

ZINC *Protects!*

Zinc and Sustainable Development The Case of the Red Dog Mine

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Cominco Ltd



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Poverty is one of the most significant causes of environmental degradation. This occurs because exploitation of local natural resources is the only option left to people who have no monetary means to fulfil basic human needs. Degraded water quality, species extinction, desertification, and often moral and social decay, are the inevitable outcomes of increasing populations relying on limited resources for subsistence living. There is no simple solution: Experience shows that external intervention does not reverse the downward spiral of poverty and environmental degradation. On the other hand, wealth generation by economic development that occurs in isolation from environmental protection and social equity is not sustainable over the long-term. The concept of sustainable development offers an alternate approach to economic development that embodies the concepts of economic well-being, social equity and environmental protection; it offers the prospect of a long term solution to the downward poverty spiral for many countries and regions.

Society achieves sustainable development when communities become self-sustaining: through wealth creation, by developing internal social capabilities and by adequately protecting the environment. While recognizing the need to internalize the capabilities, wealth creation for developing countries often requires some form of external resources to help them to get on the right path. Developing countries seek to attract foreign investment because they need the financial capital and, in many cases, the technology to develop their 'natural capital' into the 'energy' required to fuel regional economies. Innovative and progressive companies, such as Cominco, Teck, Rio Algom, Noranda, Doe Run and others have demonstrated the ability and commitment required to develop resources in a socially and environmentally responsible manner.

This paper examines Cominco's experience in applying the principle of sustainable development to its operations.

Cover-picture.

*Mill and accommodations
complex middle-left;
mine pit in foreground.*

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Sustainable development, mining and metals

One thing is clear - people in countries with developed economies also enjoy cleaner environments; have access to clean water and shelter; live longer, healthier lives; and are better educated. Technological and economic advances are closely linked with social and political progress as well as heightened awareness of the need for environmental protection. People that grow up with developed economies will pass on to successive generations a more productive, technologically and socially advanced world. Thus, economic development is vital in terms of meeting the needs of current and future generations. At the same time, economic development leaves an imprint on the land. Mankind cannot survive on this earth without using and consuming some of its natural resources. However, it is how they are converted from natural capital into other forms of capital (social and economic) as well as whether resources are used wisely that determine whether the development will be sustainable or not.

Literally speaking sustainable development is a process of economic and social advancement that can be supported or continued indefinitely. Within a social, environmental and economic context it means: development that satisfies the needs of present generations without compromising the possibility for future generations to meet their needs. The principle of sustainable development focuses as much on people as it does on environment, and embodies broad social and environmental aspirations of modern society that include the following:

- Ensure basic human needs are met,
- Respect for human rights,
- Provision of clean and safe living and working conditions,
- Preservation of options for future generations,
- Protection of the environment, and
- Use limited natural resources efficiently and conservatively.

Products that result from mining activity are one of the sustainable aspects of mining. In this respect, mining produces the essential raw materials necessary to construct material goods, which improve our standard of living. Transportation, housing, agriculture and many other essential human needs are met by using the natural materials that result from mining. In fact, modern life could not exist without metals. Metals extracted by mining are durable and recyclable and thus meet the test of efficiency in mankind's use of resources.

Mines, however, are not 'sustainable' because they are not perpetual developments. Mining ceases upon exhaustion of the ore-body; and while technological advances enable extraction of minerals at lower concentrations



NANA (Northwest Alaska Native Association) shareholders at work. Almost 50 percent of the workforce are NANA shareholders.



NANA shareholder employed as an electrician.

A set of practices that embody the themes of sustainable development

thereby prolonging the life of mines, mines inevitably close. The level of economic activity during the mining process can be disruptive to communities and temporarily distort local economies, if not managed appropriately. Nevertheless, mining can also be a catalyst for other sustainable activities and contribute lasting benefit to communities. Communities and people in developing countries where resources are poorly developed due to inadequate technology, and where economies struggle under the burden of mounting national debts, are particularly in need of these types of developments.

Mining can provide sustainable benefits that improve the quality of life while minimizing the disruption of culture and traditional economies. In a cooperative relationship that respects culture and values, mine owners and local communities affected by the mining activity can work together to ensure that the benefits of mining are equitably shared. Community involvement helps to identify shared objectives between the mine owner and the affected populations, thereby enhancing the likely success of the operation.

Sustainable development and the Cominco experience

Cominco is a Canadian-based integrated natural resource company, whose principle activities are mineral exploration, mining, smelting and refining. Incorporated in 1906, Cominco is one of the world's largest zinc concentrate producers and fourth largest zinc metal producer. Although zinc mining and refining are the company's primary businesses, its operations also extend to other metal products including lead and copper. The company has mining operations worldwide, a history of success and innovation, and the reputation of being a responsible corporate citizen.

The company has had over 60 years experience working and operating mines in remote northern locations in North America and Greenland. These areas are characterized by extreme climatic conditions, poor to non-existent infrastructure, and sparse, widely disseminated, populations of, mostly impoverished, indigenous people. Economic development in these areas is predominantly natural resource based and sporadic. Consequently, many indigenous people rely heavily on subsistence hunting to meet basic human needs. The subsistence lifestyle also forms an important part of the cultural and spiritual nature of these people. Cominco's northern operations currently include the Polaris mine, on Little Cornwallis Island, Canada and the Red Dog mine, in Alaska, USA.

Over time, Cominco's experience of working with northern communities has helped it formulate a set of practices that embody the themes of sustainable development. From sound environmental management practices to socio-economic agreements, Cominco's experience at the Red Dog mine highlights the basic elements of sustainable development policy for a mining company.

The Red Dog Mine

Red Dog is the world's richest zinc deposit and is located on land owned by the Inupiat native people of northwest Alaska who are owners of a corporation known as the NANA (Northwest Native Alaskan Association).

Profitably develop one of the richest zinc deposits in the world and provide lasting benefits to people of the region

The land in which the Red Dog ore body is located is part of a land claim settlement agreement between NANA and the government of the United States. After a long period of meetings and negotiations covering the development of the Red Dog deposit between NANA and Cominco, a lease agreement was reached in 1982. This landmark agreement contained significant provisions and commitments to be implemented during the development and life of the mine.

Under the agreement, Cominco financed, constructed and now operates the mine and mill, in addition to marketing the concentrates produced. Cominco also assumed responsibility for employing and training NANA shareholders to staff the operations. Royalties are paid to NANA until Cominco recovers its capital investment, after which NANA will begin to share in the net proceeds from the development. An important provision in the agreement deals with employment; first preference on all hiring at the mine goes to qualified natives in the NANA region.

The objectives of the agreement were clearly established: to profitably develop one of the richest zinc deposits in the world and provide lasting benefits to the people of the region.

The mine is projected to host more than 40 years of reserves at current production rates.

Sustainable development policy elements

Sustainable development is about people, their long term economic well being and their environment. From Cominco's experience at Red Dog, it is clear that there are five main elements to sustainable development:

- Empowering people,
- Respecting culture, community values and traditional economies,
- Developing and internalizing capabilities,
- Equity in benefit sharing, and
- Protecting the environment.

Empowering people

In years past, mines were "permitted" based on assessments or agreements that took place between a mine owner and the relevant levels of government. Public involvement in the process was limited. Typically, arrangements between the mine owners and government took the form of some kind of tax or royalty payment required by regulation.



Environmental technician collecting water samples from a local creek that are used to monitor environmental conditions.

In theory, the needs and goals of the affected communities were represented by the governments. In fact, many of the monetary benefits flowed into general government revenues, rarely finding their way back to the surrounding or affected communities. Communities may or may not have directly benefited, primarily from employment, contracting services and supplies, or from infrastructure improvements related to the mining activity. However, these benefits were not always guaranteed as mining companies often imported experienced workers and goods from outside local communities.

Empowering communities through meaningful participation

A new paradigm of mine assessment and approval processes is emerging in most developed countries, which mandates community participation. The underlying principle is that this process provides fairness and transparency to the assessment of the costs and benefits of natural resource development. Empowering communities through meaningful participation is not only morally responsible, it enhances the likely success of the mine operation. Through a clear vision of shared objectives, mining can operate profitably while communities receive positive economic, employment and social benefits that arise from the successful development. Improvement to quality of life can be achieved through local involvement in decisions made on how benefits, both economic and social, will be distributed among the community, region or country. In some cases, this can be achieved through a social contract between the mine and communities. For tax revenue or royalty sharing, cooperation of the central government is usually required.



An essential factor in the success of the Red Dog mine was early participation of NANA in supporting the development and establishing the shared objectives. NANA and Cominco shared the objectives of profitably developing the mine while maximizing benefits to the people of the NANA region. A joint NANA/Cominco management committee was set up to regularly review and approve the mine operation's activities.

Other committees, such as the subsistence and employment committees, were established to oversee specific aspects of the NANA/Cominco agreement.

NANA's position as landowner obviously places it in a unique position of authority as compared to most communities, which are affected by mining activities. At the same time the degree of cooperation, mutual respect and support, and success of the operation, speak to the efficacy of such agreements that recognize shared goals.

Respecting community values, culture and traditional economies

Respect for culture and traditional economies are fundamental to building sustainability into the mining process. Culture dictates the value system of a community, while traditional economies, such as trapping or agriculture, can be vital to its long-term sustainability. A sustainable development policy must accommodate both culture and traditional economies.



At Red Dog, the vast majority of people in the NANA region are Inupiat Eskimos, whose ancestors inhabited the area for over 10,000 years. The Inupiat of this region rely heavily on subsistence hunting and fishing and for most families, the household economy is a mix of hunting, fishing, and part-time or seasonal employment. Reliance on subsistence hunting and fishing is not only an economic consideration; it also bears strong cultural and social significance. Dependence on the land is a traditional way of life for the Inupiat people and is vital to their identity and value system. The NANA and Cominco agreement contains significant provisions to protect the Inupiat's natural resources thereby allowing them to retain their connection with the land. Moreover, the work schedules at the mine are set up to accommodate the needs for individual NANA members to return to their communities to hunt and fish. A Subsistence Committee, comprised of representatives from NANA's local communities, oversees and continually reviews progress and maintenance of commitments made to protect the wildlife resources upon which the subsistence lifestyle depends.

Developing and internalizing capabilities

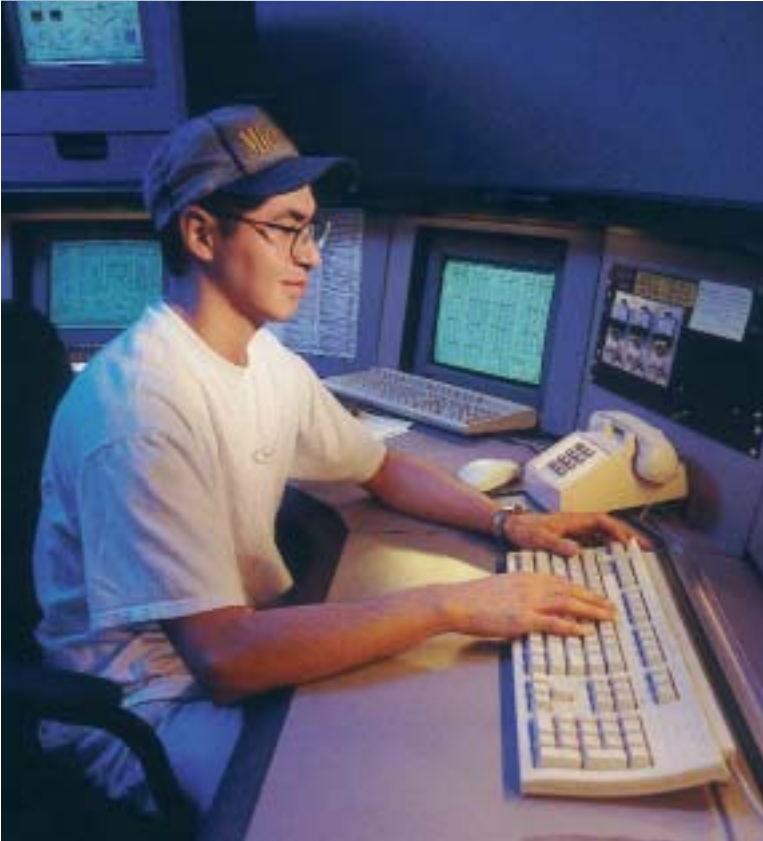
One of the most universally recognized means of improving standards of living is through education and skills development. Education contributes to sustainability by equipping individuals with the skills necessary to generate economic opportunities for their future. Many skills utilized in the mining industry are applicable in other industries and NANA shareholders who gain these skills at Red Dog are able to apply them elsewhere as opportunities arise. Education and knowledge transfer, however, are equally important in the other direction, from the community to the operation, and can be a critical factor in the successful development of the mine. Effective lines of communication need to be fostered early in order to incorporate local knowledge into the management and design of the mine.

*Respect for
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The community's expectations and aspirations with respect to education, skills training and, ultimately, employment in the more highly skilled jobs, must be balanced against the time-frame of the development, the existing educational resources in the community and what is realistically achievable. Early agreement between the community and the mine operator on training and other educational activities can help establish realistic goals. Most companies employ full-time trainers or have apprenticeship programs that provide skills training. Additional efforts are required to set up more highly skilled training programs and scholarships can be used to provide some of these needs. In some instances, longer-term opportunities could even be achieved by foregoing immediate results. The company, for example, could

establish a scholarship program, build a school or provide educational materials in lieu of on-the-job skills training in the more advanced positions.

One of the main goals of the original agreement between Cominco and NANA was to ensure NANA shareholders were preferentially hired to work at the operation. At the outset, there were many opportunities to work in less skilled occupations. However, NANA and Cominco recognized that, in order to employ shareholders in high skilled jobs, a major effort was required to encourage NANA's youth to pursue more ambitious goals in education. While NANA strives to raise regional educational standards, Cominco has concentrated on providing training and scholarships to students interested in careers in the mining industry. Both parties believe that making natural resources development viable over the long term involves careful investment - not only in infrastructure and equipment, but also in current and potential employees.



NANA shareholder at work in the mill operation's control room. Training and educational programs are in-place to promote shareholder advancement into senior-level positions.

Cominco made significant changes to its on-site training programs. The on-site training management plan is geared toward ensuring extensive training for all employees. Employees share acquired skills by teaching others with whom they work, and the company gains a diversified, multi-skilled workforce. Off site, Cominco has added an engineering scholarship education program and a school-to-work partnership with a local school district. The latter is a job shadow program, which helps to make school a more relevant experience for high school students by directly connecting their studies to future jobs. The aim is to form partnerships with the business community, develop mentor relationships, provide exposure to different opportunities, and spark interest in post-secondary studies.

The other educational initiatives include career days, environmental education, apprenticeship programs, tuition aid and a cooperative education job share program for employees. The job-share program offers employees a semester on/semester off job share education schedule.

At present, 59 percent of the workers and contractors employed by Cominco Alaska are NANA shareholders. Almost 100 percent of people in training are NANA shareholders. NANA and Cominco remain optimistic about future generations and the legacy of present employment opportunities at the mine and improved access to education. The ideas and skills of the young NANA shareholders presently employed at the mine will be a source of economic strength and leadership to NANA, the region and the State.

Equity in benefit sharing

One thing is clear in the history of mining activities : nobody benefits if the mine is not profitable. Taxes and/or royalty mechanisms, administered by regional governments, dictate the terms of how the proceeds of mining are shared with the wider community. However, in order to ensure benefits are

Sustainable development policy should recognize the priority of employing and supporting local services

directed toward communities that are affected by mining activities, flexibility and cooperation from national or regional governments are essential. Innovative approaches such as tax relief in favor of direct company investments in community infrastructure, roads or schools, should be considered as alternatives to the current management paradigm which emphasizes revenues to central authorities.

Other benefits derived from mining activities relate to direct employment or through indirect employment in providing supplies and contracting services. A sustainable development policy should recognize the priority of employing and supporting local services and supplies. At the same time it must recognize that the 'boom and bust' characteristic of mining activity needs to be mitigated.

Thus, equal effort should be placed on supporting and enhancing traditional economies and infrastructure developments, training and so on, that provide lasting improvements to the local and regional quality of life.

In addition to priority hiring given to NANA shareholders, NANA contractors have secured much of the business of supplying the mine including engineering and technical services, transportation and catering services and construction support. Indeed many services for the mine operation are obtained locally. In 1997, for example, Red Dog's local air charter payments to local carriers were approximately US \$ 1.1 million.

This put the charter service in a position to continue to offer scheduled air runs in to remote villages within the region. NANA's joint ventures associated with providing the mine's services have not only provided direct employment to NANA shareholders but also provided returns through profits and dividends. The lesson in Red Dog's case is that NANA maximizes opportunities and benefits through providing services and employing their shareholders in the delivery of

services. For many communities, a precursor to this approach is the development of business capabilities. Each situation will be different and it is not practical to be prescriptive in how such capabilities are developed. Creative thinking and cooperation between communities, the mining company and, possibly governments, is necessary to identify the opportunities for sharing the benefits of contracting services.

Finally, benefits of mining activities can also be shared through innovative arrangements with the regional governments. In Alaska, the regional government allows Cominco to provide payments directly to the Northwest Arctic Borough in lieu of taxes. Several millions of dollars support the Borough, relieving the residents of taxation. The payment is based on the



Hydroseeding a mine waste slope. The spray contains grass seed, fertilizer and a natural agent to help the seed stick to the ground. Hydroseeding is an important part of ongoing reclamation activities at the mine.

Borough's review of Red Dog's assets and the overall variability of the operations and is currently set at US \$ 4 million. These funds flow back to the area residents in the form of improved education and economic development opportunities.

Protection of environment

The mine's goal is to be the environmental model for the mining industry

As it is with any of mankind's activities, mining leaves an imprint on the land. For modern mining companies, a primary goal is to minimize the footprint left after mine closure. Within the footprint, however, consideration must be given to making the land useful after the mine closes and input from communities is an important part of this process. A concept that has taken hold in much of the North American mining industry is that of 'designing mines for closure'. Here mine closure is considered at the outset of mine planning. Community involvement at this stage is critical. This is in contrast to past practices where closure and reclamation planning came late in the life of mines or not at all. Cominco has had extensive experience in environmental management at mining operations and has successfully applied innovative approaches to water treatment and closure planning. Cominco has also had considerable success in developing and applying new technologies for metal refining that deliver superior environmental performance compared to older technologies.

Water is the most essential resource to support life on earth and is an essential component for mining. Therefore, protection of watercourses and water quality is a primary consideration. At Red Dog, Cominco has made significant advances in water treatment technology, which have resulted in setting new industry standards. Major water management and treatment projects include a US \$ 11 million diversion ditch as well as a system to collect and treat dirty water containing dissolved metals.

Of course, recycling is a critical part of the water management system and more than 95 percent of water used at the mill comes from recycled water.

In addition to water resources, Red Dog has programs in place to ensure protection of other land resources. The Subsistence Committee plays an important role in the environmental life of the mine. For instance, one of the first tasks of the committee was to select the route for the 52-mile road from the mine site to the port - a pathway that generally avoids important caribou migration paths, fish spawning areas and waterfowl nesting sites. The committee also directs monitoring programs for the area that provides information on aspects of subsistence hunting. At times during caribou migration, the haulage road is closed to reduce potential risks to the herd. The management of land and water resources is among the several examples



Caribou on a hillside near Red Dog mine; mill and accommodations complex shown top center of photo. Caribou migrate through the area towards the south in late summer and early fall, and to the north in the spring to early summer.

of how Red Dog incorporates environmental management into the operation of the mine. Red Dog is developing a more comprehensive environmental management system based on the ISO 14000 framework. The mine's goal is to be the environmental model for the mining industry.

Sustainable development and the sustainability of mining



Good fortune and hard work have put Cominco in an enviable position at Red Dog. The world-class ore body currently has at least 40 years of reserves with good potential to discover additional ore. In the past, having the opportunity to utilize a resource of this magnitude was practically a guarantee for success and wealth generation. And yet, one of the most significant changes in mining over the last 25 years is increasing societal expectations in regard to the contributions of mining to social and economic conditions and environmental responsibility. This ethos has been growing throughout the world, particularly with the rapid improvements in communications in recent years.

Stakeholders, from those at the most grass-roots community level to trans-national social investment organizations commonly demand information on issues ranging from operations activities to corporate codes of practice. Often, the desire for information stems from a long-standing sense of suspicion and mistrust of mining in general.

Sustaining the mining industry requires that mining activities continue to contribute to sustainable development. Achieving sustainable development can only be accomplished when stakeholders recognize their interdependence and need for mutual support and cooperation.

The key factor in building cooperative relationships is the development of fundamental trust and respect amongst the parties, as well as shared goals and objectives. Open communication and transparency are critical components in building that relationship. Successful communications are facilitated by the institutional structure developed in regulatory frameworks and agreements between parties, but that is only part of the story. Parties must be willing to listen actively to understand each other's position and to discuss fairly and openly options leading toward solutions. Success in this area also requires a commitment to maintain ongoing dialogue. Beyond the commitment to talk, is the willingness to accommodate evolving relationships over time. As society's needs and understanding in respect of sustainable development change over time, the mining industry must be prepared to adapt and contribute.

Stakeholders recognize their interdependence

Cominco's experience at Red Dog has demonstrated that by identifying and focusing activities to achieve the necessary elements of sustainability, the company is helping to achieve society's needs and its own desire for prosperity, social well-being and environmental integrity.

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