

ENDING POLLUTION AT THE BRITANNIA COPPER MINE

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THE BRITANNIA COPPER MINE was once the largest copper mine in the British Commonwealth. Located only forty kilometres from Vancouver beside the current Highway 99 (opened in 1959) to Squamish and Whistler, it started production in late 1904.¹ In its best year, 1929, it mined and milled fifty-five hundred tonnes per day from several underground headings and paid more in dividends than any other BC mine.² Always American-owned, it was closed in 1974 by the last operator, Anaconda Canada Limited, due to rising costs from aging equipment and a precipitous drop in US copper prices.³ The mine lands were sold; its townsite, Britannia Beach, remained as a rental community under a single owner; and the mining properties became largely derelict.

Britannia is an example of a “legacy” mine that caused water pollution throughout and long after its seventy-year life. It closed as public awareness of pollution and environmental degradation increased and as citizens came to expect government regulatory action to control it. British Columbia has other historic mines that cause pollution, but none on the scale of Britannia. Between 1960 and 1974, the province broadened its concern with water pollution from an initial focus on sewage and public health to regulating industrial pollution through permits and orders issued by the director of pollution control.⁴ The history of applying water pollution controls to British Columbia’s mining sector is too large a subject for this article, but a recent PhD dissertation by

* In 2012, an earlier version of this article, given at the 9th International Mine History Conference in Johannesburg, South Africa, was intended to inform that country’s efforts to control pollution from its many historic mines. See <http://www.imhc.co.za/>.

¹ Bruce Ramsay, *Britannia: The Story of a Mine* (Britannia: Britannia Beach Community Club, 1967), 25.

² British Columbia, *Annual Report of the Minister of Mines, 1929* (Victoria: King’s Printer, 1930), II.

³ Peter Svedberg and John E. Tilton, “The *Real*, Real Price of Nonrenewable Resources: Copper, 1870–2000,” *World Development* 34, 3 (2006): 510, fig. 2.

⁴ This was a newly created position. See Pollution Control Act, S.B.C. 1967, Ch. 34.

Arn M. Keeling provides a comprehensive summary.⁵ Complaints made in the 1950s and earlier regarding contamination of freshwater fisheries and water supplies led, in the 1960s, to systematic measurement of adverse environmental effects. This work gave enough evidence of pollution to make a compelling political case for regulation in the 1970s, but its initial focus was on preventing freshwater pollution.

The director of pollution control issued an order to Britannia to reduce pollution just before the mine closed, but it had no material effect. Thereafter, the insolvency of the mine's new owner and the lack of effective regulatory tools hindered efforts to end the pollution. Not until 1997 did new regulatory tools produce agreements under which government, industry, and donors invested in a water treatment plant and other site restoration work. The shoreline ecology has largely recovered its health, and Britannia Beach is now an attractive community adjacent to the popular Britannia Mining Museum.⁶

THE POLLUTION PROBLEM AND ITS ORIGIN

In 1898, prospectors discovered copper mineralization on a mountain in the Britannia Creek Valley, at an elevation of 1,220 metres and six kilometres east of the Howe Sound shoreline.⁷ American capital underwrote the property's extensive development, which included a two-hundred-ton-per-day mill, or concentrator, and hydroelectric installations. Production began in 1905, with ore delivered by tramline to a concentrator built at the beach.⁸ This was later replaced by the "incline," a funicular railway. Through seventy years, the mine processed 48 million tonnes of ore, yielding over five hundred million kilograms of copper and associated zinc, silver, and gold.⁹ Copper mineralization occurred in a chain of sulphide ore bodies that outcrop at the summit of Mount Sheer and plunge steeply to the west, extending far below sea level. When the mine closed, its underground workings had a vertical

⁵ A.M. Keeling, "The Effluent Society: Water Pollution and Environmental Politics in British Columbia, 1889-1980" PhD diss., University of British Columbia, 2004, 136 ff.

⁶ As of May 2015 the BC government posts some information about Britannia at <http://www.agf.gov.bc.ca/clad/britannia/index.html> but changes to the site earlier in 2015 stripped it of regulatory background information, and may soon remove its many technical reports. The private site, <http://www.britanniainmuseum.ca/> informs tourists about the site's history and present attractions.

⁷ Anon, "A History of Britannia Beach and Surrounding Area," 5 December 1966, British Columbia Archives (hereafter BCA), Britannia MS 1221, box 120, file 38.

⁸ Martin J. Wells, *Tramway Titan* (Victoria, BC: Trafford, 2005), 129.

⁹ Tailings were discharged into the inlet. Complete production data appears at <http://minfile.gov.bc.ca/searchbasic.aspx>. Search by MINFILE number 092GNW003.



Figure 1. Location of Britannia Mine, British Columbia.

extent of eighteen hundred metres, with access to the workings through at least six adits or levels, but only one shaft. The mine cannot be sealed by plugging the adits because this would cause groundwater inflows to rise within the mine, raising hydraulic pressure on the lowest plug and producing an unacceptable risk of failure.

Ending Britannia's pollution posed an intractable technical problem for three reasons: the rocks, the structure, and the climatic setting. Britannia ore bodies occur within the very large mass of granitic rocks forming the Coast Mountains of British Columbia and Alaska, gouged with deep fjords or inlets by glaciation that ended about ten thousand years before the present era. The ores carry high concentrations of metallic sulphide minerals ("fool's gold," or iron pyrites, is one example). Exposure of sulphide minerals to oxygen and water causes them to form weak acids, a process that creates rust stains seen in rocks all over the world. When this happens in metallic ores, the acids can dissolve other minerals and release toxic heavy metals like copper, zinc, or cadmium into receiving water.

Britannia sulphide minerals were exposed to air and water throughout the mine workings. During peak mining periods, with fresh exposures of mineralized rock, dissolved copper concentrations in the mine's drainage approached two hundred milligrams per litre. That level was high enough to allow metal recovery in the form of sludge by leading the mine's drainage through long concrete troughs filled with iron scrap.¹⁰ The dissolved copper replaced the iron (just as occurs when metallic copper plates on a knife blade are immersed in a copper solution). In contrast, the regulated maximum for copper in mine effluent is only 0.3 milligrams per litre, or almost one thousand times less concentrated. Zinc and cadmium concentrations also greatly exceeded permitted limits. Britannia's drainage obviously required treatment before discharge.¹¹

The structure of the mine was the second difficulty. Canada's underground mines have access downward via a shaft, but Britannia's openings are in the side of a mountain. The first mine workings were tunnels, or adits, driven horizontally into the walls of Jane Basin, a glacial cirque originally about twenty hectares in extent. As the mine developed, the adits became connected by raises driven upward from lower levels, some of them reaching the basin floor and becoming ore draw points, or glory holes.¹² These expanded into craters, which trapped melting snow and rain that, even today, encourage oxidation of sulphide minerals in the waste rock and carry metal salts down into the mine. Sealing the holes would be very costly and possibly unsafe because the slopes above are undermined and unstable. The acid rock drainage cannot be stopped at its source.

High precipitation is the third difficulty. The nearby town of Squamish receives an average of twenty-four hundred millimetres of precipitation per year.¹³ At Jane Basin, 950 metres above sea level, precipitation probably exceeds thirty-five hundred millimetres, of which one-third would fall as snow.¹⁴ All precipitation falling on the mine enters the mine workings, which for decades drained out into the environment from two levels or

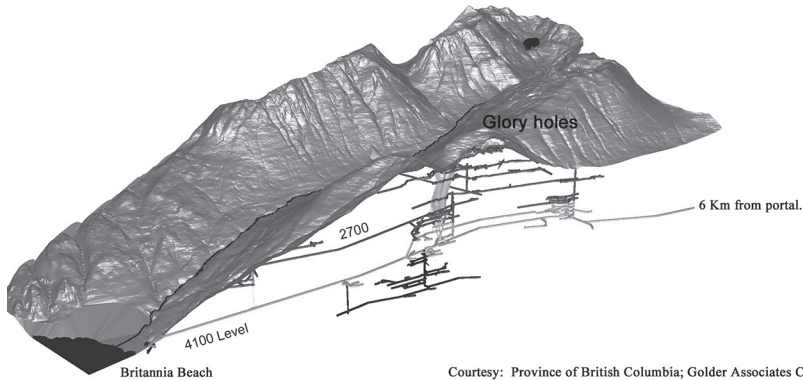
¹⁰ Anon, "Copper Precipitation at Britannia," 3 December 1966, BCA, Britannia MS 122r, box 120, file 38. Dissolved copper replaces iron, leaving behind a copper-rich sludge.

¹¹ The current effluent permit is posted at <https://j200.gov.bc.ca/pub/ams/Default.aspx?PossePresentation=DocumentSearch>, search for authorization number 17469.

¹² The names of Britannia mine levels increase downward, in feet, from the summit at 100 Level to the lowest, 5,950, fifteen hundred feet below sea level. Jane Basin is approximately 1000 Level.

¹³ Canada, Environment Canada, Climate Normals for Station 1047672, Squamish, fifteen kilometres north of Britannia. See http://www.climate.weatheroffice.gc.ca/climate_normals/index_e.html.

¹⁴ Precipitation increases with elevation. This estimate is corroborated by three years of current but patchy Jane Basin precipitation data and a worse case, in Britannia's Annual Report for



Courtesy: Province of British Columbia; Golder Associates Corp.

Figure 2. Apparent modelled 3-D view of Britannia Mine, along an east-west plane. The 2200 Level does not appear because it drained northwards, to Britannia Creek.

adits. The lower 4100 Level drained through an outfall into Howe Sound, while the higher 2200 Level drained into Britannia Creek at a point six kilometres above the beach. Until it was plugged in 2001, 2200 Level flows were less than the 4100 Level flows but had higher metal concentrations. Mining engineering researchers from the University of British Columbia installed a concrete plug early in the millennium to divert the adit’s drainage internally; it now plunges almost six hundred metres down raises and ore passes to the lower 4100 Level (see Figure 2).¹⁵

The portal for the 4100 Level is about fifty metres above sea level, behind the vast Britannia mill building. Started in 1916 as the main haulage level, it was driven six kilometres eastward over the next thirty years, ending beneath the Furry Creek Valley where it intersected with Victoria mine workings and the only true shaft on the Britannia properties.¹⁶ The whole length of the 4100 Level functions as a drain, receiving groundwater and rain and snow collected by glory holes at Jane Basin, Victoria, and other openings. Anaconda, the last mine operator, installed a thick concrete plug four hundred metres from the portal. This plug has

1933, when Tunnel Camp (2200 Level) measured 348 inches (8.8 metres) of precipitation. See BSA, MS 1221, box 2, file 15.

¹⁵ John A. Meech, John McPhie, Kirsten Clausen, Yale Simpson, Brennan Lang, Elisa Campbell, Shauna Johnstone and Patrick Congdon. “Transformation of a Derelict Mine Site into a Sustainable Community: The Britannia Project,” *Cleaner Production* 14 (2006): 349-65. Sadly, Dr. Meech died in February 2015.

¹⁶ Almost all Canada’s underground mines use shafts for access, so, even when allowed to flood, their overflowing drainage would be only a small fraction of Britannia’s drainage flows.

stainless steel pipes and large valves that usually remain open. During snowmelt each spring, mine flows and the metal salts they contained released up to two tonnes per day of dissolved copper and zinc into Howe Sound.¹⁷ Other abandoned or historic mines in British Columbia have persistent contaminated drainage, but the metal flux from the worst of these is less than Britannia's by nearly two orders of magnitude.¹⁸

BRITANNIA COMPARED TO OTHER SITES

Britannia's pollution and its effects were unmatched in Canada.¹⁹ Until 2002, Britannia Creek had no aquatic life due to copper and zinc contamination from the 2200 Level. Groundwater draining from the 4100 Level is usually warmer than surface water in Howe Sound, so it formed a buoyant layer or zone. The toxic heavy metals in that layer sterilized at least a kilometre of the adjacent shoreline and posed risks to juvenile salmon migrating down Howe Sound from the Squamish River estuary.²⁰ The magnitude of the Britannia problem is best demonstrated by comparing it to three mines with adverse environmental effects that require perpetual treatment and government action. These are: Wheal Jane in Cornwall, England (United Kingdom); Iron Mountain near Redding, California (United States); and Mount Lyell in Queenstown, Tasmania (Australia).²¹

In Cornwall, the flooded, interconnected shafts and ramps of the Wheal Jane Mine form a wide underground reservoir with a comparatively small seasonal fluctuation in water level. When tin mining stopped in 1991, the shaft dewatering pumps were turned off and the mine was allowed to flood. Four months later, the failure of a temporary dam at the lowest portal released an outburst of contaminated water

¹⁷ See Britannia, "Historical Water Quality and Flow Data," 4100 Level, which as of May 2015, is posted under "reports" with other technical reports at <http://www.agf.gov.bc.ca/clad/britannia/>.

¹⁸ http://webmap.em.gov.bc.ca/mapplace/historicMines/mines_entry.htm presents a GIS atlas of historic BC mines. Viewing may require downloading free Autodesk® software.

¹⁹ Nearly all of Canada's mines are located in areas of low relief, so flows to the environment would be absent or very small in comparison. Metals concentrations in municipal sewage are typically very low.

²⁰ For Britannia's environmental effects, see Canada, Department of Environment, Regional Program Report, 03-06 "Nearshore Contaminated Sediment Investigations at Britannia Beach, BC" on <http://www.agf.gov.bc.ca/clad/britannia/index.html>, under "reports".

²¹ I have seen these mine sites, as well as Butte, Montana (<http://www.mbmgtmtech.edu/env/env-berkeley.asp>) where contaminated groundwater from many interconnected mines poses one of the world's most costly and intractable mine pollution problems. Similar polluting mines occur in Europe, Africa, and South America.

that caused obvious bright red pollution in the Fal River estuary.²² The toxic metals concentrations were like Britannia's in their effect. Dead fish and highly visible pollution made the mine's remediation an urgent political obligation. The United Kingdom Environmental Agency then built a treatment plant, which started in late 2000. It did not attempt cost recovery from former mine owners and operators. The cost of the treatment plant and its annual maintenance of £1.5 million remains a charge on the UK government.²³

The Iron Mountain copper mine in northern California includes very large bodies of massive iron sulphides. The site is famous among geochemistry experts for its unusual salts and extremely high natural acidity.²⁴ Copper and zinc concentrations were ten and one hundred times higher, respectively, than Britannia's; however, since mine flows were much less, the flux of heavy metals entering the receiving environment was comparable. This damaged the Sacramento River, once famous for its steelhead and a source of potable water, with pollution causing "levels of copper, zinc, and cadmium exceeding lethal concentrations for aquatic life."²⁵ Building a treatment plant was essential.

The United States Environmental Protection Agency declared Iron Mountain a "Superfund" site in 1983, describing its pollution, not controlled until October 1994, as "one of the nation's toughest, costliest cleanup challenges."²⁶ The agency ordered the responsible parties to build and operate a treatment plant even before a final settlement was reached in December 2000. The final, out-of-court settlement with former mine owners described as "the largest settlement with a single potentially responsible party in epa history," required them to pay US\$160 million to maintain mine water treatment in perpetuity.²⁷

²² Richard Coulton, Chris Bullen, John Dolan, Clive Hallen, Jim Wright, Clare Marsden, "Wheal Jane Minewater Active Treatment Plant – Design, Construction and Operation," *Land Contamination and Reclamation* 2, 2 (2003): 245–52.

²³ United Kingdom, House of Commons, Research Paper 99/10, 2 February 1999, "Treatment of Acid Mine Drainage," 14. The UK Coal Authority manages the site (e-mail to author, January 2012).

²⁴ See, for example, Kirk D. Nordstrom, "Advances in the Hydrogeochemistry and Microbiology of Acid Mine Waters," *Environmental Geology Review* 42 (2000): 504.

²⁵ "EPA Superfund Record of Decision: Iron Mountain Mine, EPA ID: CAD980498612 OU or, Redding, CA, 10/03/1986," accessible at <http://www.epa.gov/region9/superfund/superfundsites.html>.

²⁶ Iron Mountain flows and concentration data derived from Table 2 in Attachment A in the "Five-Year Review of the Superfund Remedial Action at Iron Mountain Mine" dated 8 October 1998.

²⁷ See <http://www.epa.gov/region9/annualreport/04/land.html>, US EPA, Region 9, 2004 Annual Report, 16.

In Tasmania, the Mount Lyell copper mine in Queenstown, in the rugged northwest part of the state, has many similarities to Iron Mountain in that massive bodies of sulphides produce very high iron and copper concentrations in its drainage, but its low zinc concentrations resemble Britannia's.²⁸ The site releases into receiving waters almost two tonnes per day of dissolved copper but much less zinc. Both the Government of Tasmania and the Commonwealth of Australia have studied the site, but work remains unfinished, complicated by the fact the mine is still operating.²⁹ The current mine operator has an exemption from liability for pollution caused by previous owners.³⁰ Mount Lyell pollution poses intermittent risks to the valuable aquaculture industry in Macquarie Harbour.³¹ The site's pollution "has led to its recognition as a world-scale environmental problem," and it remains a priority contaminated site for the state's environmental protection authority.³²

The fundamental problem at these mines and many others involves compelling someone to pay for perpetual water treatment. In British Columbia, until 1997, both federal and provincial governments lacked the legal tools to make owners fix the problem, and neither government was willing to pay millions in cleanup costs. But Britannia is located on a major highway, and its dilapidated appearance conflicted with provincial aspirations for the 2010 Winter Olympics held in Whistler. If Canada's mining industry was attempting to appear environmentally responsible, Britannia was setting a poor example.

THE FISHERIES ACT AND BRITANNIA POLLUTION

The British North America Act, 1867, assigned authority over "sea coast and inland fisheries" to the federal government.³³ The act recognized provincial ownership and control over natural resources, including land,

²⁸ Australia, Department of Sustainability, Environment, Water, Population and Communities, Supervising Scientist Report 126, "Mount Lyell Remediation: Final Report" (Commonwealth of Australia, 1997), Table 5.1, p. 21, at <http://www.environment.gov.au/resource/final-report-mount-lyell-remediation-research-and-demonstration-program>.

²⁹ See Geoffrey N. Blainey, *The Peaks of Lyell*, 6th ed. (Hobart: St David's Publishing, 2000). See also Copper Mines of Tasmania website at www.cmt.com.au.

³⁰ See Blainey, p. 3. See also, Copper Mines of Tasmania Pty. Ltd (Agreement) Act 1999, and Mt Lyell Acid Drainage Reduction Act 2003, both at <http://www.thelaw.tas.gov.au/index.w3p>.

³¹ The red iron staining of pollution is visible in the Queen River, passing through the community of Queenstown, on Google Maps® at the largest scale satellite views.

³² See Mt Lyell at <http://epa.tas.gov.au/epa/mt-lyell-acid-drainage-remediation>. I visited the mine site in 2009 and discussed it with an environmental scientist employed by the state.

³³ British North America Act, 30-31 Victoria, C. 3, sec. 91(12); subsequently renamed The Constitution Act (1982).

water, minerals, and agriculture as well as property and commerce. Federal jurisdiction extended over communications, railways, banking, and fisheries.³⁴ Among the first laws passed by Canada's new Parliament was a prohibition against depositing "deleterious substances' into fisheries waters."³⁵ The law received amendments many times over the next 144 years, but section 36 of today's Fisheries Act contains the same prohibition.³⁶

The forensic test for deleterious substances is to place ten rainbow trout fingerlings in a twenty-litre tank full of undiluted effluent. If five or more fingerlings die within three days, the effluent is proven acutely toxic and therefore deleterious. It is the *release* of a deleterious substance (so-defined) that is against the law, not its effects. Yet there is widespread public belief that a lack of adverse environmental effects means the law is not being broken.³⁷

The Fisheries Act has been ineffective in dealing with Britannia pollution for three reasons: (1) duplication in laws, (2) the discretionary nature of prosecution, and (3) retroactive application. The provinces issue permits or approvals to all sectors (mining, forestry, municipal, energy) making use of the natural environment, while federal jurisdiction is limited to fish. In the 1970s, this separation in jurisdiction became blurred when the federal government received new regulatory powers to define "deleterious" and to protect fish habitat water quality.³⁸ The 1970s also saw significant growth in federal research, especially with regard to the environmental effects of mining and pulp and paper industries. Meanwhile, the provinces began issuing effluent approvals or permits, many of which allowed greater concentrations of noxious elements than were prescribed by federal regulations. In particular, the federal "non-toxic" requirement was often left out of BC effluent permits. One commentator on the Fisheries Act writes: "If a liberal interpretation of this provision (i.e. Sect 36) were adopted, few industries in Canada could operate."³⁹

³⁴ Canada's northern territories have limited control over otherwise federal natural resources.

³⁵ Canada, Parliament, 31 Victoria (1868) c. 60, sec. 14.

³⁶ Canada, *Revised Statutes 1985*, chap. F-14, at <http://laws.justice.gc.ca/eng/acts/>.

³⁷ Victoria's untreated sewage is probably always toxic. Some argue that the lack of measurable adverse effects shows treatment is not necessary. The 2012 Wastewater Systems Effluent Regulations (SOR/2012-139) will finally compel all of Canada's municipalities to treat their sewage.

³⁸ R.S.C. 1985 C. F-14, sec. 36(5). The February 1977 "Metal Mining Liquid Effluent Regulations" (since revoked) were among the first; however, previously closed mines like Britannia were exempt.

³⁹ Kernaghan Webb, *Pollution Control in Canada: The Regulatory Approach in the 1980s*. Administrative Law Series (Ottawa: Law Reform Commission of Canada, 1988), 25.

Since the 1970s, the overlap in federal and provincial environmental protection authority has been obvious.⁴⁰ Common law allows those affected by this to receive court interpretations that are “fair, large and liberal.”⁴¹ Federal officials might have ignored provincial jurisdiction and prosecuted Britannia and other polluting mines in provincial court, but the province would likely have defended its mines, and federal-provincial relations would then have deteriorated. Even had a federal prosecutor won a conviction, the provincial court could have set an ineffective penalty, such as a notional fine or a suspended sentence.

The second reason for the inability of the Fisheries Act to deal with Britannia lies in the discretionary nature of prosecution. A century ago, the act explicitly allowed the minister of fisheries to grant an exemption for pollution if he or she believed that “enforcement [was] not requisite in the public interest.”⁴² This provision reduces the transparency of the legal process. The current Fisheries Act allows private prosecution; however, if someone were to proceed thus, the provincial attorney general would most likely take over the action and suspend proceedings. The courts cannot compel prosecutors to explain their actions. They are answerable only to Parliament, a fact that makes “prosecutorial discretion especially ill-suited to judicial review.”⁴³

The third reason that the Fisheries Act could not be applied to Britannia pollution is that it is not retroactive. If a law makes a long-standing practice illegal – for example, allowing a toxic discharge one day and prohibiting it the next – the courts will presume the legislature did not intend the law to apply retroactively. The law “ought not to change the character of past transactions carried on upon the faith of the then existing law.”⁴⁴

This was made explicit in the adroit excuse Environment Canada offered in 2003 when faced with a complaint about not enforcing the Fisheries Act at Britannia:

Over those years (1906 to 2003) the mine site has been owned and operated by a number of different mining companies. These factors made it very difficult for Environment Canada investigators to determine

⁴⁰ This is changing: the current federal administration has diminished its role in environmental protection of sectors under provincial jurisdiction.

⁴¹ Ruth Sullivan, *Sullivan on the Construction of Statutes*, 5th ed. (Markham, ON: Lexis, 2008), 195.

⁴² Canada, *Revised Statutes* 1886, c. 95, sec. 15.

⁴³ British Columbia Court of Appeal, 1997, *Werring v. British Columbia (Attorney General)*, see para. 7.

⁴⁴ Elmer A. Driedger, *The Construction of Statutes* (Toronto: Butterworth’s, 1983), 185, quoting *Phillips v. Eyre* (1870) L.R. 6 Q.B. p. 23.

whether the pollution they were targeting had occurred within the two year limitation period for prosecuting an offence under s. 36(3), and to identify which company was responsible for causing the pollution. The requirement for the Crown to prove, beyond a reasonable doubt, all elements of a charge under the Fisheries Act made it very unlikely that a prosecution would have been successful.

As a result of a substantive amendment to the Fisheries Act in 1991, a violation of section 36(3) became a hybrid offence which could be prosecuted by summary conviction (misdemeanour) or by way of indictment (felony), and the two year limitation period for prosecuting offences was dropped. This amendment, however, did not have retrospective application. This means that no person could be prosecuted after 1991 for a violation of s. 36(3) which occurred before 1991. Because the substances causing the pollution were deposited by the mining companies before 1991, these companies could not be prosecuted under the Fisheries Act after it was amended in 1991.⁴⁵

Coercion – by prosecution under the Fisheries Act, for example – is not always the best way to achieve environmental compliance. Carleton University’s Dr. Kernaghan Webb notes that the public seems to think that the government’s job in protecting the environment is analogous to prosecuting a crime.⁴⁶ But in prosecuting an environmental offence, like an oil spill, it is very difficult to prove intent, and the application of deterrent penalties does not ensure future compliance. The polluter can use a “due diligence” defence, meaning, “I did everything I possibly could to prevent it.” This forces pollution cases to become very technical and expensive, especially given often divergent opinions of expert witnesses. If the object is environmental protection, not punishment for environmental despoliation, a non-coercive approach may offer a quicker and cheaper route to the desired goal.

These reasons explain why nothing was done to stop the destruction of the Howe Sound shoreline until 1997, when the province applied its very flexible powers under the Contaminated Sites Regulations.

⁴⁵ Commission on Environmental Cooperation, see “Submissions, Factual Records, BC Mining,” SEM-98-004, p. 28, at <http://www.cec.org/>.

⁴⁶ Webb, *Pollution Control in Canada*, 6.

THE CONTAMINATED SITES REGULATIONS

In the 1960s, the leakage of petroleum products from thousands of buried, single-walled storage tanks and the discovery of adverse environmental effects caused by persistent organic pollutants such as PCBs, dioxins, and DDT highlighted the need to regulate soil contamination.⁴⁷ Such contamination made the land unfit for other uses and caused rancorous disputes between buyers and sellers. The remediation of soils contaminated with petroleum products, toxic organic compounds, or heavy metals is costly. Most cities have tracts of industrial land (i.e., “brownfields”) that remain vacant for years or even decades because cleanup costs would outweigh any profit from the land’s redevelopment.

Canada’s provinces developed policies for contaminated land through the Canadian Council of Ministers of Environment (CCME), a consultative body whose purpose was to “develop national strategies, norms, and guidelines that each environment ministry across the country [could] use.”⁴⁸ The CCME was aware of the US Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and its more recent amendments.⁴⁹ This 1980 law assigns liability for the costs of site remediation on the “polluter-pays” principle, even in those instances in which the pollution occurred before the current owner assumed title to the property. The right to assign cleanup costs retroactively was upheld in a well-known 1983 case (*Ventron*) that was tried in the Supreme Court of New Jersey.⁵⁰

The CCME’s 1991 “Guidance Document on the Management of Contaminated Sites in Canada” affirms the polluter-pays principle and coordinates federal, provincial, and industrial funding for site assessments and cleanup. Knowing that industry feared being subjected to the cleanup costs of unforeseen contamination, and that provincial governments wanted to avoid paying all the costs for the consequences of poor past environmental practices, the CCME recognized the existence of orphan,

⁴⁷ Artificial compounds like PCB (polychlorinated biphenyl), dioxins (polychlorinated dibenzodioxins), and DDT (dichlorodiphenyltrichloroethane) are strictly regulated because of their environmental persistence and risk of causing tissue damage and cancer in humans and animals.

⁴⁸ See <http://www.ccme.ca/about/>.

⁴⁹ See <http://www.epa.gov/superfund/policy/cercla.htm>.

⁵⁰ The case tested the state’s authority to collect cleanup costs associated with fifty years of mercury pollution of a tidal estuary. See *New Jersey Department of Environmental Protection v. Ventron Corp.*, 94 N.J. 473 (1983). This is available at several internet sites reporting US court judgments.

high-risk sites where “parties legally responsible for the problem cannot be identified.”⁵¹

The CCME’s first broad principle in assigning liability is polluter pays, implying retroactive application. The second is “fairness,” meaning the rules should balance risks, benefits, and certainty and not necessarily focus on the party having the most resources. Other principles aimed to provide transparency, avoid enrichment of a beneficiary, and address environmental, human health, and economic considerations. Regulators were to cast a “broad net” to find “potentially responsible persons” and then reduce their number by exempting persons with no direct responsibility, such as lenders and trustees.⁵²

Incorporating polluter pays into law raises questions of fairness. Why should a former owner pay for cleanup costs that would only benefit the new owner? Legislators wanted ministers to have the power to protect the environment by assessing contamination, determining cleanup methods and standards, and allocating liability between past and present owners. The legal profession soon recognized the implications of the new rules on real estate transactions. One lawyer advised: “Even if a person acted in full compliance with the regulations of the day, that person may be liable, years later, to remediate a contaminated site.”⁵³ Another wrote: “Such retrospectivity or retroactivity denies even the conscientious an opportunity to comply with the law. It is therefore profoundly inconsistent with the rule of law.”⁵⁴

While the fundamental principle remained untested in Canadian courts, research into the history of a contaminated site and business ownership became vitally important to finding potentially responsible persons and assigning liability. One of British Columbia’s earliest uses of the new powers came in the summer of 1997. The Ministry of Environment invited present and former owners of a site contaminated by a wood-preserving business to apportion responsibility to control and to remediate pollution leaching into the Fraser River. After they replied, the minister issued a cleanup order, naming three successive owners and operators. They appealed the minister’s order to the Environmental

⁵¹ “Guidance Document on the Management of Contaminated Sites in Canada,” CCME, April 1997, posted at http://www.ccme.ca/files/Resources/csm/pn_1279_e.pdf, 1.

⁵² “Recommended Principles Contaminated Sites Liability,” CCME 2006, http://www.ccme.ca/files/Resources/csm/csl_14_principles_e.pdf, 3.

⁵³ Paul C. Wilson, “Overview of the Waste Management Act,” in *Contaminated Sites Legislation – Impact on Real Estate and Other Commercial Transactions*, Legal Education Seminar, 3 June (Vancouver: Continuing Legal Education Society of BC, 1994), 1.1.06.

⁵⁴ Dianne Saxe, “Retrospective Liability for Environmental Contamination.” *Canadian Bar Review* 71 (1992): 502.

Appeal Board, which upheld it. The board's decision was itself appealed, and in 2000 the BC Supreme Court affirmed the Ministry of Environment's powers and its decisions.⁵⁵ The companies had changed names and ownership over the fifty years the plant had operated, so research proving who did what and when was essential in assigning liability. The dispute confirmed both the ministry's powers and the need for evidence of forensic quality regarding the industrial activity, ownership, and management of contaminated lands. This is the legal background of work towards settlement of the Britannia problem.

The retrospective aspect of the regulations received a definitive test in Canada when a large oil company challenged a Quebec minister's powers to assign retroactive liability. In 2003, Canada's Supreme Court upheld the minister's powers, stating:

The Quebec legislation reflects the growing concern on the part of legislatures and of society about the safeguarding of the environment. That concern does not reflect only the collective desire to protect it in the interests of the people who live and work in it, and exploit its resources, today. It may also be evidence of an emerging sense of inter-generational solidarity and acknowledgement of an environmental debt to humanity and to the world of tomorrow.⁵⁶

This is a strong defence of retrospective environmental legislation, but it came too late to strengthen the provincial government's power in its negotiations with the parties responsible for Britannia's environmental problems.

BRITANNIA AS CONTAMINATED SITE: THE FIRST STEPS

In mid-1974, the BC Ministry of Environment issued a pollution abatement order to Anaconda Canada Limited, the last operator of the Britannia mine. It wanted Anaconda to stop drainage from the 2200 Level from reaching Britannia Creek and to route 4100 Level flows through beds filled with scrap iron into a deep, subtidal outfall.⁵⁷ Anaconda stopped

⁵⁵ The facts are summarized in *Beazer East, Inc. v. Environmental Appeal Board et al.*, B.C.S.C. 2000.

⁵⁶ Canada, Supreme Court; *Imperial Oil Ltd. v. Quebec (Minister of the Environment)*, [2003] 2 S.C.R. 624, 2003, at <http://www.scc-csc.gc.ca/decisions/index-eng.asp>.

⁵⁷ British Columbia, Ministry of Environment, "Reasons of Decision for Issuance of Remediation Order OE-16097, Effluent Discharge Permit PE-12840 and Refuse Discharge Permit PR-15938" 8 September 1999. Until 2015, this document appeared on a Ministry of Environment website. The old URL now leads to <http://www2.gov.bc.ca/gov/topic.page?id=A78468F6BBAA41F2B01670FCF5908302&title=Contaminated%20Sites%20in%20B.C> which requires a \$100 deposit to

mining in November 1974 and went some way towards compliance. In 1978, it sold a large parcel of mine lands to a private company, Copper Beach Estates Limited, which then became responsible for compliance. A small parcel, including the huge mill building, was transferred to what was to become the Britannia Mining Museum.

Copper Beach Estates had a modest income from renting houses and lands in the mine's privately owned townsite, but it failed to make payments on a large mortgage, let alone comply with the environmental order. The mine buildings and houses were becoming neglected, almost derelict. In 1991, Copper Beach defaulted on its mortgage, making the properties subject to a court-ordered sale; however, the mortgagee found no buyers.⁵⁸ Although Copper Beach's chronic financial problems and its owner's actions delayed a solution to the Britannia problem, it was that owner, the mine records that he kept, and the consultants he selected that identified all parties responsible for cleanup. In the meantime, in 1991, Environment Canada and the British Columbia Ministry of Environment began a fruitful joint program of fieldwork and studies to define the pollution problem at Britannia, measure its effects, and assess its solutions. By April 1998, this work culminated in a consultant's estimate that a water treatment plant would cost \$4.3 million, with annual operating costs of \$0.78 million.⁵⁹

In June 1993, the BC legislature amended the Waste Management Act to manage contaminated sites, but the government postponed its proclamation for four years to allow public consultations.⁶⁰ The resulting Contaminated Sites Regulations came into force in April 1997. The province was then able to declare Britannia a contaminated site and to issue a new cleanup order to Copper Beach Estates as; "A person who is responsible for remediation of a contaminated site ... is absolutely, retroactively, and jointly and separately liable to any person or government body for reasonably incurred costs of remediation of the contaminated site."⁶¹

search contaminated sites. Unfortunately, it seems the reader must ask the Ministry's regional office in Surrey for a copy.

⁵⁸ A court-appointed receiver then managed the property, and the rents remaining after expenses passed to the mortgagee. Copper Beach Estates received no income from its property.

⁵⁹ "Treatment of Acid Drainage at the Anaconda - Britannia Mine," H.A. Symons Ltd, March 1998, at "Reports" <http://www.agf.gov.bc.ca/clad/britannia/index.html>. As of May 2015, all Britannia technical reports are posted at this site.

⁶⁰ The law is summarized in British Columbia, Supreme Court Reports 2000, *Beazer East Inc v. Environmental Appeal Board*, at http://www.courts.gov.bc.ca/search_judgments.aspx.

⁶¹ See http://www.bclaws.ca/civix/document/id/complete/statreg/03053_04.

The Ministry of Environment, Lands and Parks also began searching for companies tied to Britannia's operation. Anaconda Canada Limited, the last operator, no longer existed, but its Canadian affiliates soon heard that the government regarded them as "potentially responsible persons." So did the very large oil company ARCO (Atlantic Richfield Company, later British Petroleum), which had purchased Anaconda and its affiliates. In June and July 1998, each company received a letter from the ministry which "proposed a cooperative round table discussion to resolve the issues at Britannia."⁶² In August, six weeks after hearing from the government, ARCO replied that it was not responsible because it had not bought Anaconda until 1977, three years after the mine closed.

In November 1998, at its regional office in Surrey, the ministry hosted a meeting of all parties with an interest in Britannia's cleanup, including the current owner, and representatives of companies that denied any responsibility.⁶³ The meeting had a formal, even tense tone. One lawyer representing a company said: "We're here because we were asked." Another said that his client companies did not do the mining at Britannia and were therefore not responsible. Another pointed out that corporate law limits the liability of parent companies for cleanup costs of the actions of subsidiaries.⁶⁴ These remarks revealed that the parties, while defensive of their clients' interests, were not prepared to make submissions of fact or law but were ready to listen, without prejudice, to the ministry's position.

The US-based representative for ARCO said that the company would expect the ministry to become a "co-equal party," adding that the ministry "must put some of its own skin in the game." Another representative made the prescient remark that the ministry "might collect ten percent [i.e., of the remediation cost], if it's lucky, from the companies represented." Finally, two of the company representatives repeated a complaint concerning the absence of anyone representing the successors to the Howe Sound Company, which had operated the mine for sixty years before selling it to Anaconda.

The discussions clarified everyone's position but ended in stalemate. The ministry's representatives said that they did not want to apportion responsibility between the parties but would circulate a draft cleanup order and give all parties time to respond. An agreement between parties

⁶² British Columbia, Ministry of Environment, file 26250-20/0517/96-97, binder 1, 28 July 1998.

⁶³ I attended representing Environment Canada. I recall about a dozen other people being present from the ministry and companies the ministry had invited. Many were lawyers.

⁶⁴ The lawyer referred to the then-recent US Supreme Court decision, *US v. Best Foods*, June 1998, which clarified a parent company's liability for cleanup costs for actions of a subsidiary.

would make it unnecessary for the government to include them in the pollution abatement order given to Copper Beach Estates.

In the meantime, the federal-provincial research effort to assess Britannia pollution and to test ways of ending it had been making real progress when the federal government received criticism from an unexpected direction. The North American Commission on Environmental Cooperation (CEC) received a complaint in June 1998 from three Canadian environmental groups that Canada was failing to enforce section 36 of the Fisheries Act against Britannia's owners. This commission has Canadian, American and Mexican representation which reviews complaints that one of the participating countries is not enforcing its own environmental laws. The complainants accused Canada of ignoring pollution at Britannia and two other closed and abandoned mines in the province. They did not know that the province was taking steps to solve the problem. Five years later, the commission issued its 234-page "Factual Record: BC Mining Submission."⁶⁵ This report explained how federal prosecutors had used their discretion in not prosecuting Britannia's owners under the Fisheries Act.⁶⁶

DELAYS IN ASSIGNING LIABILITY

While the province was throwing out a net for responsible persons, Copper Beach's owner came up with a plan. He would use Jane Basin glory holes as a disposal site for contaminated soil collected in the Lower Mainland, and it would apply disposal, or tipping, fees towards building and operating a multi-million-dollar water treatment plant. It would also identify all former owners and operators and persuade them, under threat of litigation, to contribute towards the cleanup. Early in 1999, the company applied to the Ministry of Environment for the necessary effluent and solid waste permits. Since Copper Beach Estates was the landowner and the applications met an acceptable standard for review, the ministry had to review them, suspend action to hold other persons accountable, and allow the permit process to run its course. In four communities, in May and June, representatives of the company

⁶⁵ The Commission on Environmental Cooperation resulted from the 1994 "North American Agreement on Environmental Cooperation." Find the "Factual Record BC Mining" SEM-98-004, p. 132, at http://www.cec.org/Storage/68/6172_98-4-FFR_en.pdf. The other two BC mines complained about were Tulsequah Chief (near Atlin) and Mount Washington (near Courtenay).

⁶⁶ The CEC's "Factual Record" did not launch further action, but its exhaustive compilation of Britannia's regulatory history is unique and includes a key fact about the negotiations described below.

and both governments held public meetings to explain the applications.⁶⁷ The proposals attracted significant media interest and seemed to have more support than criticism, so the province issued the permits in September 1999.⁶⁸

Copper Beach Estates also retained consultants based in Seattle, Washington, who specialized in the assessment and cleanup of “brownfield” sites. They had in-house expertise in documenting the history of a contaminated site and its ownership to a level of proof needed to prove liability in US courts. They sent a team to the British Columbia Archives in Victoria to search a very large collection of Britannia documents and reports donated by the mine’s last operator.⁶⁹ They copied documents that proved that, for decades, the Howe Sound Mining and Smelting Company operated the mine under the day-to-day control of its American parent, the Howe Sound Company. The history they compiled of the mine’s development and management was later given to the Ministry of Environment.

The consultants identified several present-day companies as successors to the Howe Sound Company. These included ALCOA (Aluminum Company of America) which bills itself as the world’s largest aluminum company. Copper Beach now had the facts to launch an action in US courts that would compel both ARCO and ALCOA to participate in Britannia’s cleanup.

By the spring of 2000, the company’s momentum was faltering and the Ministry of Environment, Lands and Parks realized that Copper Beach Estates would not meet its permit conditions. In April 2000 the ministry’s Regional Waste Manager sent a letter to the potentially responsible persons it identified in 1998, and asked for their submissions.⁷⁰

Over the next six months a torrent of paper changed hands between the named potentially responsible persons (i.e., corporations) and the provincial and federal governments. The ministry received the submissions and supporting documentation in multiple sets of binders, also given to all the named parties. The binders included all recent government correspondence, orders, and reasons for decision; corporate agreements for sale, registrations, and changes of name; land title documents; court filings and rulings on contaminated sites; and US and Canadian case

⁶⁷ The community meetings were led by the Honourable Iona Campagnolo and David Marshall of the Fraser Basin Council. I attended representing Environment Canada.

⁶⁸ For the permits and reasons for decision, see the source cited in footnote 57.

⁶⁹ Britannia MS 1221, located in BCA, comprises 127 bankers’ boxes of records.

⁷⁰ Regrettably, this correspondence seems no longer available online. See footnote 57. The Ministry of Environment in Victoria may grant permission to read its file 26250-20/0517/96-97 and later including regulatory correspondence from March to December 2000.

law.⁷¹ These papers defined a common factual basis for the coming negotiations. Millions of dollars were at stake, impelled by a growing sense of urgency to end the pollution.

One of the named parties alleged that the ministry was itself a potentially responsible person because of work it did responding to a flood at Britannia Beach. In August 1990, after heavy rains flooded Highway 99 and the adjacent railway, the ministry replaced the heavy outfall pipe for the mine's drainage. It was stretching the point to argue the action made the ministry potentially responsible for cleanup, but it provoked the Deputy Director of Waste Management, in Victoria, into telling all parties that he was "assuming conduct of the remediation order process" to avoid any appearance of conflict. A similar accusation was made that Canada's wartime contract to buy Britannia copper meant it was partly responsible for the pollution. Canada later denied any responsibility.

The ministry's new regulator notified ALCOA he intended to include that company in the list of potentially responsible persons as a successor to the Howe Sound Company. Late in 2000, events occurred too quickly to analyze a new estimate of \$53 million capital cost for cleaning up the mine's contamination and building the treatment plant, plus \$1.2 million per year in continuing costs. This was much more than the 1998 estimates of \$4.2 million and \$0.78 million per year. Government technical officers met briefly on 28 November and discussed the risks that Britannia's costs could be substantially higher than even the revised \$53 million estimate. Senior officials seemed prepared to indemnify the former mine owners without even a notional understanding of remediation needs and costs over the entire site, or of a target amount beyond which the province would pay from general revenues.

The first unknown was the cost of a water treatment plant which depended on the flow the plant had to treat (in other words, its hydraulic capacity). Britannia's unregulated drainage flows vary by a factor of ten: high during snowmelt but low in late summer.⁷² High flows would need a large plant to treat to the regulated standard but most of the year this capacity would not be used efficiently. The valves in the 4100 Level plug could solve that problem by storing peak flows within the mine and allow a smaller, less costly plant to be built. But the plug's condition

⁷¹ British Columbia, Ministry of Environment, file 26250-20/0517/96-97 and later includes at least seven large three-ring binders.

⁷² Footnote 17 explains how to access technical reports, such as, in this case, Britannia mine 4100 Level drainage flows, which as of May 2015, remains posted.

was unknown. If it stored water under high pressure and then failed, it would cause a catastrophe.⁷³

Other unknown costs were: the cleanup of copper and zinc contamination from spilled concentrate at the mine site and shoreline; collecting and treating contaminated groundwater; disposal of treatment plant sludge; removing and disposing of contaminated soils; and providing reliable fire and domestic water service and sewage treatment for several hundred residents living at Britannia Beach. The mine site presented obvious risks to public safety from open mine workings, neglected dams in Britannia Creek, potentially unstable rock walls in Jane Basin and risks of debris torrents. Despite these unknowns, senior managers pressed towards an agreement. It is possible they believed that a broad, comprehensive view of all aspects of site reclamation would increase costs and that this, in turn, would decrease the likelihood of achieving a timely settlement.

The first meeting with all responsible parties (except Copper Beach Estates) occurred on the evening of 30 November 2000.⁷⁴ A senior manager of the BC government acted as chairperson. Standing before a flip chart, holding a felt pen, he told the former owners' representatives that he was prepared to negotiate, *at that meeting*, the cash amount the province would receive to indemnify the parties against any further claims. He also warned that, if even if they reached an agreement, it needed approval by the Ministry of Environment regulator.

Company representatives reacted with polite astonishment. The ARCO representative said that the 1998 estimate of \$4.2 million in capital costs for the plant and \$780,000 per year for its operation was reasonable, and after a discussion of how long the financing would apply, offered \$6 million for an indemnity. The other parties were more circumspect and non-committal. The meeting discussed some technical aspects of the reclamation and the length of time before the province assumed all responsibility over the whole site.

The meeting resumed next morning (1 December 2000) and ended the same day. The potential financial contribution of Copper Beach Estates remained unknown so the companies wanted to press ahead to settle their own interests. They knew Copper Beach planned to sue them in US courts but dismissed the case as weak because Copper Beach had done nothing towards ending the pollution. After further discussion of

⁷³ Test work later proved the concrete plug had been engineered and installed to a high safety standard.

⁷⁴ I attended this initial evening meeting and the following, morning meeting, but did not attend nor was I privy to subsequent meetings with the responsible parties.

costs and timelines, the provincial negotiators offered, and the companies representing the former owners accepted their making a combined cash payment of CDN\$15 million, to be released from and indemnified against any further claims.⁷⁵

The province's representatives accepted this even though they knew that the US Environmental Protection Agency had just reached an agreement on the Iron Mountain Superfund Site, a "structured settlement [that] provides, through an insurance vehicle, coverages totaling approximately \$337 million for the first thirty years of the [Iron Mountain Superfund] Site activities."⁷⁶

Someone privy to the 1 December 2000 meeting gave information about it to a prominent representative of British Columbia's mining industry.⁷⁷ The ministry soon received complaints that the initial settlement amount had been far too low. Maybe the negotiators had given too much weight to a perceived threat of protracted litigation. In December 2000, such a threat was real.

British Columbia borrowed the polluter-pays concept from American practice without emulating the United States' underlying capacity or culture – even appetite – for litigation. The province faced two very big US companies, ALCOA and ARCO, and legal talent of the calibre available to deep pockets. Although the province had a favourable 2000 BC Supreme Court judgment to support its retrospective liability policy, a constitutional challenge of retroactive liability was still possible (and was not alleviated until the Canadian Supreme Court delivered its 2003 judgment).

Some weeks later, the negotiated settlement amount increased to \$30 million. The reason was not revealed until two years later. The lawyer for the Commission on Conservation and writing the "Factual Record BC Mining" asked the responsible manager about the increase. The manager attributed it to adding the cost of treating contaminated groundwater, a topic among many overlooked in the haste to reach the earlier settlement.⁷⁸ A few weeks later, the same official settled with Copper Beach Estates. Both agreements went to the provincial cabinet

⁷⁵ These were representatives of successor companies to Howe Sound Company and Anaconda; settlements with Copper Beach and its successors came later.

⁷⁶ United States, Environmental Protection Agency, region 9, superfund site: Iron Mountain. Follow the links at <http://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0901755> for the narrative of regulatory and remediation actions.

⁷⁷ The representative phoned me to ask if it was true. The matter was then confidential so I could neither confirm it nor give an opinion.

⁷⁸ Commission on Environmental Cooperation, "Factual Record BC Mining," SEM-98-004, 120. See footnote 65.

for review, and, on 12 April 2001, the provincial government announced the settlement: a \$30 million cash payment indemnifying the former mine owners, and the equivalent of \$5 million from Copper Beach Estates Limited in land transferred back to the province and future cash payments from development of uncontaminated lands.⁷⁹

SUBSEQUENT ACTIONS

With \$30 million in hand, the responsible ministry, now renamed the Ministry of Sustainable Resource Management, retained a project manager from an international firm of consultants. The managing engineer started dozens of engineering and managerial tasks and contracts related to the mine's cleanup.⁸⁰ This work assessed site contamination, including groundwater; tested water treatment methods; and analyzed the mine's drainage. Assessing the 4100 Level plug was a vitally important task because its condition would dictate whether the mine could safely store water, which, in turn, prescribed the treatment plant's hydraulic capacity.

Also in 2001, the University of British Columbia and its Centre for Environmental Research in Minerals, Metals, and Materials reached an agreement with Copper Beach Estates Limited on a research project. The province had previously ordered 2200 Level flows diverted away from Britannia Creek. The agreed project would plug that level and demonstrate other designs that could seal mine tunnels. In spite of difficulties in access and winter weather, a concrete plug was cast in place just before the 31 December 2001 deadline set by the Ministry of Environment regulator. It also had the immediate benefit of stopping contamination of Britannia Creek, thus taking the first significant step towards ending pollution at the mine, but a great deal remained to be done.⁸¹

Three years after the settlement agreement, the province called for bids to design, build, and operate a treatment plant.⁸² In October 2005, it entered service and the mine's discharges finally complied with effluent requirements. The ownership of Copper Beach Estates Limited and its properties changed in 2003, when, after a long delay, Macdonald

⁷⁹ See <http://www.news.gov.bc.ca/archive/pre2001/default.htm>. Search "Britannia" and "2001."

⁸⁰ Gerry O'Hara, "Water Management Aspects of the Britannia Mine Remediation Project, British Columbia, Canada," *Mine Water and the Environment* 26, No.1 (March 2007): 46-54, describes all the remediation work.

⁸¹ Meech et al., "Transformation of a Derelict Mine Site."

⁸² Provincial negotiators contacted officials of the United Kingdom's Environment Agency in Exeter to learn about the management of the Wheal Jane treatment plant under a public-private partnership agreement.

Development Corporation took possession.⁸³ The new owner transferred most of the mine lands to the province, including a location for the treatment plant, valued at \$5 million.⁸⁴ The 2004 agreement imposed an “environmental levy” of up to fifty-five hundred dollars on future sales of each of 224 building lots as well as additional levies on commercial land development.⁸⁵

The new owner gave the townsite’s tenants preferential treatment in purchasing their formerly rented homes, a generous action that, together with other improvements, succeeded in converting a near-derelict company town into an attractive small community. At the same time, through separate appeals for public and private funding, the Britannia Mining Museum raised enough to rejuvenate the vast mill building and, later, to open a new museum office and gift store.⁸⁶

The 2001 agreement stated: “The total cost of remediation is estimated to be \$75 million.”⁸⁷ The province obtained about a third of this from present and former owners, leaving open the question whether the final agreement was a good one for BC taxpayers. But there was another payoff. In February 2010, thousands of visitors driving past the old mine to attend the 2010 Winter Olympics would have no reason to guess that Britannia had once been a source of severe pollution – indeed, that it had been counted among the worst mine sites in the world.

MINING AND CONTAMINATED SITES REGULATIONS

What makes the Britannia site unique? The imposition of retrospective liability at a contaminated mine site. This is rare in Canada, but it is an old story in the United States. Cleanup agreements at Iron Mountain, CA; Butte, MT; and Reserve Mining near Duluth, MN, show the US Environmental Protection Agency did not give pollution from mining preferential treatment.⁸⁸ The Britannia case differs for perhaps two

⁸³ *Vancouver Sun*, 22 August 2003, G5.

⁸⁴ British Columbia, Ministry of Environment, Land Remediation, high-profile sites, Britannia, “Voluntary Remediation Agreement,” 25 May 2004, at http://www.env.gov.bc.ca/epd/remediation/high_profile/britannia/orders/index.htm.

⁸⁵ See http://www.macdevcorp.com/britannia_beach.html.

⁸⁶ Meech et al. “Transformation of a Derelict Mine Site.”

⁸⁷ This is “net present value.” A former provincial official advised me that it could increase to 2000 million in inflated dollars for the first twenty years, with annual costs of \$2 million in 2012 dollars.

⁸⁸ Iron Mountain has been explained. For Butte, see footnote 21; for Reserve Mining, see Thomas R. Huffman, “Exploring the Legacy of Reserve Mining: What Does the Longest Environmental Trial in History Tell Us about the Meaning of American Environmentalism?” *Journal of Policy History* 12, 3 (2000): 339–68.

reasons: (1) long-standing political support for mining and (2) a dislike of litigation. For decades, Canada's mining sector benefited from supportive policies – including wartime cost plus metal supply contracts, postwar subsidies for gold mines, a three-year income tax holiday, resource depletion allowances, and accelerated depreciation of plants – summed up by the observation: “Mining industry received extremely favourable treatment from Canadian governments without even having to ask for it.”⁸⁹

British Columbia was the first province to require mines to reclaim their lands, but the law was not retroactive.⁹⁰ Other provinces with mines followed that example, and today Canada's new mines publicize their restoration of the land surface. But national contaminated sites policies that appeared in the 1990s focused on real estate, which left a policy gap for high-risk abandoned mine sites.

The provinces and Natural Resources Canada created the National Orphaned/Abandoned Mines Initiative (NOAMI) in 2001.⁹¹ It considers “orphaned or abandoned mines ... for which the owner cannot be found or for which the owner is financially unable or unwilling to carry out clean-up.” A January 2006 NOAMI workshop on mine cleanup cost liability does not mention provincial laws on retroactive liability.⁹²

Mines must earn a profit in order to continue operations. When they close due to falling metal prices or exhaustion of ore, the accumulated capital survives. It does not vanish. Canadians seem reluctant to “follow the money,” as though unwilling or unable to throw out a big net, find former mine owners, and order them to pay for cleanup. Despite the Britannia precedent, taxpayers seem fated to pay tens of millions or more for cleaning up closed, polluting mine sites such as Kam Kotia and Deloro in Ontario; Faro and Keno Hill in the Yukon; Giant in the Northwest Territories; and Mount Washington, Bralorne-Takla, Atlin Ruffner, and Island Mountain in British Columbia.⁹³

⁸⁹ David Yudelman, *Mining and the Macdonald Commission: The State of the Industry in the 1980s* (Kingston: Centre for Resource Studies, 1983), 26.

⁹⁰ B.J. Barton, *Canadian Law of Mining* (Calgary: Canadian Institute of Resource Law, 1993), 8.

⁹¹ <http://www.abandoned-mines.org/home-e.htm>.

⁹² <http://www.abandoned-mines.org/pdfs/workshop-proceedings.pdf>. See also, “Barriers to Collaboration: Orphaned/Abandoned Mines in Canada” by John Castrilli, 2002, 18 at <http://www.abandoned-mines.org/pdfs/Castrilli%20Final%20Report.pdf>.

⁹³ Websites for the Ontario, Northwest Territories, and Yukon mine sites appear with any search engine. For BC Mines see http://www.al.gov.bc.ca/clad/ccs/cabinet/reports/t2_CLORB_Biennial_Report.pdf; J. Sandlos and Arn Keeling, “Zombie Mines and the (Over)burden of History,” *Solutions*, 4, 3 (2013): 80–83. This article gives a broad view of the problem posed

CONCLUSION

Legislatures in Canada and the United States decided that both present and former owners of contaminated sites shall be “absolutely, retroactively and jointly and separately liable” for cleanup costs. In 2001, application of this law at Canada’s Britannia Mine resulted in the elimination of one of the world’s largest point sources of metals pollution. British Columbia accepted CDN\$30 million cash to grant to former owners perpetual indemnities against further claims for cleanup costs. This was much less than the amount needed, but the settlement proved to be the catalyst for the site’s reclamation and so had a positive outcome. Assigning retrospective liability to former owners of contaminated mine sites remains an undeveloped tool in protecting and remediating the Canadian environment.

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by other orphan and polluting mines in Canada and elsewhere, but it is silent on retroactive liability.