

# Environmental

## OVERALL IMPACTS

### Possible Questions:

- What are the main environmental impacts of the company's operations?
- What local environmental impacts are caused by mining operations, including exploration?
- What is company doing to minimize these impacts?
- Does the company evaluate potential environmental impact or enhancement during the exploration phase?
- Have environmental risks and opportunities been considered for every phase of mining?

## OPERATIONAL DETAILS

### Possible Questions:

- What is the ore grade (range) for the past year of operation?
- How much ore was extracted annually?
- How much metal (etc.) was produced annually?
- Is there a site-wide quality assurance project plan (QAPP)?
- What extraction, beneficiation, and processing methods are used?

## BASELINE STUDIES/MONITORING/DATA COLLECTION

### Possible Questions:

- Was an EA/EIS/EIA conducted?
- What are climatic conditions at the site (precipitation, wind, evaporation, solar radiation, etc)?
- Are environmental conditions being monitored in such a way that seasonal and climatic changes can be determined?
- Are locations of all monitoring points identified on maps and/or with latitude/longitude data and linked to analytical results?
- Are detection limits, analytical methods and laboratory QA/QC flags identified for each analysis?
- Are sampling and analysis plans used for each sampling event?
- Have baseline/background locations, samples, studies, etc. been verified as background/baseline by an independent entity?
- Are environmental data validated and verified? If yes, By whom?
- Does mining company provide funding for an independent entity to conduct separate analyses and interpret results of environmental monitoring for the community?

### Possible Indicators:

- Frequency of sampling (tailings, water and soil)
- Number of sites with ISO14001 certification
- % implementation of internal environmental management system
- Number of operations with site-specific environmental reports, with distribution strategy/contact information

## REMEDIATION

### Possible Questions:

- Does the company develop an environmental closure plan for each mining operation?
- Does the company have a remediation plan for each mining operation?
- How many acres were remediated this year and what methods were used? Where?
- Will remediation enhance environmental conditions in any way?

## ENERGY USE

### Possible Questions:

- What is company doing to minimize its energy use?
- Are there opportunities to create power on site?
- Is the company using (or exploring the use of) renewable energy systems to create on-site power?
- What is the company doing to increase energy efficiency?

### Possible Indicators:

- Amount of electricity purchased (by primary fuel source)
- Total fuel use by type
- Energy intensity (Mwh/ Ton of metal)
- Energy to produce one ton AL (kWh)
- Energy use per unit of product

## WATER USE/QUALITY

### Possible Questions:

- Prior to mining, does the company determine background/baseline: surface water concentrations and flows; groundwater concentrations and elevations; and seeps and spring flows and concentrations?
- Does the company undertake a baseline inventory of springs and seeps, wetlands, and riparian areas in the proposed area of operations? If yes, at what stage in operations?
- Does the company collect anecdotal information about water quality and quantity prior to mining?
- Are systems in place (monitoring, etc.) to determine if baseline/background surface water, ground water, and seep/spring water conditions have changed?
- What is the potential of the project to degrade or enhance water quality and quantity?
- Will mining activities disrupt, block and/or re-route any rivers/stream channels, or modify surface water? If yes, which specific water resources will be affected?
- What are the loadings of pollutants to surface water and groundwater from/at the mine site?
- Have predictions of final water quality (pit, stream, groundwater, etc.) been determined?
- How do current measured concentrations of pollutants in water match with predicted concentrations?
- What is company doing to minimize water use?
- Have on-site water recycling/reuse opportunities been identified?
- Have waste/mining units been designed to withstand the maximum realistic flood?

**Possible Indicators:**

- Volume of fresh and raw water used
- Change in recycled water use over time
- Number of daily permit levels exceedences
- Frequency of water temperature exceedences
- Quantity of polluting matter in waste water
- Water extraction / ton ore milled
- Water used / ounce of product
- Gallons of treated water
- Dollars spent in water recovery
- Metal released to water / ton metal produced

**EMISSIONS, EFFLUENTS & WASTE****Possible Questions:**

- What is company doing to minimize its use of potentially hazardous chemicals?
- Is the company investigating alternatives to problematic chemicals?
- Is the company engaged in any partnerships with research institutions to develop alternatives to problematic chemicals?
- How many pounds/gallons of reagents were used on site annually and for what purpose?
- Have on-site chemical recycling/reuse opportunities been identified?
- What is the amount, and type, of waste discharged to land, air, and water annually?
- What is company doing to minimize waste created by its operations?
- What is the amount of individual hazardous substances discharged to land, air, and water annually?
- What is the potential mobility of hazardous substances from discharged wastes? (e.g., metals in waste rock dumps, potential acid mine drainage)
- What is potential of waste and mined material to generate acid and/or release metals/metalloids?
- How will the waste produced by the mining project on- and off-site be handled?
- What methods are used to process slag?
- Does the company undertake landfill audits?
- Have on-site waste recycling/reuse opportunities been identified?
- What is the global warming potential of each mining project?
- What is the ozone depleting potential of the mining project?
- What is the potential of the project to degrade or enhance air quality (through blasting, earth moving, transportation operation (*dust in the atmosphere: particle fall-out around mine sites*))
- How will operational emissions from smelters and non-ferrous smelters) affect local air quality?

**Possible Indicators:**

- Change in cyanide consumption over time
- Concentrations fluoride/cyanide, etc. in vegetation within 1 km of plant
- Change in fluoride emissions

- Dissolved fluoride in effluent
- Fluoride levels in tree foliage
- Greenhouse gas emissions in tonnes of CO<sub>2</sub> equivalent.
- Ozone-depleting substance emissions in tonnes of CFC-II equivalent.
- Other emissions as appropriate in kgs or tonnes
- Toxic releases in kg / yr by substance
- Fine particulate matter concentrations
- Total metals released
- Number of times emissions limits were exceeded
- Frequency that ambient air quality is above hourly limit
- Total amount of total waste created (and percentage of this that is disposed of vs. recycled)
- Change in recovery of waste over time
- Reagent consumption in tons
- Recycled materials (by volume & material)
- Volume of waste oil removed
- Quantity of tailings to surface impoundment
- Tons of tailings stored
- Tons of waste rock to surface dumps
- Tons of solid waste shipped
- Quantity of spent pot lining generated
- Recycled waste as a proportion of landfill waste
- Percentage of dust collected
- % recovery of hydrocarbons
- Total ore treated; total mill tailings; storage capacity
- Amount spent on research and development into environmentally-preferable chemicals and methods

## **SPILLS AND COMPLIANCE**

### **Possible Questions:**

- Are emergency plans in place to address spills/releases of reagents/hazardous substances?

### **Possible Indicators:**

- Number of spills/incidents (with details of where and when, and severity and impacts)
- Number of non-compliance incidents
- Number of days total suspended solids exceeded limits
- Total air and water non-compliance events
- Number of spills that escaped site containment systems
- Amount paid in fines
- Number of regulatory actions
- Number of times prosecuted

## **LAND USE**

### **Possible Questions:**

- Does the company determine background/baseline landscape characteristics, and soil

concentrations, pH and other soil conditions

- Are systems in place (monitoring, etc.) to determine if baseline/background soil and landscape conditions have changed?
- Has the company collected anecdotal information about soil quality prior to mining?
- What is the potential of the project to degrade or enhance land quality?
- What mechanisms does the company use to control erosion?
- How much land will be disturbed as a result of: waste disposal; facility buildings and areas; open pits; roads; and exploration pits, pads, etc.?

**Possible Indicators:**

- Area and % change of rehabilitated land
- Area of disturbance and % change
- Cumulative disturbed land
- Rehabilitated land / disturbed land
- Number of hectares revegetated
- Number of hectares used
- % of till and waste rock stockpiles resloped
- % of mine structures removed
- Current and estimated future (\$) for land restoration

**BIODIVERSITY**

**Possible Questions:**

- Is the company engaged in any partnerships with conservation/ biodiversity organizations?
- Does the company have a biodiversity action/protection plan?
- Does the company undertake an assessment of change in species composition and population around each site?
- How does the company ensure the protection of fish stocks?
- Does the company undertake a baseline inventory of: aquatic biota; vegetation (native and revegetation species); mammals; birds; and endangered species? If yes, at what stage in operations?
- Are data available or studies underway to determine background/baseline: fish populations and abundance; macroinvertebrate populations and abundance; mammal populations and abundance; vegetation (native, riparian, revegetation); bird populations and abundance; and amphibian populations and abundance?
- Are systems in place (monitoring, etc.) to determine if baseline/background conditions have changed regarding any of the above?
- Has the company collected anecdotal information about vegetation and fish, mammal, bird, macroinvertebrate, amphibian, populations and identity prior to mining?
- What is the potential of the project to degrade or enhance vegetation and habitat for and populations of fish/macroinvertebrates, mammals, birds, amphibians?

**Possible Indicators:**

- Number of key species in water bodies
- Wildlife mortalities related to operations
- Acres of land sold at low cost for conservation
- Number of chemical-related wildlife mortalities

- Change in area of coral reef coverage

## URANIUM SECURITY

### Possible Question:

- Has the company signed non-proliferation agreements where uranium is sold?

## Social

### COMMUNITY INVOLVEMENT/INTERACTION

#### Possible Questions:

- Who will be affected by the negative environmental and social impacts of the projects?
- Who are the most vulnerable, least visible, and voiceless people in the project area?
- Has a community advisory committee been established? How are members of this committee chosen?
- Is easy understandable information (written, oral, visual), describing the project, available for the community?
- How is the full participation of the community guaranteed in social development programs?
- How are gender issues addressed by the company in its interactions with local communities?
- Does the company provide a forum for women's issues to be addressed, both in the workforce and in interactions with the local community?
- Has a mechanism been established to resolve problems which guarantees - at the local and national levels - the equality of different actors?
- Is community involved in the design of the mine and the design of remediation efforts?
- Are conflicts with local communities recorded?
- Has the company or other entity sat down with representative community members to learn their stories and what they value, in order to determine their priorities?
- Is there a mechanism in place to discuss results and implications of environmental monitoring results with the community on a regular basis?
- Does the mining company understand/know what the community values in terms of the environment and why?
- Does the company have a cross-cultural awareness program in place?
- Have anthropological/cultural resources been evaluated in the immediate area of the mine?
- Is the EA/EIS/EIA available to the public? Where can the public view a copy?
- Does the company train the local community regarding H&S, environmental and other topics?
- Does the company have any community scholarships/education programs?
- Are employees encouraged to participate in environmental/social programs?
- Are employees encouraged to make suggestions regarding improvements to environmental/social programs?

#### Possible Indicators:

- Range of stakeholders involved in company programs
- Number of people living or using the land on and around the planned mining site
- Amount and extent of involvement of communities
- Resources expended in community/communication

- Staff time in training in social/economic values
- Research/Development expenditures in social programs
- Involvement of community in training
- Loss of archaeological sites
- Number of suggestions regarding environment/social programs / 1,000 employees

## **HEALTH & SAFETY ISSUES**

### **Possible Questions:**

- Is there a baseline study of the peoples' health in the area impacted by mining and will their health be monitored during and after the project?
- How does the company train its workforce regarding H&S, environmental and other issues?
- What protections are given to miners?
- What protections are given to local communities regarding potentially toxic exposures?
- How does company ensure that contractors apply similar EHS standards?
- Is there an investigative team to prevent accidents?
- What policies/programs does the company have regarding tuberculosis/malaria education prevention and treatment? How does the company ensure compliance with these policies/programs?
- What policies/programs does the company have regarding HIV/AIDS education, prevention and treatment? How does the company ensure compliance with these policies/programs?
- Has the company studied the real and potential impact of HIV infection on workforce absenteeism, productivity, turnover, etc.?
- Does the company provide free and confidential testing for HIV and other STDs?
- Does the company provide free condoms for workers?
- Does the company provide free drugs, or other forms of treatment, to workers with HIV/AIDS or other illnesses?
- Does the company continue to provide benefits to workers after illness (HIV/AIDS etc.) impairs or terminates the ability to work?
- What non-discrimination practices does the company have with regard to HIV infection?
- How does the company promote family- or community-living situations for its workers?

### **Possible Indicators:**

- Number of accidents, including contracted employees
- Number of HSC violations
- Number of fatalities
- % change in lost time injuries over time
- % change in new occupational health cases
- LTIF rate; ratio with metalliferous sector average
- Medically-treated injury frequency rate
- Number of non-fatal disabling injuries
- Total amount spent on workers' compensation
- Decrease of malaria over time/ Change in incidence of malaria
- Decrease of tuberculosis over time/ Change in incidence of tuberculosis
- Number employees receiving flu shot
- Radiation exposure levels

- Average blood lead/arsenic levels
- Frequency of monitoring for blood lead
- Number of employees with berylliosis or b.sensitivity
- Blood lead levels in local children <3yrs
- Change in number of STDs transmitted over time
- Changes in prostitution rates
- % of HIV+ people in region / to HIV+ in workers
- Number of families using counseling services
- % of employees attending stress workshop
- % business units that support health clinics
- Total amount donated to health-related non-profit groups

## **HUMAN RIGHTS**

### **Possible Questions**

- Does the company support of UN Declaration of Human Rights and/or the Global Compact?
- How does the company investigate/respond to reported human rights violations?

### **Possible Indicators:**

- Number of human rights complaints
- Number employees w/ human rights training

## **Economic**

### **JOB PROVISION/SATISFACTION/WAGES**

#### **Possible Questions:**

- Will the mining company provide labor to locally available skilled and unskilled people, and for how long?
- What jobs are offered to the local community, and what is the satisfaction level?
- How does the company ensure compliance with national/international labour standards?

#### **Possible Indicators:**

- Number and percentage of local/indigenous employees
- Increase in local employment since the start of the project, categorized by type of activity/work.
- Change in indigenous people hired over time
- Wages and benefits paid annually (by region)
- Average compensation / employee
- Average. hourly unionized wage rates (comparative)
- % making more than national statutory minimum wage
- Ratio of lowest wage to national legal minimum and costs of living
- Health and pension benefits provided to employees
- Percentage of employees that are unionized
- Average length of service
- Percentage of the workforce that is migratory
- Percentage of men/women employed

- Number of employee grievances / yr
- Employee satisfaction levels

## **LOCAL ECONOMY**

### **Possible Questions:**

- What does the company do to lobby for/promote sustainable development?
- What are the common types of economic livelihood of the local population, and how do mining activities affect or support these activities?
- Who will benefit from the project other than the project sponsor and investors?
- Does the mining company invest directly in local businesses?
- Does the mining company buy products locally and make use of local resources?
- What is done to ensure that the local economy will be sustainable after the mine closes?
- How does the mining company ensure the local economies do not become dependent on mining operations?
- What is your company's plan for closure?
- How does the company prevent the local community becoming economically-dependent upon mining operations?

### **Possible Indicators:**

- Loss of livelihood (through access to land base for indigenous communities)
- Changes in landuse (loss of traditional territory for indigenous groups)
- Changes in local population numbers
- Changes in housing (availability, rent, quality, etc.)
- Investment in local infrastructure projects (number of houses, roads, bridges, schools, hospitals, etc. built)
- % of former employees at closed mines who found jobs

## **LAND PURCHASES/TAXES**

### **Possible Questions**

- How does the company determine who owns the land being considered?
- At what level in the country is payment made for the right to mine (ie. national, regional, local)?
- Has a bond amount been established?
- If so, what is the amount and how is it held?
- Was the community consulted on a bond amount? Are affected people compensated to a standard of living at least equivalent to the standard prior to the project?
- Does bond cover perpetual treatment, if necessary?
- Does bond cover long-term maintenance of remediation, etc.?
- Is bond amount reported in annual report?
- What is the amount of taxes paid to all taxing authorities and what does the company do to reassure the state's investments in its area of operation?

### **Possible Indicators**

- % of total economic value in taxes and royalties
- % of value remaining in country/region of operation

<b>SPENDING ON ENVIRONMENTAL/SOCIAL PROGRAMS</b>
<b>Possible Indicators</b> <ul style="list-style-type: none"><li>• Annual spending on environmental programs (both total and as % of annual gross revenue)</li><li>• Annual spending on community programs (both total and as % of annual gross revenue)</li><li>• Number of non-profit community and environmental groups that have benefited</li><li>• Amount spent on remediation annually?</li><li>• Amount spent on treatment annually?</li><li>• Monies available for closure and restoration projects (current and future estimated)</li></ul>