

# Silence is Golden, Leaden, and Copper

## Disclosure of Material Environmental Information in the Hard Rock Mining Industry

Robert Repetto



## Report Number 1

DATE OF REPORT	July 2004
COVER DESIGN	Bryan Gillespie, Yale Reprographics and Imaging Services (RIS)
PAGE LAYOUT	Dorothy Scott, New Haven, CT
PRINTING	Yale RIS
PAPER	60 lb. Text, recycled
RESEARCH ASSISTANTS	Nan Burroughs & Stephen Rogness
TO CONTACT THE AUTHOR:	rrepetto@stratusconsulting.com Robert Repetto Stratus Consulting 200 Brooks Place Boulder, CO 80302
TO ORDER COPIES OR DOWNLOAD AS FREE PDF	<a href="http://www.yale.edu/environment/publications">www.yale.edu/environment/publications</a>
ACKNOWLEDGEMENT	The research underlying this report was supported by the NAFTA Commission on Environmental Cooperation, by Environment Canada, and by the Liz Claiborne-Art Ortenberg Foundation. Neither the funders, nor The Yale School of Forestry & Environmental Studies, bear any responsibility for the contents of this report nor necessarily endorse its findings, which are solely those of the author.

# Silence is Golden, Leaden, and Copper

## Disclosure of Material Environmental Information in the Hard Rock Mining Industry

Robert Repetto

### Abstract

The requirements applicable to hard rock mining companies listed on U.S. or Canadian stock exchanges for financial disclosure of material environmental information are summarized. Ten financially material environmental events that occurred to ten such mining companies in recent years are reviewed to explore to what extent the companies had complied with such requirements. These events included dam failures, increases in remediation liabilities, increased bonding requirements, and other environmentally-related changes. The most common shortcomings in disclosure were found in the failure of the Management Discussion & Analysis section of company financial reports to disclose material risks and uncertainties known to management which were likely to result in material changes in financial conditions and results.

### Table of Contents

Executive Summary .....	1
Main Report .....	16

# Silence is Golden, Leaden, and Copper

## Disclosure of Material Environmental Information in the Hard Rock Mining Industry

Robert Repetto

### EXECUTIVE SUMMARY

Full disclosure of material information<sup>1</sup> by publicly owned companies is obviously crucial for the efficient functioning of capital markets and for the protection of investors, as recent corporate scandals have underscored. Full disclosure has therefore long been the foundation of U.S. and Canadian securities law and regulation. It has also long been recognized that some environmental information is material and must be disclosed. Disclosure, can forestall attempts by corporate managers to boost short-term profitability by measures that are not in the long-term interests of shareholders, including efforts to conceal environmental liabilities or to pursue risky environmental policies. There are increasing demands from shareholders, including large institutional investors, for fuller disclosure of environmental information. Securities regulators, environmental protection agencies and other government bodies have also expressed concern about the inadequacy of such disclosures.

In the securities laws of both the United States and Canada, the fundamental rule is that all material information must be promptly disclosed. In both countries, existing law requires disclosure in the Management Discussion & Analysis sections of financial reports of risks and uncertainties known to management that would be reasonably likely to cause future financial results and conditions to differ materially from those currently reported. In addition, there are specific requirements for the disclosure of material environmental information, including the current and future financial impacts of environmental regulations and environmental risk factors that might have a material effect on the enterprise. Environmental liabilities, such as the

<sup>1</sup> Information is material, according to Canadian and U.S. law, if reasonable investors would find it relevant to their investment decisions.

future costs of closure and reclamation of mining sites, must be disclosed unless the firm can make a determination that such expenditures are not reasonably likely to be necessary, or, if necessary, not financially material. In disclosing such liabilities, firms must reveal a probable range of costs even if no single figure can be determined.

These environmental disclosure rules are particularly applicable to hard rock mining companies because their operations typically have significant environmental impacts and require extensive reclamation when concluded. In the past, mining companies have understated environmental risks and liabilities, such as closure and reclamation costs, and have declared bankruptcy when mining has ceased, leaving costly environmental clean-up operations to the public sector.

The study reported here investigated the adequacy of Canadian and U.S. mining companies' disclosures of material environmental information. The methodology of the study consisted of the following steps:

First, a number of recent events were identified that 1) occurred to publicly-traded mining companies listed on U.S. or Canadian stock markets; 2) had material<sup>2</sup> financial significance for those companies and their investors or creditors; 3) were related to the companies' environmental exposures, performances, obligations, or liabilities.

Second, the financial filings and press releases of the company involved in each event before, after, and at the time of the event were examined to learn what the company had disclosed about each of the events. For U.S. companies, this involved reviewing 10-K, 10-Q and 8-K forms. For Canadian companies, it involved reviewing annual information forms, press releases and other periodic and special disclosures.

Third, the background and context of each event was investigated to learn what the company involved knew or was in a position to know about the event when and after it happened and what it was in a position to know about the possibility or likelihood of the event before it occurred. This phase was carried out by examining reports, studies and other material prepared by government agencies, consultants or other experts that would have been available to the company and other parties at specific times. Summaries of the case studies carried out with this methodology are given below.

In all but one of the case studies, disclosures were found to be deficient, especially in the disclosure to investors of known material environmental risks and liabilities. This finding lends weight to recent calls for stricter enforcement by securities regulators of existing environmental disclosure requirements and for better compliance by publicly listed companies with current environmental disclosure rules.

### **Canyon Resources, Inc. – The Kendall Mine, Montana, USA**

The Kendall gold mine in Lewiston, Montana, is owned and operated by Canyon Resources, Inc. The company's \$1.86 million reclamation performance bond had existed since 1989. In October 1999, the Montana Department of Environmental Quality, after reviewing the costs of cleaning up the cyanide leach pad and other mine works, increased the required bond to \$8.3 million. This increase was a material amount for the company relative to its total and current assets of \$81.8 and \$13.6 million at the

<sup>2</sup> Material events included those involving bankruptcies; abrupt and large percentage movements in the company's stock price; denials in operating permits to exploit important properties; or increases in financial liabilities and obligations that were significant in the context of the company's overall balance sheet. The financial magnitude of the events selected for investigation left little doubt of their materiality.

end of 1998. On August 21, 2000, the DEQ raised the bond amount to \$14.2 million. Prior to October 1999, Canyon Resources knew that its reclamation bond was under review by the Montana DEQ, so the possibility that the required bond might be raised by a material amount was an uncertainty known to management prior to the event and had to be disclosed under Item 303(d).

The company did disclose this material uncertainty in its 1998 10-K filing on April 7, 1999. The report's MD&A stated, "The DEQ requires the Company to maintain a \$1,869,000 Reclamation Bond to ensure appropriate reclamation. The DEQ is currently reviewing the adequacy of the bond amount and the Company anticipates that the DEQ will require a bond increase, but cannot presently predict the amount of any such increase."

Moreover, in the company's third quarter 10-Q filing, dated September 30, 1999, it promptly disclosed the increased bond amount. Next year, in its quarterly 10-Q filing for September 30, 2000, the company stated, "In August, 2000, the DEQ further revised the bond amount to approximately \$14.2 million. The company believes the DEQ bond amount exceeds the cost of remaining work and has filed an administrative appeal to the DEQ's actions."<sup>3</sup> In subsequent disclosures through the third quarter of 2003, the company discussed its ongoing controversy with the DEQ over reclamation at the Kendall mine, including information that in February 2002 the DEQ had decided that a comprehensive Environmental Impact Statement would be required to guide the remaining reclamation, which the company said would needlessly delay work and increase costs.

In conclusion, Canyon Resources did promptly disclose material information, as required, and provided the required warning regarding a material uncertainty known to management.

### **Hecla Mining Company – Coeur d'Alene Basin, Idaho, USA**

A century's mining and smelting by many companies in Idaho's Coeur d'Alene basin resulted in such extensive metals pollution that a 21 square mile area was made one of the nation's first Superfund sites in 1983. In February 1998, EPA started to study whether a much bigger area should be included in the site, which a federal court affirmed in June 2000. EPA's draft Remediation Investigation/Feasibility Study, describing clean-up options in the larger area with costs ranging from \$194 to \$2,600 million, was released for comment in June 2000 and finalized in July 2001. In September 2001 EPA's Record of Decision chose an option with a present value cost of \$360 million, excluding the costs of cleaning up the original smaller site. Meanwhile, in March 1996, the U.S. Department of Justice sued the company for recovery of clean-up costs and natural resource damages over the entire basin. In September 2003, the trial's first phase was decided, assigning Hecla a 31 percent liability for whatever damages were subsequently determined.

Although Hecla disclosed material events related to the Coeur d'Alene/Bunker Hill Superfund site as they occurred and warned investors that these events may have material adverse effects on the company, disclosure fell short on three counts.

<sup>3</sup> Canyon Resources, Inc., 10-Q report, Third Quarter, September 20, 2000, notes to CFS, Commitments and Contingencies, (a) Site Restoration Costs, p.11.

First, after the court assigned a 31 percent liability to Hecla, the EPA's Record of Decision with respect to clean-up costs in the wider basin (Operating Unit 3), and the estimated costs of cleaning up the Bunker Hill "Box" (Operating Units 1 and 2), it was implausible that the potential liability of \$18 million that the company disclosed was as likely as any other figure or that the range of \$18 to \$58 million captured the company's potential liability, for the following reasons:

- Within Operating Units 1 and 2, the total clean-up expenditures were estimated in a GAO study at about \$212 million, most of which was borne by state and federal agencies and is included in the amounts the government seeks to recover in part from Hecla based on its 31 percent liability.
- The EPA's Record of Decision estimated a \$359 million discounted present cost for the preferred remediation option for Unit 3, of which 31 percent is \$111 million.
- Although the trial judge opined that the plaintiffs had exaggerated natural resource damages, the alleged damages exceeded a billion dollars, based on contamination in a 1,500 square mile area over a period extending decades into the past and decades into the future. It is questionable that the most likely trial outcome is that damages will be found to be negligible.

Second, current regulations require a company to disclose the assumptions underlying its liability estimates. Hecla has not done this with respect to the liability it has accrued for the Coeur d'Alene site.

Third, from the time the government sued the company for damages and cost recovery in 1996 to the time of the court's assignment of substantial liability to Hecla in 2003, events indicated the company's increasing financial exposure to the basin's problems. These events included a court's affirmation that the wider basin could be included in the CERCLA action, the release of the EPA's draft RI/FS report with its range of costs, the Record of Decision indicating a discounted present cost of \$360 million for the preferred option, and finally the decision of the first phase of the trial assigning Hecla 31 percent liability. As seen through the eyes of management, this increasing financial risk to the company must have been obvious, given the efforts it made through negotiation, legal and political channels to limit the company's exposure. Nonetheless, the Management Discussion & Analysis sections of financial reports over this period provide little such guidance beyond an indication that unfavorable outcomes could have material adverse consequences.

### **Anvil Range Mining Company – The Faro Mine**

In 1994, Anvil Range Mining Company purchased the Faro zinc and lead mine in the Yukon from a receiver for the assets of Curragh Resources, which went bankrupt in 1992. Anvil operated the mine into 1997 but declared bankruptcy in April of 1998,<sup>4</sup> though in the fall of 1997 the company had declared assets of \$162.5 million and liabilities of \$93.8 million. However, the present value cost of closing and cleaning up the Faro mine had been estimated in 1993 at \$124 million, against which Anvil held a

<sup>4</sup> Mining Watch Canada and The Sierra Club of Canada. "TOXICCanada: Thirteen Good Reasons to Establish a Clean Canada Fund" [online]. July 1, 2001. Available: [http://www.miningwatch.ca/publications/toxic\\_13.html](http://www.miningwatch.ca/publications/toxic_13.html). 11-23-03.

Reclamation Securities Trust containing \$12.5 million in 1998. In November 1994 Anvil Range had agreed to fund the Trust from operating revenues with contributions varying with the net price of zinc. In October 1995 Anvil Range had also recognized a liability of \$43.5 million for environmental remediation on the property, having adopted Curragh's assumptions that reprocessing of tailings and lower reclamation standards would bring the costs well below those estimated in 1993.

Under this arrangement, falling zinc prices lowered the company's contributions to the Reclamation Securities Trust at the same time that the reprocessing of tailings became less economical, raising the company's reclamation liabilities. The company never made this risk clear as zinc prices fluctuated nor did it disclose a current estimate of the environmental liability in the event that reprocessing of tailings proved infeasible. By 1998, when the company declared bankruptcy, inflation and the increased volume of waste materials had raised the previous estimated cost of \$125 million to the \$145-150 million range, more than enough to make the company insolvent.

The company consistently stated in its financial disclosures that it expected the amounts accumulating in the RST to be adequate to meet its closure and reclamation obligations at Faro. Thus, up to the brink of bankruptcy, Anvil Range continued to maintain that it had adequately provided for reclamation of the Faro mine and failed to disclose its increasing liability as its strategy for funding the reclamation disintegrated.

### **Manhattan Minerals Corporation – The Tambogrande Mine, Peru**

Manhattan Minerals Corporation is a Canadian mining company devoted internationally to the exploration and development of mining properties. Its shares trade on the Toronto Stock Exchange. Its principal asset was a concession to develop a gold mine in Tambogrande, Peru, acquired in 1997 from President Fujimori by supreme decree. There was persistent opposition to the mine in Tambogrande since deposits lie under the town itself and mining operations were thought to be a potential threat to profitable commercial agricultural production. A company-funded Environmental Impact Study and discussions between the company and community organizations over several years failed to overcome opposition. On October 11<sup>th</sup>, 2002, the local government announced that a popular referendum would be held and on June 2, 2002, the residents of the town where the mine would be located conducted a referendum on the question of whether the mine project should go forward. Over 93 percent of those participating voted "No".

Manhattan Minerals' stock price fell by approximately 30 percent in the following days. Moreover, in September 2002, the company announced that due to "volatility in equity markets," the company was postponing a private placement and re-pricing significantly downwards share purchase warrants that it had issued a year earlier. This increased the company's difficulties in demonstrating to the Peruvian government that it had the financing to develop the concession property, a question then at issue. In December 2003, this issue formed the announced basis for the government's decision that Manhattan Minerals had not fulfilled the financial requirements of the

project and had forfeited its concession rights. Therefore, the referendum was clearly a material financial event for the company.

Throughout 2001 and 2002, the company's press releases and financial reports discussed its consultations with the community and progress in carrying out the Environmental Impact Assessment. However, the first mention of the referendum came in a press release dated February 14, 2002, in which the company declared:

“On February 10, 2002 the Ministry of Energy and Mines published in the official gazette its resolution to enforce existing laws in Peru that prevent local municipalities from calling referendums on issues which conflict with National laws. Specifically, the Government of Peru has now publicly stated their legal findings that a referendum on mining in the District of TamboGrande is not legal and that the Government will enforce the existing laws against such a referendum through the National Prosecutor if necessary.”

No indication was given in that release that the popular referendum constituted a material risk to the company's project or plans or a risk to investors.

The company's disclosures did not mention the impending resolution again until June 2, 2002, the day of the voting, when it issued a press release attacking the referendum and re-emphasizing its illegality. Results were not disclosed until the following day.

In summary, the strong local opposition to Manhattan Mineral's project in Tambogrande, culminating in an overwhelmingly negative vote in the community referendum in June 2002, was a material risk and a known uncertainty in the months leading up to the voting. The overwhelmingly negative vote in that poll resulted in a significant loss to shareholders and contributed to the challenge facing the company in attracting the capital needed to meet the financial conditions in its concession agreement. The company's disclosures in the months prior to the referendum did not disclose this risk adequately to investors.

### **Cambior – The Omai Mine, Guyana**

Overnight between August 19 and 20, 1995, the tailings dam failed at Cambior's Omai gold mine in Guyana, releasing approximately 4 million cubic meters of cyanide-laden mine waste into the Omai river, which feeds into the Essequibo, which eventually runs through the capital city of Georgetown. Cambior's stock plummeted 23 percent from Friday, August 18, 1995, to Monday, August 21, 1995. Trading volume went from about 27,000 on the 18<sup>th</sup> to about 3.7 million on the 21<sup>st</sup>. Moreover, the dam remained closed for months while the failure was investigated and a new tailings impoundment was constructed, resulting in substantial loss of income and additional costs for the company.

At the time of the failure, the amount of fluid in storage was eight times larger than the maximum allowable amount specified in the project's 1991 Environmental Impact Statement, which was the only operating plan in existence for the Omai mine project. The impoundment's cyanide content was many times higher than permitted in releases to the river.

In addition, according to the report<sup>5</sup> of the Dam Review Team to the Guyana Geology and Mines Committee, appointed to study the dam failure, the failure resulted from flaws in the dam's design and construction.

"It is our current judgment that failure of the dam was caused by massive loss of core integrity resulting from internal erosion of the dam fill, a process also known as piping. This means simply that finer particles from one soil moved freely under the influence of seepage forces into and through the interstitial voids of adjacent coarser soil due to excessive disparity between particle sizes of the two soils, allowing cavities and tunnels to develop within the dam."

"In basic terms then, the rock fill adjacent to the filter sand was simply too coarse to prevent the sand from washing into and through it, and both potential and actual problems this produced appear to have gone unrecognized or uncorrected throughout the sequence of design and construction until the failure occurred."

The Dam Review Committee thus found that the failure was caused primarily by faulty design and construction that went unrecognized or uncorrected. Evidence from other sources indicates that the problems were not unknown, but remained uncorrected. The Commission of Enquiry quoted from faxes between the resident engineer supervising the company's employees constructing the dam and the engineering firm's head office in September 1992, when the first stage of the dam was under construction. The resident engineer pointed out that with respect to the grades of rock fill adjacent to the filter sand, "It is fairly certain that the selected run of mine waste will not satisfy this specification. Is there room for coarsening the specification?" The reply came back: ". . . basically we will accept the finest of the run of mine muck which should be fairly close to spec (i.e., some coarsening of spec is acceptable.)"<sup>6</sup>

The Review Team also found that a corrugated steel diversion conduit through the dam had leaked, contributing to the dam's internal erosion. Again, the Commission of Enquiry cited communications between the project engineer and his home office during dam construction discussing whether to grout and reinforce the conduit with cement. The decision was not to do so, but to accept the risk that the culvert would collapse.

Cambior disclosed the dam failure and subsequent events in a series of press releases and financial reports starting in 1995. However, prior to the event, there was no mention in any of the company's Management Discussion & Analysis filings that the build-up of liquid behind the dam to volumes many times greater than its design capacity, combined with known flaws in the design and construction of the dam, constituted a known material risk or uncertainty. Since the company had known as early as 1992 and 1993 that flaws in the construction of the dam posed risks of failure, it is hard to imagine that those risks, combined with the large volumes of liquids with high cyanide concentrations in storage, did not appear through the eyes of management to pose material risks to the company and its investors.

<sup>5</sup>"Technical Causation of the Omai Tailings Dam Failure." Submitted to Guyana Geology and Mines Commission by Dam Review Team, November 16, 1995.

<sup>6</sup>Report of the Commission of Inquiry, p. 40.

### **Royal Oak Mining, Ltd. – The Giant Mine, Northwest Territories, Canada**

Royal Oak Mining Ltd. declared bankruptcy in April 1999, citing low gold prices, although Royal Oak's third quarter 1998 report listed assets totaling \$840.3 million and liabilities totaling \$645.8 million.<sup>7</sup> The latter excluded the cost of dealing with 240,000 tons of highly toxic arsenic trioxide buried in underground mining vaults in its Giant Mine in Yellowknife in the Northwest Territories that were leaching arsenic into ground and surface waters. Recent engineering estimates of the costs of closure and remediation are approximately \$200 million, against which the government held a \$0.4 million performance bond for water quality reclamation.

The Giant Mine went into production in 1948 using a roasting operation to extract gold from its arsenopyrite ore, producing arsenic trioxide dust as a waste product. The arsenic trioxide dust that was collected was blown underground into mined out and some specially constructed chambers for storage 20 to 75 meters below the surface. After 50 years of mining operations, approximately 240,000 tons of arsenic trioxide dust had accumulated underground. Approximately 10-13 tons were added every day over the last few decades.

Royal Oak Mines acquired ownership in 1990 and operated the mine from then until April 1999, when it went into bankruptcy. At low gold prices, Giant Mine became a break-even operation. Royal Oak Mines went into receivership in April 1999 with no provisions to deal with the arsenic trioxide problem, which was left to the federal government. Extracting it would be difficult to accomplish without endangering workers' health, since arsenic trioxide can be lethal if inhaled or absorbed through the skin and extraction would leave open the question of suitable long-term surface storage.

At present, after ten years of engineering studies, the government is supporting a plan to freeze the arsenic underground and let the arctic permafrost hold it in place, at a discounted present cost of about \$100 million. Under this scenario, the pumps would have to keep running until the arsenic has leached out of backfilled chambers and vaults, which would add an additional \$100 million in discounted present costs to the bill.

Royal Oak never recognized a liability for reclamation of the stored arsenic trioxide nor did it discuss the problem in its financial reports. It did provide for reclamation of the surface area under the terms of its lease. According to language in its 1997 and 1998 annual financial filing: ". . . the Company believes that it has made adequate financial provisions for the costs associated with mine closures and reclamation, and is of the opinion that any changes to environmental laws and regulations in the future should not have a material effect on the Company." Royal Oak did refer to the arsenic trioxide problem in its Water License Annual Report for 1998, but made no estimate of financial liability on the grounds that studies of various remediation options were still underway.

In other words, in its public disclosures, investors would find no reference to or estimate of the very large financial liability that the stored arsenic trioxide represented, a liability that had been valued at over \$120 million in 1993 and subsequently has been estimated in the \$200 million range. Were these estimates disclosed, the true state of Royal Oak's balance sheet would have been clear well before its declaration of bankruptcy in April 1999.

<sup>7</sup> Royal Oak Mines Inc. "Quarterly Report." USSEC. 11-16-98. Available: [www.sec.gov](http://www.sec.gov).

### **Boliden Ltd. – Los Frailes Mine, Spain**

On April 24 and 25, 1998, a large tailings pond dam failed at Spain's Los Frailes mine, owned by the Canadian mining company Boliden Ltd. A slab of soil beneath the dam 20 meters wide slid downhill approximately one meter. The dam cracked and broke abruptly. Between five and seven million cubic meters of acidic, metals-laden water and slurries spilled through the gap. Three rivers were affected, along with 11,000 acres of farmland.<sup>8</sup> Damage was also caused in the Doñana National Park, a U.N. World Heritage Site.

The dam failure prompted a 28 percent decrease in the value of Boliden's stock on the Toronto Stock Exchange in the five days after it was reported.<sup>9</sup> The event also triggered other material consequences. Boliden has spent at least \$12 million dollars cleaning up the Los Frailes spill.<sup>10</sup> On October 2, 2000, Boliden announced that its subsidiary Boliden Apirsa had filed a court application for commencement of bankruptcy proceedings and that the company would not continue development of the Los Frailes mine after October 2001.

A class action lawsuit was filed by the Canadian law firm Klein Lyons on behalf of Boliden's shareholders. The lawsuit alleges negligence on Boliden's part and claims millions of dollars in damages as a result of Boliden's failure to disclose the risk of the dam breach.<sup>11</sup> Moreover, on November 16, 2002, Boliden was sued for \$89.9 million by the Andalusian regional government. Although this case was dismissed on January 2, 2003, the regional government is now trying to recover the money through administrative channels. On August 2, 2002, the Spanish Council of Ministers demanded that Boliden pay \$45 million in penalties for the spill. Boliden refused and this demand is still pending. The Spanish Government has spent over \$275 million cleaning up the spill.

The principal cause of the Los Frailes accident has been established as deficiencies in the design and construction of the tailing dam by Boliden's contractor Dragados y Construcciones and its associated engineering firms, Itecsa and Geocisa.<sup>12</sup> These deficiencies, coupled with the fragility of clay soil and the high pressures of the water on the clay foundation,<sup>13</sup> are said to have triggered the dam failure. Essentially, with the weight of tailings behind it, a segment of the dam slid downhill on its slick clay base. The flow of tailings that escaped through the breach caused a rupture of a 50-meter section of the embankment.

The company knew of these risks. Following complaints in 1995 from the company's own engineer and a Spanish environmental group regarding seepage through the dam and possible instability and a 1996 report from engineering consultants that sliding surfaces were forming in the clay underlying the dam, Boliden and the regional authorities undertook a series of studies of seepage and the dam's stability, installed monitors within the dam to detect movement, and strengthened seepage containment works. These steps convinced the authorities to permit Boliden to raise the dam to accommodate more tailings from Los Frailes, despite the fact that according to a report by Geocisa, a civil engineering firm hired by Boliden, deformations of the inclinometers had been observed in 1997, indicating movement in the dam.

Nothing in Boliden's annual reports or interim financial statements prior to the dam failure mentions any possibility of structural problems in the Los Frailes tailings

<sup>8</sup> Eriksson, N. and P. Adamek. "The Tailings Pond Failure at the Aznolcollar Mine, Spain." United Nations Environment Programme. Mineral Resources Forum. Available: <http://www.mineralresourcesforum.org/incidents/Losfrailes/>

<sup>9</sup> Coleman, Thomas W. and Ana Perales. "Boliden Apirsa, Los Frailes Tailings Incident." United Nations Environment Programme. Mineral Resources Forum. Available: <http://www.mineralresourcesforum.org/incidents/Losfrailes/>

<sup>10</sup> Diehl, Peter. "The Los Frailes Tailings Dam Failure." World Information Service on Energy, Uranium Project. November 10, 2003. Available: <http://www.antenna.nl/wise/uranium/mdaff.html>.

<sup>11</sup> Ibid.

<sup>12</sup> Principa-EQE, Report (1999) "Structural Stability of the Aznalcóllar Tailings Dam," : one of several studies presented as evidence in the investigation as to the cause of the dam failure.

<sup>13</sup> Bolaños, A (8 April 2000) El País newspaper: A report was prepared by Antonio Gens and Eduardo Alonso, from the Polytechnic University of Catalonia in Barcelona.

dam. The company's Management Discussion & Analysis prior to the event did not treat the risk of a dam failure as a material uncertainty known to management. Subsequent to the event, Boliden admitted in a press release dated Feb. 26, 1999 that the tailings dam was ill-designed and blamed its contractor Dragados y Construcciones and its associated engineering firms Itecsa and Geocisa for the failure, claiming that their "incorrect interpretation of the geotechnical properties of the Margas Azules (Blue Clay) Formation [ . . . ] facilitated the failure of the tailings dam."<sup>14</sup> Faced with claims from Spanish authorities for recovery of damages and restoration costs, Boliden warned of possible adverse financial consequences. In October 2002, Boliden's Spanish subsidiary Boliden Apirsa sued the construction company Dragados y Construcciones S.A. for a minimum of 107 million Euros.

<sup>14</sup> Boliden news release, February 26, 1999.

### **Dakota Mining Company – The Gilt Edge Mine, South Dakota, USA**

Gilt Edge Inc., the company eventually reorganized as Dakota Mining Company in Canada, was granted a state mining permit in 1986 for the Gilt Edge Mine, a gold heap leach project. It finished mining the original reserves in 1992. Despite existing evidence of acidity and the presence of sulfide rocks, the original cash bond for reclamation was based on mining non-acid generating rock and totaled \$1.2 million. During operations waste rock containing enough sulfide minerals to generate acid was mined. Acid drainage from the waste dump was detected in 1993.

On April 19, 1993, in response to the acid problem, the South Dakota Department of Environment and Natural Resources issued the company a notice that required it to develop a mitigation plan. On March 16, 1995, the Board of Minerals and Environment approved the plan. The acid drainage problem raised the 1995 estimated cost of reclamation and reclamation bond to \$8.4 million. The company was able to provide only an additional \$1.0 million cash bond, with a \$6.2 million demand note to cover the rest.

In 1996, the state approved the company's permit to mine an adjacent site in order to generate cash for the reclamation program. However, part of the new site was on National Forest land and the Forest Service did not grant approval of the company's environmental impact statement, despite two applications. Consequently, the company stopped contributing to the reclamation fund, which then contained \$6.2 million, and in May 1998 informed the state government that it had no money to maintain the site or operate the water treatment plant to prevent acid drainage. Instead, it filled all the mine pits with 130 million gallons of acidic wastes. By then, estimated reclamation costs had reached \$13 million.

Although the governor of South Dakota sued the company to force it to maintain the site and operate the plant, the company's credit was exhausted and in July 1999, it declared bankruptcy. The state had the mine listed as a Superfund site in 1999 and has already spent \$27 million on cleanup, with an estimated \$18 million more needed for completion.

From 1996 through its 1999 bankruptcy filing, Dakota Mining consistently underestimated its reclamation liabilities at the Gilt Edge mine, even relative to the surety required by the state of South Dakota, an amount which itself was considerably less

than the actual reclamation cost. For example, in statements repeated in filings throughout 1997, the company stated that “the ultimate amount of the reclamation obligations to be incurred is uncertain, however the Company estimates these costs to be \$6.9 million at Gilt Edge Mine . . .” According to a government official familiar with this case, although it was faced with the problem for years at Gilt Edge, Dakota Mining downplayed its potential liabilities from acid mine drainage in order to avoid scaring off potential investors.<sup>15</sup>

### **Newmont Mining Corporation – The Midnite Mine, Washington State, USA**

The Midnite Mine was an open-pit uranium mine on the Spokane Indian reservation in Washington State. The site contains pits filled with hundreds of millions of gallons of contaminated waters, waste rock and tailings. The mine was owned and operated by Dawn Mining Company, of which Newmont Mining is majority owner. In April 1998, the EPA began an Expanded Site Inspection (ESI) that confirmed the elevated level of contamination. In February 1999, the EPA proposed that Midnite be added to the National Priority List as a Superfund site. This proposal carried important financial implications for Newmont, the parent company, because CERCLA’s provisions for joint and several liability greatly increased the likelihood that it, as the majority owner of Dawn Mining, would be held liable for remediation costs at the Midnite Mine and possibly the entire cost. A Remedial Action/Feasibility Study was begun. Data collections continued from the fall 1999 to the spring of 2000. On May 11, 2000, EPA listed the Midnite Mine site on its Superfund National Priorities List.

Newmont has promptly disclosed material events at the Midnite Mine as they have occurred. As the federal government moved toward listing the Midnite Mine as a Superfund site, Newmont noted the various phases. In its 1998 10-K report, after EPA had proposed the site for the National Priorities List on February 16, 1999, the company made the following disclosure: “In early 1999, the EPA proposed that the mine be included in the National Priorities List under CERCLA. If asserted, the Company cannot reasonably predict the likelihood or outcome of any future action against Dawn or the Company arising from this matter.”<sup>16</sup> In the following year’s 10-K, the company mentioned that the RI/FS had begun and moderated its position as to liability: “In mid-2000, the mine was included on NPL and EPA has initiated a RI/FS under CERCLA to determine environmental conditions and remediation options at the site. The EPA has asserted that Dawn and the Company are liable . . .”<sup>17</sup>

A year later, the company’s annual report further modifies its potential liability at the Midnite Mine: “The environmental standards that may ultimately be imposed at this site as a whole remain uncertain and there is a risk that the costs of remediation may exceed the provision Newmont’s subsidiary has made for such remediation by a material amount. Whenever a previously unrecognized remediation liability becomes known or a previously estimated cost is increased, the amount of that liability or additional cost is expensed and this can materially reduce net income in that period.”<sup>18</sup>

However, in subsequent filings through 2003, the company has maintained that since remediation requirements at the Midnite have not been finally decided, it

<sup>15</sup> Personal communication from Mike Cepak, South Dakota Department of Environment and Natural Resources, 02-06-04.

<sup>16</sup> Newmont 10-K Annual Report 1998. CFS, Note #18 Commitments and Contingencies, p.32.

<sup>17</sup> Newmont 2000 10-K Annual Report *CFS Contingencies*.

<sup>18</sup> Newmont 2001 10-K Annual Report *Remediation Costs for Federal Superfund Law Liabilities May Exceed the Provisions We Have Made*, p. 13.

cannot estimate its potential liability and intends vigorously to contest claims against it. Since the EPA had not completed its RI/FS by the end of 2003, even to the extent of releasing the estimated costs associated with its retained remediation alternatives, and had not issued a Record of Decision, Newmont could plausibly claim that it could not estimate its potential liability. However, when the Midnite Mine was put under CERCLA's provisions, the company became subject to specific SEC and FASB disclosure requirements. Those requirements prohibit the company from deferring disclosure until a single cost estimate had been established and require it to provide a range of possible liabilities if such a range could reasonably be estimated. Newmont had not provided even a range of potential reclamation costs. In late 2003, an asset management company filed a shareholder resolution with Newmont calling for fuller disclosure of environmental liabilities.

### **Teck Cominco – The Red Dog Mine, Alaska, USA**

On July 15, 2002, the Kivalina Relocation Planning Committee of the village of Kivalina, a small traditional Inuit community, notified Teck Cominco Alaska, operator of the Red Dog Mine, that they were going to sue the company under the citizens' suit provisions of the Clean Water Act for up to \$88 million in penalties for more than 3,000 violations of the Clean Water Act at the mine and the associated port facility. The suit charges that the mine regularly violated its discharge permits regarding effluents of cyanide and total dissolved solids and also discharged excessive quantities of heavy metals. The case was dismissed on the grounds that the plaintiff was not a "person" but the six individual members have filed a new suit making similar claims.

The Red Dog Mine site is in the western Brooks Range, approximately 600 miles north of Anchorage and 55 miles inland. It is the largest zinc mine in the world, producing 1.2 million tons of lead and zinc concentrates annually. These are then transported by road to a port site storage facility. Teck Cominco Alaska, a subsidiary of Teck Cominco,<sup>19</sup> operates the mine under an agreement with Northwest Alaska Native Association Regional Corporation (NANA), which owns the land where the mine and port are located.

The Red Dog Mine has a history of water quality problems, which baseline geologic and engineering studies done in the 1980s foretold. In July 1997, Cominco Alaska settled a federal government suit alleging hundreds of violations of the Clean Water Act through exceeding permitted levels of metals and pH at its wastewater pit. In the settlement, Cominco paid a \$1.7 million fine, upgraded its water treatment plant, and agreed to spend more than \$3 million on long-term ongoing monitoring and ecological studies. These studies showed that mine effluents had no incremental adverse impacts on water quality in Red Dog Creek, given that high background contaminant levels made it already unfit for aquatic life.

However, water quality problems continued at the mine. The two year compliance record available online at EPA's Office of Enforcement and Compliance Assurance shows that Red Dog Mine was non-compliant with provisions of the Clean Water Act in all 8 quarterly periods from October 2001 through September 2003.

<sup>19</sup> Teck Cominco was formed in 2001 through the merger of the Teck Corporation and Cominco Ltd., the previous operator of the mine.

Concentrations of total dissolved solids exceeded permitted levels by 1800 percent in the last quarter of 2001 and cyanide concentrations exceeded permitted levels by 100 percent in 2002. During this period the company operated under a compliance order under consent, while it negotiated with EPA for a much less stringent permit level for total dissolved solids and an alternative method for estimating cyanide concentrations, both of which were granted in 2003.

A June 2001 study for the Alaska Department of Fish and Game Restoration found that effluents from the Red Dog Mine over the period June 27, 1996 to June 27, 1997 had high concentrations of sulfate ions (1800-1900 mg/l), high concentrations of calcium ions (590-665 mg/l), high concentrations of total dissolved solids (2700-2740 mg/l) and that, on balance, the effluent was highly acidic, all at levels that would have been toxic to salmon and other aquatic organisms, had they existed in the 10-mile stretch downstream of the mine.

In June 2001, a study for the National Park Service found elevated levels of lead, zinc and cadmium along the road leading from the mine to the port through a national park. The company subsequently addressed emissions from the hauling trucks. In September 2001, the Alaska Community Action on Toxics released information that monitoring of the port site from 1990 to 1996 had found lead concentrations in soils as much as 36 times the state of Alaska's threshold for remediation requirements and more than twice as high as the threshold for zinc contamination.

In short, Teck Cominco was aware of its environmental problems at the Red Dog Mine and its record of permit violations over the decade preceding the suit because of its mandated monitoring and reporting programs, monitoring by outside bodies, and records of non-compliance kept by government environmental agencies. It also knew that operating under a compliance order by consent did not shield it from citizen lawsuits under the Clean Water Act.

Teck Cominco took note of the lawsuit in its 2002 Annual Report's Environment, Health and Safety Section: "A Committee from the community near the Red Dog mine brought proceedings against Teck Cominco alleging violations of the Clean Water Act and the mine's water discharge permits. The vast majority of the alleged incidents were permitted through compliance orders issued by the EPA and Teck Cominco Alaska has worked closely with the regulatory authorities and NANA to meet the concerns of the community of Kivalina."

Prior to the time the suit was announced, none of the company's filings give any indication that the pattern of non-compliance extending over a period of years might create a financial risk or exposure. For that matter, the company's disclosures do not reveal ongoing non-compliance. Neither the Management Discussion & Analysis nor the Environmental Matters sections of the company's reports treat the issue as a risk or uncertainty known to management. The company holds that the lawsuit was not a material event, although in the five day window surrounding its announcement, the company's stock price fell by 10 percent.

## MAIN REPORT

### WHY IS DISCLOSURE IMPORTANT?

Mandatory disclosure is a widely used public policy instrument, employed to protect the public and to improve the performance of businesses and government in fields as diverse as food safety, fuel efficiency, management of toxic substances, and sales of financial securities. Disclosure is a policy tool that relies on informed consumer and public choice rather than on direct regulation. Disclosure increases market efficiency by eliminating informational asymmetries between sellers and potential buyers that can distort market prices and sometimes deter market transactions altogether. Publicity provides strong incentives for business and government managers to improve performance by preventing them from shielding inferior or excessively risky products and services behind a veil of secrecy.

Improved disclosure will increase the efficiency with which financial markets allocate capital. At present, because information is not adequately available about environmental exposures that may affect future costs, earnings, and capital outlays, investors have difficulty in identifying companies that have better prospects and lower risks. Several studies of environmentally sensitive industries, such as oil and gas, pulp and paper, motor vehicles, and electric power have demonstrated that individual companies within those sectors vary widely in their financial exposure to impending environmental developments, largely because of the companies' past business decisions.<sup>20</sup>

These differences in exposure can lead to competitive advantages and disadvantages among companies within an industry and highly material impacts on shareholder value for the most exposed companies. In environmentally sensitive industries, the success with which companies manage their environmental risks can be a significant determinant of their value. Efficient functioning of financial markets depends on the extent to which they can accurately translate companies' exposures and competitive positions into assessments of financial value and risk, on the basis of available information.

The effectiveness of mandatory disclosure as a policy instrument has been reinforced in the last two decades by several ongoing trends. The development of the internet and of communications technology has dramatically improved the ease and speed of communication and has lowered its costs. Also, in many industries, more of a company's market value now consists of intangible assets, including its brands and business reputation. Since strategic alliances, supplier networks, complex chains of financial relationships, and other networks have become an increasingly prominent aspect of the business world, impairment of a firm's reputation can be a devastating loss. Reputational losses can also undermine consumers' brand loyalty and make it more difficult for a company to recruit and retain high quality employees.

In the environmental realm, mandatory disclosure programs have been notably successful. The U.S. EPA's Toxic Release Inventory has not only informed the public about potential hazards in their communities, it has also provided a strong stimulus

<sup>20</sup> Robert Repetto and Duncan Austin, "Quantifying the Financial Implications of Corporate Environmental Performance," *Journal of Investing*, Fall, 2002; Robert Repetto, "The Complexities of Strategic Environmental Management in the Electric Utility Industry," *Corporate Environmental Strategy*, March, 2003; Duncan Austin, *Changing Oil*, World Resources Institute, Washington, DC, 2002.

to companies generating reportable quantities of toxic substances to reduce their generation and release.<sup>21</sup> Subsequent to the publication of TRI data, prominent companies such as Dupont and Dow Chemical, among many others, entered into voluntary commitments to achieve major reductions, largely through pollution prevention initiatives. Explaining these commitments, CEOs of these companies have cited the need to protect their firms' reputations. It has also been documented that the companies with the largest reported quantities of toxic materials in the inventory experienced adverse stock market reactions, adding a financial impetus to their pollution reduction efforts.

In Canada, the National Pollution Release Inventory (NPRI) has had a similar success, prompting many companies to embark on accelerated pollution prevention and reduction programs.<sup>22</sup> Emissions reporting requirements such as the TRI and NPRI stimulated managers in some companies to quantify emissions on a plant and company-wide basis for the first time. On the principle that "You manage what you measure," this expanded measurement by itself encouraged better environmental control. In addition, greater transparency discouraged management from pursuing unduly risky environmental policies that might save money in the short-run but would expose the company and the public to excessive potential damages in the longer run.

The requirement that companies disclose to the investment community the material financial implications of their environmental exposures is also increasingly important. When the Securities and Exchange Acts of 1933 and 1934 enshrined disclosure as the principal means for regulating financial markets in the United States, Justice Brandeis said, "Sunlight is the best disinfectant." Since then, financial disclosure has become even more powerful, for several reasons. For one, the influence of external financial markets on management decision-making has become more pronounced. Within financial markets, an ever-larger percentage of assets are controlled by institutional money managers, who are capable of large, rapid portfolio shifts in response to new information. Consequently, unpleasant surprises can lead to massive sell-offs of a company's securities and rapid declines in their value. This is particularly true when the surprising information undermines investor confidence in a company's management and raises investor uncertainty about possible future revelations.

For example, the stock of Solutia, a company formed when Monsanto spun off its chemical division, plunged by almost 60 percent within a few weeks when an article in the *Washington Post* revealed that Monsanto had dumped tons of PCBs in Anniston, Alabama, and had covered up its behavior for decades. The company's behavior was deemed to be "outrageous" by an Alabama jury that held the company liable for negligence, suppression of truth, and nuisance, which opened Solutia to further lawsuits. In another well-known case, the stock of U.S. Liquids, a Houston waste management firm, fell 58 percent in one week when employees revealed to government authorities that the company had illegally dumped hazardous wastes and falsified records. Consequently, shareholders filed suit against the company for violation of securities law by issuing false and misleading reports and failing to disclose material information. Now, U.S. Liquids has itself been liquidated.

<sup>21</sup> A. Fung and D. O'Rourke, 2000, "Reinventing Environmental Regulation from the Grassroots Up: Explaining and Expanding the Success of the Toxic Release Inventory", *Environmental Management*; 25, 115-127.

<sup>22</sup> K. Harrison and W. Antweiler, 2003, "Incentives for Pollution Abatement: Regulation, Regulatory Threat, and Non-Governmental Pressures," *Journal of Policy Analysis and Management*, 22(3); 361-382.

These instances illustrate not only the power of publicity in financial markets but also the temptations into which managers can fall when imprudent or improper activities can be hidden from public scrutiny. As managers' compensation is more closely tied to stock market performance through stock options and performance-linked bonuses and as financial analysts focus ever more closely on quarter-by-quarter earnings, the temptation to manage earnings through short-sighted strategies has become more powerful. Although in recent years this has been seen most obviously in accounting irregularities and financial engineering perpetrated by such companies as Enron and Worldcom, the temptation to pursue shortsighted environmental practices may be no less strong. The Solutia and U.S. Liquids experiences also illustrate the dramatic damages that can be suffered by companies and investors through lack of transparency regarding environmental risks and exposures. The recent corporate scandals have reduced investor confidence in corporate management to a minimum and, if anything, have increased the potential damages to companies and investors when hidden information becomes public.

Yet, there is a significant unmet need in financial markets for greater disclosure of material environmental information. At present, although some companies release environmental reports and statements, these are very rarely linked to financial reports, nor are their financial implications explained. Financial analysts report difficulty in linking environmental to financial information. Consequently, analysts typically place little weight on environmental factors in evaluating a security's risks and potential returns, even in those sectors in which such factors are demonstrably significant.<sup>23</sup>

Despite a general rule in the securities laws of the United States and Canada that publicly traded companies disclose all financially material information in a timely manner, few companies with significant environmental exposures actually provide such information in their financial statements and filings. A study of thirteen large companies in the U.S. pulp and paper industry found that, for the most exposed companies, the most likely estimate of the financial impact of important impending environmental rules was an 8 to 10 percent loss in total shareholder value. Yet only three of the thirteen companies mentioned those environmental issues at all in their financial statements, and those three did so only in a cursory qualitative fashion.<sup>24</sup> Comparable studies in other industries have arrived at similar findings.<sup>25</sup>

The lack of material environmental information is especially pronounced in those sections of financial reports intended to disclose business trends and uncertainties significant for the company's future earnings and financial conditions, such as the Management Discussion & Analysis section. A report recently made public by the Securities and Exchange Commission on their review of financial statements filed by the Fortune 500 largest U.S. companies stated:

"We found that we issued more comments on the MD&A discussions of the Fortune 500 companies than any other topic. Item 303 of Regulation S-K requires . . . [a discussion of] known material events and uncertainties that would cause reported financial information not to be necessarily indicative of future operating results or of future financial conditions . . . Our comments addressed situations where companies simply recited financial

<sup>23</sup> Robert C. Eccles et al., *The Value Reporting Revolution*, Wiley, NY, 2001; ch.7.

<sup>24</sup> Robert Repetto and Duncan Austin, "A Quantitative Approach to Strategic Environmental Risk Management," with Duncan Austin, in Peter N. Nemetz, ed., *Bringing Business on Board*, JBA Press, Vancouver, 2002.

<sup>25</sup> Robert Repetto and J. Henderson, "Environmental Exposures in the U.S. Electric Utility Industry," *Utilities Policy*, (11) 103-111; 2003.

statement information without analysis or presented boilerplate analysis that did not provide any insight into the companies' past performance or business prospects as understood by management."<sup>26</sup>

Such information is crucial for investors because the value of securities depends on the stream of future returns and their riskiness. In many industries, future returns and risks are significantly affected by environmental exposures. Because these are inadequately disclosed and analyzed, investors often suffer sudden and significant losses when those risks materialize. Most of these occurrences were the culmination of environmental exposures and risks that existed beforehand but were not disclosed and were not understood by investors, who consequently suffered serious losses.

Financial markets are now asserting a growing demand for transparency, in part because of these experiences. According to a recent Standard and Poor's *Transparency and Disclosure Study* (available at [www2.standardandpoors.com/spf/pdf/products/WhitePaper.pdf](http://www2.standardandpoors.com/spf/pdf/products/WhitePaper.pdf)),

"Public companies around the world are increasingly under pressure from the ongoing 'corporate governance revolution' in which large institutional investors are intensifying the pressure on management to disclose all material information."

A corroborating study by the accounting and consulting firm Ernst and Young found, after a study of share performance in the 1000 largest global companies, that poor investor relations was the third most frequent cause of sudden and major drops in share value. Companies that are lax on disclosure are more vulnerable to share price volatility than those that provide qualitatively good information. Moreover, investors have shown that they are willing to pay a premium for companies with superior disclosure records.<sup>27</sup>

In the United States and also in Canada, in the wake of corporate scandals, new requirements have been adopted requiring CEOs and CFOs to certify the accuracy and completeness of their financial statements and MD&As, requiring more independence of corporate directors from management, requiring corporation lawyers to take action if accounting or reporting irregularities are discovered and not corrected, and requiring separation of auditing and advisory functions. In addition, the current U.S. administration and Congress have markedly increased appropriations of funds to strengthen the enforcement capabilities of the Securities and Exchange Commission, which itself has taken steps to tighten disclosure standards.

The demand for more disclosure extends to environmental information. The SEC review of Fortune 500 company disclosures found specifically that information on environmental exposures and liabilities was frequently deficient.

An increasing number of shareholder resolutions are being filed asking management for disclosure of material environmental information.

- In Canada, shareholders of Imperial Oil recently submitted a resolution requiring the company to spell out potential financial liabilities associated with its greenhouse gas emissions and to put in place a plan to reduce those liabilities.

<sup>26</sup> U.S. Securities and Exchange Commission, "Summary by the Division of Corporate Finance of Significant Issues Addressed in the Review of the Periodic Reports of the Fortune 500 Companies", February 27, 2003; available at <http://www.sec.gov/divisions/corpfin/fortune500rep.htm>

<sup>27</sup> "Going with the Flow," *Investor Relations on the Net*, October 15, 2002.

- In the United States, in 2003, an investor coalition that includes the State of Connecticut's [Retirement] Plans and Trust Fund filed resolutions with five of the largest U.S. electric power companies requesting that they disclose to shareholders the economic risks associated with emissions of carbon dioxide and other air pollutants and the business benefits associated with reducing those emissions. In an important recent development, Institutional Shareholder Services, an organization that advises pension and mutual fund managers on how to vote their proxies, endorsed these shareholder resolutions.<sup>28</sup> This endorsement potentially adds institutional money managers controlling hundreds of billions of dollars in assets to those demanding more environmental transparency.
- The Carbon Disclosure Project, an even larger initiative backed by thirty-five of the world's largest institutional investors, has been urging companies to disclose their greenhouse gas emissions and the risks they pose to the companies, and the extent of their emission reduction programs.

<sup>28</sup> Jeffrey Ball, "Global Warming is a Threat to Health of Corporations," *Wall Street Journal*, April 16, 2003.

Another trend sustaining the demand for more environmental disclosure is the increasing share of investor assets held in environmentally screened or "socially responsible" mutual funds and portfolios. Such portfolios now hold at least a trillion dollars in assets.

Their growth has been stimulated by two factors. First, the replacement of defined-benefit pension plans with defined-contribution plans, in which beneficiaries have greater control over asset allocation, has led money management firms to create and offer screened portfolios or funds as an investment choice. For this reason, among others, almost all major investment houses now have staff responsible for environmental evaluation and research. Second, the demonstration in recent years that screened portfolios often provide risk-adjusted returns superior or equal to unscreened benchmarks has encouraged investors to allocate at least a portion of their assets to the environmentally screened portfolios. Both factors in combination contribute to the demand for financially relevant environmental information.

First-generation screens merely eliminated companies or entire industries that were deemed socially unacceptable. They are being replaced by research carried out by such firms as IRRC, KLD, Innovest, Trucost and Sustainable Asset Management that seek to understand which companies are likely to provide higher risk-adjusted returns by virtue of their superior environmental and sustainability practices.

These developments have reinforced financial market demand for relevant environmental information. Such information should be available under existing general requirements in the securities laws of Canada and the United States that companies promptly disclose all material information, since some environmental information is clearly of material financial importance. In addition, there are more detailed and specific environmental disclosure requirements in U.S. and Canadian securities regulations that have been clarified through published accounting

standards and explanatory releases by securities regulators. These detailed disclosure requirements cover such matters as the costs of compliance with environmental regulation, liabilities for remediation and restoration of contaminated property, potential damages from environmentally-related legal actions, and other known environmental risks and uncertainties.

However, concerns have been raised regarding the extent to which these requirements are being complied with or enforced, partly as the result of the sector studies and individual cases mentioned above. Last year the U.S. Senate requested the General Accounting Office to investigate the adequacy of environmental disclosure by corporations publicly listed on U.S. securities markets, and the adequacy of the SEC's enforcement of its own requirements. This request followed the release of a 1998 study by EPA that found that 74 percent of the companies subject to environmental legal proceedings that should have been disclosed under SEC rules had failed to do so. In Europe as well, the European Commission issued stricter non-binding guidelines in 2001 for disclosure of environmental costs and liabilities in response to a finding that unreliable and inadequate information about environmental performance "makes it difficult for investors . . . to form a clear and accurate picture of the impact of environmental factors on a company's performance or to make comparisons between companies."<sup>29</sup>

In fact, enforcement of environmental disclosure requirements in the past has been minimal. In Canada, only a single case involving environmental disclosure was brought by securities regulators within a period of twenty-five years. In the United States, only a handful of cases were raised.<sup>30</sup> Enforcement has not been vigorous in years past because environmental issues were not salient among all the securities regulatory issues that the responsible agencies were faced with. Moreover, those agencies have typically been under-staffed and under-funded to the extent that they were able to deal with only the most urgent and egregious issues.<sup>31</sup>

The lack of enforcement effort has weakened compliance with disclosure regulations. Further, this has led to the misperception among some financial analysts and investors that, since little environmental information was included in financial disclosures, such information must not have been material.

## WHY FOCUS ON THE HARDROCK MINING SECTOR?

These considerations are extremely relevant to the mining industry. According to the U.S. Environmental Protection Agency, aside from global warming, mining presents the most significant threat to ecosystems around the world. A modern open pit mine extracts hundreds of millions of tons of earth, rock and ore, disrupting the landscape and in many instances blocking or contaminating waterways. It processes extracted ores in the open, using such toxic chemicals as cyanide and sulfuric acid. It exposes native rock and mineral waste to oxygen and water so that acids and heavy metals leach into surface and ground water. When mining ceases, remediation and reclamation of the pit and surrounding waste can require decades of work and cost hundreds of millions of dollars.

<sup>29</sup> Donald Sutherland, "Europe Tightens Corporate Environmental Accounting Rules," *Environmental News Service*, Brussels, October 5, 2001.

<sup>30</sup> Commission on Environmental Cooperation, *Environmental Disclosure Requirements in the Securities Regulations and Financial Accounting Standards of Mexico, Canada and the United States*, Montreal, 2002.

<sup>31</sup> U.S. Government Accounting Office, *SEC Operations: Increased Workload Creates Challenges*, Washington, Govt. Printing Office, March 2002.

Mines throughout the United States and Canada are responsible for major environmental impacts on land, air and water quality. In the U.S., EPA estimates that mining has polluted 40 percent of western watersheds, where most mining occurs. The EPA has also identified the mining industry as the largest toxic polluter in the U.S. There are tens of thousands of abandoned mine sites throughout western North America, many of which are still causing environmental damage.

Mining companies have often understated such impacts in permit applications, environmental impact assessments, and financial prospectuses. This pattern of performance has had significant financial consequences. When faced with the costs of remediation, mining companies have sometimes declared bankruptcy, to the detriment of creditors and shareholders. Taxpayers have been forced to assume the clean-up costs of abandoned mining sites. In past years, cases have been brought by citizens or by securities regulators in the U.S. and Canada alleging inadequate disclosure of material environmental liabilities. No new paragraph here. Follow on “In September . . . In September 1998, Local 890 of the United Steelworkers’ Union brought suit in federal court, alleging that Phelps Dodge had failed over a period of years to disclose releases of large volumes of toxic materials at its mining operations in New Mexico. At the close of 2003, the Boston Common Asset Management Group filed a shareholder resolution with Newmont Mining Corporation calling on the company to report on the risk to the company’s operations, profitability and reputation from its social and environmental liabilities. A spokesperson for the Group stated, “Newmont Mining senior executives purport to be committed to sustainable development but we continue to have concerns as investors that the company is not fully disclosing its social and environmental liabilities. We feel that Newmont needs to disclose not only its potential liabilities but also what policies the company will put in place to avoid those costs in the future.”<sup>32</sup> These and other examples illustrate the need to examine more broadly the disclosure practices in the mining sector.

<sup>32</sup> Press release from Oxfam America, December 11, 2003.

<sup>33</sup> *Securities Act*, R.S.O. 1990, c. S. 5., s. 53(1) [hereinafter *OSA*]; *Securities Act*, S.A. 1981, c. S-6.1, s. 81(1) [hereinafter *ASA*]; *Securities Act*, R.S.B.C. 1996, c. 418, s. 61(1) [hereinafter *BCSA*].

## WHAT DISCLOSURE REQUIREMENTS APPLY TO U.S. AND CANADIAN MINING COMPANIES?

### Essential Features of Applicable Disclosure Requirements in Canada

Securities regulation falls within the responsibilities of the provincial governments but Ontario’s regulations generally set the standard. The securities disclosure regime begins with the requirement that a preliminary and final prospectus be filed<sup>33</sup> containing “full, true and plain disclosure of all material facts relating to the securities issued or proposed to be distributed.”<sup>34</sup> ‘Material fact’ is defined by the Ontario Securities Commission as “a fact that significantly affects, or would reasonably be expected to have a significant effect on, the market price or value of such securities.”<sup>35</sup> Material changes, defined as “. . . a change in the business, operations or capital of the issuer that would reasonably be expected to have a significant effect on the market price or value of any of the securities of the issuer,” must also be promptly disclosed.<sup>36</sup> Any material change in the affairs of a reporting issuer must be disclosed to securities

<sup>34</sup> *Ontario Securities Act (OSA)*, s. 56; *Alberta Securities Act (ASA)*, 84(1); *British Columbia Securities Act (BCSA)*, s. 61(2), 63(1).

<sup>35</sup> *OSA*, s. 1.

<sup>36</sup> *OSA*, s. 1.

regulators and to the public through a press release by a senior officer of the company that describes the nature and substance of the development.<sup>37</sup>

The legislation appears to set up separate disclosure requirements for material facts and changes. However, provincial securities commissions and stock exchanges have largely eliminated this distinction; instead, there is an obligation to make continuous and timely disclosure of all material information that arises in the affairs of a reporting issuer, a category including both material facts and changes.<sup>38</sup>

### *Disclosure Requirements of Environmental Information*

To the extent that environmental information could reasonably be expected to influence investors' decisions or securities prices, it must be disclosed under existing regulations. In addition, there are specific disclosure requirements pertaining to environmental information.

The prospectus must include a narrative description of the business of the issuer, including “. . . the financial and operational effects of environmental protection requirements on the capital expenditures, earnings and competitive position of the issuer in the current financial year and the expected effect, on future years.”<sup>39</sup> The issuer must also list “risk factors material to the issuer that a reasonable investor would consider relevant to an investment in the securities being distributed,” such as “environmental and health risks.”

Securities law requires the reporting issuer to set out in its annual information form the impact of the following environmental criteria on its business generally and to list for the affected industry segments “. . . the financial or operational effect of environmental protection requirements on the capital expenditures, earnings and competitive position of the Issuer for the current fiscal year and any expected impact on future years.”<sup>40</sup>

According to the Canadian Institute of Chartered Accountants, the following general provisions would also apply:<sup>41</sup> Under Part III, Management Discussion & Analysis, Item 1(4)(a), para. 124, environmental expenses that are unusual or infrequent events or transactions or otherwise represent any significant economic change materially affecting income from operations must be disclosed, along with the extent to which the income from operations are affected.

If disclosure of an environmental risk or uncertainty is necessary for an understanding of the Issuer's financial condition, changes therein, or results of operations, it should be disclosed under Part III, MD&A, Item 1(1)(3), para.108, with particular emphasis on risks over the next two years. Recent guidance issued by CICA on MD&A disclosures emphasizes companies' obligations to provide management's assessment of future value drivers and material trends and uncertainties, giving investors a realistic portrayal of the business outlook and prospects as seen by management, not simply a boilerplate narrative reiteration of current financial data.<sup>42</sup>

Disclosure requirements for natural resource companies in British Columbia are particularly relevant for mining companies. Regulations require substantial disclosure of the financial impact of environmental regulations.<sup>43</sup> Concerning proposed exploration and development programs, they require disclosure where environmen-

<sup>37</sup> OSA, s. 75(1); ASA, s. 118(1)(a); BCSA, s. 85(1)(a).

<sup>38</sup> First published (1987), 10 Ontario Securities Commission Bulletin (O.S.C.B.), 6295; restated (1993), 16 O.S.C.B. 2722.

<sup>39</sup> Published in (2000) 23 O.S.C.B. (Supp.) 685. The same criteria is found in *Ontario Securities Commission Supplement General Prospectus Requirements* (2000), 23 OSCB (Supp.) 795, with the costs of environmental compliance dealt with also at 6.1 (1), 4. (h), and risk factors at item 20.1(1)(h).

<sup>40</sup> First published in (1989) O.S.C.B. 4275, as am. by (1990) 13 O.S.C.B. 943.

<sup>41</sup> Moore, David J. ed., *Accounting for Environmental Costs and Liabilities* (Toronto: CICA, 1993).

<sup>42</sup> Canadian Institute of Chartered Accountants, *Management Discussion and Analysis Guidance Document*, Toronto, 2002.

<sup>43</sup> British Columbia Securities Commission, Chapter 1 – Notices Weekly Summary, Edition 95:15, p. 10 April 21, 1995 *Form 14A Information Required in Prospectus of a Natural Resource Issuer*.

tal restrictions are likely to have an effect on operations. They also require environmental regulations to be listed again under the heading of “risk factors,” where such regulation could be a material financial risk to an investor. For the mining industry in particular, regulations in British Columbia require the disclosure, to the extent known, of all environmental liabilities to which the property is subject and call on the issuer to include a discussion in the Technical Report of environmental bond posting, remediation and reclamation obligations, if applicable.

In Canada, companies must present their financial statements according to GAAP. The CICA Handbook is an authoritative source of GAAP, including the proper treatment of environmental liabilities. Section 3060 of the Handbook requires that an accrual for the future removal and site restoration costs be made through charges to income.” Section 3060 also states that these future environmental liabilities are to be reported only “when the likelihood of their incidence is established as a result of environmental law, contract, or because the enterprise has established a policy to restore a site.” Future expenditures are to be recognized in financial statements if the transaction or event has already occurred. The CICA’s position is that past environmental damage is definitely a triggering event when there is environmental legislation that requires a company to undertake remediation.

### **Environmental Disclosure Requirements in U.S. Securities Regulations**

In addition to extensive specific disclosure requirements set forth largely in Regulation S-K, the Securities and Exchange Acts lay on companies a far more general obligation to disclose all material information needed to make required statements not misleading. This requirement applies to securities registrations, prospectuses, proxy statements, and periodic reports. Making false or misleading facts or omitting to disclose a material fact that is needed to make other statements not misleading opens a company and its officers to severe penalties, including criminal prosecution, civil penalties, withdrawal of registration, and private lawsuits by investors who have suffered damages. Recently, the Sarbanes-Oxley Bill placed legal requirements on CEOs and CFOs of publicly traded companies to certify the completeness and accuracy of their financial disclosures and increased the responsibilities of company directors.

A materiality filter has been applied to distinguish information that companies must disclose, including environmental information. Moreover, in response to National Resources Defense Council’s rulemaking petition, the SEC clarified its position that, insofar as environmental information is material, its disclosure is required under securities law and that requirement would be enforced.<sup>44</sup>

The concept of materiality has been clarified in litigation and interpretive releases. Material information is information that a reasonable investor would find significant, in the total mix of available information. In *SEC Staff Accounting Bulletin No. 99*, devoted to materiality, the Commission reminded companies that no numerical benchmark could be relied upon as a threshold of materiality. Rather, “a matter is material if there is a substantial likelihood that a reasonable person would consider it important.”<sup>45</sup> The *Bulletin* quotes a judgment by the U.S. Supreme Court to the effect

<sup>44</sup> SEC, Securities Act Release No. 5627; Oct. 14, 1975; also, Williams, p. 1251.]

<sup>45</sup> 17CFR§211, August 12, 1999.

that a fact is material if there is a substantial likelihood that the fact would have been viewed by a reasonable investor as having significantly altered the total mix of information made available.<sup>46</sup> The *Bulletin* cites examples of misstatements or omissions that might be material although quantitatively small in financial terms. Among these are mis-statements bearing on the integrity or competence of management, such as a company's compliance with environmental regulatory requirements.

<sup>46</sup> *TSC Industries v. Northway, Inc.*, 426 U.S. 438, 449 (1976).

The SEC has issued regulations, instructions and interpretative and explanatory releases that have created an extensive and highly integrated disclosure system. The disclosure rules are specified in detail in Regulation S-K.<sup>47</sup> These information requirements have been standardized to a large extent across several important disclosure stages specified in the Securities and Exchange Acts. They include:

<sup>47</sup> CFR §§ 229.10 – 229.702 (1998).

- 1) information contained in a prospectus or similar document when securities are offered for sale to the public or otherwise distributed;
- 2) information contained in a statement accompanying the registration of securities with the Securities and Exchange Commission;
- 3) information contained in proxy solicitations in conjunction with the election of officers and votes in annual meetings; and,
- 4) information contained in required annual, quarterly, and special ongoing reports filed with the SEC and made available to the public.

Some disclosure requirements apply specifically to information of an environmental nature. However, the SEC has stated that compliance with such specific disclosure requirements does not obviate the firm's obligation to comply with more general requirement that all material information must be revealed.<sup>48</sup> For example, if a company makes public disclosure of its environmental policies, it must ensure that statements made are accurate and sufficient to make the information not misleading.

<sup>48</sup> SEC Release No. 33-6130; 44FR56925.

Section 101 c) xii) of Regulation S-K specifies:

“Appropriate disclosure also shall be made as to the material effects that compliance with Federal, State and local provisions which have been enacted or adopted regulating the discharge of materials into the environment, or otherwise relating to the protection of the environment, may have upon the capital expenditures, earnings and competitive position of the registrant and its subsidiaries. The registrant shall disclose any material estimated capital expenditures for environmental control facilities for the remainder of its current fiscal year and its succeeding fiscal year and for such further periods as the registrant may deem material.”

In an interpretive release, the SEC made it clear that companies may have to make and disclose estimates of environmental compliance costs in future years if they expect such costs to be material and significantly higher than current costs.<sup>49</sup> For example, most environmental regulations are enacted with a compliance deadline set

<sup>49</sup> SEC Release No. 33-6130; 44FR56924, Oct. 3, 1979.

in the future, so that future year capital expenditures might substantially exceed those expected in the current year.

The distinction between provisions that have been enacted and those that have been adopted is significant in the United States system, because many environmental regulations that are enacted are not adopted for months or years thereafter because of legal challenges. Section 101c) xii) requires disclosure of the material effects of regulations enacted but not yet adopted.

In addition, though not targeted exclusively at litigation arising out of environmental matters, Section 103 of Regulation S-K requires disclosure of pending material legal proceedings:

“Describe briefly any material pending legal proceedings, other than ordinary routine litigation incidental to the business, to which the registrant or any of its subsidiaries is a party or of which any of their property is the subject.”

The instructions for Item 103 stipulate that

“. . . No information need be given with respect to any proceeding that involves primarily a claim for damages if the amount involved, exclusive of interest and costs, does not exceed 10 percent of the current assets of the registrant and its subsidiaries on a consolidated basis. “. . . Notwithstanding the foregoing, an administrative or judicial proceeding (including . . . proceedings which present in large degree the same issues) arising under any Federal, State or local provisions that have been enacted or adopted regulating the discharge of materials into the environment or primary for the purpose of protecting the environment shall not be deemed “ordinary routine litigation incidental to the business” and shall be described if:

- A. Such proceeding is material to the business or financial condition of the registrant;
- B. Such proceeding involves primarily a claim for damages, or involves potential monetary sanctions, capital expenditures, deferred charges or charges to income and the amount involved, exclusive of interest and costs, exceeds 10 percent of the current assets of the registrant and its subsidiaries on a consolidated basis; or
- C. A governmental authority is a party to such proceeding and such proceeding involves potential monetary sanctions, unless the registrant reasonably believes that such proceeding will result in no monetary sanctions, or in monetary sanctions, exclusive of interest and costs, of less than \$100,000; provided, however, that such proceedings which are similar in nature may be grouped and described generically.”

Another disclosure requirement imposed by Regulation S-K with great potential significance for environmental information is Item 303, which specifies the requirements for the Management Discussion & Analysis, a narrative explanation

that accompanies the financial reports. Item 303 requires a disclosure and discussion of any known trends, commitments, events or uncertainties that will have a material effect on the firm's financial condition or results of operation. The instructions to Item 303 state *inter alia*:

“ . . . The discussion and analysis shall focus specifically on material events and uncertainties known to management that would cause reported financial information not to be necessarily indicative of future operating results or of future financial condition . . . ”

The scope of this requirement was further explained in an interpretive release, which states that

“A disclosure duty exists where a trend, demand, commitment, event or uncertainty is both presently known to management and reasonably likely to have material effects on the registrant's financial condition or results of operation.”

This release shifts the burden of proof onto management, in that known uncertainties must be disclosed unless management can determine that a material effect “is not reasonably likely to occur.”<sup>50</sup> In its explanation of this requirement, the SEC used a hypothetical proposed government safety regulation affecting a company's operations as an example. In deciding whether this proposed regulation must be disclosed, the SEC stated:

“ . . . management must make two assessments:

- (1) Is the known trend, demand, commitment, trend or uncertainty likely to come to fruition? If management determines that it is not reasonably likely to occur, no disclosure is required.
- (2) If management cannot make that determination, it must evaluate objectively the consequences of the known trend, demand, commitment, event, or uncertainty on the assumption that it will come to fruition. Disclosure is then required unless management determines that a material effect on the registrant's condition or results of operations is not reasonably likely to occur.”<sup>51</sup>

In this release, the SEC pointed out that events that have already occurred or are anticipated may give rise to material known uncertainties. It warns registrants that

“Where a material change in the company's financial condition or results of operations appears in a reporting period and the likelihood of such change was not discussed in prior reports, the Commission staff, as part of its review of the current filing, will inquire as to the circumstances existing at the time of the earlier filings to determine whether the registrant failed to discuss a known trend, demand, commitment, event or uncertainty as required by Item 303.”<sup>52</sup>

<sup>50</sup> SEC Release No. 33-6835; 54FR22430, May 24, 1989.

<sup>51</sup> 54FR22430.

<sup>52</sup> SEC Release No. 33-6835; 54FR22431, n28, May 24, 1989.

In its interpretive discussion of required disclosure in the Management, Discussion & Analysis section, SEC staff specifically referred to a company's obligations when identified as a Potentially Responsible Party (PRP) to a site contamination under CERCLA, the "Superfund" law. After a company is so notified, it may be subsequently subject to the law's joint and several liability provision for environmental remediation costs. The interpretive release states that a PRP notification does not automatically require disclosure of an anticipated government proceeding under Item 103 of Regulation S-K. However, under Item 303, a PRP notification does require a MD&A discussion unless management is able to determine, based on the known facts and circumstances, that a material financial effect is not likely to occur. Such circumstances might include the company's contribution to the contamination, its insurance coverage, and the likely contribution from other responsible parties.

### **Generally Accepted Accounting Standards**

As in Canada, U.S. companies are required to use generally accepted accounting practices in preparing and presenting financial statements. Section 4-01a of Regulation S-X rules that statements that do not comply with GAAP are considered to be misleading. GAAP is defined through authoritative pronouncements by accounting standards bodies, such as the Financial Accounting Standards Board (FASB). These accounting standards have an important bearing on the way companies disclose and treat environmental information.

Because the Superfund Laws enactment of strict, joint and several liability for cleanup of badly contaminated sites created such potentially large financial liabilities for many companies, it stimulated considerable attention from the accounting profession to contingent liabilities arising from environmental contamination. The basic accounting framework for dealing with such contingencies is set forth in the FASB Financial Accounting Standard No. 5 ("Accounting for Contingencies") and Financial Interpretation No. 14 ("Reasonable Estimation of the Amount of a Loss"). Potential liability for costs of environmental cleanup is classified as a contingent liability unless the possibility is remote or the costs insignificant.

FAS5 sets forth two criteria determining whether a contingent liability must be accrued. It must be reasonably probable that a loss has occurred, the value of an asset has been impaired, or a liability has been incurred. Further, the amount of a loss must be reasonably estimated. However, even if no accrual is necessary, the contingency must be disclosed if there is a reasonable possibility that a loss has been incurred. In order to prevent companies from taking refuge in uncertainties surrounding their share in cleanup costs, FIN14 prescribes that if a probable range of loss can be determined, then the most likely amount within that range should be accrued. If no amount is more likely than any other, however, the low end of the range should be recorded. FASB's Financial Interpretation No. 93 (FIN93) further prescribed that contingent liabilities such as those for environmental remediation should be recorded without netting out possible financial recoveries from insurance companies or other responsible parties, except under very narrowly defined circumstances. Moreover, FASB's Emerging Issues Task Force, in release EITF 93-5, "Accounting for Environmental Liabilities," prescribed

that such liabilities should not be discounted to their present value unless the amount and timing of the outlays can be reliably determined.

The SEC issued *Staff Accounting Bulletin 92* to elaborate on these issues of generally accepted accounting practices for contingent liabilities.<sup>53</sup> *SAB 92* instructs registrants that disclosure or accrual should not be delayed because of uncertainty until only a single amount can be reasonably estimated. Estimates should be based on available information and updated in later filings as more information becomes available. *SAB 92* confirms that potential recoveries from third parties should not be netted against potential liabilities. Rather, the gross amount and the potential recovery should be recorded separately in the balance sheet. Further, disclosure should be made of the amounts of potential recovery that are contested by third parties. If a company does discount an environmental liability, *SAB 92* prescribes that it must disclose its discounting method and rate, which must not exceed the U.S. Treasury bill rate. *SAB 92* also articulates the disclosure required in notes to the financial statement to make them not misleading, if no amount is accrued. The company should disclose the circumstances surrounding the contingency, the range of possible outcomes and the company's judgments and assumptions regarding those outcomes. In general, consistent with Regulation S-K, Item 303, the SEC requires that disclosure should be sufficient to enable investors to understand the range of outcomes that could have a material effect on the company's liquidity, financial condition and results of operation.

<sup>53</sup> SEC Release No. 92, 58FR32843 (June 8, 1993).

## **THE APPROACH USED IN THIS REVIEW OF MINING COMPANY DISCLOSURE PRACTICES**

This study is an exploratory investigation of the extent to which the disclosures of material environmental information by mining companies in the United States and Canada have in recent years followed the rules and guidelines summarized above. The methodology of the study consists of the following steps:

First, a number of events were identified that met the following criteria: 1) they happened to publicly-traded mining companies listed on U.S. or Canadian stock markets; 2) the events had material financial significance for those companies and their investors or creditors; 3) the events were related to the companies' environmental exposures, performances, obligations, or liabilities; and 4) the events occurred, with few exceptions, in the relatively recent past – mostly within the last five years.

The screen of financial materiality that was used in identifying such events was straightforward. Material events included those involving bankruptcies; abrupt and large percentage movements in the company's stock price; denials in operating permits to exploit important properties; or increases in financial liabilities and obligations that were significant in the context of the company's overall balance sheet. The financial magnitude of the events selected for investigation left little doubt of their materiality.

Second, the financial filings and press releases that the company involved in each event made at the time of the event, during subsequent periods and during periods

preceding the event were examined in order to learn what the company had disclosed about each of the events selected for investigation. For U.S. companies, this involved reviewing 10-K, 10-Q and 8-K forms. For Canadian companies, it involved reviewing annual information forms, MD&As, press releases and other periodic and special disclosures.

Third, the background and context of each event was investigated in an effort to learn what the company involved knew or was in a position to know about the event when and after it happened, and what it was in a position to know about the possibility or likelihood of the event before it occurred. This was the most difficult aspect of the exploration because it was carried out with no access to internal company documents or other material. This phase was carried out by examining reports, studies and other material prepared by government agencies, consultants or other experts that would have been available to the company and other parties at specific times.

The purpose of this phase of the investigation was to explore whether the requirements of the Management Discussion & Analysis section of the financial reports of publicly traded companies – that uncertainties known to management that would cause future financial conditions and results to be materially different from those reported be disclosed – were being fulfilled. This focus on MD&A reporting was motivated by recent reports by securities regulators or accounting standards bodies in both the United States and Canada that fulfillment of MD&A reporting obligations has generally been unsatisfactory, as well as by the intrinsic importance for investors of insight into material forward-looking information.

In summary, this exploratory investigation is an effort to pursue the line of inquiry to which the SEC long ago committed itself but apparently has not pursued:

“Where a material change in the company’s financial condition or results of operations appears in a reporting period and the likelihood of such change was not discussed in prior reports, the Commission staff, as part of its review of the current filing, will inquire as to the circumstances existing at the time of the earlier filings to determine whether the registrant failed to discuss a known trend, demand, commitment, event or uncertainty as required by Item 303.”<sup>54</sup>

<sup>54</sup> SEC Release No. 33-6835; 54FR22431, n28, May 24, 1989.

## CASE STUDIES

### Canyon Resources – Kendall Mine

#### *The Event*

The Kendall gold mine in Lewiston, Montana is owned and operated by Canyon Resources, Inc. A reclamation performance bond amounting to \$1.86 million had been provided by the company in 1989. In October, 1999, the Montana Department of Environmental Quality, on the basis of a review of the costs of clean-up and remediation of the cyanide leach pad and other mine works, determined that the bond must be increased to \$8.3 million. This increase of \$6.44 million represented a material amount for the company relative to its total and current assets of \$81.8 and \$13.6 mil-

lion at the end of 1998. On August 21, 2000, the Montana DEQ further raised the required bond amount to \$14.2 million.

### *The Company's Disclosures*

In the company's third quarter 10-Q filing, dated September 30, 1999, it promptly disclosed the increased bond amount, stating that the company "had received a determination notice from the Department of Environmental Quality for an increase in the Kendall Mine reclamation bond from approximately \$1.9 million to approximately \$8.1 million. Although the company believes the increased bond amount greatly exceeds the costs of remaining work to be accomplished, it is unsure what remedies, if any, the DEQ may seek if the parties cannot agree on the appropriate bond amount."<sup>55</sup>

Moreover, next year, in its third quarter 10-Q filing for September 30, 2000, the company disclosed that "In August, 2000, the DEQ further revised the bond amount to approximately \$14.2 million. The company believes the DEQ bond amount exceeds the cost of remaining work and has filed an administrative appeal to the DEQ's actions."<sup>56</sup> Therefore, Canyon Resources discharged its obligation to promptly disclose this material information. Furthermore, in subsequent disclosure extending from 2000 through the third quarter of 2003, the company discussed its ongoing controversy with the state of Montana regarding reclamation at the Kendall Mine, including the information that in February, 2002 the DEQ had issued a decision that a comprehensive Environmental Impact Statement would be required to guide the remaining reclamation, a decision that the company maintained would unnecessarily delay work and increase costs.

Prior to October 1999, Canyon Resources was aware that the adequacy of its reclamation bond was under review by the Montana Department of Environmental Quality. The Montana Mine Reclamation Act stipulates that the department must carry out an overview of the bond amount annually and a comprehensive bond review at least every five years. It also provides that the department shall consult with the licensee or permittee if the review indicates that the bond should be adjusted. The DEQ notifies the company when such a review is undertaken and makes use of data and information provided by the company.<sup>57</sup> Therefore, the possibility that the required reclamation bond might be raised by a material amount was an uncertainty known to management prior to the event and was required to be disclosed under Item 303(d).

The company did disclose this material uncertainty in its 1998 annual 10-K filing, dated April 7, 1999. The company's MD&A stated that

"The Kendall Mine operates under permits granted by the DEQ. The DEQ requires the Company to maintain a \$1,869,000 Reclamation Bond to ensure appropriate reclamation. The DEQ is currently reviewing the adequacy of the bond amount and the Company anticipates that the DEQ will require a bond increase, but cannot presently predict the amount of any such increase. Additionally, although the DEQ has approved the Company's plans related to recontouring, revegetation, drainage and dewatering, discussions of long-

<sup>55</sup> Canyon Resources, Inc. 10-Q report, Third Quarter, September 30, 1999, note 10, Other Contingent Matters, p.14-15.

<sup>56</sup> Canyon Resources, Inc., 10-Q report, Third Quarter, September 20, 2000, notes to CFS, Commitments and Contingencies, (a) Site Restoration Costs, p.11.

<sup>57</sup> Personal communication, Warren McCullough, Montana DEQ, 1/28/04.

term water handling and heap closure methods continue. The Company's estimate to achieve final mine closure may be impacted by the outcome of these pending matters."<sup>58</sup>

<sup>58</sup> Canyon Resources, Inc., 10-K, 1998, filed 4/07/1999; Management Discussion & Analysis, p. 40.

In view of the disagreement between the company and the DEQ regarding the additional reclamation required, it is plausible that the company at that time was unable to predict accurately the outcome of the review. However, Item 303(d) requires reports to include a range of estimates, when such a range can be reasonably estimated.

In conclusion, in the case of this event, the company, Canyon Resources, did promptly disclose material information, as required, and also provided the required warning regarding a material uncertainty known to management though it did not reveal the possible financial range of that uncertainty.

### **Hecla Mining Company – Bunker Hill/ Coeur d'Alene Mining Superfund Site**

#### *Background*

Mining in the Coeur d'Alene basin in Idaho dates from the 1880s. Many companies extracted ores of lead, zinc and other metals from the region for more than a century. The Bunker Hill lead smelter there began operations in 1917, when few, if any, environmental restrictions were in place. It released hundreds of pounds of lead and other heavy metals into the atmosphere daily for years. Tailings discharged into the river dispersed onto the floodplain. A fire in 1973 crippled air pollution control capacity and markedly increased emissions. In 1977 tall stacks were constructed, which dispersed atmospheric deposition over a much wider area. The smelting operation was shut down in 1982 and in 1983 a 21 square mile area ("the Box") was put onto the Superfund National Priorities List because of the high levels of lead, arsenic, cadmium and other toxic residues in soils and evidence of extremely elevated levels of lead in children's blood samples. Remediation in the residential areas of the site ("Operable Unit 1") began in 1989 and included excavating and replacing contaminated soil. Wider remedial action elsewhere in the Box ("Operable Unit 2") began on the basis of an EPA Record of Decision in 1992. In August 1994 a consent decree was filed involving Hecla and other major surviving mining companies calling for cleanup of residential areas at a cost of about \$44 million. This work, mostly performed by the EPA and the State of Idaho, continued throughout the 1990s and beyond at a cost estimated by the General Accounting Office in March 2001 of \$212 million.

A much larger area in the Coeur d'Alene valley and beyond was polluted both by atmospheric deposition and by mine effluents discharged into the Coeur d'Alene River, released from holding ponds or washed from mines, tailings and mine wastes. The area affected suffered damages to fish and wildlife as well as to the human population, including those on tribal reservation lands. Efforts to deal with this widespread contamination during the early 1990s had had limited effect.

In February 1998, after consultations with mining companies and state officials, EPA made a controversial announcement of the decision to carry out a Remediation

Investigation/Feasibility Study under CERCLA, a step leading toward Superfund remediation action for the broader area. In June 2000 a federal court decision confirmed that the broader area outside the Box was included in the National Priority List definition of the Bunker Hill facility. The remedial investigation carried out by the EPA included extensive consultations and negotiations with local communities and governments, mining companies, and state officials. The draft RI was released for public comment in July 2000 and finalized in July 2001. The various remediation options described in the study ranged in cost from \$194 million in present value, the mining companies' preferred option, to \$2.6 billion, the maximum option. On September 12, 2002, after months of public comment and discussion, the EPA released its Record of Decision for the much larger area outside the Box ("Operable Unit 3") to deal with contaminated soils and water. The total estimated discounted present cost of the actions identified in this ROD was approximately \$360 million. This cost estimate was additional to the amounts of money spent and remaining to be spent on remediation within the 21-square mile Box area.

In March 1996, the U.S. Department of Justice filed suit on behalf of the EPA and other federal agencies, alleging that Hecla and other mining companies were liable for the payment of response costs and natural resource damages resulting from the release of hazardous materials. This suit was consolidated with an earlier suit brought in 1991 by the Coeur d'Alene Tribe for recovery of natural resource damages. EPA sued to recover costs spent by the federal government on removal and remediation of hazardous materials. Other plaintiffs sued for recovery of natural resource damages. The suit finally came to a partial decision on September 3, 2003. The district court ruled that Hecla was liable for 31% of the damages and response costs. The second phase of the trial will settle the extent of damages and liabilities. It will go to trial in 2004 and a decision is expected in 2005.

### *The Events*

Within this history, two events stand out as particularly significant. The first is the EPA's announcement in September 2002 of its Record of Decision for remedial action in Operating Unit 3, the larger Coeur d'Alene Basin, with an estimated discounted present cost of approximately \$360 million. The second is the decision of the federal court in September 2003 assigning a 31 percent liability to Hecla for the costs of remedial actions and natural resource damages. Both followed well after the consent decree of 1994 in which Hecla assumed partial responsibility for remedial actions within Operating Units 1 and 2. Because of the lengthy processes preceding these findings, both decisions represented material uncertainties known to the company well prior to the dates of announcements.

### *Hecla's Disclosures*

During this lengthy process Hecla disclosed each of the events described above and other related events as they occurred, mostly in the Financial Contingencies segment of its annual and quarterly reports. It also disclosed its remedial spending on the Bunker Hill and other sites and the liabilities it had accrued for future work at Bunker

Hill and other sites. Despite the availability of EPA's draft RI/FS documents and their range of cost estimates, it did not discuss its possible liabilities in the wider basin. For example, the following language from the 10-Q issued in May 14, 2001, well after the draft feasibility study estimates became available, states:

“Hecla has not accrued any amounts for potential liability associated with the Coeur d’Alene River Basin environmental claims as the amount, if any, is currently not estimable. It is reasonably possible that Hecla’s obligation may change in the near or longer term. An adverse ruling against Hecla on liability and damages in this matter could have a material adverse effect on the Company.” (10-Q, 5/14/01)

However, on August 20, 2001, Hecla made use of the 8-K disclosure form to announce the conclusion of its Agreement in Principle with the government on August 16, 2001 with respect to those liabilities and elaborated in its next quarterly report on August 20<sup>th</sup>.

“On August 16, 2001, the Company entered into an Agreement in Principle with the United States and the State of Idaho to settle the governments’-claims for natural resource damages and cleanup costs related to the historic mining practices in the Coeur d’Alene Basin in northern Idaho. The settlement, if and when finalized in the form of a Consent Decree, would release the Company from further liability to the governments for its historic mining practices in the Coeur d’Alene Basin. The Agreement in Principle caps for a period of ten years the majority of the cleanup related expenditures the Company is responsible for annually at the Bunker Hill Superfund Site, the Grouse Creek Mine and the Stibnite site in central Idaho. The Agreement limits these payments to the Government and/or cleanup obligations at these sites to a fixed annual cap of \$5.0 million for each of the first two years of the Agreement and \$6.0 million for each of the next eight years. Hecla is committed to work and/or make payments of \$4.0 million annually for the following 20 years thereafter. In addition, Hecla would either have to pay or perform clean up obligations amounting to 10% of its operating cash flow as adjusted for certain exploration expenditures. Hecla would provide a security interest in assets with a value of \$20 million, which will decline over ten years. The Agreement in Principle does not include the Coeur d’Alene Indian Tribe; however, the Company hopes to be able to include the Tribe as a party to the settlement under the terms of a final consent decree. Representatives of the United States, the State of Idaho and the Company continue to work on terms of a definitive consent decree incorporating the terms of the Agreement in Principle. However, there are a number of significant issues, which will need to be resolved prior to finalizing the definitive Consent Decree. As of March 31, 2002, the Company has accrued \$42.7 million related to the properties covered by the Agreement in Principle. The range of liability for these sites could be up to \$138.0 million on an undiscounted basis plus the percentage of operating cash flow.”

A year later, in August 2002, the company announced its intention to withdraw from the Agreement in Principle, as follows:

“Since August 2001, the Company and EPA have continued to negotiate a final consent decree based upon the terms set forth in the Agreement in Principle. Due to a number of changes that have occurred since the signing of the Agreement in Principle, including improvements in the environmental conditions at Grouse Creek and lower estimated cleanup costs in the Coeur d’Alene Basin as well as the Company’s improved financial condition, the terms of the multiple properties settlement approach set forth in the Agreement in Principle appear no longer favorable to the Company. It is expected that utilizing the Agreement in Principle as a settlement vehicle will likely be discontinued. However, Hecla continues to negotiate the terms of a settlement with the United States and the State of Idaho that would be limited to resolving its environmental cleanup liabilities for historic mining practices in the Coeur d’Alene Basin.”

In its next quarterly report, issued in November, 2002, Hecla did disclose the EPA’s Record of Decision with its estimated discounted present cost of \$359 million, and the ongoing trial of Hecla’s liability for those costs and natural resource damages. Its conclusion, however, was as follows:

“Due to a number of uncertainties related to this matter, including the outcome of pending litigation and the result of any settlement negotiations, the Company does not have the ability to estimate what, if any, liability exists related to the Coeur d’Alene River Basin at this time. It is reasonably possible the Company’s ability to estimate what, if any, obligation relating to the Coeur d’Alene Basin may change in the near or long term depending on a number of factors. In addition, an adverse ruling against the Company for liability and damages in this matter could have a material adverse effect on Hecla.”

When the district court issued its ruling that Hecla’s liability for contamination of the Coeur d’Alene Basin amounted to 31 percent of damages and response costs, Hecla disclosed this event in its next quarterly report, on November 14, 2003:

“On September 3, 2003, the Court issued its Phase I ruling, holding that we have some liability for Coeur d’Alene Basin environmental conditions. The Court refused to hold the defendants jointly and severally liable for historic tailings releases and instead allocated a 31% share of liability to us for these releases. The natural resource damages to which this 31% applies and the Court’s determination of an appropriate cleanup plan will be addressed in the Phase II trial. The Court also found that while certain Basin natural resources had been injured, the Court stated that ‘there has been an exaggerated overstatement’ by the plaintiffs of Basin environmental conditions and the mining impact. The Court also significantly limited the scope of the trustee plaintiffs’ resource trusteeship and will require proof in the Phase II

trial of the trustees' percentage of trusteeship in co-managed resources. The Court also left for the Phase II trial issues on the deference, if any, to be afforded the government's cleanup plan and on defendants' constitutional due process/retroactivity defense. The Phase II trial is scheduled to commence on January 18, 2005. . . . Although the U.S. Government has previously issued its Record of Decision proposing a cleanup plan totaling approximately \$359 million, based upon the Court's prior orders, including its September 3, 2003 order and other factors and issues to be addressed by the Court in the Phase II trial, we estimated the range of our potential liability in the Basin to be \$18.0 million to \$58.0 million, with no amount in the range being more likely than any other number at this time. Based upon generally accepted accounting principles (GAAP), we accrued the minimum liability within the range. As of September 30, 2003, we have estimated and accrued a potential liability for claims in the Coeur d'Alene Basin litigation of \$18.0 million. It is reasonably possible that our ability to estimate what, if any, liability we may have relating to the Coeur d'Alene Basin may change in the future depending on a number of factors, including the outcome of the Phase II trial."

#### *Disclosure Issues*

Although Hecla has disclosed material events related to the Coeur d'Alene/Bunker Hill Superfund site promptly as they have occurred and has warned investors that these events may have material adverse effects on the company, as the excerpts from their financial filings quoted above indicate, three disclosure issues related to these events appear to be significant.

First, in the light of the court's assignment of a 31 percent liability to Hecla, the EPA's Record of Decision with respect to clean-up costs in the wider basin (Operating Unit 3) and the estimated costs of cleaning up the Bunker Hill "Box" (Operating Units 1 and 2), it does not seem plausible that a potential liability to the company of \$18 million is as likely as any other figure, or that the range of \$18 to \$58 million captures the company's potential liability. The following considerations lead toward a significantly higher range of outcomes. Taken in combination, they raise a serious question whether the company has accurately estimated its liability.

- Within Operating Units 1 and 2, the total expenditures for response and remediation have been estimated to total in the vicinity of \$212 million, according to a study by the General Accounting Office. The larger part of those costs was borne by state and federal agencies and is included in the amounts the government seeks to recover in part from Hecla. Moreover, since most of those expenditures were made prior to September 2003, they cannot be discounted into present value terms in estimating a liability.
- The EPA's Record of Decision estimated a cost for the preferred remediation option in Operating Unit 3 of \$359 million in present costs. This option was chosen from a range with associated discounted present costs of \$194 to \$2,600 million. Thirty-one percent of the ROD costs amounts

to \$111 million. Since those costs are already expressed in present value terms, it would be inappropriate to discount them again. Though the company has questioned the plan adopted in the record of decision, it perhaps should have afforded some weight to the government's decision.

- Although the trial judge remarked that in his view the claims for natural resource damages had been exaggerated by the plaintiffs, which include various federal agencies as well as the Coeur d'Alene Tribe, the alleged damages were in excess of a billion dollars, based on contamination of human, fish, and wildlife habitat in a 1,500 square mile area over a period extending decades into the past and decades into the future. It is questionable whether the most likely outcome is that the damages will be found to be negligible.

Second, according to current regulations, a company is required to explain the assumptions underlying its estimates of liability. Hecla has not done this with respect to the liability it has accrued for the Coeur d'Alene site.

Third, over the period from the time that the government decided to initiate a Remediation Investigation/Feasibility Study for the Coeur d'Alene basin in 1998 to the court's assignment of substantial liability to Hecla, the sequence of events indicated the company's increasing financial exposure to the problems in the basin. These events included a court's affirmation that the wider basin could be included in the CERCLA action, the release of the EPA's draft RI/FS report with its range of costs, the Record of Decision indicating a discounted present cost of \$360 million for the preferred option, and finally the decision of the first phase of the trial for recovery of damages and response costs. As seen through the eyes of management, this increasing financial risk to the company must have been obvious, given the efforts that management made through negotiation, legal and political actions to limit the company's exposure. Nonetheless, the Management Discussion & Analysis sections of financial reports over this period, intended to provide investors with an understanding of the risks, prospects, and uncertainties facing the company as seen by management, provide little such guidance, beyond the indication that unfavorable outcomes could have material adverse consequences.

For example, after the announcement of EPA's Record of Decision in September 2002, the MD&A for the next quarterly report, after repeating information regarding the abrogation of the Agreement in Principle with the government, went on to say little of any value to investors:

“Due to a number of uncertainties related to this matter, including the outcome of pending litigation and the result of any settlement negotiations, the Company does not have the ability to estimate what, if any liability exists related to the Coeur d'Alene River Basin at this time. It is reasonably possible [that] the Company's ability to estimate what, if any, obligation relating to the Coeur d'Alene Basin may change in the near or long term depending on a number of factors. In addition, an adverse ruling against the Company for liability and damages in this matter could have a material adverse effect

on Hecla. (For additional information, see Note 5 of the Notes to Consolidated Financial Statements). Reserves for closure costs, reclamation and environmental matters [at all sites] totaled \$50.7 million at September 30, 2002. Hecla anticipates that expenditures relating to these reserves will be made over the next several years. Although Hecla believes the reserve is adequate based on current estimates of aggregate costs, Hecla periodically reassesses its environmental and reclamation obligations as new information is developed. Depending on the results of the reassessment, it is reasonably possible that Hecla's estimate of its obligations may change in the near or long term."

After the court decision finding Hecla's liability to be 31 percent of the total was announced, the MD&A in the next quarterly report was similarly uninformative and not fully consistent with the current status of the issue, since the EPA had already issued a Record of Decision and Hecla's liability had already been established.

"On January 1, 2003, we adopted SFAS No. 143 'Accounting for Asset Retirement Obligations' . . . At our non-operating properties, we accrue costs associated with environmental remediation obligations when it is probable that such costs will be incurred and they are reasonably estimable. Accruals for estimated losses from environmental remediation obligations have historically been recognized no later than completion of the remedial feasibility study for such facility and are charged to provision for closed operation and environmental matters. We periodically review our accrued liabilities for remediation costs as evidence becomes available indicating that our remediation liabilities have potentially changed. Such costs are based on management's current estimate of amounts expected to be incurred when the remediation work is performed within current laws and regulations. Recoveries of environmental remediation costs from other parties are recorded as assets when their receipt is deemed probable. Future closure, reclamation and environment-related expenditures are difficult to estimate in many circumstances due to the early stages of investigation, uncertainties associated with defining the nature and extent of environmental contamination, the uncertainties relating to specific reclamation and remediation methods and costs, application and changing of environmental laws, regulations and interpretations by regulatory authorities and the possible participation of other potentially responsible parties. Reserves for closure costs, reclamation and environmental matters totaled \$70.3 million at September 30, 2003. We anticipate that expenditures relating to these reserves will be made over the next thirty years. It is reasonably possible that the ultimate cost of remediation could change in the future and that changes to these estimates could have a material effect on future operating results as new information becomes known."

## **Teck Cominco – Red Dog Mine**

### *The Event*

On July 15, 2002, the Kivalina Relocation Planning Committee of the village of Kivalina, a small traditional Inuit community living in a remote coastal area of Alaska, notified Teck Cominco Alaska, operator of the Red Dog mine, of their intention to sue the company under the citizen's suit provisions of the Clean Water Act for up to \$88 million in penalties for more than 3,000 violations of the Clean Water Act at the mine and the associated port facility. The suit charges that the mine regularly violates its discharge permits with respect to effluents of cyanide and total dissolved solids and also discharges excessive quantities of heavy metals. The case was dismissed on the grounds that the plaintiff, not being a “person” or “citizen” under the Act’s provisions, lacked standing to sue, but six individual members of the KRPC have filed a new suit making similar claims. These individuals are being represented in their suit by the Center on Race, Poverty and the Environment, a non-governmental organization in San Francisco.

### *The Background*

The Red Dog Mine is located in the DeLong Mountains of the western Brooks Range, approximately 600 miles north of Anchorage and 55 miles inland from the Chuckchi Sea. It is the largest zinc mine in the world, producing 1.2 million tons of lead and zinc concentrate annually. Lead and zinc are mined and then transported over the DeLong Mountain Transportation System (DMTS) (the haul road’s official name), to a port site storage facility. The metals are transported year-round, but are stored most of the year while the Chuckchi Sea is choked with ice. The mine and the port facility are located on land owned by the Northwest Alaska Native Association Regional Corporation (NANA) and are operated by Teck Cominco Alaska, a subsidiary of Teck Cominco (a Canadian mining company). The Alaska Industrial Development and Export Authority (AIDEA) owns the DMTS. Teck Cominco was formed in 2001 through the merger of the Teck Corporation and Cominco Ltd., the previous operator of the mine.

The Red Dog Mine has a history of water quality problems, of which Teck Cominco has been well aware. Baseline geologic and engineering studies were done in the 1980s that indicated that the mine’s geology would make it susceptible to acid mine wastes and drainage. In July 1997, Cominco Alaska settled a federal government suit alleging that it had repeatedly violated the Clean Water Act by discharging excessive levels of metals and acidity from its wastewater pit and had over a thousand violations from 1990 to 1993 at its sanitary sewage facility at the port. In the settlement, Cominco paid a \$1.7 million fine and agreed to spend more than \$3 million on long-term ongoing monitoring and ecological studies. The company also upgraded its water treatment process to deal with zinc and cadmium in the effluents. Ecological studies found that the Red Dog Creek immediately downstream of the mine had background concentrations of metals sufficiently high that the water was unfit for aquatic life, against which background the mine had no additional adverse impacts on aquatic communities.

However, water quality problems and other environmental problems continued at the mine. The two year compliance record available online at EPA's Office of Enforcement and Compliance Assurance shows that Red Dog Mine was non-compliant with provisions of the Clean Water Act in all eight quarterly periods from October 2001 through September 2003. During this period, concentrations of total dissolved solids exceeded permitted levels by 1800 percent in the last quarter of 2001 and cyanide concentrations exceeded permitted levels by 100 percent in 2002. In comments on a draft of this case study, the company pointed out that over the period 1998 to 2003 it was in negotiations with the EPA and the Alaskan government over establishing a standard for total dissolved solids for the mine three times less stringent than the one in force and operated under consent orders until 2003, when this higher limit of 1500 ug/L was put into place. The company also pointed out that over the same period it was negotiating with EPA and Alaska about the appropriate way of measuring harmful cyanide in the effluent, eventually gaining acceptance of a different method that showed cyanide concentrations meeting permitted levels.

Within this period, in another study written in June 2001 for the Alaska Department of Fish and Game Restoration, it was reported that effluents from the Red Dog Mine over the period June 27, 1996 to June 27, 1997 had high concentrations of sulfate ions (1800-1900 mg/l) as well as high concentrations of calcium ions (590-665 mg/l) and high concentrations of total dissolved solids (2700-2740 mg/l) and that on balance the effluent was highly acidic. Based on a scientific literature review, the report stated that toxicity to aquatic organisms depends primarily on ionic properties and that TDS concentrations in excess of 750 mg/l significantly reduces fertilization and hatching in coho and chum salmon. Red Dog's effluents at the outfall had concentrations more than three times as high as that threshold. The company stated that it relied on dilution to reduce concentrations to non-toxic levels downstream at the point at which salmon could begin spawning.

Other EPA records also indicate continuing environmental problems. When the mining industry began reporting under the Toxic Release Inventory in 1998, the Red Dog Mine had the fifth largest toxic releases of all reporting mines. Although the company asserts that reportable TRI "releases" consisted of controlled mining wastes containing naturally occurring minerals, TRI records show that for the period 1998 through 2001 releases of reportable toxic substances to air and water, as well as to land, all showed rising trends.

In June 2001 a study carried out for the National Park Service found elevated levels of lead, zinc and cadmium along the road leading from the mine to the port through a national park. Shortly thereafter, in September 2001, the Alaska Community Action on Toxics released information that monitoring of the port site from 1990 to 1996 had found lead concentrations in soils as much as 36 times the State of Alaska's threshold for remediation requirements and more than twice as high as the threshold for zinc contamination. The company's comments state that it has taken steps to improve those problem areas.

In short, Teck Cominco was well aware of its environmental problems at the Red Dog Mine and its history of record of permit violations over the decade preceding the

suit, because of its mandated monitoring and reporting programs, monitoring by outside bodies, and notices of non-compliance by government environmental agencies. It knew that the fact that it was operating under a compliance order did not shield it from citizens' suits alleging damages from violations of standards then in force.

### *Disclosures*

When the lawsuit was announced, Teck Cominco took note of it in its 2002 Annual Report's Environment, Health and Safety Section:

“A Committee from the community near the Red Dog mine brought proceedings against Teck Cominco alleging violations of the Clean Water Act and the mine's water discharge permits. The vast majority of the alleged incidents were permitted through compliance orders issued by the EPA and Teck Cominco Alaska has worked closely with the regulatory authorities and NANA to meet the concerns of the community of Kivalina.”

Prior to the time that the suit was announced, none of the company's filings give any indication that the water quality or other environmental problems at the Red Dog Mine, extending over a period of years, might create a financial risk or exposure. Neither the Management Discussion & Analysis nor the Environmental Matters sections of the company's reports treat the issue as a risk or uncertainty known to management. The Description of Business section of the company's 2002 Annual Information Form stated

“All contaminated water from the mine area and waste dumps is collected and contained in a tailings impoundment and seasonally discharged through a water treatment plant. Mill process water is reclaimed from the tailings pond. The mine and associated port facility operate under effluent permits issued by the EPA and air permits issued by the state of Alaska. The operation is in material compliance with all of its permits or related regulatory instruments and has obtained all the permits that are material to its operations.”

This statement seems to be inconsistent with the information published by EPA's Office of Enforcement and Compliance Assurance, which stated that Red Dog was not in compliance with the Clean Water Act throughout 2002 and early 2003 and was guilty of significant non-compliance with the Act's regulations in the last quarter of 2001. The company's explanation is that it was operating under Compliance Orders under Consent during this period. A Compliance Order under Consent is an administrative order issued by the regulatory agency to a permittee stating what the latter must do to correct a violation, to which actions the permittee has consented.

The company's reports during 2001 and 2002 emphasized the company's environmental awareness and progress. The 2001 AIF states: “At the date hereof, none of the company's operations are the subject of litigation or administrative proceedings relating to environmental matters that could materially affect the business of the company.”

There is no indication of any impending risk of such events. The MD&A section of the 2001 Annual Report announced the company's freestanding Sustainability Report and stated that "overall environmental performance at Red Dog remains on par with the best mines in the world."

The company's position is that it had no reason to regard an environmental law suit as likely because it took actions to correct water quality problems, its studies did not show that its effluents presented health or ecological problems above those inherent in background conditions, and that it operated with the concurrence of environmental regulatory agencies. Moreover, it holds that the lawsuit was not a material event. However, investors may not have agreed: in the five-business-day window surrounding the announcement of the forthcoming suit, the company's stock price fell by ten percent.

<sup>59</sup> Mining Watch Canada and The Sierra Club of Canada. "TOXICanada: Thirteen Good Reasons to Establish a Clean Canada Fund" [online]. July 1, 2001. Available: [http://www.miningwatch.ca/publications/toxic\\_13.html](http://www.miningwatch.ca/publications/toxic_13.html). 11-23-03.

<sup>60</sup> Anvil Range Mining Corporation. "Material Change Report" [online]. Filed February 5<sup>th</sup>, 1998, with the Canadian Securities Administrators. Available: <http://www.sedar.com/csfsp/rod/data8/filings/00067523/00000001/g%3A%5Cbusiness%5Canvilran%5Cmaterial%5Csedarfil.598%5Cmcrjan.pdf>. 11-24-03.

<sup>61</sup> Conversation with Malcolm Taggart, 01-28-04.

<sup>62</sup> Personal communication from Walter Kuit, January 22, 2004.

<sup>63</sup> *Ibid.*

<sup>64</sup> Email from Walter Kuit, environmental specialist at Teck Cominco, 01-22-04.

## **Anvil Range Mining Company – The Faro Mine**

### *The Event*

In 1994, the Anvil Range Mining Company purchased the Faro Mine property in the Yukon from a receiver that was handling the assets of Curragh Resources, which went bankrupt in 1992. Anvil operated the mine intermittently into 1997. Anvil declared bankruptcy in April of 1998,<sup>59</sup> although in the fall of 1997 the company had declared assets of \$162.5 million and liabilities of \$93.8 million. At the time that Anvil received court protection from creditors, its outstanding debt was over \$30 million.<sup>60</sup> Anvil Range claimed that their bankruptcy was due to low lead and zinc prices. However, at that time the Faro Mine faced closure and remediation costs that had been estimated at \$124 million in 1993, before Anvil Range purchased the mine, against which Anvil held a Reclamation Securities Trust that was funded at the level of \$12.5 million.

### *Background*

Following Curragh Resources's abandonment of the Faro properties in 1993, the Department of Indian Affairs and Northern Development Canada (DIAND) studied the cost of closure and cleanup at the site. A 1993 engineer's report commissioned by DIAND estimated that the cleanup of Faro would cost \$124 million in discounted present value terms.<sup>61</sup> At that time Cominco Ltd. also considered acquiring the Faro property but judged that the liability could well be in the \$125 million range and decided not to pursue the acquisition.<sup>62</sup> In a letter dated February 22 1994, Richard D. Minor of Cominco told the receiver in charge of the Faro properties that Cominco had determined a reclamation liability of about \$120 million<sup>63</sup> and largely for this reason had decided not to purchase the properties.<sup>64</sup> Curragh had made a lower estimate in the \$55 million range on the assumption that mine tailings would be reprocessed, an assumption that Cominco dismissed.

In November 1994, Anvil Range entered an agreement with DIAND to establish a Reclamation Security Trust for the Faro property that was capped at \$100 million and would be funded on a units of production basis, with contributions rising and falling with the net price of zinc. By the end of October 1995 the RST had accumulated \$9.4

million and a year later the fund stood at \$11.6 million. In October 1995, Anvil Range had also recognized a liability of \$43.5 million for environmental remediation on the property, having adopted Curragh's assumptions that reprocessing of tailings and lower reclamation standards would bring the costs well below those estimated for DIAND two years earlier.

As the result of this arrangement, in which DIAND had concurred, falling zinc prices lowered the company's contributions to the Reclamation Securities Trust at the same time that the reprocessing of tailings became less economical, raising the company's reclamation liabilities. The company never made this risk clear as zinc prices fluctuated, nor did it disclose a current estimate of the environmental liability in the event that reprocessing of tailings proved infeasible. By 1998, when the company declared bankruptcy, inflation and the increased volume of waste materials had raised the previous estimated cost of \$125 million to the \$145-150 million range.

A final reclamation plan for the site has not been completed. However, a report from Canada's Commissioner on Environment and Sustainable Development estimated in 2002 that cleanup at Faro will cost at least \$200 million.<sup>65</sup> David Sherstone, the person directly in charge of the cleanup effort for DIAND, estimates that the cleanup will cost between \$200 million and \$250 million, which he characterized as "almost certainly an underestimate."<sup>66</sup> Other estimates range as high as \$400 million.<sup>67</sup> DIAND has already given \$40 million to Anvil Range's interim receiver for reclamation at the site; this number is not included in any of the estimates for completing reclamation.<sup>68</sup>

### *Disclosures*

The company consistently stated in its financial disclosures that it expected the amounts accumulating in the RST to be adequate to meet its closure and reclamation obligations at Faro. In its 1996 Annual Information Form released in mid-1997, for example, it stated

"While the RST [Reclamation Securities Trust] together with the amounts secured by existing security arrangements under the Water Licenses are expected to be adequate to fund the closure liabilities of all these properties, based on the ICAP [Integrated Comprehensive Abandonment Plan], Anvil Range remains liable for such liabilities notwithstanding the existence of the RST. Anvil Range's on-going costs to maintain the mines in environmental compliance on the Faro Properties will be funded from operating cash flow."<sup>69</sup>

In its 1997 Annual Report, the company discussed the situation at Faro as follows:

"The Water Licenses also contain provisions relating to the reclamation and eventual abandonment of the mining and mill sites and require Anvil Range to submit plans for conducting those activities in an environmentally safe manner for the Water Board's review. Accordingly, in 1996, the Integrated Comprehensive Abandonment Plan ("ICAP") and the Tailings Reprocessing Feasibility Study were filed with the Yukon Territory. The reports describe

<sup>65</sup> Commissioner of the Environment and Sustainable Development, "2002 Report of the Commissioner of the Environment and Sustainable Development." Office of the Auditor General Canada. Available: <http://www.oag-bvg.gc.ca/domino/reports.ns/f/html/c20021003ce.html>.

<sup>66</sup> Email from David Sherstone, 12/29/03.

<sup>67</sup> Struzik, Ed. "Abandoned Mines Across Canada's North." *Edmonton Journal*. December 21, 2003.

<sup>68</sup> Sherstone (corroborated by Struzik).

<sup>69</sup> Anvil Mining Company, Annual Information Form, 1996, released May 30, 1997, p. 13-14.

Anvil Range's plans for providing adequate protection to downstream fisheries and other natural resources upon mine closure."

"Abandonment of the Vangorda and Grum open pits will be undertaken in stages when fully depleted. Final abandonment of the Faro Properties will be dependent on whether or not Anvil Range locates additional reserves, and will be unlikely to occur prior to 2010 although Anvil Range will take certain reclamation measures before then. . . ."

"While Anvil Range generally endorses the technical approach proposed by Curragh in dealing with the monitoring, recycling, and reclamation of tailings and dumps left behind by it and other predecessor operators at the Faro Properties, Anvil Range has made significant modifications to the approach to funding the Faro Properties' environmental liabilities. Anvil Range executed as of November 8, 1994 a Reclamation Security Agreement ("RSA") with the Federal Government as represented by the Department of Indian Affairs and Northern Development ("DIAND") relating to environmental matters . . . Pursuant to the RSA, Anvil Range has created a Reclamation Security Trust ("RST"), which will fund its environmental closure liabilities on the Faro Properties on an ongoing basis. The RST is managed by an independent trustee, who obtains independent investment counsel for investment decisions. The RST, together with existing security arrangements under the Water Licenses, will have a maximum contribution limit of \$100 million, inclusive of interest, subject to downward adjustment for reclamation expenditures made before final mine closure. If after the earlier of October 3, 2001 or October 31 of the year in which Anvil Range has on a commercial basis commenced reprocessing of tailings (and subject to a review every three years thereafter) the estimated closure liabilities related to the Faro Properties exceed the then current maximum contribution limit, the limit will be increased quarterly thereafter by the amount of the Canadian Gross Domestic Product Implicit Price Deflator applied to the difference at that time between the balance in the RST and such estimated closure liabilities."

"The RST will be applicable to the decommissioning and reclamation of mining and related activities relating to the historical operations of the Faro Properties and to future operations at the Faro Properties. While the RST together with the amounts secured by existing security arrangements under the Water Licenses are expected to be adequate to fund the closure liabilities of all these properties, based on the ICAP, Anvil Range remains liable for such liabilities notwithstanding the existence of the RST. Anvil Range's ongoing costs to maintain the mines in environmental compliance on the Faro Properties will be funded from operating cash flow."

“The RST will be funded by a net smelter royalty (“NSR”) which is determined as a percentage of the net sales proceeds of Anvil Range from sales of zinc and lead concentrates derived from the Faro Properties after deducting ocean freight, smelter treatment charges and other off-shore charges. The royalty calculation applies to all mine revenue but the rate of the NSR will be determined on a graduating scale based on prevailing zinc prices commencing at a zinc price of US \$0.50 per pound.”

Thus, up to the brink of bankruptcy, Anvil Range continued to maintain that it had adequately provided for reclamation of the Faro Mine and failed to disclose its increasing liability as its strategy for funding the reclamation disintegrated.

### **Manhattan Minerals – Tambogrande**

#### *The Event*

Manhattan Minerals Corporation, a Canadian mining company headquartered in Vancouver, is devoted to the international exploration and development of mining properties, with a heavy strategic emphasis on northern Peru, where its concessions at Tambogrande are located. Manhattan Minerals Corporation shares trade on the Toronto Stock Exchange. It acquired a concession to develop the Tambogrande deposits in 1997 from President Fujimori and began exploratory studies. On June 2, 2002, the residents of the town where the mine would be located conducted a referendum on the question of whether the mine project should go forward. Over 93 percent of those participating voted “No.”

Manhattan Minerals’ stock price fell by approximately 30 percent in the following days, proving that the results constituted a material event to investors. Moreover, in September 2002, the company announced that due to “volatility in equity markets” the company was postponing a private placement and re-pricing significantly downwards share purchase warrants that it had issued a year earlier. This increased the company’s difficulties in demonstrating to the Peruvian government that it had the financing to develop the concession property, a question then at issue. In December 2003, this issue formed the announced basis for the government’s decision that Manhattan Minerals had not fulfilled the financial requirements of the project and had forfeited its concession rights. Therefore, the referendum was clearly a material financial event for the company.

#### *Background*<sup>70</sup>

Prospective mining activity in the Tambogrande region dates from 1978, when the Peruvian government declared the district of Tambogrande a national reserve in which mining development was in the national interest of the country and authorized the French company Bureau de Recherches Géologiques et Minières (BRGM) to carry out a pre-feasibility study. The government’s efforts to establish a mine in Tambogrande in the 1980s failed largely because there was already opposition from the local population.

<sup>70</sup> This history draws mainly from the report of the international observers’ team that monitored the referendum. See Stephanie Rousseau and Francois Meloche, “Gold and Land: Democratic Development at Stake: Report of the Observation Mission of the Tambogrande Municipal Consultation Process in Peru,” International Center for Human Rights and Development, Montreal, Canada, 2002.

On May 6, 1999, the regime of President Alberto Fujimori published a supreme decree allowing Manhattan Minerals Corporation to acquire ten mining concession rights covering a territory of 10,000 hectares in Tambogrande, which includes an urban area and an area slated for urban expansion. On May 14, 1999, another supreme decree incorporated the Tambogrande mining project, formed of Manhattan Minerals Corporation and *Minero Perú*, a government corporation. Manhattan Minerals Corporation purchased the concession rights and preliminary studies from BRGM and the government granted Manhattan Minerals exploration rights over 10,000 hectares for a period of four years as of May 6, 1999.

The May 1999 agreement between the government and Manhattan Minerals stipulated that a new company, *Empresa Minera Tambogrande*, be created to operate the mine. Manhattan Minerals would own 75 percent of the company and the other 25 percent would be owned by *Minero Perú*, a state-owned company. The agreement also stipulated that Manhattan Minerals, alone or with a partner, must hold assets of US\$100 million and that the average processing capacity of the mine be 10,000 tons of rock per day, using methods and technologies that would not affect the infrastructure of the town of Tambogrande or harm the population or cause damage to the surrounding agricultural areas.

The Tambogrande district, with a population of approximately 70,000, is in the Department of Piura, where commercial agriculture has become the main economic activity, largely because of an internationally financed irrigation project. Limes, mangos, rice, carob, and other foodstuffs for domestic consumption and for export are produced there, generating hundreds of millions of dollars in annual sales. The town of Tambogrande, under which are located the main deposits, has a population of about 16,000.

Manhattan Minerals undertook geophysical studies in 1997 and carried out exploratory drilling during the summer of 1999, confirming the existence of significant gold and silver deposits under part of the town of Tambogrande. In addition, other deposits were discovered one kilometer and thirteen kilometers south of Tambogrande. In 1999, when exploratory drilling in the urban area began, the opposition to mining that had existed for years began to mobilize again and grew significantly, much of it under the leadership of the Tambogrande Defense Front, an organization composed of delegates elected by consensus in the ten zones of the Tambogrande district and delegates from the urban area. The leaders of the Front are elected annually and the president is elected in a general public meeting of the entire population.

The “Tambogrande” project, as presented by Manhattan Minerals Corporation, contained the following: a 250 meter deep open-pit mine affecting a total area of 750 hectares within the present boundaries of the town, requiring the relocation of approximately 8000 residents and the purchase of 540 hectares of agricultural land; the diversion of the Piura River; an ore processing plant; a mine tailings pond and other facilities. The mine in Tambogrande has a projected life span of approximately 10 years, exclusive of closure, remediation, and long-term monitoring.

As required by law, an environmental impact assessment study was prepared by an international consulting firm hired by the company, to be submitted by Manhattan Minerals Corporation to the Peruvian government. According to the company's directors, the study would respect the environmental and social standards established by the World Bank's Multilateral Investments Guarantee Agency (MIGA), including standards for relocation and compensation.

During the period from 1997 through the date of the referendum, Manhattan Minerals carried out extensive discussions, meetings and consultations with local government officials and residents. The company disseminated information about the project and also built model homes to show what relocation of townspeople would bring. Nonetheless, opposition within the community and from groups outside the community continued.

One of the central issues for opponents in Tambogrande concerned the powers the local population possessed to participate in the decision on the granting of mining concessions in an area that is privately owned, inhabited, and under cultivation. Consultation with the provincial and the district municipality was a legal prerequisite that was not met before the central government granted concessions.

Despite the company's assurances, opponents also feared risks to and long-term degradation of water resources and the environment. A preliminary EIA of the Tambogrande project made public by Manhattan Minerals Corporation in July 2000 was evaluated by geologist Robert Moran in May 2001. Mr. Moran reported several inadequacies in the preliminary study. He also argued that the proposed mine could cause a drop in levels of the surface and underground water necessary for agriculture, contaminate ground water because of acid runoff from the mine and risk ecological disaster related to El Niño, which generates torrential rains in the region every three or four years. He recommended that adequate environmental studies be carried out by consultants independent of and not hired by the company.

During the same period, the Front held many meetings with company representatives, including one with the then president, Mr. Graham Clow, on June 12, 2000. At this meeting, a document was signed in which the company recognized the Front as a "natural and legitimate representative," and committed itself to "respecting the decisions of the population that result from the process of dialogue that should continue from this time onward."

At the beginning of 2001, because of the concerns of a large number of his fellow citizens, the mayor, who had granted the permit for exploratory activity within the town, changed his position and gathered the signatures of approximately 28,000 citizens (75 percent of voters) of Tambogrande demanding the termination of activities related to mining in the region and the withdrawal of Manhattan Minerals Corporation. This petition was presented to the Peruvian Congress and several public institutions, but did not receive any response.

On February 16, 2001, the municipal council resolved to respect the will of the residents to oppose the government's wish to grant authorization to the mining project in the district of Tambogrande. A few days later, on February 27 and 28, 2001, thousands of Tambogrande residents took part in a demonstration organized by the

Front to demand that Manhattan Minerals leave the region. In the urban area of the district, the demonstration degenerated into a confrontation with the 300 police officers posted to protect the company's facilities. Fifteen demonstrators and 25 police officers were injured and many demonstrators were arrested. Afterward, during the night, unidentified individuals burned down the model homes constructed by Manhattan Minerals, vandalized the offices of the company and one of its subcontractors and destroyed equipment and material.

On March 16, 2001, one month after the resolution of the municipal council had been passed and two weeks after the violent events, the mayor of Tambogrande signed a decree rescinding the earlier decree authorizing Manhattan Minerals to carry out exploratory drilling within the urban and urban expansion zones. The assassination of a community leader, Godofredo García Baca, on March 31, 2001, increased the climate of tension and distrust on the part of Tambogrande inhabitants. Mr. García Baca had spoken out against the mining project many times during public assemblies and in meetings with representatives of the mining company.

Both the mayor of Tambogrande and the leaders of the Defense Front assert that they initiated the idea of holding a municipal referendum on mining development in their region in order to find a mechanism by which the very strong opposition of a good portion of the population could be expressed peacefully. On June 23, 2001, *The Economist* reported that Carlos Herrera, Peru's energy minister, stated that if the citizens of Tambogrande didn't want the mine to go ahead, it wouldn't, even though there was nothing legally binding about the citizens' feelings.<sup>71</sup> A municipal order of October 11, 2001, created the *consulta vecinal* as a mechanism for citizen participation in the district of Tambogrande, using for justification

- The municipal organic law, which establishes the responsibility of the municipal authority in development planning and the competency of the municipal authority to promote and define the mechanisms of public participation in community development;
- The law establishing rights of participation and control by citizens, which provides for the mechanisms of citizen participation at the municipal level, without defining those mechanisms.

The municipal council resolution of October 11, 2001, stated that citizens were to respond, negatively or affirmatively, by secret ballot, to the following question: "Do you agree with the development of mining activities in the urban, urban expansion, agricultural, and agricultural expansion zones in the district of Tambogrande?"

The resolution also called on the Peruvian national electoral agency to organize the municipal referendum. However, the national government clearly opposed the referendum process, stating that it was not a legal mechanism provided for under the applicable legislative framework for approval or rejection of a mining project and that decisions should await the completion of the environmental and social impact assessment.

Nonetheless, the community continued to organize the referendum. The electoral regulations allowed for the constitution of two groups to promote the two options

<sup>71</sup> "Mining a Sour Vein in Peru." *The Economist*. June 23, 2001.

citizens were to vote on, the YES option and the NO option. The NO campaign was primarily organized by the Defense Front, with the support of member organizations from the Technical Committee, including the financial support of Oxfam UK. The mining company declined to campaign for the YES side on the grounds that the public did not yet have the information contained in the EIA and so could be manipulated by political or ideological interests instead of making a decision on the basis of technical information. The company representatives also maintained that the consultation had no legal validity and that a NO majority would not lead to the project's termination.

In the voting, out of a total population of 36,937 registered voters, 27,015 ballots were issued, a participation rate of 73.14 percent. The NO side won with 25,381 votes, or 93.95 percent of the vote, taking into account spoiled or blank ballots. Counting only the ballots for the YES and the NO side, the NO side won with 98.65 percent.

In reaction, the Peruvian government repeated that submission of the EIA followed by public hearings were the legal steps toward a decision concerning the future of the Manhattan Sechura project in Tambogrande. The Minister of Energy and Mines repeated that the municipal consultation had no legal validity. However, the Deputy Minister of Mines acknowledged that the result of the vote revealed such massive opposition to mining activity that the government could not ignore it.

### *Disclosures*

Throughout 2001 and 2002, the company's press releases and financial reports discussed its consultations with the community and progress in carrying out the Environmental Impact Assessment. However, the first mention of the referendum came in a press release dated February 14, 2002, in which the company declared

“On February 10, 2002 the Ministry of Energy and Mines published in the official gazette its resolution to enforce existing laws in Peru that prevents local municipalities from calling referendums on issues which conflict with National laws. Specifically, the Government of Peru has now publicly stated their legal findings that a referendum on mining in the District of Tambogrande is not legal and that the Government will enforce the existing laws against such a referendum through the National Prosecutor if necessary.”

No indication was given in that release that the popular referendum constituted a material risk to the company's project or plans or a risk to investors.

The referendum was not mentioned again in company disclosures until June 2002, when the company issued a lengthy press release discussing the referendum. Although the discussion of the referendum is in the future tense, the press release itself is dated June 2, 2002, the date on which the voting took place. This press release did not indicate the results of the voting nor the criticisms in Moran's review of the mining studies. Also, many of the events leading up to the referendum, now recited as background information, had not been previously disclosed by the company.

“On June 2, 2002 the residents of the District of Tambogrande will be asked to participate in an opinion poll on mining development in their community. The results of this opinion poll are not binding on any of the participants or parties involved in the process. It is expected the results of the poll will be used as part of a larger public relations campaign being fashioned to discourage industrial development in Peru rather than as a constructive expression of social interest in a local development project. The ‘consulta popular’ or opinion poll being called for June 2, 2002, has been commissioned by OXFAM United Kingdom and is scheduled to occur two days prior to a nationwide anti-industrial development campaign being funded by, and incorporating, a wide number of national and international NGOs, including the National Committee Coordinator of Communities Affected by Mining (CONACAMI).”

“Manhattan’s position has been, and continues to be, that the company must gain a social license to operate and receive a positive consensus from the population impacted by the project before constructing a mine. But the June 2nd opinion poll has no validity on a social license to operate. It is impossible for those most impacted by the project to provide an informed opinion about the viability, benefits, and risks of a project, without being able to review the independent technical, economic, and social issues that are researched in the Feasibility Study and Environmental Impact Assessment. The timing of this opinion poll puzzles us in that it is scheduled a few weeks prior to the release of the company’s Feasibility Study and Environmental Impact Assessment.”

“What’s more, the June 2nd, 2002 opinion poll commissioned by OXFAM United Kingdom runs counter to recommendations made in the August 15, 2002 OXFAM America-funded report, *An Alternative Look at a Proposed Mine In Tambogrande, Peru* published by Robert Moran of the Mineral Policy Center, and Environmental Mining Council. In his report, Moran concurs with Manhattan’s position that informed decisions about development cannot be made until all of the independently researched information is available to community members.”

“As a first step, Manhattan Minerals must provide a full impact assessment, including a comprehensive and final baseline study, and should provide community leaders with resources to conduct their own independent assessment of Manhattan’s conclusions. It is only on this basis that those affected can make an informed decision about whether or not they wish to accept the likely impacts of this mine on their environment, livelihoods and community, in exchange for the potential economic benefits of a large scale mining operation.”

“This supports Manhattan’s views regarding informed decisions.”

“Since there are no reputable independent public relations firms, Peruvian NGOs or government agencies involved in the opinion polling—The Defensoria del Pueblo, the Oficina Nacional del Procesos Electorales, the Jurado Nacional de Elecciones, and Transparencia have all declined to participate—and OXFAM is not heeding its own advice, Manhattan believes the results of the opinion poll have no validity.”

“The following provides background on the June 2, 2002 opinion poll being conducted in the District of Tambogrande.

#### Background

- On October 11, 2001, the Town Council of the District of Tambogrande, Peru passed Ordinance No O12-2001-MDT-C, creating a mechanism for citizen’s participation. On the same day the Council passed Resolution 020-2001-MDT-CM which enabled the council to develop a neighborhood opinion poll regarding mining activity in the District.
- Concurrent to the Town Council’s resolutions the Defensoria del Pueblo (Peruvian Ombudsman Organization) was organizing a Table of Dialogue for the stakeholders of the Tambogrande mining project. The first meeting, including the Mayor of Tambogrande, was held on October 21, 2001 and the Mayor confirmed the opinion poll (Consulta Popular) would not be held in view of the progress being made in organizing the dialogue process. In particular the participation of the Defensoria del Pueblo.
- On November 24th, 2001, the Defense Front of Tambogrande withdrew from the Dialogue process, claiming the Defensoria del Pueblo, the Minister of Energy and Mines, and the Minister of Agriculture were biased.
- The Mayor and town council of Tambogrande subsequently approached the National Office of Electoral Processes (ONPE) to organize a Consulta Popular to gauge community support for the project and make the majority’s opinion legally binding.
- On January 17th, 2002, ONPE issued Resolution 020-2002-J/ONPE (published January 19th, 2002), and on March 22nd, 2002 ONPE issued Resolution 098-2002-J/ONPE (published April 26th, 2002) in which it stated “the popular consultation referred under Municipal Decision 012-2001-MDT-C and Council Agreement 020-2001-MDT-CM, both dated October 11, 2001, issued by the Tambogrande District Municipality, are not binding, and consequently do not obligate ONPE to organize, plan and execute said consultation.”

- On February 9th, 2002 the Peruvian Government, Ministry of Energy and Mines agreed and published Resolution 066-2002-EM/DM indicating any Consulta Popular in the Tambogrande Municipality would have no legal or binding basis.
- On February 14th, 2002, in Piura, Peru, Julio Bonelli, General Director on Environmental Affairs from the Ministry of Energy and Mines, and Matias Prieto Celo, Chief of INRENA held a press conference confirming the non legally binding consulta popular, and introduced an accepted formal public process of consultation for reviews of industrial development. At this same press conference they confirmed that an independent team would monitor Manhattan's Environmental Impact Assessment.
- On April 20, 2002, the Mayor of the District of Tambogrande issued Decree 003-2002-MDT-A calling for a neighborhood opinion poll for Sunday, June 2, 2002—just weeks prior to the completion of the independently monitored Environmental Impact Assessment. The Mayor also appointed Fredy Martin Giraldo Rivera as technical council for the opinion poll.
- As of May 10th, 2002 the Office of the Electoral Processes (ONPE) withdrew all of its advisory and logistical support for the Tambogrande Municipality. On May 11th, after the complete withdrawal of the Peruvian Office of Electoral Processes the Mayor of Tambogrande proceeded to present the committee and advisor for what now constitutes a public opinion poll.”

On the following day, June 3, 2002, the CEO of Manhattan Minerals issued a public statement providing the results of the voting but again dismissed them as politically motivated and non-binding. In this statement, he also revealed that in the previous year's protests the company's office in Tambogrande had been destroyed. Subsequent statements, such as a press release dated August 29, 2002, were generally optimistic:

“Just after the quarter ended the second informal meeting was held with Peruvian government regulatory agencies to discuss aspects of the EIS. The informal information session was well received by authorities and Manhattan does not expect the Tambogrande EIS review process to differ from the normal EIS review process, except for the request for additional public audiences. Manhattan welcomes the additional public audiences, and plans to utilize these interactions to gain the necessary community acceptance and to obtain a mine development permit.”

In summary, the strong local opposition to Manhattan Mineral's project in Tambogrande, which was the company's principal asset, culminating in an overwhelmingly negative vote in the community referendum in June 2002, was a materi-

al risk and a known uncertainty in the months leading up to the voting. The overwhelmingly negative vote in that event resulted in a significant loss to shareholders and contributed to the challenge facing the company in attracting the capital needed to meet the financial conditions in its concession agreement. The company's disclosures in the months prior to the referendum did not disclose this risk adequately to investors.

## **Cambior – The Omai Mine**

### *The Event*

Overnight between August 19 and 20, 1995, the tailings dam failed at the Omai mine in Guyana, releasing approximately 4 million cubic meters of cyanide-laden mine waste into the Omai river, which feeds into the Essequibo, which eventually runs through the capital. Eighty kilometers of the Essequibo River were contaminated, animal and aquatic life suffered, and a large percentage of the local residents reported negative health effects.<sup>72</sup> Cambior, a Canadian company, owned 65 percent of Omai Gold Mines Ltd., the operating company, Golden Star owned 30 percent and a Guyana government corporation owned the remaining 5 percent.

<sup>72</sup> Mineral Resources Forum.

### *Material Financial Effects on the Corporation*

Cambior's stock plummeted 23 percent between Friday, August 18, 1995 and Monday, August 21, 1995. Trading volume went from about 27,000 on the 18<sup>th</sup> to about 3.7 million on the 21<sup>st</sup>. Golden Star Resources, the minority owner, experienced a similarly sharp decline in its stock value.<sup>73</sup> Moreover, the dam remained closed for months while the failure was investigated and a new tailings impoundment was constructed, resulting in substantial loss of income and additional costs for the company. Therefore, the dam failure and spill was clearly a financially material event.

<sup>73</sup> All stock information obtained from Big Charts. Available: <http://bigcharts.marketwatch.com/symbollookup/symbollookupresults.asp?symb=cambior&country=all&type=stock>.

The financial consequences did not stop there, however. In 1999, Guyanese citizens tried to sue Cambior for \$100 million in damages in Canadian courts. The suit was dismissed in 1997 on the grounds that the Guyanese did not have standing to sue in Canada. Another class action lawsuit was filed in May of 2003 on behalf of 23,000 Guyanese, claiming \$1 billion in damages against Cambior. Cambior has refused to settle, claiming that there is no merit to the suit's claims.<sup>74</sup>

<sup>74</sup> Marowitz, Ross. "Cambior Declines Settlement Offer," *The Gazette*, Montreal. July 5, 2003. B4.

### *The Background*

The tailings dam spanned the valley of the Omai River and was designed to rise in stages to a height of 534 meters. Construction began in 1991. A diversion conduit was constructed to carry the river waters through the dam. The dam crest was at 534 meters and the water level was at 529.6 meters at the time of failure, less than 5 meters below the top of the dam. Virtually all of the impounded water was lost when the dam failed.

The subsequent investigations provided considerable information about the reasons for the event. The Process Review Committee, appointed by the Guyana Geology and Mines Committee to advise on plans for the mine's reopening and waste

management, stated in its November 1995 report that, at the time of the failure, the amount of fluid in storage was eight times larger than the amount specified in the project's 1991 Environmental Impact Statement, which was the only operating plan in existence for the Omai Mine project. In fact, the EIS specified a maximum of 0.5 million cubic feet, about one-eighth the amount of liquid released when the dam failed.<sup>75</sup>

<sup>75</sup> Report of the Process Review Committee concerning Omai Gold Mines Ltd, submitted to the Guyana Geology and Mines Commission, November 17, 1995.

There were two significant reasons why so much water was being stored behind the dam. One was that in Guyana's tropical climate, heavy annual precipitation in the watershed created a positive water balance in the impoundment, requiring that liquids be released periodically from the dam. The second reason, however, was that prior to the spill the cyanide content of the liquid in storage was too high for it to be released into the river. The company anticipated that natural degradation would reduce the cyanide content of the liquid in storage, obviating the need for additional treatment with hydrogen peroxide, which they opposed.<sup>76</sup> However, in May 1995, Cambior applied to the government of Guyana for a modification of its Environmental Impact Statement allowing release of water with a cyanide content of 8 ppm, four times higher than that prescribed in its 1991 EIS. "This request was motivated primarily by the fact that the company was reluctant to raise further the level of the dam . . . even though water levels would have exceeded the maximum permissible by June 1995."<sup>77</sup> This request was denied, so the volume of water in storage continued to increase, raising pressure at the upstream dam face and reducing the amount of freeboard at the dam's summit below that prescribed in the Environmental Impact Statement.

<sup>76</sup> *Ibid.*

<sup>77</sup> Report of the Commission of Inquiry into Discharge of Cyanide and other Noxious Substances into the Omai and Essequibo Rivers", January 5, 1996.

<sup>78</sup> "Technical Causation of the Omai Tailings Dam Failure," submitted to Guyana Geology and Mines Commission by Dam Review Team, November 16, 1995.

In addition, according to the report<sup>78</sup> of the Dam Review Team to the Guyana Geology and Mines Committee, appointed to study the dam failure, the failure resulted from flaws in the dam's design and construction. The dam construction consisted of:

<sup>79</sup> Saprolite is defined as clay, silt or other rock remnants unmoved from the site of disintegration.

- "a sloping core constructed of low-permeability, clayey saprolite<sup>79</sup> soils. The purpose of the core is to limit and control seepage through the dam.
- a thin zone of coarse-rock "riprap" along the *upstream* side of the core to protect it from wave and rainfall erosion.
- a primary zone of compacted rock fill that comprises the main structural body of the dam.
- a thin zone of filter sand whose intent is to prevent fine soil particles in the core fill from migrating into and through the voids between the coarse rock fill fragments under the influence of dam seepage."

The Dam Review Team considered several reasons why other tailings dams had failed, including seismic activity, floods, mine subsidence and other natural events. All were ruled out. Instead, the Team pointed to flaws in the dam itself:

"It is our current judgment that failure of the dam was caused by massive loss of core integrity resulting from internal erosion of the dam fill, a process

also known as *pipng*. This means simply that finer particles from one soil moved freely under the influence of seepage forces into and through the interstitial voids of adjacent coarser soil due to excessive disparity between particle sizes of the two soils.”

“We believe this process began at the interface between the filter sand and the compacted rock fill. Loss of filter sand into the rock fill left the overlying saprolite core material unsupported and subject to the development of cavities, softened zones, and cracks as its particles too moved into the rock fill. Cavity development in the core fill is likely to have propagated undetected for some period of time until reaching the reservoir at and above the slimes level. The final breakthrough of these cavities formed “pipes,” or tunnels, in the core fill at multiple locations that allowed uncontrolled flow of water into and then longitudinally through the rock fill zone of the dam. These features are now manifested by sinkholes on the upstream slope of the dam, as core fill and riprap have subsided into the open voids.”

“There are believed to be two primary physical defects in the dam that allowed this process to occur, one related to *filter incompatibility* between the sand and rock fill zones, and another involving the diversion conduit. *Both were produced by known or suspected deficiencies in design, construction, or construction inspection, either singularly or in combination. [Emphasis added.]* Moreover, defects related to filter incompatibility and the diversion conduit may not be mutually exclusive, and may have interacted in complementary ways not yet fully understood.”

“Internal erosion between zones of adjacent soils is prevented by controlling their particle size distributions (or *gradations*) according to filter design criteria developed over 50 years ago and little changed since then. These filter criteria were applied in the dam design, which limited the gradation of the rock fill directly adjacent to the filter sand. Current design practice also recognizes that coarse material is prone to particle-size segregation during construction that has often allowed internal erosion to occur even when other filter design criteria have been satisfied. According to supplemental criteria that address this problem, the transition zone rock fill should not have exceeded a maximum specified particle size of about 25-50mm, whereas the design allows for fragments as large as 600mm. Therefore, the transition zone rock fill as specified would have been highly susceptible to particle size segregation and consequent filter incompatibility.”

*“These design deficiencies notwithstanding, it is apparent that the transition zone rock fill was never included in the dam during construction in any complete or systematic way. Even if properly designed, meticulous adherence to transition rock fill gradation specifications at each and every location within the dam would have been mandatory to ensure its safety against internal erosion. By contrast, construction documentation and existing*

*conditions on the dam crest indicate that pit-run rock fill of essentially unrestricted gradation was placed directly against the filter sand, without adequate construction control of this critical feature.” [Emphasis added.]*

“Rock fill placement was supervised during construction of the initial stages of the dam and is believed to have been inspected or observed by several geotechnical engineers on various occasions. Such gross disparity of particle sizes between the filter sand and adjacent rock fill as can be currently seen on the dam crest should have been visually evident to any experienced geotechnical engineer, along with equally clear implications for filter incompatibility between the two materials. However, we have been provided with no information to indicate that any such supervision, inspection, or observation sufficiently recognized the severity of this condition, adequately warned of its potential consequences, or undertook measures necessary to correct it.”

“In basic terms then, the rock fill adjacent to the filter sand was simply too coarse to prevent the sand from washing into and through it, and both potential and actual problems this produced appear to have gone unrecognized or uncorrected throughout the sequence of design and construction until the failure occurred.”

The Dam Review Committee thus found that the failure was caused primarily by faulty design and construction that went unrecognized or uncorrected. Evidence from other sources, discussed below, indicates that the problems were not unknown but remained uncorrected.

With respect to the conduit carrying water through the dam, the Review Team found that:

“The pattern, nature, and distribution of surficial damage provide circumstantial evidence to suggest that the corrugated steel diversion conduit was associated with internal erosion processes. Furthermore, problems related to conduits in general have been responsible for a significant proportion of earth dam and tailings dam failures, and in particular the use of unencased corrugated metal culverts through dam cores is considered bad practice.”

“Since the remaining slimes behind the dam and saturation levels within it are likely to preclude any excavation or direct inspection of the conduit, actual damage it may have experienced or produced may never be completely known. “Additionally, design details for the conduit were not only ambiguous from the start but also underwent continuing change from the feasibility design continuing on throughout construction, making it difficult for us to fully assess the intent of the design or the actual as-built conditions. One largely unexplained aspect is that the evolution of conduit design and construction appears to have progressed in several important respects from more conservative to less conservative over time, resulting in a number of irregularities. It is known that the corrugated steel culvert was crushed by

heavy equipment and repaired at two separate locations and occasions during construction, suggesting the possibility that other latent damage might have gone unrecognized.”

“The nature of corrugated metal culverts is such that they must deform (from circular to slightly oval shape) in order to develop load-carrying capacity. This raises the possibility that deformation incompatibility between the rigid grouted section and the deformable open section may have caused structural failure, or that the combined fill, slimes, and water loads may simply have exceeded the structural capacity of the culvert in the critical region beneath the Stage 1A starter dyke. Any such structural failure would have produced a void or allowed soil to enter the conduit, providing a direct path for concentrated seepage and cavity formation within the fill.”

“Even so, structural failure of the conduit would not necessarily have been required for concentrated seepage and internal erosion to initiate and propagate along the outer surface of the conduit, a common occurrence without adequate safeguards. The details of conduit backfilling and as-built construction are important in assessing this mechanism, and our ongoing investigation is continuing to evaluate it. There is evidence to indicate that sand was used for culvert backfill beneath some portion of the Stage 1A starter dyke. Concentrated seepage within this sand may have produced internal erosion at its downstream terminus with the rock fill as a result of filter incompatibility issues previously discussed . . .”

The conclusion of the Dam Review Team indicates that the operating company knew or should have known of the risks of dam failure:

*“In this regard, our investigation to date provides no reason to believe that the failure was related to any concealed geologic conditions or features, or to any anomalous behavior or engineering properties of the dam, foundation or fill soils, that would pertain to other structures at the mine site. The failure was caused not by some ‘hidden flaw’ but by inadequate application and execution of sound practices for design, construction, supervision, and inspection that are well understood in current embankment dam and tailings dam technology.” (Emphasis added.)*

Were the flaws in the dam known to the company as the water levels rose, or should the company have known about them? The Commission of Enquiry quoted from faxes between the resident engineer supervising the company’s employees constructing the dam and the engineering firm’s head office in September 1992, when the first stage of the dam was under construction. The resident engineer pointed out that with respect to the grades of rock fill adjacent to the filter sand, “It is fairly certain that the selected run of mine waste will not satisfy this specification. Is there room for coarsening the specification?” The reply came back: “. . . basically we will accept the finest of the run of mine muck which should be fairly close to spec (i.e., some coarsening of spec is acceptable.)”<sup>80</sup>

<sup>80</sup> Report of the Commission of Inquiry, p.40.

With respect to the diversion culvert, the Commission of Inquiry cited an exchange of letters between the project engineer and the home office:

“Further to our discussion yesterday regarding the grouting of the remaining 33 meters of the diversion culvert, there are two options to be considered:

“Option 1: Drilling 2 HQ holes into the culvert from the embankment crest and tremie a sand cement mortar into the culvert to complete the grouting as designed. The argument for doing this is to prevent possible collapse of the culvert near the upstream face of the embankment.”

The letter continued to say that the load on the corrugated steel culvert would exceed design maximum by 60 percent and that the cost of implementing this option would be less than two thousand dollars.

“Option 2: Complete grouting of existing concrete plug and leave the remainder of the culvert as is . . . and accept the risk that the culvert will collapse and threaten the integrity of the embankment. This risk is considered to be small as a high degree of conservatism is built into the design tables.”

The latter, less conservative option was recommended by the consulting engineer and accepted by the Omai Mine.<sup>81</sup>

In summary, this evidence indicates that the company knew that the dam was being subjected to stresses exceeding its design capacity, that there were flaws in its construction that could lead to its failure and that any such failure would have disastrous consequences because of the large volumes of liquids that would be released and their elevated cyanide concentrations.

In addition, news and other documents refer to reports that are not in the public domain. A report produced in 1988 for The National, a program put on by the Canadian Broadcasting Company, cited a U.S. engineer’s report that stated that “We are at a loss to explain why the design and construction of . . . critical elements of the dam were executed so inadequately.”<sup>82</sup> A coalition of NGOs working on the Omai case stated that environmental specialists had referred to the Omai Mine as an ongoing disaster well before the 1995 dam failure.<sup>83</sup>

In contrast, Cambior’s 1995 Annual Report painted a rather different picture. According to the statement signed by the CEO and the Chairman of the Board:

“The Commission’s Dam Review Committee conducted a thorough investigation of the tailings pond dam and determined the cause to be structural failure related to the faulty design and site supervision of the filter zone and drainage culvert from the initial stage of construction. While Cambior has consistently applied North American environmental and operating standards to its domestic and foreign activities, the Omai tailings dam failure reveals that such rare incidents can befall even the most prudent of mining companies anywhere, at any time.”<sup>84</sup>

<sup>81</sup> *Ibid.*, p.42.

<sup>82</sup> The National. “The Ugly Canadian.” July 6, 1998. Available at <http://www.tv.cbc.ca/national/pgminfo/ugly/guyana.html>.

<sup>83</sup> National Committee for Defense Against Omai, et al. Press Release dated May 9<sup>th</sup>, 1996. *Saxakali Magazine* online. Available at <http://saxakali.com/saxakali-magazine/saxmag3e1.htm>.

<sup>84</sup> Statement by Gilles Mercure, Chairman of the Board & Louis Cignac, President & CEO, Cambior Annual Report, March 1, 1996.

### *Disclosures*

Cambior disclosed the dam failure and subsequent events in a series of press releases and financial reports. For example, the 1995 CAMBIOR Year End Financial Results Press Release contains a brief mention of the incident: “. . . 1995 had been a difficult year with the Omai incident.” Also, “the reduction of cash flow and the reporting of a loss in 1995 are attributable to the interruption of operations at the Omai mine . . .”<sup>85</sup> In subsequent releases, the company disclosed the results of the various official inquiries, Management Discussion & Analysis filings that the build-up the filing and subsequent progress of lawsuits against it, the resumption of operations at the mine, and other material facts relevant to the aftermath of the event. Cambior met its disclosure obligations in that regard. However, prior to the event, there was no mention in any of the company’s reports of liquid behind the dam accumulating to volumes many times greater than its design capacity, combined with known flaws in the design and construction of the dam, constituted a known material risk or uncertainty. Since the company had known as early as 1992 and 1993 that flaws in the construction of the dam posed risks of failure, it is hard to imagine that those risks, combined with the large volumes of liquids with high cyanide concentrations in storage, did not appear through the eyes of management to pose material risks to the company and its investors.<sup>86</sup>

<sup>85</sup> NO CORRESPONDING FOOTNOTE.

<sup>86</sup> NO CORRESPONDING FOOTNOTE.

### **Boliden – Los Frailes**

#### *The Event*

Overnight between April 24 and 25, 1998, a major portion of a large tailings pond dam failed at Spain’s Los Frailes mine, owned by the Canadian mining company Boliden, Limited. A slab of soil beneath the dam 20 meters wide slid approximately one meter towards Agrio River. The dam cracked and broke abruptly, spilling between five and seven million cubic meters of contaminated water and slurries through the gap. The spill of highly acidic liquids containing high concentrations of metals and other toxic compounds caused a 3.6 meter increase in the water level of the river as far as 7 kilometers below the dam. Three rivers were affected: the Los Frailes, Agrio, and Guadiamar, along with approximately 5,000 hectares (11,000 acres) of land, much of which was highly productive farmland.<sup>87</sup> Damage was also caused in the Doñana National Park, a UN World Heritage Site. The Guadiamar River runs directly through this park. Boliden has spent at least \$12 million on cleanup of the Los Frailes spill.<sup>88</sup>

<sup>87</sup> Eriksson, N. and P. Adamek. “The Tailings Pond Failure at the Aznocolar Mine, Spain.” United Nations Environment Programme. Mineral Resources Forum. Available: <http://www.mineralresourcesforum.org/incidents/Losfrailes/>.

<sup>88</sup> Diehl, Peter. “The Los Frailes Tailings Dam Failure.” World Information Service on Energy, Uranium Project. November 10, 2003. Available: <http://www.antenna.nl/wise/uranium/mdaff.html>.

<sup>89</sup> Coleman, Thomas W. and Ana Perales. “Boliden Apirsa, Los Frailes Tailings Incident.” United Nations Environment Programme. Mineral Resources Forum. Available: <http://www.mineralresourcesforum.org/incidents/Losfrailes/>.

<sup>90</sup> Klein Lyons. “Class Action Law Suit Alleges Misrepresentation by Boliden Limited.” December 7, 1998. Available: <http://www.kleinlyons.com/boliden/news1.html>.

#### *Material Consequences*

The news of the dam failure prompted a 28 percent decrease in the value of Boliden Limited’s stock on the Toronto Stock Exchange in the five days after it was reported.<sup>89</sup> The total drop in share value as a result of the disaster is estimated at between \$50 and \$100 million Canadian dollars.<sup>90</sup> The event also triggered other material consequences. On October 2, 2000, Boliden announced that its subsidiary Boliden Apirsa had filed a court application for bankruptcy. The company would not continue the development of the Los Frailes mine after October 2001. The Spanish court accepted this petition.

A class action lawsuit was filed by the Canadian law firm Klein Lyons on behalf of Boliden's shareholders. The lawsuit alleges negligence on Boliden's part and claims millions of dollars in damages as a result of Boliden's failure to disclose the risk of the dam breach.<sup>91</sup> Moreover, on November 16, 2002, Boliden was sued for \$89.9 million by the Andalusian regional government. Although this case was dismissed on January 2, 2003, the regional government is now trying to recover the money through administrative channels. On August 2, 2002, the Spanish Council of Ministers demanded that Boliden pay \$45 million in penalties for the spill. Boliden refused and this demand is still pending. The Spanish Government has spent over \$275 million cleaning up after the spill.

<sup>91</sup> Ibid.

### *The Background*

Aznalcóllar is located in southern Spain, 45 kilometers northwest of Seville. In 1960, Andaluza de Piritas, SA (Apirsa) was formed as part of the Banco Central SA industrial group (now Banco Hispano Americano), in order to acquire and exploit pyroclast and pyrite deposits. The tailings dam was constructed in 1978 and processing began with the production of zinc, lead and copper concentrates in 1979. It was designed and built by Geocisa, another company owned by Banco Central. In 1987, Apirsa was acquired by the Swedish-Canadian group Boliden, which continued extraction from the Aznalcóllar open pit until 1996. The company also located another ore body, called Los Frailes, in the same area. Production from this deposit started in 1997, with a capacity of 4 million tons per year, using the same processing facilities and tailings impoundment as Aznalcóllar.

The geology of the valley where the tailings pond and dam were constructed consists of a 10-meter layer of alluvial gravel overlying 30 meters of marl.<sup>92</sup> The tailings dam is two kilometers long and one kilometer wide. The embankments are constructed of a bentonite plug extending through the alluvial sediments one and a half meters into the clay layer below and are built up with waste rock. At its highest point, the embankment is currently 30m above ground level and is raised annually by one meter. The impoundment was designed for 70 metric tons of tailings, equivalent to 32.6 million cubic meters, and had reached almost half its capacity when the dam failed. The liquid in the impoundment was highly acidic and contained elevated levels of copper, lead, zinc and iron.

<sup>92</sup> Marl is a mixture of clay and carbonates of calcium and magnesium.

<sup>93</sup> Principa-EQE, Report (1999) "Structural Stability of the Aznalcóllar Tailings Dam," It was one of several studies presented as evidence in the investigation as to the cause of the dam failure.

<sup>94</sup> Bolaños, A (8 April 2000) *El País* newspaper: A report was prepared by Antonio Gens and Eduardo Alonso of the Polytechnic University of Catalonia in Barcelona.

The principal cause of the Los Frailes accident has been established as deficiencies in the design and construction of the tailing dam by Dragados y Construcciones, and its associated engineering firms, Itecsa and Geocisa.<sup>93</sup> These deficiencies, coupled with the fragility of clay soil and the high pressures of the water on the clay foundation<sup>94</sup> are said to have triggered the dam failure. Essentially, with the weight of tailings behind it, a segment of the dam slid downhill on its slick clay base. The flow of tailings that escaped through the breach caused a rupture of a 50-meter section of the embankment. About two million cubic meters of liquid and three million cubic meters of solids were released from the tailings impoundment.<sup>95</sup>

<sup>95</sup> Montero Sandoval, JM [2000]

Complaints had been made to the Andalusian authorities in late 1995 by Boliden-Apirsa's mining engineer, Manuel Aguilar Campos, about seepage from the tailings

facility.<sup>96</sup> Thereafter, in early 1996, a Spanish environmental group<sup>97</sup> filed a complaint in the Court of First Instance in Sanlúcar la Mayor alleging that defects in the construction of successive lifts of the dam wall since 1989 could cause a failure of the walls and that seepage from the dam was polluting the Agrio and Guadiamar Rivers.<sup>98</sup>

Shortly after the complaints were made, Boliden-Apirsa and the Spanish authorities agreed to commission Geotécnica y Cimientos, S.A. (Geocisa), to conduct a study of the stability of the dam. This study was reviewed by outside academic experts and forwarded for review to the appropriate Spanish central and regional authorities. The study included a review and verification of the original 1978 design parameters. It also included borehole drilling and trench excavation at the dam and laboratory tests and stability calculations under various hypotheses. In March 1996 the study found no signs of instability in the dam.

Early in 1996, Boliden-Apirsa also commissioned Golder Associates to carry out a hydro-geological study to determine the actual extent of the seepage. This study concluded that the volume of water seeping through the dam wall and screens were 10 cubic meters per hour, of which 85 percent were being captured by existing containment and pumping systems. Boliden-Apirsa also commissioned Dames & Moore to investigate and report on possible technical solutions to minimize this seepage.

After its stability study, Geocisa was commissioned to design the next stage of dam wall lifts required to accommodate tailings from the Los Frailes mine and to make recommendations for expanded monitoring of the dam. In its June 1996 report, Geocisa recommended actions to verify that new construction conformed to design specifications. Geocisa also recommended that instruments be installed and monitoring conducted to detect possible movements in the aquifer in the alluvium terrace and the dam. These recommendations were all accepted by Boliden-Apirsa and subsequently implemented by Geocisa under a separate contract.

On 20 June 1996, the regional government issued an order permitting Boliden-Apirsa to proceed with the next stage of dam wall lifts in accordance with Geocisa's design. The authority was satisfied that the steps taken by Boliden-Apirsa "confirm the stability of the tailings dam challenged in the complaint." The order also stated that the agency had recommended retaining the current features of the construction and monitoring the behavior of the dam wall.<sup>99</sup>

This order terminated the complaint process initiated by Boliden-Apirsa's ex-mining engineer Manuel Aguilar Campos and on 4 March 1997 a Court dismissed the complaint lodged by the Spanish environmental group, as the facts alleged were found not to constitute any offense.<sup>100</sup>

As the dam wall was lifted, a hydraulic barrier was constructed around it, 20-30 meters downhill, to eliminate seepage, and the capacity of the existing water treatment plant was also increased by 50 percent. In early 1997, Boliden-Apirsa and Geocisa completed the installation of the recommended monitoring system. In accordance with the recommendations of Geocisa, piezometers were installed in the alluvium terrace and did not penetrate into the marl formation. By March 1997, Geocisa had begun the recommended inspection and reporting program. Geocisa delivered the first of these summary reports (for 1997) to Boliden-Apirsa in March

<sup>96</sup> Montero Sandoval, JM [2000].

<sup>97</sup> CEPA [June 2000].

<sup>98</sup> Montero Sandoval, JM (2000).

<sup>99</sup> Order dated June 20, 1996 of the Head of Industry, Energy and Mining Service, of the Department of Industry, Trade and Tourism of Junta de Andalucía.

<sup>100</sup> Order dated June 20, 1997 of the Magistrates Court of First Instance No.2 Sanlúcar La Mayor.

1998, one month before the dam failure. The most recent inspection prior to the failure was on 14 April 1998. None of the inspections and monitoring activities carried out before the failure indicated any instability in the dam.<sup>101</sup>

<sup>101</sup> Lindahal, Lars-Åke [1998].

After the event, criminal charges were filed in 1998 against 22 individuals associated with the company, its contractors, and other organizations, alleging that they had brought about the accident. On 27 December 2000, the court exonerated the defendants in the case,<sup>102</sup> stating that there was no indication of criminal liability with regard to the failure of the dam and the toxic spillage.<sup>103</sup> An expert report prepared on behalf of the Court of Sanlúcar la Mayor had stated that the dam failure was due to the fact that during its construction and enlargement the builders did not take into account two factors crucial for its stability. The first was the susceptibility of clay soil under the dam to the risk of triggering a dam failure. The second was the high pressure of the water in the clay foundation.<sup>104</sup> Boliden-Apirsa repeatedly stated that the accident was to be attributed to *force majeure*. A report on the causes of the dam failure, published on 29 December 1999 by the regional government of Andalucía,<sup>105</sup> supported the company's position, finding that the accident was caused by a failure of the marl formation beneath the impoundment.

<sup>102</sup> Juzgado De Primera Instancia e Instrucción No Dos Sanlúcar La Mayor Sevilla, Case No DP 763/98-2.

<sup>103</sup> El Mundo 27 Dec. 2000.

<sup>104</sup> Bolaños, A. (8 April 2000) *El País* newspaper: Report was prepared by Antonio Gens and Eduardo Alonso of the Polytechnic University of Catalonia in Barcelona.

However, between 1992 and 1997 several complaints had been made to SEPRONA (the Environmental Criminal Investigative Police Unit) and to the various courts in the area regarding both the high levels of toxic chemical that were allegedly seeping out of the Aznalcóllar Mine into the Agrío River and the possibility that the dam was unstable. Moreover, the report prepared by Geocisa on behalf of Boliden in June 1996 stated that sliding surfaces were forming in the marl underneath the foundation.

<sup>105</sup> The report was prepared by Centro de Estudios y Experimentación (CEDEX) – a technical body within the Ministry of Public Works and the Industry.

Other technical experts in Spain have also pointed to flaws in the dam's construction. Rafael Baena Escudero of the Department of Physical Geography and Regional Geographic Analysis stated:

“In this case, a complete lack of foresight emerged. The dam was built on top of expansive clays. Within these clays, deformations have occurred, which were propagated to the soil, readjusting the blocks whenever a movement occurred. In this sense, the seepage through the marls has the effect that these layers, the phyllosilicates, swell and expand their volume. The opposite happens when they dry out and force the shrinking of the clay. This movement of expansion/contraction is constant and should have been accounted for. Especially, after the inclinometers had become deformed: something was moving. This is a matter of general negligence and not a problem of nature.”  
(*El Mundo*, May 25, 1998)

In addition, according to a report by Geocisa, deformations of the inclinometers had already been observed in 1997, indicating movement in the dam.

Faced with claims from Spanish authorities for recovery of damages and restoration costs, Boliden admitted in a press release dated Feb. 26, 1999, that the tailings dam was ill designed and blamed its contractor Dragados y Construcciones and its associated engineering firms, Itecsa and Geocisa, for the failure. Their “incorrect interpretation of the geotechnical properties of the Margas Azules (Blue Clay)

Formation [. . .] facilitated the failure of the tailings dam.”<sup>106</sup> In October 2002, Boliden’s Spanish subsidiary Boliden Apirsa sued Dragados y Construcciones S.A., for a minimum of 107 million Euros.

Continuing the litigation, a class action lawsuit was filed in Canada by Klein Lyons that cites a myriad of warnings from the Spanish government, scientists, and Boliden’s own engineers of the deficiencies in the dam prior to its failure. Lawyers at Klein Lyons have obtained internal documents that they claim will be crucial in proving these allegations. However, they are confidential and will not be available to the public until they are entered in court proceedings.<sup>107</sup>

<sup>106</sup> Boliden news release, February 26, 1999.

<sup>107</sup> Personal communication from Douglas Lennox, Klein Lyons, attorney, 01-29-04.

### *Disclosures*

Nothing in Boliden’s annual reports or interim financial statements prior to the dam failure mentions any possibility of structural problems in the Los Frailes tailings dam. The company’s Management Discussion & Analysis prior to the event did not treat the risk of a dam failure as a material uncertainty known to management.

Following the event, which the company disclosed in a press release, Boliden’s Annual Information Form for 1998, released on April 6, 1999, contained a lengthy discussion of the failure, the company’s potential liability, and the possible legal consequences:<sup>108</sup>

<sup>108</sup> Boliden Annual Information Form 1998.

“On April 25, 1998, the Aznalcollar tailings dam failed. Approximately 1.3 million cubic metres of tailings and 5.5 million cubic metres of tailings water were discharged into the nearby Rio Agrio, a seasonal watercourse in the semi-arid Andalusian region. The discharged materials flowed in a southeasterly direction following the course of the riverbed approximately two kilometres into the Rio Guadiamar and from there further downstream. Approximately 2,600 hectares of land along the Rio Agrio and the Rio Guadiamar were covered with tailings. There was limited property damage but no personal injuries. Immediately after the failure, all mining and milling activities at Los Frailes were halted. Within three days of the failure, Apirsa developed a plan for cleaning up the discharged tailings . . .”

“In November 1998, Apirsa filed a final closure and remediation plan for the tailings facility with the Spanish governmental authorities and applied for the licences and permits required to implement the plan. Apirsa has not yet received approval of the plan. Apirsa has, however, completed almost all the work required by the Spanish governmental authorities to strengthen the tailings dam. The balance of the work will be completed as soon as the judge investigating the cause of the tailings dam failure authorizes Apirsa to do so. See “Investigations into the Cause of the Failure” below . . .”

### Investigations into the Cause of the Failure

“. . . Immediately after the failure, each of Apirsa and the Spanish governmental authorities engaged independent consultants to investigate the cause of the failure. Subsequently, the investigating judge also engaged independ-

ent consultants to investigate the cause of the failure. Apirsa engaged Eptisa, Servicios de Ingenier' \_a S.A. ("Eptisa") as its consultant. Apirsa also engaged an international panel of independent engineering experts from Canada, Spain and Sweden to review Eptisa's work and to assist it in preparing its report.

"To date, Eptisa is the only independent consultant to have delivered its report. In its report, Eptisa concluded that the tailings dam failed as a result of a 60 metre lateral displacement of a 700 metre long section of the eastern portion of the tailings dam. The tailings dam, together with the four metre thick alluvium terrace upon which it lies and the upper 10 metres of the blue marl (clay) formation below the alluvium terrace, formed a block which slid, with almost no deformation of the tailings dam, along a near horizontal bedding plane in the marl formation. The failure was initiated by overstressing and progressive failure on the bedding plane and was influenced mainly by excess pore pressures induced in the marl formation by the tailings dam construction process. The failure mechanism developed during an undetermined period, from an initial stage of slow and progressive weakening along the bedding plane, eventually reaching instability."

#### Position of Apirsa

*"In the opinion of Apirsa, neither the work carried out by the independent consultants involved in the original design, siting and construction of the tailings dam (which was completed in 1978, nine years before Boliden acquired Apirsa) nor the work carried out by the independent consultant engaged by Apirsa in 1996 in connection with the project to increase the height of the tailings dam to accommodate tailings from the new Los Frailes mine (which included an assessment of the stability of the tailings dam following severe flooding in the area) and thereafter to monitor the stability of the tailings dam gave any indication of the possible failure of the tailings dam."*

*"In February 1999, Apirsa received the report of its geotechnical consultant, Principa-EQE, which identified three significant deficiencies with respect to the work carried out by third parties in connection with the original design, siting and construction of the tailings dam and the project to increase the height of the tailings dam in 1996. The first deficiency relates to the overestimation by the designers of the rate at which the weight of the dam and the pond would contribute to the stability of the structure and the rate at which the dam could be safely enlarged. This overestimation resulted from the use of inaccurate assumptions with respect to the rate at which water in the soils underlying the tailings dam would dissipate over time. The second deficiency relates to the use of inaccurate design values with respect to the frictional resistance of the blue marl (clay) formation to shear or sliding failure that*

*did not take into account all of the available laboratory test data. The third deficiency relates to the use of safety ratios and material strength properties that did not sufficiently reflect the degree of conservatism necessary when dealing with a material such as marl which is brittle and over-consolidated. The report concludes that, if the deficiencies had not occurred, a more conservative design would have resulted and, in the words of the report, "if that additional conservatism had been implemented, the failure of the tailings dam at Aznalcollar need not have occurred."* (Emphasis added.)

#### Possible Liability

"Notwithstanding the position of Apirsa, it is possible that officers of Apirsa will have criminal charges laid against them in connection with the tailings dam failure and be convicted and fined and that they will be held liable, in whole or in part, for the damages suffered by third parties as a result of the failure, including the costs incurred by the Spanish governmental authorities in cleaning up the southern sector below the tailings dam. It is also possible that Apirsa will have administrative charges laid against it in connection with the failure and be convicted and fined, either on the basis of strict liability or because a court concludes that Apirsa was negligent in some way or is vicariously responsible for any liabilities of its officers."

"Apirsa believes that the investigation currently underway will eventually determine and allocate liability for all the damages caused by the failure, including the damages suffered by Apirsa. Apirsa intends to vigorously pursue any claims for damages that it may have against those third parties that it believes are responsible for the failure."

"There is a risk that one or more third parties who suffered damages as a result of the failure could commence an action against the Corporation and one or more of its subsidiaries as direct or indirect shareholders of Apirsa alleging that they are not entitled to the limited liability protection provided to shareholders under Spanish corporate law based on the theory of 'piercing the corporate veil' or similar legal theory. There is also a risk that such third parties could be successful in such an action and that the Corporation and one or more of its subsidiaries could be held responsible for any liabilities of Apirsa. The Corporation has obtained an opinion from Spanish legal counsel that, although the matter is not free from doubt, in any final decision of the Supreme Court of Spain, the Corporation and one or more of its subsidiaries as direct or indirect shareholders of Apirsa should not be held responsible for any liabilities of Apirsa, based on the legal theory of 'piercing the corporate veil' or any similar legal theory. The opinion relies, in part, on a certificate of an officer of Apirsa as to certain factual matters with respect to Apirsa, including its share capital, management structure, ongoing operations, assets and number of employees."

Subsequent filings reported on further consequences of the event as they developed. In summary, Boliden was aware for years prior to the accident of allegations that there were risks that the dam might fail because it was warned by its own engineering employee and by its engineering consultant. It was aware that liquids were seeping through the dam and responded with studies, tests, monitoring, and inspections. Its own monitoring equipment detected movement within the dam well before it failed. Although it initially claimed that the dam failed through *force majeure*, it eventually conceded that the design and construction were at fault. Prior to the dam's failure, however, the company never disclosed to investors that this was a material risk and a known uncertainty.

### **Royal Oak Mining – The Giant Mine**

#### *The Event*

Royal Oak Mining, Limited, declared bankruptcy in April 1999, citing low gold prices, leaving behind substantial unfunded and undisclosed environmental liabilities at its mining properties. Notable among them was the Giant Mine in Yellowknife, Canada where 240,000 tons of highly toxic arsenic trioxide remained buried in underground mining vaults, leaching arsenic into ground and surface waters. Prior to bankruptcy, Royal Oak's third quarter 1998 report listed assets totaling \$840.3 million and liabilities totaling \$645.8 million, exclusive of the costs of dealing with the arsenic trioxide.<sup>109</sup> That problem was left to the government of Canada and the taxpayers. Recent engineering estimates of the costs of closure and remediation are approximately \$200 million.

<sup>109</sup> Royal Oak Mines Inc. 10-Q Quarterly Report, 11-16-98.

#### *Background*

The Giant Mine went into production in 1948 using a roasting operation to extract gold from its arsenopyrite ore, producing arsenic trioxide dust as a waste product. The arsenic trioxide dust that was collected was blown underground into mined out and some specially constructed chambers for storage 20 to 75 meters below the surface. After 50 years of mining operations, approximately 240,000 tons of arsenic trioxide dust had accumulated underground and about 10-13 tons were added every day over the last few decades. When underground storage began in 1951, it was considered the best option at the time, based on the occurrence of permafrost and low permeability in the bedrock. The storage chambers were located in the zone that had been dried out by mining activities that lowered the water table but water was flowing in the chamber areas. This flow was captured by the mine's collection system and treated prior to discharge to the environment.

However, open pit mining and extensive underground workings around the chambers compromised the permafrost. This, together with the permeability of the host rock and a re-assessment of the rate of mine re-flood has called underground storage into question as a permanent solution. Arsenic trioxide is soluble in water and there is evidence of groundwater movement through the rock. Elevated levels of arsenic are present in the mine water pumped from the underground workings, indicating that groundwater seepage from the storage chambers is already taking place. The vaults

where the arsenic is stored underground are a few hundred meters from Great Slave Lake and threaten the entire Mackenzie River watershed.

The Giant Mine has had several owners over the years. Royal Oak Mines acquired ownership in 1990 and operated the mine from then until April 1999, when it went into bankruptcy. The mine is located on land owned by the government of the Northwest Territories. It was held by Royal Oak Mines, Ltd. under a surface lease without any security for clean up and reclamation other than a requirement to return the land in a manner acceptable to the territorial government. The surface clean-up costs have been estimated at over \$8 million.

The Giant Mine was operated pursuant to subsurface mineral leases issued by the Department of Indian Affairs and Northern Development (DIAND). A required federal water license set out conditions related to water use and waste management and imposed a security bond of \$400,000 for abandonment and reclamation. The license also called for studies and actions leading to a management plan for the arsenic trioxide stored underground. The same requirements were in the previous license and were not fulfilled by Royal Oak. It is remarkable that the government authorities allowed Royal Oak to operate the mine for nine years without an approved plan to deal with 240,000 tons of arsenic or a bond to ensure implementation.

At low gold prices, Giant Mine became a break-even operation that required a large infusion of capital to bring it up to modern-day standards for worker safety, efficiency, and pollution control. Royal Oak Mines went into receivership in April 1999 with no provisions to deal with the arsenic trioxide at the Giant Mine. The arsenic problem was left to the federal government. The DIAND Minister initially indicated that the federal government would not accept responsibility for the clean up required at Giant. However, in late 1999, the receivers, the federal government and Miramar Mining Corporation (the owner of the other gold mine in Yellowknife) negotiated an agreement that saw the federal government take over the property. The assets were then sold to Miramar with the federal government retaining all of the pre-existing environmental liability. The underground mining operation at Giant resumed in March 2000 with the ore trucked to the nearby Miramar mill. As long as the property is profitable and remains in production, Miramar will provide a relatively small contribution to a fund that will assist with environmental remediation.<sup>110</sup>

DIAND undertook at least 25 studies to find a solution to the problem of the underground arsenic, starting in 1997, spending more than \$750,000 as a result of Royal Oak's inaction. Few, if any, satisfactory options have been found.<sup>111</sup> Several preliminary options were explored, ranging in cost from \$70 million to over \$1.7 billion. Most of the permanent remediation options are of dubious feasibility. Encapsulation in cement would require excessive amounts of cement and would not work at the high concentrations of arsenic in the waste. Extraction would be difficult to accomplish without endangering workers' health, since arsenic trioxide can be lethal if inhaled or absorbed through the skin, and extraction would leave open the question of suitable long-term surface storage. Refining the extracted waste into a commercial product of 99.5 percent purity would be expensive and the market (almost entirely for wood preservatives) has virtually disappeared.

<sup>110</sup> The preceding paragraphs were based on information in a paper by Kevin O'Reilly, Canadian Arctic Resources Committee. April 15, 2000.

<sup>111</sup> N. Thompson, P. Spencer, and P. Green, "Management of Arsenic Trioxide Bearing Dust at Giant Mine," Department of Indian Affairs and Northern Development, Yellowknife, no date.

Leaving the arsenic trioxide in place underground is now considered is the best short-term option. This requires the mine water to be pumped to the surface and treated in an effluent treatment plant until the preferred long-term management strategy can be determined. Just running the pumps, along with other efforts to reduce the flow of water through the mine, costs the federal government \$3.6 million a year.

In the long term, the main issues associated with underground disposal are perpetual pumping and treatment and preventing the chambers from flooding. At present, after ten years of engineering studies, DIAND is supporting a plan to freeze the arsenic underground and let the arctic permafrost hold it in place. It will be the first time it has ever been tried and, if successful, it will be one of the longest and most expensive environmental cleanups ever undertaken in Canada, all at public expense. The plan involves sinking pylons to the level of the lowest arsenic chamber and using active refrigeration to restore the permafrost destroyed by decades of mining. The siphons, which require no outside power to operate, would then keep the ground frozen. Water would slowly be flooded back into the mine, freezing and immobilizing the entire area. The entire process would take 20 years and cost the taxpayer somewhere between \$90 million and \$120 million.<sup>112</sup> Even under this scenario, the pumps would have to keep running until the arsenic has leached out of backfilled chambers and vaults, which adds an additional \$100 million in discounted present costs to the bill.

<sup>112</sup> Bob Weber, "Frozen Arsenic a Minor Miracle," Bob Weber, *Toronto Globe and Mail*, August 3, 2003.

### *Disclosures*

Royal Oak never recognized a liability for reclamation of the stored arsenic trioxide nor did it discuss the problem in its financial reports. It did provide for reclamation of the surface area under the terms of its lease. According to language in its 1997 and 1998 annual financial filing:

"Where estimated reclamation and closure costs are reasonably determinable, the Company has recorded a provision for environmental liabilities based on management's estimate of these costs. Such estimates are subject to adjustment based on changes in laws and regulations and as additional information becomes available."

"The Company is not able to determine the impact of future changes in environmental laws and regulations, which are generally becoming more restrictive, on its operations and future financial position due to the uncertainty surrounding the ultimate form such changes may take. Insurance against certain liabilities for environmental pollution or other hazards as a result of exploration and production has not generally been available at reasonable cost to the Company. Absent such insurance, the Company's assets are directly exposed to unknown and unforeseen, but potential, liabilities for environmental claims and regulations. The satisfaction of any such liabilities could reduce resources otherwise available for other business purposes. *Nevertheless, the Company believes that it has made adequate financial provisions for the costs associated with mine*

*closures and reclamation, and is of the opinion that any changes to environmental laws and regulations in the future should not have a material effect on the Company.” (Emphasis added.)*

“RECLAMATION AND ENVIRONMENTAL REMEDIATION: . . . In Ontario, the Northwest Territories and British Columbia the Company is required to post security against all or part of the estimated costs of such reclamation. The Company has completed and filed reclamation plans for all of its active operations. Reclamation plans have also been prepared for most of the Company’s inactive mine sites, and reclamation is well advanced at many of these sites. Although the ultimate amount of the obligation to be incurred is uncertain, the Company has currently estimated these future costs to be \$41.2 million. The Company has accrued \$24.7 million of reclamation and closure costs through December 1997 and will charge the remaining amount to operations, over the remaining lives of its operations, on a unit-of-production basis. At December 31, 1997, the Company had reclamation deposits of \$14.3 million of cash and cash equivalents restricted for reclamation purposes. The Company believes that the current salvage value of its assets at its various mine sites will be sufficient to fund the majority of these reclamation costs.”

Of that \$41 million, \$9.4 million was on account of the Giant Mine, presumably for surface reclamation. However, Royal Oak did refer to the arsenic trioxide problem at the Giant Mine in its Water License Annual Report for 1998:

#### Revisions to Contingency Plan and Abandonment & Restoration Plan

“The Contingency Plan was thoroughly revised and submitted to the Water Board in August 1998. The plan was approved by the Water Board in October, with a request for the inclusion of some additional specific information. Due to limited resources, this additional information has not yet been appended to the plan.”

The Abandonment & Restoration Plan for the site was thoroughly revised by EBA Engineering Consultants Ltd. and Royal Oak Mines, and submitted to the Water Board on December 2, 1998. A one-month extension to the original submission date was granted by the Water Board. The document included a revision to the estimated reclamation liability, calculated using the Reclaim Version 3.1 software. *The specific financial liability of the arsenic trioxide concentrate stored underground was excluded from this cost estimate, since the research being conducted on removal, processing and chemical stabilization methods for the material has not yet yielded firm conclusions on the technical viability of the methods being considered.” (Emphasis added.)*

In summary, despite the fact that Canadian government authorities allowed Royal Oak to operate the Giant Mine for nine years without an approved plan to deal with the arsenic trioxide problem or a security bond to ensure that the plan would be

carried out, it is difficult to conceive that, seen through the eyes of Royal Oak's management, the 240,000 tons of lethal arsenic trioxide in the mine's vaults did not represent a known uncertainty with potentially material financial consequences. However, in its public disclosures, investors would find no reference or estimate of the very large financial liability that the stored arsenic trioxide represented, a liability that subsequently has been estimated in the \$200 million range. Were these estimates disclosed, the true state of Royal Oak's balance sheet would have been clear well before its declaration of bankruptcy in April 1999.

## **Dakota Mining Company – Gilt Edge Mine**

### *The Event*

In July 1999 the Dakota Mining Company filed for bankruptcy under Canadian law. At that time, its Gilt Edge gold mine in South Dakota faced a serious problem with acid mine drainage and had 130 million gallons of acid mine wastewater stored in pits on the site. The state's estimate of reclamation costs then exceeded \$13 million, against which it held a cash bond from the company of \$6.2 million and a demand note for the balance.

After the company abandoned the site, the state government proposed it as a Superfund site on the National Priorities list. It was included in 2000. The federal government estimated that it would cost between \$23 and \$27 million to reclaim the site. To date, the state of South Dakota has already spent approximately \$27 million on reclamation. An estimated \$18 million more will be needed in order to finish the job.<sup>113</sup>

<sup>113</sup> Personal communication from Ken Wanderud, project manager, EPA region 8, 01-28-04.

### *Background*

The Gilt Edge Mine site near Deadwood, South Dakota, was mined by several companies starting in the late 1800s. Most of these were small underground gold mines. Mining continued sporadically up until 1941, generating piles of acidic tailings that continually discharged acidic and metals-laden water into the nearby creek.

Gilt Edge, Inc., a subsidiary of Brohm Resources, Inc., was granted a state large-scale mining permit in 1986 for the Gilt Edge Mine, a gold heap leach project. On January 15, 1987, Gilt Edge, Inc. underwent a corporate name change to Brohm Mining Corporation. In 1993, in another reorganization, the company changed its name to Dakota Mining Corporation, which was incorporated in Canada and had its business offices in Denver, Colorado. Brohm became a wholly owned subsidiary incorporated in South Dakota. Brohm began construction of the Gilt Edge Mine in 1987 and completed mining the original reserves in 1992. Despite existing evidence of acidity and the presence of sulfide rocks, the original cash bond for reclamation was based on mining non-acid generating rock and totaled \$1.2 million. During operations, waste rock containing enough sulfide minerals to generate acid was mined. Acid drainage from the waste dump was detected in 1993.

On April 19, 1993, in response to the acid problem, the South Dakota Department of Environment and Natural Resources issued Brohm a Notice of Violation and Order that required Brohm to develop a mitigation plan. On March 16, 1995, the

Board of Minerals and Environment approved the plan. The acid drainage problem raised the 1995 estimated cost of reclamation and reclamation bond to \$8.4 million, seven times the original bond of \$1.2 million. Due to its financial difficulties, Brohm was only able to provide an additional \$1.0 million cash bond. To cover the rest of the increase, the Board of Minerals and Environment approved a \$6.2 million Demand Note based on the net worth of Dakota Mining Corporation.

In 1996 the Board of Minerals and Environment approved Brohm's new large scale mine permit application for the Anchor Hill Project, which is adjacent to, but separate from, the Gilt Edge Mine. The Anchor Hill Project was projected to provide cash flow for Brohm to complete reclamation of the Gilt Edge site.

The Anchor Hill Project was divided into two phases: Phase I on privately held land and Phase II on a site that encroached on U.S. Forest Service land. The state permit for both phases was approved on January 16, 1996. Because the second phase encroached on 37 acres of U.S. Forest Service land, it was subject to the federal National Environmental Policy Act process. The required Environmental Impact Statement was finally approved by the Forest Service in the fall of 1997 but was appealed by several environmental groups. The Forest Service withdrew its approval of the EIS on February 18, 1998.

Brohm stopped mining Phase I of Anchor Hill in August 1997 and stopped contributing to the reclamation cash bond. Gold production from ore on the leach pads ceased in January 1998. Thereafter, the company laid off 79 employees, leaving 13 to manage the water treatment plant and other facilities. On May 21, 1998, Brohm notified DENR that it no longer had funding to maintain the mine site and that it planned to abandon the site. Because Brohm did not have the money to operate the water treatment plant, they had filled all available storage places with acid water.

By 1999 revenues from Phase I of the Anchor Hill Project had funded increases in the cash bond for the Gilt Edge site from \$2.2 million to just over \$6.2 million. However, the estimated reclamation costs had increased to more than \$13 million.

On May 29, 1998, Governor Janklow filed suit against Brohm and Dakota. A temporary restraining order and preliminary injunction were obtained that compelled Brohm to continue maintaining the site and to comply with its permits. A creditor agreed to fund the site in hopes the EIS would be finalized allowing Phase II mining to proceed. During the summer of 1998, the Forest Service also issued its second approval of the Anchor Hill EIS, but environmental groups again filed an appeal.

Brohm's creditors stopped funding in 1999. The additional pressure from creditors, along with permitting delays, legal battles and low gold prices, led Dakota in June of 1999 to announce its intention to declare bankruptcy, and in July 1999 Dakota Mining filed for bankruptcy under Canadian law, leaving behind its un-funded reclamation obligations.

### *Disclosure*

During the period from 1996 through its bankruptcy filing, Dakota Mining consistently underestimated its reclamation liabilities at the Gilt Edge Mine, even relative to the surety required by the state of South Dakota, which itself was considerably less

than the reclamation cost as later established. For example, in the first half of 1997, the South Dakota's total security requirement was \$10.3 to \$10.9 million for the Gilt Edge Mine. By comparison, the company's 10-K issued during this period stated:

"In April 1993, the DENR issued the Order regarding remediation efforts related to acid rock drainage at Gilt Edge Mine. The DENR Order remains in effect and Dakota is in full compliance. The DENR Order principally requires that, unless discharge water meets certain permitted terms and conditions, there shall be no discharge of acid mine drainage. On January 19, 1996, Dakota received final approval of an updated and amended reclamation plan from the State of South Dakota. Under the conditions of the revised reclamation plan, Dakota plans to reclaim waste depositories and other areas by capping these areas with impervious materials available from the overburden associated with the Anchor Hill oxide deposit. Such capping will prevent any continued migration of acid mine drainage."

"Dakota has provided the State of South Dakota with a form of financial assurance in the amount of \$7.9 million in connection with the reclamation and remediation plan in the form of cash deposits of \$2.4 million and a demand note as proof of financial assurance in the amount of \$5.5 million. Dakota has estimated that its actual capping costs will approximate \$3.2 million, which costs have been fully accrued at December 31, 1996. Funding of this obligation will be made from operating cash flow derived from processing the Anchor Hill oxide deposit."

"At a future date when Dakota provides notice to the State of South Dakota that the Gilt Edge Mine will close and that post closure care is to begin, Dakota will be obligated to convert a portion of its financial assurance into a post-closure fund in a form acceptable to the State to ensure long term treatment and maintenance of the site. The amount of the post-closure financial assurance is not expected to be less than \$3.0 million although no final determination will be made until the mine actually close."<sup>114</sup>

#### Reclamation Costs

"The ultimate amount of the reclamation obligations to be incurred is uncertain, however the Company estimates these costs to be \$6.9 million at Gilt Edge Mine, \$721,000 at Stibnite Mine and \$900,000 for the Company's 40% share at Golden Reward. Of the total \$8.4 million in estimated costs, \$6.0 million has been accrued for as of December 31, 1996. The remaining costs will be accrued as mining continues at Gilt Edge Mine and Stibnite Mine. However, no assurances can be given that the above estimates accurately reflect the actual costs of all reclamation activities that may be required."

This information was repeated in quarterly 10-Q filings for the second and third quarters of 1997. By mid-1998, when the company was disclosing its capital and working capital shortfalls, it disclosed the state government's successful suit to force it to

<sup>114</sup> Dakota Mining Corporation, 1997 Annual Financial Statement 10-K, Management Discussion & Analysis section.

maintain the Gilt Edge site. However, by that time, the estimated cost of reclamation had risen to \$12.6 million, more than twice the amount in the company's cash bond. This increased liability was not disclosed.<sup>115</sup>

“On May 29, 1998, the State of South Dakota obtained a Temporary Restraining Order (“TRO”) against a subsidiary of Dakota, Brohm Mining Corp. (“Brohm”). The TRO requires Brohm to continue to operate water treatment systems at the Gilt Edge mine in accordance with state mine permits. Pending a court hearing scheduled for June 5, 1998, the Company intends to comply with this order. The Gilt Edge mine is not in operation at this time.”<sup>116</sup>

In summary, in the period when the company's balance sheet and income statement were deteriorating, the company understated its reclamation liability at Gilt Edge by a material amount. According to government officials familiar with this case, although it was faced with the problem for years at Gilt Edge, Dakota Mining downplayed its potential liabilities from acid mine drainage in order to avoid scaring off potential investors.<sup>117</sup>

## **Newmont Mining – Midnite Mine**

### *The Event*

The Midnite Mine was an open-pit uranium mine on the Spokane Indian reservation in Washington State. The site contains pits filled with hundreds of millions of gallons of contaminated waters, waste rock, and tailings. The mine was owned and operated by Dawn Mining Company, of which Newmont Mining is majority owner. In April 1998, the EPA began an Expanded Site Inspection (ESI) that confirmed the elevated level of contamination; also at this time, Newmont, in agreement with the Bureau of Land Management, conducted limited data collection. In February 1999 the EPA proposed that Midnite be added to the National Priority List as a Superfund site and a Remedial Investigation/Feasibility Study (RI/FS) began. Data collections continued from the fall 1999 to spring 2000. On May 11, 2000, EPA listed the Midnite Mine site on its NPL.

### *Background*

Newmont Mining Corporation owns 51 percent of the Dawn Mining Company (DMC), which operated the Midnite Mine, an open-pit uranium mine near Wellpinit, Washington from 1955 – 1981. During mine operations, about three million tons of 0.2 percent uranium oxide ore, 2.5 million tons of low-grade ore (protore), and approximately 33 million tons of waste rock were dug up from six pits. Some of the most radioactive ore was uncovered just prior to the mine closure and is still exposed. When this ore, which contains sulfides and pyrites, is exposed to oxygen and water, it forms sulfuric acid. As the acid percolates through the ore, it leaches uranium and other heavy metals into the open pits and into the groundwater. During the 1980s, approximately 500 million gallons of acidic water filled the open pits, threatening to overtop the pits and flush acidic wastes into nearby Blue Creek.

<sup>115</sup> South Dakota Surety Tracking Database, Brohm Mining Corporation, Table 1A, updated June 30, 1999.

<sup>116</sup> Dakota Mining Corporation, 8-K, June 8, 1998.

<sup>117</sup> Personal communication from Mike Cepak, SD Department of Environment and Natural Resources, 02-06-04.

After excavations ceased in 1981, two of the six pits were left open and have collected seep water. The other four were backfilled with waste rock from the mine. Protore and waste rock piles lie throughout the 320 acres disturbed by mining. In the decade following closure (i.e., from 1981-1991) the former U.S. Bureau of Mines and the U.S. Geological Survey conducted site inspections that documented heavy metals and radionuclides in the seeps, groundwater, and pit water at the mine.

After 1981, Dawn Mining Company (DMC) operated an onsite mill to extract uranium from sludge and other remaining ores. Waste from this process was dumped into a lined tailings disposal pond. In 1991, the lease to DMC was terminated and a formal mine reclamation plan was required. Since 1992, Dawn has been collecting and treating surface water to control contaminated mine drainage. Water is treated on-site and discharged, under an NPDES permit, into a surface drainage. DMC's reclamation plan, submitted in 1994, proposed accepting radioactive wastes from other states for processing and disposal at the mill. It met with community challenges and was not accepted by the state. Although a revised plan has been tied up in legal contests, nonetheless DMC did obtain licenses for reclamation and closure activities from the State of Washington in 1996. DMC was required to post reclamation bonds of \$10 million for the mill site and \$9.7 million for the mine site, but only \$1.0 - \$3.2 million is currently in the reclamation fund. In comparison, the cleanup and reclamation cost of the mill and mine has been estimated in press reports at \$120 to \$240 million.

In April 1998, the EPA began an Expanded Site Inspection (ESI) that confirmed the elevated level of contamination. Also at this time, Newmont, in agreement with the Bureau of Land Management, conducted some data collection. In February 1999 the EPA proposed that Midnite be added to the National Priorities List and a Remedial Investigation/Feasibility Study (RI/FS) began. This proposal carried important financial implications for Newmont, the parent company, because CERCLA's provisions for joint and several liability greatly increased the likelihood that it, as the majority owner of Dawn Mining, would be held liable for remediation costs at the Midnite Mine and possibly the entire cost.

Data collection continued from the fall 1999 to spring 2000. On May 11, 2000, EPA listed the Midnite Mine site on its National Priorities List. The second phase data collection of the RI/FS began in the fall of 2000 and continued to fall 2001. Data from Newmont, primarily related to onsite elements, was incorporated in "scoping the work." EPA was expected to complete the RI/FS study at the end of 2003. In December 2003 EPA released a report that outlined clean-up alternatives but did not contain cost estimates.

### *Disclosures*

Newmont has promptly disclosed material events at the Midnite mine as they occurred. Going back to the first quarter 10-Q filing in 1994, for example, the company disclosed that the state government had not accepted Dawn's reclamation plan, which Dawn was therefore revising. It also stated that

"Dawn does not have sufficient funds to pay for the reclamation plan it proposed, for any alternative plan, or for the closure of its mill. The corpora-

tion's best estimate for the future costs related to these matters is included in the accrued liability for environmental matters, as previously discussed. The Department of Interior previously notified Dawn that when the lease was terminated, it would seek to hold Dawn and the Corporation liable for any costs incurred as a result of Dawn's failure to comply with the lease and applicable regulations. If asserted, the Corporation will vigorously contest any such claims."<sup>118</sup>

Elsewhere in the filing, it was indicated that \$61.6 million had been accrued for environmental obligations related to former mining activities, including Midnite. This amount fluctuated in later reports.

Subsequent filings updated this information with varying amounts for accrual. In the third quarter of 1994, the company disclosed that it had submitted revised reclamation plans and in the first quarter of 1995 it revealed that DMC received a license from the state for its mill closure plan, but it was being contested by third parties. In the second quarter of 1996, Newmont disclosed that: "The Department of Interior has begun an ESI to analyze DMC's proposed plan and to consider alternatives to the company plan." Nine months later, the 10-Q stated that: "In March 1997, a Washington superior court upheld DMC's license for reclamation activities, but there are further legal appeals."

As the federal government moved toward inclusion of the Midnite Mine in the Superfund remediation program, Newmont noted the various phases in rather non-specific language: In its first quarter 10-Q in 1998, just before EPA announced its Expanded Site Investigation, it disclosed that "Other government agencies also might attempt to hold the Company liable for further remediation and reclamation at the mine or mill site." In its third quarter filing, after the EPA action, it stated that: "EPA may become more involved in the process." In its 1998 10-K report, after EPA had proposed the site for the NPL on February 16, 1999, the company disclosed, "In early 1999, the EPA proposed that the mine be included in the National Priorities List under CERCLA. If asserted, the Company cannot reasonably predict the likelihood or outcome of any future action against Dawn or the Company arising from this matter."<sup>119</sup>

Not until the first quarter of 1999 did Newmont specifically mention the ongoing ESI study:

"The Department of Interior has commenced an Environmental Impact Study to analyze Dawn's proposed plan and to consider what type of mine reclamation plan may be selected by the Department of Interior. Dawn does not have sufficient funds to pay for the reclamation plan it proposed, for any alternative plan, or for the closure of its mill. The Department of Interior previously notified Dawn that when the lease was terminated, it would seek to hold Dawn and the Company liable for any costs incurred as a result of Dawn's failure to comply with the lease and applicable regulations. In early 1999, the EPA proposed that the mine be included on the National Priorities List under CERCLA. If asserted, the Company will vigorously contest any such claims. The Company cannot reasonably predict the likelihood or out-

<sup>118</sup> Newmont Mining Corporation Quarterly Report 10-Q, 3/31/94 CFS, Note 6, Contingencies, p. 10.

<sup>119</sup> Newmont 10-K Annual Report 1998 CFS, Note #18 Commitments and Contingencies, p.32.

come of any future action against Dawn or the Company arising from this matter. Dawn has received a license for a mill closure plan that could generate funds to close and reclaim both the mine and the mill. The license is being challenged by third parties.”<sup>120</sup>

<sup>120</sup> Newmont 10-Q 3/31/99 *CFS*, Note #8 *Contingencies (a) Environmental Obligations*.

In its following 10-K annual report for 1999, Newmont discussed the government's inclusion of Midnite on the NPL: “Other government agencies have asserted that the Company is liable for future reclamation or remediation work at the mine or mill site. In mid-2000, the mine was included on the NPL under CERCLA. The Company will vigorously contest any claims as to its liability. The Company cannot reasonably predict the likelihood or outcome of any future action against Dawn or the Company arising from this matter.”<sup>121</sup>

<sup>121</sup> Newmont 1999 10-K Annual Report MD&A *Environment Section*.

In the following year's 10-K, the company mentioned that the RI/FS had begun and moderated its position as to liability: “In mid-2000, the mine was included on NPL and EPA has initiated a RI/FS under CERCLA to determine environmental conditions and remediation options at the site. The EPA has asserted that Dawn and the Company are liable . . .”<sup>122</sup>

<sup>122</sup> Newmont 2000 10-K Annual Report *CFS Contingencies*.

A year later, the company's annual report further modifies its potential liability:

“At a third site in the U.S., an inactive uranium mine and mill formerly operated by a subsidiary of Newmont, remediation work at the mill is ongoing, but remediation at the mine is subject to dispute and has not commenced. The environmental standards that may ultimately be imposed at this site as a whole remain uncertain and there is a risk that the costs of remediation may exceed the provision Newmont's subsidiary has made for such remediation by a material amount. Whenever a previously unrecognized remediation liability becomes known or a previously estimated cost is increased, the amount of that liability or additional cost is expensed and this can materially reduce net income in that period.”<sup>123</sup>

<sup>123</sup> Newmont 2001 10-K Annual Report, *Remediation Costs for Federal Superfund Law Liabilities May Exceed the Provisions We Have Made* p. 13.

However, in subsequent filings through 2003, the company has maintained that since remediation requirements at the Midnite have not been finally decided, it cannot estimate its potential liability and intends vigorously to contest claims against it.

Since the EPA had not completed its RI/FS by the end of 2003, even to the extent of releasing the estimated costs associated with its retained remediation alternatives, and had not issued a Record of Decision, Newmont could plausibly claim that it could not estimate its potential liability. However, when the Midnite Mine was put under CERCLA's provisions, the company became subject to specific SEC and FASB disclosure requirements, as discussed in a prior section of this report. Those requirements prohibited the company from deferring disclosure until a single cost estimate had been established and required it to provide a range of possible liabilities if such a range could reasonably be estimated. By the end of 2003 Newmont had not provided even such a range of potential reclamation costs, although the Midnite Mine had been a Superfund site for three years. In late 2003 an asset management company filed a shareholder resolution with Newmont calling for fuller disclosure of environmental liabilities.

## CONCLUSIONS

The large majority of the case studies in this report reveal a common deficiency in disclosure. Recall the requirement in Canadian securities law and regulation that “If an environmental risk or uncertainty is necessary for an understanding of the Issuer’s financial condition, changes therein, or results of operations, it should be disclosed under Part III, MD&A, Item 1(1)(3), para. 108, with particular emphasis on risks in the next two years.”<sup>124</sup>

<sup>124</sup> See above, p. 9.

Recent guidance issued by the Canadian Institute of Chartered Accountants on MD&A disclosures emphasizes companies’ obligations to provide management’s assessment of future value drivers and material trends and uncertainties, giving investors a realistic portrayal of the business outlook and prospects as seen by management. Securities regulations in the United States contain equivalent requirements.

These ten case studies investigated events that were financially material, some to the extent that they involved bankruptcy of the company involved. In nearly all of the cases, the underlying risks and uncertainties that resulted in the events were known to management but were not disclosed or discussed in the companies’ MD&A filings sufficiently to provide investors a realistic portrayal of the risks. In most cases they were simply not mentioned at all.

These findings reinforce the calls that have been made in recent years by investor groups and public interest groups for improved disclosure of environmental information. They add to the evidence available from other studies that disclosure practices in many environmentally sensitive industries have been inadequate. They support the claims that enforcement efforts by securities regulators in both the United States and Canada need to be strengthened in order to secure better compliance with relevant disclosure requirements. Finally, they also support recent pronouncements by accounting standards bodies and securities regulators calling for improvements by listed companies in their Management Discussion & Analysis of known material risks and uncertainties stemming from environmental and other business exposures.

**Robert Repetto** is a Senior Advisor to Stratus Environmental Consulting, Inc. in Boulder, Colorado, Fellow of the Tim Wirth Chair in the Graduate School of Public Affairs at the University of Colorado, and Professor in the Practice of Economics and Sustainable Development at the Yale School of Forestry & Environmental Studies (2001-2004). Before moving to Boulder, Dr. Repetto was vice president of the World Resources Institute, a non-profit policy research center in Washington, D.C., and director of its economics program. From 1998 to 2000 he was a Pew Fellow in Marine Conversation at the Woods Hole Oceanographic Institute. Earlier in his career, Robert Repetto was a professor at the Harvard School of Public Health, a World Bank official working in Indonesia, an economic advisor to the planning commission in Bangladesh, a Ford Foundation staff economist in India, and an economic analyst at the Federal Reserve Bank of New York.

Dr. Repetto is known for his writings and research on the interface between environment and economics and on policies to promote sustainable economic development. His recent work with Duncan Austin on environment and finance was awarded the Moskowitz Prize for 2000. He has served as a member of the National Research Council's Board on Sustainable Development and as a member of the Environmental Economics Advisory Committee of EPA's Science Advisory Board. He holds a BA and a Ph.D. in economics from Harvard University and a M.Sc. degree from the London School of Economics.

Robert Repetto  
Stratus Consulting  
200 Brooks Place  
Boulder, CO 80302  
rrepetto@stratusconsulting.com

## **Yale School of Forestry & Environmental Studies**

### **PUBLICATION SERIES**

To capture exciting environmental projects at Yale of interest to a broad professional audience, the Yale School of Forestry & Environmental Studies Publication Series issues selected work by Yale faculty, students and colleagues each year in the form of books, working papers and reports. All publications since 1995 are available for order as bound copies, or as free downloadable pdfs, at our online bookstore at [www.yale.edu/environment/publications](http://www.yale.edu/environment/publications). To contact Jane Coppock, Editor, F&ES Publication Series: [jane.coppock@yale.edu](mailto:jane.coppock@yale.edu)

**Yale School of Forestry  
& Environmental Studies**  
PUBLICATION SERIES

205 Prospect Street  
New Haven, Connecticut 06511  
USA