

The Mining Industry and Sustainable Development

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It is a common perception that the mining and minerals industry is polluting and environmentally hostile. This impression is based on the past performance of mining when most mines were small businesses with a few miners trying to extract minerals with little understanding of future impacts. The nation was sparsely populated and generally the mines were located distant from population centers. Furthermore, the local communities had slight knowledge of the detrimental effects that resulted from abandoned mines. With expansion of the population, ease of travel, and greater concern for the environment, these adverse influences have been amplified. Additionally, mining in underdeveloped countries or areas with indigenous populations has generated issues about the equitable distribution of profits. The contemporary mining industry is abundantly cognizant of these concerns and is aggressively engaged in conducting operations in a safe and sustainable manner, and in restoring formerly degraded mining areas.

Issue

The minerals industry appreciates that whereas it mines and processes minerals to maintain and advance our standard of living, it must do so in a manner that protects the Earth and its environs so that the generations to come are not adversely impacted and can enjoy its bounties.

Background

Although awareness to the Earth's environment had become a prominent topic earlier, the concept of Sustainable Development (SD) did not become widespread until 1987 when the World Commission on Environment and Development published *Our Common Future*, commonly known as the Brundtland Report. That report defined SD as "development which meets the needs of current generations without compromising the ability of future generations to meet their own needs". This basic definition holds to this day though several attempts have been made to modify it to fit the minerals industry. One such effort was the Milos Statement¹ resulting from the 14th Annual General Meeting of the Society of Mining Professors and the First International Conference on Sustainable Development Indicators in the Minerals Industry, both held in May 2003, on the Island of Milos, Greece. The Society for Mining, Metallurgy & Exploration Inc. (SME) was a participant in these meetings and adopted the Milos Statement, which addressed the entire minerals community and enunciated that:

- *Minerals are essential to meeting the needs of the present while contributing to a sustainable future, and that the*
- *The minerals community will contribute to a sustainable future through the use of our scientific, technical, educational, and research skills in minerals, metals, and fuels.*

The statement expounded that these goals would be achieved through professional responsibility, education, training and development, and communication.

Several conferences have been held (1992 to 2015) before and after the Milos meetings, with specific themes which corroborates the view that the mining industry has been making progress towards incorporating various attributes related to SD, and its commitment to SD goals:

- Establishing the “3 pillars” of Sustainable Development—economic, environmental and social.
- Publishing “Breaking New Ground: Mining, Minerals and Sustainable Development.” This document discussed the issue of SD and mining at length, and provided an agenda for immediate and future actions by the minerals industry.
- Developing a “Plan for Implementation,” comprising 10 chapters, and instituting criteria for measuring results.
- Accentuating sustainability indicators, data evaluation and reporting, life-cycle assessment, and product stewardship.
- Focusing on issues of benchmarking, SD value creation, operationalization of SD, creation of knowledge hubs, modeling, fiscal issues, and best practices and tools.
- Presenting frameworks and tools for integrating sustainable development considerations into mine and plant design.
- Attracting young professionals, since they are more amenable to accepting SD goals.
- Incorporating sustainability into the educational process, and development, monitoring and assessment of SD criteria for mineral operations.
- Integrating Economics, Community, Environment and Governance.

The above-listed themes underscore that the mining industry has been actively involved with SD almost from the beginning of the SD campaign and that many mining companies have cooperated, collaborated, and adopted new processes towards achieving its objectives.

It is clear the act of mining a finite resource is not a sustainable activity². But it should be borne in mind that most of the communities where mining is conducted are sustained, in large part, by the mining operations. All industrial and many personal activities use mined minerals for a variety of applications and/or energy production. Thus mining has a significant positive impact on society in spite of its perceived detrimental consequences. Contemporary mining companies have incorporated SD into their long-term management strategies.

The development of new procedures and processes, use of new materials for manufacturing, greater emphasis on recycling, reclamation of old and current mining operations, cleaning up water discharges, improving air quality, and paying greater attention to health and safety, leaves future generations in an enhanced position and does not compromise their ability for a better life.

Principles

The major principles³ of SD are:

- Economic—which entails augmenting individual welfare; using all assets cost-effectively; incorporating environmental and social expenditures; and increasing the capabilities of business.

- Social—that is equitably allocating expenses and benefits to everyone; respecting human rights, including civil and political autonomy; cultural freedom; monetary independence; individual security; and to nurture improvements over a period so that future generations should not suffer from depletion of the resource.
- Environmental—so as to responsibly develop the resource with respect to the environment and remediate earlier impairment; diminish waste and destruction throughout the process; use caution when impacts are unidentified; work within environmental boundaries; and shield nature.
- Governance—assisting representative egalitarianism and participatory resolution of issues; support free enterprise with lucid laws and incentives; avoid concentration of power and institute checks and balances; have correct information readily available to all; be accountable for decisions based on careful scrutiny; promote teamwork to foster confidence; advance mutually accepted goals; and make decisions at proper levels and subsidiarity.

Stakeholders that have an interest in sustainability issues⁴ include employees, contractors, suppliers, customers, shareholders, creditors, insurers, local communities, local authorities, governments, NGOs (nongovernmental organizations), and others in specific instances. Particular stakeholders have special interests in certain issues. They assess if their interests are being met by tracking indicators or indices.

Monitoring Indicators

Indicators⁵ that may be used to observe whether the principles of SD are being observed include:

Economic Contributions

performance of shares
net earnings
percent return on capital investment
amount of mineral produced
number of jobs created
taxes and royalties created
capital expenditures

Social Benefits & Impacts

lost time injury frequency
injuries requiring medical treatment
risk-related educational programs
regular medical surveillance of employees
lifestyle seminars and family assistance
ranking of company as desirable place to work
employee perceptions about the company
percent employee turnover
workforce and training
wages
long-term incentive plan for employees
number of local residents employed
diversity of workers
donations to charities
work employee volunteers for community

Environmental Protection

control harmful emissions from equipment
minimize deforestation for new mines
control use of ozone creating gases & sprays
use low sulfur diesel & fuels
treat emissions to minimize nitrogen oxides
minimize use of benzene and volatiles
reduce flaring of natural gas (DOI rules)
minimize methane releases into the air
eliminating spills of hazardous substances
minimizing water used
restrict disturbance of new lands
reclaiming disturbed land
managing waste creation
recycle products and waste
reduce power usage
regulatory compliance

Governance

disclosure of contracts with extractive companies
timely release of revenue & operation info
make state-owned company accounts open
expose corruption
encourage freedom of information
introducing comprehensive legislation
promote independent licensing
report revenues for easy interpretation
balance with public sector
reporting sources of revenue
report all subsidies
open board selection
adopting international accounting standards
disclosing conflicts of interest
instituting proper auditing
controlling corruption
counteracting the perception of corruption

Adoption by Mining Companies

Most mining companies have embraced the principles of SD, and the major companies publish annual reports on their SD activities. Several indicators have been developed to monitor the achievement of the various goals of SD, and these are being continually upgraded. Many financial institutions require plans for SD before financing new projects. They have also developed their own indicators which they use to monitor adherence to the plan.

The National Mining Association encourages SD and has adopted a position, the highlights of which are:

- Its members share a mutual responsibility with all Americans to ensure that their actions meet the needs of today without compromising the ability of future generations to satisfy their needs;

- The fundamental benefits of mining industry products to modern economic and social development and to environmental improvement are by their nature for the betterment of future generations as well as the current one;
- Economic benefits that mining provides to local communities encompass employment, wages, economic activity due to purchases of goods and services, and from the payment of taxes, royalties and fees to local, state and national governments;
- Members accept the importance of accounting for these factors and taking prudent steps to minimize them, balancing benefits with adverse impacts that mining may have;
- To recognize the responsibility to participate in and contribute to a decision-making process that allows balanced development.

SME Statement of Technical Position

- The National Environmental Policy Act of 1969 (NEPA) and the Surface Mining Control and Reclamation Act of 1977 (SMCRA) imposed considerable environmental restrictions on the mining industry; SME has always reinforced strict adherence to the laws.
- In 2002, SME established a Sustainable Development Committee to lead its efforts in this area and to propel the organization into global prominence.
- SME is a signatory to the Milos Statement of 2003 on Sustainable Development, so it is committed to providing scientific, technical, educational, and research skills in minerals, metals, and fuels.
- SME recognizes that SD programs adopted by the industry have a tangible return on investment through brand recognition and loyalty, facilitation of permitting, reduced occurrence of community protests and vandalism, and diminished political risks.
- SME actively promotes educational programs that encourage professional growth and interaction with the engineering professional community through books, articles, symposia, short courses and/or conferences on sustainable development in the mining and minerals industries.
- SME has developed abundant expertise to provide balanced advice to government bodies, congressional staff, and other interested organizations.

References

¹Milos Statement, "Contribution of the Minerals Professional Community to Sustainable Development," May 2003.

²SME, "Sustainable development; from environmental compliance to a shared value," *Mining Engineering*, v 65, n 5, May 2013, p. 54-56.

³"Breaking New Ground: Mining, Minerals, and Sustainable Development," International Institute for Environment and Development, and World Business Council for Sustainable Development, Earthscan Publications Ltd, London, May 2002, 458 p.

⁴Azapagic, Adisa, “Developing a framework for sustainable development indicators for the mining and minerals industry,” *Journal of Cleaner Production*, Volume 12, Issue 6, August 2004, p. 639–662.

⁵Fytas, K., “Sustainable development in the Canadian mineral industry,” *Sustainable Development Indicators in the Mineral Industries*, Milos, Greece, 2003, p. 79-84.

⁶International Council on Mining and Metals, “Biodiversity Offsets – A Briefing Paper for the Mining Industry,” 25 July 2005, 18 p.

⁷Alcoa, “Integrating biodiversity into environmental management systems” from *Integrating Mining and Biodiversity Conservation*, published by the World Conservation Institute and the International Council on Mining and Metals, 2004, p. 14-16.