received inspections from the local labour inspectorate in the previous three years? Have these resulted in any penalties, fines, major recommendations or corrective action plans?
- Does the organisation have a grievance mechanism which allows employees and other stakeholders to raise concerns?
- Are employees free to form, or join, a worker's organisation of their choosing?
- Is there a programme of health awareness and education initiatives?

Other Useful Observations

- Evidence of dust emissions from the pit, such as deposits on vegetation at the site boundary;
- Are any reclamation works in progress either on stockpiles, tips, lagoons or backfilled excavation areas? What do the restoration works comprise?

Information should also be obtained on the following:

- Has the company or mine been subject to any poor publicity?
- The method of working the mine and the type of plant used; the history of the site and the previous existence of potentially contaminative activities at the site in the past;
- What systems are in place to check and maintain assets and infrastructure at the mine?
- Check the conditions and duration of validity for all permits;
- Non-mineral waste management control procedures and documentation;
- Find out what insurances are in place (health, hygiene, fire etc). Identify number and type of claims against insurance. Have insurers made any environment, health and safety audits of the facility? What were there

findings and actions taken by management to address these;

- Have the premises been inspected recently (within the past 2 years) by the regulatory authorities for health, hygiene and environment? What were their findings?
- Have there been any recent (within the last three years) incidents on site such as fatalities, fires/explosions, spills?
- Review budgets for capital expenditure (capex) and operational expenditure to cover environment, health and safety matters;
- Does the business plan have line items for Environment, Health and Safety and Hygiene improvements? Do financial provisions appropriately reflect operating and post closure environment, health and safety /social obligations as agreed with the authorities or other parties?
- Do the valuations of mineral assets appropriately reflect environmental and social obligations? Does the organisation have consent for all the mineral assets which are planned to be worked? Are these issues factored in to the business plan?

Take note/ask questions relating to any activities that address the improvements listed in the improvements section of this document.

ACTION PLANS

Dependent on the individual business, select appropriate improvements from the list above to include in the action plan. The plan should feature costed measures and set implementation targets. The measures may require increased management supervision, or significant process upgrades which may involve considerable capital expenditure.

As a minimum, any business should be required to have the following in place:

- Operational procedures to manage environmental, health & safety risks;
- Monitoring programmes;
- Improvement objectives, targets and project plans;
- Training for personnel;
- Regular independent inspections, checks and audits with records to demonstrate achievement of the required level of performance against legal requirements and improvement action;
- Emergency plans for environment, health and safety accidents;
- Mine closure and rehabilitation plan;
- Senior management review and demonstrated involvement in environment, health and safety management;
- Financial statements, budgets and financial projections which reflect environment, health, safety and social obligations.

REFERENCES AND ADDITIONAL SOURCES

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