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- **Mining in Africa 2008**
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 - **MINExpo 2008**
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Email: minexpo@heexpo.com
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 - **Oil Sands Trade Show & Conference 2008**
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 - **IMPC BEIJING 2008 – XXIV International Mineral Processing Congress**
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Beijing, China
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 - Dragline Mining Systems**
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 - Mining Economics**
Calgary: November 13–14
- For additional information or to register, please contact Marcie Schmidt at 403-217-4981 or mschmidt@runge.com.au

Overview of IFC's Environmental, Health and Safety Guidelines for Mining

INTRODUCTION

This *Pincock Perspectives* provides a basic overview of the new Environmental, Health and Safety Guidelines for Mining (Guidelines) and highlights several pertinent requirements and/or issues presented in the document. The Guidelines were issued in 2007 by the International Finance Corporation (IFC), a member of the World Bank Group. The Guidelines contain "...performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs."

IFC previously developed General Environmental, Health, and Safety (EHS) Guidelines as a reference document on common EHS issues potentially applicable to all industry sectors. These General EHS Guidelines are supplemented by over 60 industry specific guidelines in such categories as Forestry, Agriculture/Food Production, General Manufacturing, Oil and Gas, Infrastructure, Chemicals, Power, and Mining (www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines). For example, the EHS Guidelines for Base Metal Smelting and Refining is under the General Manufacturing category. Mining is the only category to have just one industry-specific EHS Guidelines document.

The EHS Guidelines are applied when World Bank Group members are involved in a

project. They contain general and industry-specific examples of Good International Industry Practice (GIIP), as defined in IFC's Performance Standard 3 on Pollution Prevention and Abatement: "*The exercise of professional skill, diligence, prudence and foresight that would be reasonably expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of financial and technical feasibility.*"

Note that the **Equator Principles** (www.equator-principles.com/) require compliance specifically with the EHS Guidelines, along with the IFC Performance Standards (www.ifc.org/ifcext/enviro.nsf/Content/PerformanceStandards - see also *Pincock Perspectives Issue No. 79 – July 2006*).

This article first addresses the applicability of the Guidelines and the basic organization and content of the document, and then summarizes several pertinent requirements and/or issues presented in the document.

APPLICABILITY

The Guidelines are applicable to underground, open pit, alluvial, and solution mining, and ocean dredging. Based on the results of an environmental assessment, the Guidelines are to be tailored to the hazards and risks established for each mining project. Technical recommendations are to be based on the opinion of qualified and experienced professionals.

Regarding the Guidelines applicability in different countries and varying environments throughout the world: "When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment."

IFC recognizes that application of the Guidelines to existing facilities will likely involve the establishment of site-specific targets, along with a suitable timetable for achieving the targets.

BASIC CONTENT AND ORGANIZATION

For the most part the Guidelines present mining EHS approaches, strategies and requirements that are already practiced in developed areas or countries (North America, Europe, Australia, etc.) for example, establishing

a water balance based on probable climatic events, secondary containment for hazardous materials, stockpiling topsoil, use of PPE, concurrent reclamation, etc.

However, in developing countries environmental and health & safety laws and regulations are not always established (or enforced) to international standards currently in practice for mining projects. For instance, as such, along with recommending basic international mining practices, in some instances the Guidelines delineate specific requirements (e.g., use of personal protective equipment, total suspended solids criteria for effluent discharges, etc.)

Note that in many cases the Mining Guidelines refer back to the General EHS Guidelines for direction and requirements for activities common to numerous industries; for example, spill prevention and control planning for the handling, storage, and transport of fuels and chemicals. Similarly, ambient air quality and noise level requirements are not specifically delineated in the Mining Guidelines, but implicitly incorporated via the General EHS Guidelines where they are listed.

The 33 pages of Mining Guidelines are organized as follows:

1.0 Industry-Specific Impacts and Management

1.1 Environmental

- Water Use and Quality
- Wastes
- Hazardous Materials
- Land Use and Biodiversity
- Air Quality
- Noise and Vibration
- Energy Use
- Visual Impact

1.2 Occupational Health and Safety

- General Workplace Health and Safety
- Hazardous Substances
- Use of Explosives
- Electrical Safety and Isolation
- Physical Hazards
- Ionizing Radiation
- Fitness for Work
- Travel and Remote Site Health
- Thermal Stress
- Noise and Vibration
- Specific Hazards in Underground Mining

1.3 Community Health and Safety

- Tailings Dam Safety
- Water Storage Dams
- Land Subsidence
- Emergency Preparedness and Response
- Communicable Diseases
- Specific Vector Control and Prevention Strategies

1.4 Mine Closure and Post-Closure

- Financial Feasibility
- Physical Integrity
- Chemical Integrity
- Ecological Habitat Integrity

2.0 Performance Indicators and Monitoring

2.1 Environment

- Emissions and Effluent Guidelines
- Environmental Monitoring

2.2 Occupational Health and Safety Performance

- Occupational Health and Safety Guidelines
- Accident and Fatality Rates
- Occupational Health and Safety Monitoring

3.0 References and Additional Sources

Annex A:

General Description of Industry Activity

PERTINENT GUIDELINE REQUIREMENTS AND/OR ISSUES

As indicated earlier, for the most part the Guidelines present practices and requirements which are already implemented in developed countries and/or by international mining companies. This section discusses just a few of the Guidelines' requirements and recommendations, including some which stood out as definitive criteria that often are not followed/implemented in developing parts of the world. Obviously the entire document needs to be considered for a complete detailing of IFC's specific guidelines and requirements.

Effluent Guidelines. Table 1 (as presented in the Guidelines) presents the effluent guideline values. The Guidelines state: "These levels should be achieved, without dilution, at least 95 percent of the time that the plant or unit is operation, to be calculated as a proportion of the annual operating hours." However, the Guidelines provide for exceptions, per the following: "Deviations from these levels in consideration of specific, local project conditions should be justified in the environmental assessment."

Surface Water Mixing Zones for Discharges. Section 1.1 of the Guidelines implies that mixing zones for discharges to surface water are acceptable: "In addition, discharges to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria outside a scientifically established mixing zone." Consideration is to be given to acceptable contaminant loads and effluent quality relative to receiving water use, assimilative capacity, and impacts from other discharge sources. It is assumed that this refers to

contaminants which are not addressed in Table 1 – and/or for receiving water bodies which may be incapable (e.g. due to size or flushing capacity) of continuously receiving effluents meeting Table 1 criteria without incurring impacts to the ecosystem or downstream water quality.

Stormwater Design Criteria. The Guidelines address various aspects of stormwater management, including drains, sediment control facilities, ditches, and stream channels. "Temporary drainage installations should be designed, constructed, and maintained for recurrence periods of at least a 25-year/24-hour event, while permanent drainage installations should be designed for a 100-year/24-hour recurrence period." Further: "Sediment control facilities should be designed and operated for a final Total Suspended Solids (TSS) discharge of 50 mg/L...." These design criteria are fairly standard for developed countries.

Tailings Facilities. Among others, the Guidelines note the following requirements and management

recommendations specifically for tailings facilities:

- "Appropriate independent review should be taken at design and construction stages...."
- "Design of tailings storage facilities should take into account the specific risks/hazards associated with geotechnical stability or hydraulic failure and the associated risks to downstream economic assets, ecosystems, and human health and safety."
- "Design specifications should take into consideration the probable maximum flood event and the required freeboard to safely contain it...."
- "Riverine (e.g., rivers, lakes, and lagoons) or shallow marine tailings disposal is not considered good international industry practice."
- "Deep sea tailings placement (DSTP) may be considered as an alternative only in the absence of an environmentally and socially sound land-based alternative and based on an independent scientific impact assessment."

TABLE 1 - EFFLUENT GUIDELINES		
Pollutant	Units	Guideline Value
Total Suspended Solids	mg/L	50
pH	mg/L	6 – 9
COD	mg/L	150
BOD ₅	mg/L	50
Oil and Grease	mg/L	10
Arsenic	mg/L	0.1
Cadmium	mg/L	0.05
Chromium (VI)	mg/L	0.1
Copper	mg/L	0.3
Cyanide	mg/L	1
Cyanide Free	mg/L	0.1
Cyanide WAD	mg/L	0.5
Iron (total)	mg/L	2.0
Lead	mg/L	0.2
Mercury	mg/L	0.002
Nickel	mg/L	0.5
Phenols	mg/L	0.5
Zinc	mg/L	0.5
Temperature	°C	<3 degree differential
Note: Metals concentrations represent total metals.		

Cyanide. The Guidelines state: “Cyanide use should be consistent with the principles and standards of practice of the International Cyanide Management Code.” However, the Guideline does not specifically require auditing and certification under the Code.

Occupational Health and Safety

Hazards. The Guidelines specify that: “Facility-specific occupational health and safety hazards should be identified based on job safety analysis or comprehensive hazard or risk assessment using established methodologies such as a hazard identification study [HAZID], hazard and operability study [HAZOP], or a quantitative risk assessment [QRA].” The results of the hazard analysis should become part of a comprehensive health and safety management plan which includes, among other things, emergency response plans, communication program, and employee training.

Specific to underground mining, among other things, the Guidelines specify: “As a general safety rule, a tagging system should be implemented to account for all persons traveling underground.” Also: “Based on an assessment of potential risk of encountering oxygen deficient atmospheres (e.g., mines operating trackless diesel powered equipment), underground mining workers should be equipped and trained in the use of self-contained self-rescue devices (SCSRs)...”.

Finally, the Guidelines state: “Monitoring should be designed and implemented by

accredited professionals as part of an occupational health and safety monitoring program with recognition for post-closure long term health concerns.”

Community Health and Safety. The Guidelines consider a range of possible community issues: “Community health and safety issues that may be associated with mining activities include transport safety along access corridors, transport and handling of dangerous goods, impacts to water quality and quantity, inadvertent development of new vector breeding sites, and potential transmission of communicable disease, e.g., respiratory and sexually transmitted infections results from the influx of project labor. In addition, there can be significant household and community level effects on the social determinants of health, e.g., drug, alcohol, gender violence, and psychosocial effects associate with the rapid influx of labor during construction and operational phases.” It is also stipulated that: “An Emergency Response Plan should be prepared in accordance with the guidance of the UNEP APPEL for Mining: Awareness and Preparedness for Emergencies at the Local Level.”

Mine Closure and Post-Closure.

Pertinent aspects of the mine closure section of the Guidelines include:

- “Mine sponsors should prepare a Mine Reclamation and Closure Plan (MRCP) in draft form prior to the start of production, clearly identifying allocated and sustainable funding

sources to implement the plan.”

- “A mine closure plan that incorporates both physical rehabilitation and socio-economic considerations should be an integral part of the project life cycle...”
- “The duration of post-closure monitoring should be defined on a risk basis; however, site conditions typically require a minimum period of five years after closure or longer.” (Note: There is some ambiguity in the Guidelines, as a later Environmental Monitoring section states: “...monitoring should extent for a minimum period of three years after closure....”.)
- **Financial Feasibility.** “The costs associated with mine closure and post-closure activities, including post-closure care, should be included in business feasibility analyses during the planning and design stages. Minimum considerations should include the availability of all necessary funds, by appropriate financial instruments, to cover the cost of closure at any stage in the mine life, including provision for early, or temporary closure. Funding should be by either a cash accrual system or a financial guarantee. The two acceptable cash accrual systems are fully funded escrow accounts (including government managed arrangements) or sinking funds. An acceptable form of financial guarantee must be provided by a reputable financial institution.”

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