MINE CLOSURE, SUSTAINABLE DEVELOPMENT & CORPORATE SOCIAL RESPONSIBILITY: AN EMERGING PARADIGM IN MINE PLANNING

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In the interest of time

This presentation is neither Mine Closure nor about Corporate Social Responsibility. I will just focus on the “shifting Paradigm and the linkage” between Sustainable Mining and Sustainable Development.
Outline of My Presentation

Briefly touch upon

1. What is Sustainable Development?
2. What Does Sustainable Development Means in Mineral Development Context
3. Challenges to Sustainable Mineral Development
4. International Context-- WSSD Key outcomes
5. Social Dimensions of Sustainable Development
6. Sustainable Mining – Unique features
7. Sustainable Development Approaches in Global Mining Companies
8. Conclusions
Who Needs Minerals?

- Developing and Developed Countries

- Greatest need in underdeveloped Countries (growing populations, resource use intensity)

- Competition between developing and developed countries over minerals is increasing
ARE CURRENT CONSUMPTION PATTERNS SUSTAINABLE?

EACH U.S. CITIZEN CONSUMES
MINERAL PRODUCTS > 58 KG/DAY
TOTAL MATERIALS > 100 KG/DAY

WHAT ARE THE IMPLICATIONS FROM AND FOR A GROWING AND ASPIRING WORLD POPULATION?
EVOLVING CONCERNS THAT AFFECT MINING INDUSTRY

- INDUSTRIAL GROWTH – QUESTIONS?
- INDUSTRIAL SYSTEMS INTEGRATION
- BIO-GEO-CHEMICAL CYCLES
- GLOBAL WARMING
- EARTH’S LIFE SUSTAINING CAPACITY
- SUSTAINABLE DEVELOPMENT
Sustainable development is defined as in the Brundtland report, namely, "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

The question then becomes one of ensuring that a development is sustainable, or that the development generated by the extraction of a mineral resource continues through time even though the mineral itself does not.
Sustainable Development

- This is a complex, long-term issue in which the social or human dimension of sustainable development becomes crucial.
- It is an issue that requires dealing with the fact that the mineral wealth of an area will come to an end, but that the development generated by that mineral wealth can and should continue so that future generations can continue to meet their needs.
- Sustainable development requires the integration of the economic, environmental and social dimensions of the development itself.
What Does “Sustainable Development” Mean in Mineral Development context?

- Long-Term Supply of Minerals
- Mineral development within the carrying capacity of the biosphere
- Long-Term Prosperity—mineral exporting/developing countries as well as mineral using/developed countries
What Does “Sustainable Development” Mean in Mineral Development context?

Long-Term Prosperity—

- Direct use of minerals supports human well being (e.g. concrete for homes, fertilizer for crops)
- Minerals are vital to the complex web of our economy (e.g. rare earths for the “new energy economy”)
- Minerals generate wealth which can be used to alleviate poverty (even if it always hasn’t been)
- Minerals are a generator of livelihoods
Eight Challenges to Sustainable Development of Minerals

Growing Populations

Growing Per Capita Mineral Use

Physical Availability of Minerals

Competition For Land

Competition For Energy

Competition For Water

Technology Development

Biosphere’s Capacity To Absorb Mining Waste Streams
A Growing World Population

Source: U.S. Census Bureau, International Data Base, June 2010 Update.
World Population Growth
Developing vs. Developed Countries

Population, in billions

Less developed countries

More developed countries

Global Income Distribution

The richest 10% of the world gets 53.1% of all the income.

The bottom 10% get 0.6%.

The richest 20% get 72.9% of the income.

Poverty vs. The Environment

Ending extreme poverty is a moral imperative now that the means to achieve this age old dream are within our grasp. Failing to grasp this opportunity is morally indefensible.


We have critical world problems of environmental stress – changes in ocean chemistry, loss of biological diversity, massive soil loss in agriculture, marine ‘dead zones,’ collapse of commercial fisheries, climate change – that threaten our ability to survive on the only habitable planet we know. If we don’t solve these problems, it won’t matter if we solve any of the rest.

See Herman Daly, *For the Common Good: Redirecting the Economy toward Community, the Environment, and a Sustainable Future* (1994).

There is a widely shared idea that the more we reduce poverty, the more we stress environmental systems, and the more we protect the environment the more people must be doomed to poverty.

Is this choice necessary, or a false choice?
Competition for Land

- Competing Land Uses
  - Agriculture
  - Urban Development
  - Retaining Land in State of Nature: Preserving Rare or Important Ecosystems
  - Tourism
  - Recreational Use

- Relative economic value of competing uses
  - Effect on land prices, making mining uneconomic. Thus, mining disproportionately affects poor/rural people
Improved Technology

**More efficient production**

**Beneficial effects**

- Expand supply: now feasible to mine lower-grade ore
- Energy efficiency
- Possible to minimize ground disturbance

**Negative effects**

- More mining of marginal deposits: increased impact on land, water, and local communities
- Consumptive deep water production
Technology Examples

- Gold – Bulk heap leaching (1960’s)
- Copper
  - Solvent-extraction/electro-winning method
  - low-cost production of copper from waste and raw ore dumps
- Uranium
  - In situ Recovery
  - Production of marginal resource without milling and tailings
  - Potential water impacts
Technology Issues

- Socio-Economic Impacts
  - Reduced need for manpower/local hiring
  - Increased worker safety
- R&D Funding Issues
  - Low profit margin of mining companies limits industry R&D
  - Government technology programs
    - Corporate welfare?
    - Is the public getting its money’s worth?
Carrying Capacity of Biosphere

- Capacity to absorb waste streams
  - Mining generates high concentrations of waste and effluents: long-term waste management and acid mine drainage issues
  - Impacts on land, surface water and groundwater, air, forest, biodiversity
- Legacy of historic mining sites
Improving Capacity of Biosphere

- Reduce waste streams
  - New technologies to mine, process, transport
  - Life-cycle pollution management
  - Shift from high-polluting minerals

- Reduce energy consumption
  - Mining, processing, transport
  - New sources of energy
  - Energy-efficient products with mineral components
Improving Capacity of Biosphere

- Land reclamation & post-mining monitoring
  - Improve predictive abilities for water impacts
  - Funding
  - Enforcement
- Reduce mining
  - Recycling
  - Substitution
  - Place ecologically sensitive areas off limits (exploration vs. mining)
International Context: 

**WSSD Key Outcomes**

“Mining, minerals and metals are important to the economic and social development of many countries. Minerals are essential for modern living”. (Hence need to find ways to enhance our contribution to SD).

Increasingly business and industry seen as part of the solution: but increased calls for more accountability and focus on governance – and transparency (reporting).
CRITERIA FOR MINE COMMUNITY SUSTAINABILITY

ECONOMIC SUFFICIENCY

BIO-PHYSICAL INTEGRITY

SOCIAL WELL-BEING

The Jeffrey Open Pit Asbestos Mine, Quebec
Guiding Principles

Mining and Minerals

Economic Sphere
◆ Maintain and enhance the conditions for viable enterprise.
◆ Ensure efficient use of all resources by maximizing royalties.
◆ Seek to identify and internalize environmental and social costs.
◆ Ensure a fair distribution of the costs and benefits of development.

Social Sphere
◆ Maximising human well-being.
◆ Respect and reinforce the fundamental rights of human beings, including civil and political liberties, cultural autonomy, social and economic freedoms, and personal security.
◆ Seek to sustain improvement over time; ensure that depletion of natural resources will not deprive future generations through replacement with other forms of capital.
Guiding Principles

Mining and Minerals

Environmental Sphere
- Promote responsible stewardship of natural resources and the environment, including redemption of past damage.
- Minimise waste and environmental damage along the whole of the supply chain.
- Exercise prudence where impacts are unknown or uncertain.
- Operate within ecological limits and protect critical natural capital.
What is the Triple Bottom Line?

“One of the greatest challenges facing the world today is integrating economic activity with environmental integrity, social concerns, and effective governance systems. The goal of that integration can be sustainable development”.

The triple bottom line focuses corporations not just on the economic value they add, but also on the environmental and social value they add – and destroy.
MINERAL INDUSTRY SUSTAINABLE DEVELOPMENT

- GOVERNMENT, MULTI-NATIONAL ORGANIZATIONS, INDUSTRY SUPPORT
- DEFINITIONS FOR MINERAL INDUSTRY SUSTAINABILITY – HEALTH AND SAFETY, ENVIRONMENT, ECONOMY, COMMUNITY, ETC
- MMSD, MSDF, NMA – GUIDELINES
SEVERAL UNIQUE FEATURES

- A LARGE NUMBER OF SUSTAINABLE PRACTICES IN MINERAL INDUSTRY – IN PLACE
- OPERATIONS HAVE TO END DUE TO DEPLETION OR ECONOMICS
- DISTRIBUTIONS OF BENEFITS AND IMPACTS – OFTEN NOT IN BALANCE
- FUTURE ECONOMIC BASE – NOT ASSURED
Sustainability can be summarized in four key principles:

First, benefits of economic activity must be considered in relation to their respective social and environmental consequences.

Second, in using resources, we must consider the needs and expectations of future generations.

Third, government, business and other segments of civil society must act together to balance these needs.

Fourth, corporate governance is a critical component of our ability to achieve success in meeting our business and sustainable development objectives.
Newmont Mining Corporation

Support and sustainable development – HIV, healthcare, business projects, tourism and mine closures.

- HIV treatment, renovation of health centres, clean water for 13,000 and fishing industry investment

Employment of locals

- 96% local rate in Ghana mines

Non-profit corporate entities

- Peru: ALAC

Poorer record when looking at conflict resolution and compensation in terms of resettlement.

- Public Eye’s ‘Hall of Shame’ in Ghana resettling 2009
Kinross Gold
Sustainability and community support

- Responsible post-mining reclamation
- Providing food to abate starvation in areas of operation,
- $12.5 million dedicated to infrastructure in Tasiast

Conflict Management

- Achieved conflict resolution, in dealing with Shuar tribe, through providing infrastructural support and fostering closer relationships.

• Employment of Locals
  - Average of 95 percent locals hired in 8 different countries.
IAMGOLD

- Mine closure policy in place which involves regular meetings with stakeholders to manage expectations.

- Community Investments are not only viewed as “strategic investments” but also “the right thing to do”.

- A strong policy is in place to hire from local and regional populations wherever possible.

- A partnership model with regards to community relations is in place to avoid conflicts.

- All sites have reclamation plans in place that are routinely updated.
Barrick Gold Corporation

“Throughout the life cycle of a mining project, Barrick endeavors to identify and address potential social impacts on local communities.”

Support. Grade - A.
- $900,000 annual investment in Peru to implement and support educational programs aimed at improving math skills and reading comprehension for more than 45,000 elementary school children etc.
- In Tanzania, sponsorship of an entrepreneurship course for villagers near the mine in 2006, that allowed some villagers to start their own businesses (e.g. Kiribo Construction Limited, 150 workers considerable amount of which are young locals)
The five principles of sustainable development (UK framework)

- Living within environmental limits
- Achieving a sustainable economy
- Promoting good governance
- Using sound science responsibly
- Ensuring a strong, healthy and just society
ICMM – SD framework, 10 principles

Ethical business practices & governance
Integrate in decision making
Human rights & respect
Risk management
Continual improvement (Health & Safety)
Continual performance (Environmental)
Biodiversity & land use
Product design, use, reuse, disposal
Community interaction
Transparent engagement, communication & verification ... in reporting
What is Sustainable Mining?

How can we measure our performance in some tangible way?
SUSTAINABLE MINING

design & build mining systems
methods, equipment, technologies, management
to perform optimally in the following contexts:
technical, economic, environmental, social performance.
UNIVERSITY OF ALASKA FAIRBANKS

MINE SUSTAINABILITY

SOCIAL WELL-BEING

ECONOMIC SUFFICIENCY

ETHICAL FOUNDATION

MINE COMPETITIVENESS

MINERAL RESOURCES

MINE ENGINEERING
Sustainable Mining...

• “…require good environmental stewardship in all activities, from exploration and processing to decommissioning and reclamation.” — United Nations*

• “…includes actions at all levels to: support efforts to address the environmental, economic, health & social impacts & benefits of mining; enhance the participation of stakeholders; and foster sustainable mining practices…” — WSSD**

Note:

*Mining and Environment Guidelines - Berlin 1991
**Paragraph 46 of WSSD Plan of Implementation
UN Guidelines

ECONOMIC

• Mining important to social, economic & material needs of society
• Avoid unnecessary environmental regulations that act as barriers to trade and investments
• Tax incentives for pollution reduction
Parameters of Sustainable Mining

UN Guidelines

ENVIRONMENTAL

- Environmental & economic considerations in the decision-making process
- Environmental impact assessments, risk analysis and risk management
- Best practices and environmentally sound technologies
- Environmental accountability
- Funding to improve environmental performance
Parameters of Sustainable Mining

UN Guidelines

SOCIAL
- Dialogues with stakeholders
- Social impact assessments
In my humble opinion........

Sustainable Mining

Sustainable Development
The mine & its local community: Aiming for a sustainable relationship

- A mine and its local community are inextricably linked.
- The two will thrive together or fail together but rarely will one thrive without the other for any length of time.
- Yet, mine planning engineers and mine managers often do not comprehensively evaluate the effect of the life-of-mine plan on the local community and vice versa.
- The quest for truly sustainable mines is unattainable without understanding how to ensure sustainable development of the local community.
Concluding Remarks

SD, Sustainable Mining and CSR are currently quite different things but are connected

SD requires a more systemic evaluation

We are a long way from SD, the clock is ticking... scale of transformation is considerable