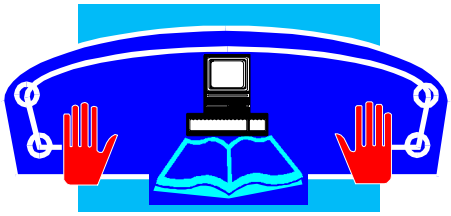

Potential Liability (g.n.w.t.) - Abandonment Of Mines

Type of Study: Reference Material

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Northwest Territories Justice

June 5, 1989

TO : Mr. G. C. Patterson
Minerals Advisor
Energy, Mines and Petroleum Products

FROM : Alexander C. Phillips
Legal Counsel
Legal Division

Re: Potential Liability Re: Abandonment of Mines

With reference to the questions you raised by your letter of February 16, 1989, to Mr. Jeffrey G. Gilmour, our department has reviewed the legal issues and would respond as follows:

1. Assuming the Government of the N.W.T. will continue to accept liability in negligence as if it were a private person, there are two potential grounds for liability in negligence with respect to abandoned mine sites:

   (i) where the G.N.W.T. is considered to be an "occupier" of the lands on which entrance to the mine is located and in breach of its common law duty of "common humanity" to prevent entry to trespassers.

   (ii) where the G.N.W.T. is in breach of a statutory duty to ensure that the mine owner erect a suitable fence around the mine or any tailings to prevent injury to people, domestic animals, wild animals, fish or property, pursuant to section 35 of the Mining Safety Act, R.S.N.W.T. 1982(3), c.12.

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2. Where the G.N.W.T. is considered to be an occupier, liability may also exist at common law for nuisance. If so, compensation may be paid to those whose use and enjoyment of private land or public rights is being interfered with by the leaching of heavy metals from mine tailings.

3. There may also be strict liability in tort based on the principle in Rylands v. Fletcher, in the absence of any finding of negligence, for the escape of heavy metals leached from mine tailings deemed to be extraordinarily dangerous.

4. The status of "occupier" does not depend on ownership of the land or premises but rater depends on its immediate supervision and control. Hence, a tenant in possession is an occupier. Moreover, there may be more than one occupier in a given set of circumstances.

5. In the absence of negligence for breach of a statutory duty under the Mining Safety Act, potential liability in negligence, nuisance and strict liability at common law, depends on the G.N.W.T. being deemed an "occupier" of the abandoned mine. In our view, the G.N.W.T. cannot likelybe an occupier when:

a) the property is leased and operating,
b) the property is inactive but owned privately,
c) the property has been certified as abandoned, but is still owned by the mining company,
d) the property is abandoned and on Territorial lands under the Territorial Lands Act,
e) the property is abandoned and on Native land surface rights.

6. Where the property is abandoned and on Commissioner's lands, potential liability as an "occupier'! , may exist, but likely only where the G.N.W.T. is aware of hazardous tailings left on its property and takes no steps to remedy the danger or to prevent the escape of the heavy metals from its lands. While third party liability may be available against the original mining company by the G.N.W.T. , this may not be practical or effective where the company has wound up or gone bankrupt during the intervening years since abandonment.

7. In our view, a conveyance of mineral rights separate from surface rights includes tailings even if the tailings are discarded upon the surface of the land as waste left over after the extraction and refining of ore. The tailings belong

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to the owner of the mineral rights, not to the owner of the surface rights in the land. Consequently, tailings deposited on Commissioner's land, in our view, would remain the responsibility of the owner of the mineral rights in the land. Where a mineral lease has expired or a mining company has wound up, this would likely be the Federal Government. [Mastermet Cobalt Mines Ltd. v. Canadaka Mines Ltd. (1978), 91 D.L.R. (3d) 283 (Ont. C.A.); aff'd (1980), 121 D.L.R. (3d) 508 (S.C.C.)].

Alexander C. Phillips

Enclosure

cc. Shane Freitag
Jeffrey Gilmour

SEATON J.A. (orally):—I agree.

MACDONALD J.A. (orally):—I agree.

MCFARLANE J.A. (orally):—Leave is grunted and the sentence appeal is dismissed.

Appeal dismissed.

LETARTE v. THE QUEEN

[94 D.L.R. (3d) 700]

Customs and excise — Seizure of goods — Illegality —'huckera picking up cargo and new trailers in United States — Truckers verbally declaring purchase of cargo and trailers but making written declarations of cargo only — Declarants unaware that written declarations required in respect of trailers — Customs officers seizing trailers without Informing declarants of necessity of written declarations — Seizure improper — Customs Act, R.S.C. 1970, c. C-4O, s. 18.

NOTE: An appeal from the above judgment of Decary J. to the Federal Court of Appeal (Pratte and Le Dain JJ. and Hyde D. J.) w-as allowed with costs on October 21, 1980. The judgment of the Court was delivered orally by

PRATTE J.:—We are all of the view that the appeal should be allowed.

It is clear that s. 18(6) of the *Customs Act,* R.S. C. 1970, c. C-10, was not observed in the case at bar. The decision of the trial Judge that, despite this fact, the seizure of the undeclared goods was not legally made appears to have been based on the good faith of the truckers, who failed to comply with s. 18(b). This reasoning appears to the Court to be without legal validity. Under s. 180, a seizure results from failure to comply with s. 18, regardless of whether the individuals in question acted in good faith.

Counsel for the respondent argued that the seizure was premature. In his submission, when the customs officers realized that the truckers concerned in this matter had made incomplete declarations, they should have brought this irregularity to their attention and asked them to correct it. The Court finds no support for this argument in statute or precedent.

The appeal w-ill accordingly be allowed with costs, the decision of the trial Judge will be quashed and the action of respondent dismissed with costs.

J.M. Aubry, for appellant.
M. Kaylor, for respondent.

MASTERMET COBALT MINES LTD. v. CANADAKA MINES LTD.

[91 D.L.R. (3d) 283]

Mines and minerals — Mineral rights conveyed separately from surface rights — Whether mineral rights Include "tailings" discarded on surface of land.

NOTE: An appeal from the above decision of the Ontario Court of Appeal dismissing an appeal from Boland J., 79 D. L. R. (3d) 743, 17 O.R. (2d) 212,-to the Supreme Court of Canada (Martland, Dickson, Beetz, Estey and Lamer JJ.) was dismissed with costs on June 17, 1980. The following was delivered by

" THE COURT:—We are all in agreement with the reasons delivered on behalf of the Court of Appeal by Mr. Justice Lacourcière.

The appeal is dismissed with costs.

George *D. Finlayson, Q. C.,* and *Roy E. Stephenson,* for appellant.
Claude Thomson, Q. C., and *Donald Short,* for respondent.

RE GYPSUMVILLE DISTRICT TEACHERS' ASSOCIATIOS SO. 1612 OF THE MANITOBA TEACHERS' SOCIETY AND CONSOLIDATED SCHOOL DISTRICT OF GYPSUMVILLE NO. 2461 et al.

RE PINE CREEK SCHOOL DIVISION NO. 30 AND PINE CREEK DIVISION ASSOCIATION NO. 30 OF THE MANITOBA TEACHERS' SOCIETY et al.

[103 D.L.R. (3d) 672]

Labour relations — Teachers — Arbitration — Act providing for tripartite representative boards of arbitration consisting of one member nominated by each party and an impartial chairman — Parties habitually nominating same person — Trustees' nominee previously acting as resource person 10 trustees in respect of labour arbitrations — Whether nominees biased — Public Schools Act, R.S. M. 1970, C. P250, s. 387.

NOTE: Appeals from the above decision of the Manitoba Court of Appeal dismissing an appeal from a judgment of Kroft J., [1979] 5 W.W. R. 600, to the Supreme Court of Canada (Martland, " Ritchie, Dickson, Estey and Lamer JJ.) were dismissed without

While the Board declared that the threats were contrary to the Act it declined to exercise its discretion to issue a direction against further threats on the basis that there was an absence of evidence of a history of such threats, and also because there was, in the majority's view, no collective agreement in existence at the time of the decision of the Board. The respondent company moved for judicial review of the decision. It asked for an order quashing the decision on the grounds that the Board was either without jurisdiction or had exceeded its jurisdiction in declaring the collective agreement null and void from February 7, 1977, onward. Counsel for the company candidly acknowledged that when the matter was before the Divisional Court he was not attacking the declaration which his client had of course asked for, nor was he asking the Divisional Court to quash the refusal of the Board to issue a cease and desist order and to remit the matter to the Board. What he was concerned with and what he wished reviewed was the statement by the Board in the course of its decision that the collective agreement was at an end as of February 7, 1977. The formal order of the Divisional Court, in effect, and understandably based on the argument before that Court, set aside a portion of the reasons for judgment which portion, in our view, was not necessary to the decision of the Board. The Divisional Court did not deal with the actual decision of lhe Board.

Counsel for all parties acknowledge that what was quashed or set aside by the Divisional Court was not the decision of the Board declaring that there was a collective agreement in effect at the relevant time and refusing to issue the requested cease and desist order, and it certainly was not a part of the application or relief sought by the company before the Board. Although we are unhappy about the result, and we can understand the parties' anxiety to have the issue raised in the appeal resolved, we cannot see our way clear to hearing submissions with relation to an attack on a portion of the reasons of a tribunal. To proceed in such a way could have even unhappier results from the standpoint of practice and procedure. The judicial review process relates to attacks on decisions of tribunals, and, although the reasons of a tribunal may be referred to to ascertain whether the decision has been arrived at by reviewable error, a portion of the reasons cannot be attacked and quashed leaving the decision itself intact. We are ail of the view that the proceedings were misconceived from the date of the Board's decision and we are not in a position to reconstitute them.

... allwithout costs and set aside

the order of the Divisional Court, and an order is to go dismissing the application to that Court. The costs in the Divisional Court are to be paid by the company to the respondents in that Court. There is no order as to costs to or against. the Ontario Labour Relations Board in the Divisional Court.

In setting aside the judgment of the Divisional Court we wish to make it clear that we are expressing no opinion on the merits of the decision of that Court *on the* issue which concerns the parties, nor on the merits of the reasons of the Ontario Labour Relations Board on that issue. We appreciate the assistance given to us by all counsel on the difficult preliminary point raised by the Court.

Appeal allowed; application dismissed.

MASTERMET COBALT MINES LTD. v. CANADAKA MINES LTD.

Ontario Court of Appeal, Arnup, Lacourcière and Morden, JJ.A.
October 12, 1978.

Mines and minerals — Mineral rights conveyed separately from surface rights — Whether mineral rights include "tailings" discarded on surface of land.

A conveyance of "minus, minerals and mining rights, in, upon or under" certain lands includes "tailings", that is, fine sand containing minerals that had formerly been discarded upon the surface of the land as waste left over after the extraction and refining of ore. A mineral retains its character as such regardless of size or economic value. Consequently, the tailings belong to the owner of the mineral rights, not to the owner of the surface rights in the land.

[*Peterson Lake Silver Cobalt Mining Co. Ltd. v. Dominion Reduction Co. Ltd.* (1917), 41 O.L.R. 182; *La Rose Mines Ltd. v. Mining Corp. of Canada Ltd.* (1922), 22 O.W.N. 61; *Seymour Management Ltd. et al. v. Kendrick et al.; Princeton, Third Party*, [1978] 3 W.W.R. 202, distd]

APPEAL from a judgment of Boland, J., 17 O.R. (2d) 212, 79 D.L.R. (3d) 743, in an action and counterclaim to determine the ownership of silver tailings on the surface of certain land.

George D. *Finlayson*, Q.C., and *Roy E.* Stephenson, for appellant, plaintiff.

Claude *Thomson*, Q.C., for respondent, defendant.

The judgment of the Court was delivered by

LACOURCIERE, J.A.:—The issue which falls for determination on this appeal can be defined as follows: whether tailings, consisting of the powdered residue after the refining and processing of ore

which have come from other properties and have been deposit.ed on the surface of the appellant's property, belong to the appellant as owner of the surface rights or to the respondent as owner Of the mining rights.

The lands in question consist of approximately 104 acres of mining lands in the vicinity of the Town of Cobalt. They were granted in the original Crown grant of 1906, in fee simple as "mining Ian(is" under the *Mines Act,* R.S.O. 1897, c. 36, and, by virtue of s. 39 thereof, subject to a reservation of pine trees. In 1936, the registered owner severed the surface rights from the mining rights. It is admitted that the respondent company leases the mining rights under an assignment of lease made in 1973 and operates a silver refinery near Cobalt.

At the date of trial before Boland, J., without a jury, the tailings had flowed onto the appellant's property along an old stream bed, as a result of being sluiced down by mine operators and by forces of nature. They consisted of a very fine sandlike material and were mostly deposited on the lands between 1905 and 1922, many years before the severance of the surface from the mining rights. The tailings became, in effect, the new surface, with an average depth of five to nine feet. During this period, the tailings were viewed as waste material without economic value, and as a hindrance to the growth of vegetation and to building. At the date of trial, because of technological advances and a dramatic increase in the price of silver, it had become economically feasible to process the tailings for their content of that metal.

The sections of the *Conveyancing and Law of Property Act,* R.S.O. 1970, c. 85, which define the meaning of "mining rights" and "surface rights" apply to any instrument purporting to deal with such rights. The sections read as follows:

> **16. Unless the contrary appears to be the intent of the instrument, where in a conveyance the "mining rights" in respect of any land are granted or reserved, the grant or reservation shall be construed 10 convey or reserve the ores, mines and minerals *on or under the land*, together with such right of access for the purpose of winning the ores, mines and minerals as is incidental to a grant of ores, mines and minerals.**
>
> **17. Unless the contrary appears to be the intent of the instrument, where in a conveyance the "surface rights" in respect of any land are granted or reserved, the grant or reservation shall be construed to convey or reserve the land therein described with the exception of the ores, mines and minerals *on or under the land* and such right of access for the purpose of winning the ores, mines and minerals as is incidental to a grant of ores, mines and minerills.**

(Emphasis added.)

These provisions were in force in 1936 when the respective interests were created: see the *Conveyancing and Law of Property Act,* R.S.O. 1927, c. 137, ss. 15 and 16. These two sections have effect only as to conveyances or instruments executed on or after July 1, 1914, and do not apply to conveyances by the Crown: R.S.O. 1970, s. 19, R.S.O. 1927, s. 18.

The instruments dealing with the mining rights and the surface rights herein are registered under the *Land Titles Act,* 1?.S.0. 1970, c. 234. Section 43(l)(b) of the Act. provides, *interalia,* that the proper Master of Titles may register the owner of

> **43(l) . . .**
>
> . . . . .
>
> **(*b*) any mines or minerals where the ownership of the same has been severed from the ownership of the land,**
>
> **in the same manner and with the same incidents in and wiLh which he is by this Act empowered LO register the owner of land, or as near thereto as circumstances admit.**

The 1936 transfer under which the predecessor of the respondent's lessor acquired title purports to transfer to it "the *mines, minerals and mining rights,* in, upon and under that certain parcel of land" particularly described: each parcel consists of parts of a numbered mining location situate on Cobalt Lake in the Township of Coleman, in the District of Nipissing.

The transfer of the same date under which the appellant's predecessor acquired title purports to convey "the *surface rights* only" to the same parts of the numbered mining locations.

The learned trial Judge, after noting that *the Land Titles Act* and the *Registry Act,* R.S.O. 1970, c. 409, were of no assistance in the definition of the words "mining rights" and "surface rights", quoted the definitions of these rights contained in the *Mining Act, 1{.S.0.* 1970, c. 274, s. 1, as well as the definition of the words "mine" and "mining" [17 O.R. (2d) 212 at p. 214, 79 D.L.R. (3d) 743 at p. 746]. These definitions are as follows:

> **15. the noun "mine", except as defined in Part IX, includes any opening or excavation in, or working of the ground for the purpose of winning, opening up or proving any mineral or mineral-bearing substance, and any ore body, mineral deposit, stratum, rock, earth, clay, sand or gravel, or place where mining is or may be carried on, and all ways, works, machinery, plant, buildings and premises below or above ground belonging to or used in connection with the mine, and also any quarry, excavation or opening of the ground made for the purpose of searching for or removal of mineral rock, stratum, earth, clay, sand or gravel and any roasting or smelting furnace, concentrator, mill, work or place used for or in connection with washing, crushing, sifting, reducing, leaching, roas ting, smelting, refining, treating or research on any of such sub-**

16. the verb "mine" and the word "mining", except as defined in Part IX, include any mode or method of working whereby the earth or any rock, stratum, stone or mineral-bearing substance may be disturbed, removal, washed, sifted, leached, roasted, smelted, refined, crushed or dealt with for the purpose of obtaining any mineral therefrom, whether it has been previously disturbed or not;

. . . . . .

19. "mining rights" means the ores, mines and minerals on or under any land where they are *or* have been dean with separately from the surface;

. . . . . .

27. "surface rights" means every right in land other than the *mining rights;*

The conclusion of the trial Judge is expressed in the following paragraph from her judgment [p. 216 O. R., pp. 747-8 D. L.R.]:

> Having considered all the evidence as well as the submissions of counsel, I find the mineral-bearing sand deposits, known as tailings, were abandoned waste material having little or no economic value until the dramatic rise in the price of silver. 1 also find the tailings are composed of particles of silver and other minerals. In my view, a mineral is always a mineral regardless of its size, economic value or change in character. The wording in the conveyances is of paramount importance in this case. In the absence of strong evidence of intention to the contrary, 1 cannot see how a conveyance of "the mines, minerals and mining rights, in, *upon* and under the lands" (emphasis ridded), can mean anything other than an exhaustive right to mine all minerals upon or under the lands, including the minerals contained in the tailings. Such a conveyance carries rights on the surface where minerals exist and owners of the surface nre not entitled to compensation.

The appellant's argument, as I understand it, is twofold:

1. IL is argued that tailings from the reduction of ore, deposited on the property of a stranger, pass to the owner of the surface rights in the property; that "mines" and "mining rights" refer to underground excavation, and not to the removal of minerals from the surface; and that the conclusion of the trial Judge is contrary Lo the traditional tests developed in the case law to determine the meaning of "mines, minerals and mining rights, in, upon and under" the lands.
2. The learned Judge erred in failing to give weight to the evidence of the appellant's witnesses, who gave evidence concerning a practice in the mining industry with respect to tailings.

The words "mine", "mines" and "minerals" have been given different meanings in the various cases which deal with these words as used in particular statutes, or in leases and other conveyancing documents containing a reservation of mines and minerals as exceptions out of a grant of land. Most of these cases

approach the problem whether a substance is a mineral as a question of fact Lo be determined by the use, character and value of the substance, in the light of the common understanding of mining engineers, commercial men and landowners at, the time of the conveyance: see *Stroud's Judicial Dictionary of Words and Phrases,* 4th ed., *vol. 3,* p. *1671; A.-G. for Isle of Man u. Moore,* [1938] 3 All E.R. 263; *Lord Provost & Magistrates of Glasgow* v. *Farie* (1888), 13 App. Cas. 657; *Seymour Management Ltd. et al. v. Kendrick et* al.; Princeton, *Third Party,* [1978] 3 W.W.R. 202; *Midland R. Co. et al. v. Robinson (1889), 15* App. Cas. 19.

To understand the vernacular of mining engineers and other mining people, it, is of great practical assistance to lurn to the definitions of the noun and the verb "mine" and the word "mining" contained in s. 1, paras. 15 and 16 of the *Mining Act* and its predecessor, and quoted above.

I would give substantial weight. to this provincial statute governing the mining industry in determining the meaning of the language of mining engineers and other persons engaged in mining — the definition of its words — in the same way that the meaning of the language of other trades and professions is influenced by relevant legislation. This proposition, rooted in common sense, finds confirmation in the *evidence* of the witness Halstead, a professional engineer.

The definitions in the Act make it abundantly clear that in the mining industry in Ontario a conveyance containing the words in the 1936 transfer of mining rights ahove quoted confers an exhaustive right to mine all minerals, including the silver contained in the tailings. In my view, the acquisition of mining rights was never intended to be limited 10 the acquisition of valuable minerals in place, and in sufficient concentration to be extracted at a profit, as contended by a mining engineer called at trial 10 give evidence on behalf of the appellant. The definition of mining in s. 1, para. 16, to include any method whereby a mineral-bearing substance may be dealt with ". . . for the purpose of obtaining any mineral therefrom, *whether it has been previously disturbed or not"* (emphasis added), necessarily includes the removal, by any process, of silver from tailings accumulated on the surface.

Dealing with the second ground of appeal, based on the alleged practice in the mining industry that the removal of tailings from property required the permission of the owner of surface rights, we note that none of the appellant's witnesses was able to testify that this practice existed with respect to the ownership of the mineral content of tailings in a situation where there had been a

severance of mining and surface rights. Section 1, para. 27 of the *Mining Act* defines "surface rights" to mean ". . . every right in the land other Lhan themining rights"; thus, a grant of surface rights does not include minerals on the surface, nor a right to mine tailings by any process for the purpose of obtaining any mineral therefrom: see s. 1, paras. 15, 16 and 17.

The present *Mining Act* contains several sections which relate to tailings. Under s. 176(1) the mine manager has the responsibility of planting and maintaining vegetation, or otherwise stabilizing "the tailings areas which will not be required for future impoundment of tailings to the satisfaction of the district engineer of mines". Where surface rights are not available for the disposal of tailings, the Minister of Mines and Northern Affairs may lease to the owner of mining rights any available surface rights: see s. 106. While these sections are not applicable Lo the facts before us, they show that the Act recognizes tailings without giving directions as to their ownership or mining rights following severance. These matters are left by the Act to the operaLion of the definition section.

Tailings initially belong to the owner of the mineral rights of the property from which the ore resulting in the tailings is extracted. In fact, there is evidence that tailings are frequently stockpiled and accumulated for later refining and processing. It seems clear from the cases referred to hereafter that tailings cannot be dumped, deposited or allowed to flow on other lands without a licence or permission from the owner. Thus, the owner of surface rights is always at liberty to prevent or restrain the accumulation of tailings on his land.

In *Peterson Luke Silver Cobalt Mining Co. Ltd. v. Dominion Reduction Co. Ltd. (1917), 41* O.L.R. 182, the question for determination was whether tailings resulting from the reduction of ore which had been deposited subsequent to the granting of a permission *on* other lands, continued to be the property of the original ore owner, or became the property of the owner of the land on which they were deposited. Middleton, J., at trial found that title in the tailings belonged to the latter, and that Lhe ore "won from the earth and earthy in its nature" was returned to the "bosom of the earth" and became part of the land. Middleton, J., said at p. 186:

> I am not losing sight of the statement that there had been for many years in the minds of chemists the hope and expectation that tailings might be retreated in such a way os to yield profit, but by many Lhis was regarded as a thing remote nnd visionary; and in the meantime there was the ever-l)rcscnt difficulty of getting rid of the vast quantity of material discarded in the operation of the known mining processes. Actions speak louder than the words of interested witnesses who, many years afterwards, say, "I thought," or "It was understood;" and the facts , all go to shew tha t until then this wa s regarded as waste material, to be got rid of as easily as was possible.

His judgment. was affirmed in the Appellate Division (44 O.L.R. 177, 46 D.L.R. '724), and in the Supreme Court of Canada (59 S. C. Il. 646, 50 D.L.R. 52).

In *La Rose Mines Ltd. v. Mining Corp. of Canada Ltd. (1922), 22* O.W.N. 61, Middleton, J., found that tailings, which when deposited al the bottom of a lake were regarded as having no practical value, became part of the freehold. Applying the principle stated in *Peterson Lake, supra,* he said, at p. 61:

> Though at the time the ore was passing through the mill the tailings as well as the concentrate belonged to the plaintiffs, they must be taken Lo have assented to what was done, and to the tailings, then regarded as worth less, being deposited upon the defendants' property in such a way as to constitute part of the freehold, They could not be regarded as chattel property stored at the bottom of the lake for convenience.

Reference was made to *Peterson Luke, supra,* in *Seymour Management Ltd. et al. v. Kendrick et al.,* already referred to, where the question to be decided was the true construction of a reservation clause of "minerals precious or base" in Crown grants. At p. 204, Munroe, J., treated the meaning of these words as a question of fact, to be decided on what they meant "in the vernacular of the mining world, the commercial world and the landowners at the time they were used in the Crown grants". He concluded that it could not. have been the intention of the parties to reserve tine to minerals in the tailings which were not then regarded as having practical value and stated, at p. 204:

> If additional earth containing minerals had accreted 10 the land after the Crown grants hy means of natural forces, those minerals would be subject to the Crown reservation—but is that so where, as here, the tailings materials were deposited after the Crown grants by man? I think not. Such reservation must, I think, be expressly stated. The intention of the parties 10 the Crown grants could not have been to reserve title in the Crown Lo minerals in tailings which were then regarded as of no practical value, placed rrn the land by man, and which later may have become practicable to treat at a profit by a *new process* resulting from technological advances.

The cases to which reference has been made support the proposition that additional earth or substances containing minerals which accrete to the land by the forces of nature become part of the land. They are not helpful to the appellant, by reason of the severance of mining and mineral rights in the subject lands, and because of the definitions quoted.

As I have said, the statutory definition of words in the *Mining Act* should be given substantial weight in the construction of private transfers or deeds of mining lands. Having regard also to the language used in the transfer of title to the predecessor of the respondent's lessor of the "mines, minerals and mining rights, in upon and under" the land and to the provisions of s. 16 of the *Conveyancing and Law of Property Act* above quoted, which defines the expression "mining rights" in a conveyance of land, I am bound to conclude that the appellant's predecessor did not obtain the ownership of or the right to mine the mineralized tailings which had accreted on the surface at the time of the severante of surface rights.

In the result, this appeal must fail and I would dismiss it, with costs.

Appeal dismissed.

RE LAMBTON FARMERS LTD.

Supreme *Court of Ontario, in Bankruptcy, Saunders, J.* October 28 1978.

Mortgages — Amount of security not expressed in dollar figure — Whether mortgage invalid as between parties — Registry Act, 1/.S.0. 1970, c. 409, s. 72.

Section 72 of the *Registry Act*, R.S.O. 1970, c. 409, providing that a registered mortgage is a security upon the land to the extent of the money advanced not exceeding the amount for which the mortgage is expressed to be a security, governs priorities among competing documents, and dots not have the effect of avoiding, as between mortgagor and morgagee, a mortgage in which no dollar amount is expressed.

Contracts — Illegality — Credit union by-law prescribing maximum amount of loan — Excessive loan not invalid.

[*Sidmay Ltd. et al. v. Wehttam investments Ltd.*, [1967] 1 O.R. 508, 61 D.L.R. (2d) 355; affd [1968] S. CR. 828, 69 D.L.R. (2d) 336; *Royal Bank of Canada u. Grobman et al.* (1977), 18 O.R. (2d) 636, 83 D.L.R. (3d) 415, 25 C.B.R. (N. S.) 132, apld]

APPLICATION by a trustee in bankruptcy for advice and direction.

C. F. MacKeen and *H.M. Fogul*, for trustee.

J. G. Kerr, Q. C., for St. Willibrord (London) Credit Union Limited.

Frank A. Highley, for Ivan Ellerker and others.

Carl Arrai, for John Southen and Forest Feed Mills Ltd.

William J. Meyer, Q. C., and *Robert G. Murray*, for Huwell Farm Supply Ltd.

SAUNDERS, J.:—The trustee brings this application for advice and direction under s. 16 of the *Bankruptcy Act*, R.S. C. 1970, c. B-3, with respect. to a mortgage entered into by the bankrupt, Lambton Farmers Limited, as mortgagor with St. Willibrord (London) Credit Union Limited (hereinafter called "St. Willibrord").

The bankrupt made an assignment on May 6, 1977. The mortgage was dated April 30, 1975, and was registered in the Land Registry Division of Lambton on May 12, 1975, as No. 366558. John E. Southen is a party to the mortgage as guarantor. The mortgage is expressed to be made in pursuance of the *Short Forms of Mortgages Act*, R.S.O. 1970, c. 437, and contains the following recital:

> AND WHEREAS S1. Willibrord had demanded from the Mortgagor security 'for payment to St. Willibrord on demand of all money and liabilities whether direct or contingent now or hereafter owing or incurred from or by the Mortgagor, whether arising from dealings between St. Willibrord and the Mortgagor or from other dealings or proceedings by which St. Willibrord may become in any manner whatever, a creditor of the Mortgagor.

The mortgage contains the following proviso:

> PROVIDED THIS MORTGAGE TO BE VOID on payment by the Mortgagor on demand of all money and liabilities whether direct *or* contingent now or hereafter owing or incurred from *or* try the Mortgagor whether as principal or surety, whether alone or jointly with any other person and in whatever name style or firm and whether arising from dealings between St. Willibrord and the Mortgagor or from other dealings or proceedings by which St. Willibrord may become a creditor of the mortgagor including, without limitation, advances upon overdrawn account or upon hills of exchange, promissory *notes or* other obligations discounted for the Mortgagor or otherwise, all bills of exchange, promissory notes and other obligations negotiable or otherwise representing money and liabilities, or any part thereof, now or hereafter owing or incurred from or by the Mortgagor and all interest, damages, costs, charges and expenses which may become due or payable to St. Willibrord or may he paid or incurred by S1. Willibrord, upon or in respect to the said money and liabilities or any part thereof, all premiums of insurance upon the buildings upon the said lands which may be paid by S1. Willibrord and taxes (the foregoing being hereinafter referred to as "the indebtedness"), and performance of statute labour and observance and [performance of all covenants provisos and conditions herein contained.

The Court was advised and the material indicates that there is owing to St. Willibrord the sum of approximately $150,()()(), plus interest.. The indebtedness apparently consists of $50,000" loaned directly to the bankrupt with the balance being the amount of loan obligations of other members of the credit union which the bankrupt has I

GOV'T Rec'd May 30 '88

REVISED DRAFT

Interim protection Provisions

Whereas Section 36.1.2 *(a)* of the Agreement-in-Principle (AIP) recognized that appropriate provisions for interim protection would be negotiated prior to land selection,

The Parties hereby agree that:

1. Land withdrawal pursuant to the Territorial Lands Act or the Commissioner's Lands Act shall occur in two stages:

   (a) Before land selection begins, critical areas of land which may be subject to pressure for development activity will be withdrawn in order to prevent their alienation during the land selection process. Withdrawal of land at this stage shall not include municipal lands, and shall be restricted to the North Slave region unless it is later agreed that the South Slave and/or Deh Cho regions *require* interim protection. The description of any lands withdrawn at this stage will be amended in accordance with results of the actual land selection negotiations.

   (b) the withdrawal of selected land *following* land selection negotiations in a particular region.

2. After government and the Dene/Metis agree upon the lands to be withdrawn, government shall, as soon as reasonably possible, withdraw the lands from disposition of surface and subsurface rights, so that, on the withdrawn lands and for the time they are withdrawn,

   (a) no new agreements for the sale or lease of land will be executed,

   (b) no new mining claims shall *be* recorded pursuant to the Canada Mining Regulations, except where those claims were located prior to the date of the withdrawal order,

   (c) no new permits, licences or leases pursuant to the Territorial Coal Regulations shall be granted, and

(a) with the consent of the Dene/Metis, Or

(b) incases of overriding public interest as determined by the Minister and after consultation with *the* Dene/Metis.

6. Any interests in land, rights, licences, permits or authorizations created pursuant to clauses 4 and 5 shall not thereafter be subject to the provisions of clauses 4 and 5.

7. No land use permits pursuant to the Territorial Land Use Regulations or the Commissioner's Lands Act shall be issued in respect *of* lands within the settlement area except after 30 days *from* delivery of a written notice to the Dene/Metis Negotiations" Secretariat.

8. Existing outfitting and tourist establishment licences which include any part *of* the withdrawn lands may be replaced, renewed, extended or transferred on the same basis as would have applied had the lands not been withdrawn.

9. Subject to clause 3, no oil or gas exploration rights will be issued in the settlement area prior to January 31, 1991, or until the signing of the Final Agreement, or until a termination of negotiations, whichever first occurs.

10. The *withdrawal* of any parcel of land pursuant to clause 1(a) shall not be interpreted as meaning that the lands are available for selection or that the Dene/Metis will ultimately hold title to those lands following land selection negotiations.

11. While these provisions are in force, government shall consult with the Dene/Metis when proposing *any* change to legislation related to land, land and water management, land use planning, and environmental assessment in the settlement area, Legislation does not include the *revision* or enactment of municipal by-laws.

12. The Dene/Metis will be invited to participate in -

(a) a new Lands Advisory Committee, *to* be created within 30 days of the signing of these provisions, by combining the present Federal Territorial Lands Advisory Committee (FTLAC) and the Land Use Advisory Committee (LUAC);

(b) *the* Regional *Environmental* Review Committee;

(b) Notwithstanding section 2, the withdrawal of lands may be revoked in cases of overrating public interest as determinedby the appropriate Minister *and* after consultation with the Dene/Metis.

3. The withdrawal of lands pursuant to clause 2 shall be subject to existing legal rights, titles, interests in land, including, licences, permits, authorizations, *reservations* by notation and any associated privileges, including renewals, replacements, extensions and transfers us might have been granted or permitted had the land not been withdrawn, provided that there will be no significant changes in the terms and conditions of such renewals, replacements, extensions or transfers Notwithstanding the generality of the foregoing, such withdrawals shall be subject to existing:

(a) located *or* recorded mineral claims or prospecting permits in good standing under the Canada Mining Regulations;

(b) rights in good standing created pursuant to section 8 of the Territorial Lands Act or Section 4 of the Commissioner's Lands Act;

(c) permits, special renewal permits and leases in good standing under the Canada Oil and Gas Land Regulations;

(d) rights and interests granted pursuant to the Canada Petroleum Resources Act; and

(e) rights issued pursuant to the Territorial Coal Regulations, Territorial Dredging Regulations, Territorial Quarrying Regulations and the Forest Management Regulations.

4. No new permits shall be issued on the withdrawn lands pursuant to the Territorial Quarrying Regulations or the Commissioner's Lands Regulations in respect of *sources* of construction material which had not been opened prior to the date of the withdrawal order except:

(a) with the consent *Of* the Dene/Metis, or

(b) in cases where, in the opinion of the appropriate Minister, no *alternative* source of supply is *reasonably* available in the surrounding *area* and after consultation with the Dene/Metis.

5. NO new timber permits or licences, other than free permits or renewals *or* replacements of existing timber permits *or* licences, issued pursuant to the Forest Management Regulations, shall be issued in respect of the withdrawn lands except:

13. Withdrawn lands remain federal Crown lands or Commissioner's lands under the administration and control of the appropriate Ministers.

14. These provisions shall not affect access to or across withdrawn lands.

15, Nothing in this agreement imposes a legal obligation on either party.

16. The provisions of this agreement may be reviewed and amended by the parties prior to the Final Agreement.

17. This agreement shall remain in force until June 30, 1991, or until settlement legislation, or until a termination of negotiations, whichever first occurs.

Ted Blondin Chief Negotiator Dene/Metis	David E. Osborn Chief Federal Negotiator	Dan Mandin Senior Negotiator GNWT

TAX TREATMENT OF MINESITE RECLAMATION EXPENDITURES

PURPOSE

To address the issue of whether, and under what circumstances, it may be necessary to amend the Income Tax Act in order to improve the tax treatment of future mine reclamation expenditures.

BACKGROUND

Protection of the environment is high on the political agenda of Canada. Mine reclamation is fast becoming an essential and unavoidable cost of conducting mining business in Canada. Many provinces require that a mine reclamation plan be submitted as a condition of granting a mining lease.

In 1987, at the request of the Mining Association of Canada (MAC), federal and provincial mines *ministers* directed the Intergovernmental Working Group on the Mineral Industry (IGWG) to prepare a report on the policy and economic implications of environmental problems associated with mine waste and minesite abandonment.

In August 1988, the IGWG Sub-committee on Mine Waste presented its "Report on the Economic and Policy Aspects of Acid Discharge" to mines ministers. Among other things, the report concluded that, because reclamation costs incurred at the end of a mine's life are unique in nature and present special difficulties from a tax standpoint, they should be recognized with a specific amendment to the Income Tax Act.

In 1988, the British Columbia Ministry of Energy, Mines and Petroleum Resources asked Revenue Canada, the federal Department of Finance and EMR for views on the tax aspects of a proposal to require mining companies operating in that province to make periodic cash contributions to mine reclamation funds. There have also been industry representations criticizing the current income tax treatment of future mine reclamation expenditures on the basis that the present rules do not effect a proper tax matching of-costs and revenues.

In response to the foregoing, the IGWG Sub-committee on Mineral Taxation, in consultation with MAC, has prepared a Discussion Paper on the issue of the income tax treatment of mine reclamation expenditures. (Informal discussions with MAC indicate little disagreement with the draft Discussion Paper). The report sets out three options to improve the tax treatment of reclamation expenditures, viz.

1. Extend the loss carryback period for a period greater than the three years currently allowed.

2. Allow a current deduction for accounting-based reserve provisions for estimated future reclamation obligation.

3. Allow a current deduction for contributions to a government-mandated fund for estimated future mine reclamation activities.

CONSIDERATIONS

Other matters that should be taken into consideration are:

1. In the course of federal/provincial consultations while drafting the Discussion Paper, it became obvious that the provinces have differing views on the issue. Few provinces support the idea of accounting-type reserves. Some provinces support the idea of an extended loss carryback; some want to use funds; others want to stay with the status quo.

2* Finance would almost certainly reject the idea of an accounting-type reserve since this would conflict with a fundamental tax principle that a deduction should be allowed only for amounts incurred.

3. Finance would also likely have reservations about enacting tax provisions to allow a deduction for contributions to a mine reclamation fund. Certainly, there would have to be assurance that deductions would reasonably reflect the present value of future mine reclamation costs. In this connection, the reliability of estimates of future minesite reclamation costs could be an issue. Other likely issues of concern to Finance would be: the tax treatment of earnings of a fund; provisions to recapture tax in the event that reclamation activities are not carried out; and, tax effects on the resource allowance and provincial mining taxes.

4. In light of the current deficit and debt reduction priorities of the federal government, Finance would be particularly concerned about the tax expenditure cost of any proposed tax change. As well, there would be reluctance to make any tax change that might be perceived as a precedent that may result in a flood of requests from other taxpayers for comparable treatment, e.g. for warranties on manufactured goods, for site reclamation or pollution abatement programs in other industrial sectors, for plant closures, for employee retraining or removal programs, etc.

5. Finally, there is the issue of who should make legislative initiatives first. That is, should the federal government initiate amendments to the Income Tax Act in anticipation of possible provincial/territorial mine reclamation fund initiatives? Or, alternatively, should the federal government wait until provincial/territorial initiatives have been made and then respond as required?

DECISIONS REQUIRED

1. A decision must be made as to what advice should be given to Mines Ministers on the matter of making representations to federal and provincial/territorial finance ministers to amend income tax and mining tax legislation.

2. A decision should be made to request the provinces and territories to make estimates of future minesite reclamation costs of existing and potential new mines within their respective jurisdictions. Such estimates are crucial to evaluating the tax expenditure implications of any federal tax initiative.

3. In regard to the actual issue to lay before ministers at the Mines Ministers' Conference, it is recommended that we agree that it should be along the lines of: " ... Ministers, the cost of minesite reclamation to the industry will be $C per year in years 1990, 91, 92 ... *2010,* and if a tax change were to occur to permit earlier deductions, the increased costs would be $F to the federal treasury and $P to the provincial and territorial treasuries".

4. In any event, we should agree on the principle that <u>all</u> relevant tax acts, both federal and provincial, should be similarly amended to reflect the sharing among governments of tax expenditure costs.

Confidential

Draft for Internal
Discussion Purposes Only

DRAFT DISCUSSION PAPER

INCOME TAX TREATMENT OF MINE RECLAMATION EXPENDITURES

Sub-committee on Mineral
Taxation
Intergovernmental Working
Group on the Mineral
Industry

FOREWORD

This Discussion paper has been prepared essentially in response to:

- Issues raised and conclusions reached in the "Report on Economic and Policy Aspects of Acid Discharge" prepared by the Sub-committee on Mine Waste of the Intergovernmental Working Group on the Mineral Industry (IGWG), which was tabled at the August, 1988 Mines Ministers' Conference:

- Requests received in late 1988 by Revenue Canada, the Department of Finance and EMR from the British Columbia Ministry of Energy, Mines and Petroleum Resources to review and advise on the efficacy and income tax implications of a proposal that would require mining companies operating in that province to make periodic cash contributions to mine reclamation funds; and

- Recent industry representations to the Minister of Finance and EMR that the current income tax treatment of mine-related environmental protection expenditures is incompatible with the expense recognition requirements of generally accepted accounting principles.

Protection of the environment is a leading item on the political agenda. Certainly, the mining industry is increasingly under pressure to incur mine site reclamation costs as a condition not only to secure new mining leases, but to sustain existing operations as well. Containment of acid discharge from mine waste is of particular public concern in this connection. Meeting these responsibilities is therefore clearly fast becoming an essential and unavoidable cost of doing business in the Canadian mining industry, and consequently, a significant determinant of the sector's international competitiveness.

Moreover, mine project sponsors are increasingly obliged by certain provinces to guarantee, in some tangible fashion, that adequate funds will be available upfront to meet mine reclamation liabilities as they arise. Indeed, as indicated above, at least one province is actively considering introducing legislation that would require mining companies to make regular cash contributions to mine reclamation funds dedicated to meeting post-production cleanup requirements. Another province, in an attempt to address this, is considering permitting mine reclamation costs incurred as prior years' costs and, therefore, eligible for deduction in those years under mining tax/royalty regimes. posted environmental securities would ensure that operators have sufficient funds to complete necessary reclamation.

Although mine reclamation activities do not, for the most part, ordinarily take place until after mining has ceased, generally accepted accounting principles require that expenses be appropriately matched with current revenues. In the case of accruing mine reclamation liabilities? mining companies must make estimates of future costs that could be reasonably attributable to current accounting periods. However, the Income Tax Act does not recognize these accounting estimates as eligible deductions. In fact, current provisions of the Income Tax Act do not allow deductions until amounts are actually expended on mine reclamation. This would be true notwithstanding that mine project sponsors may be: (a) legally mandated to carry out mine reclamation activities and, (b) legally obligated as well, to periodically provide upfront funding in respect of estimated reclamation liabilities as they accrue over the course of a mine's life.

The central issue addressed in this Discussion Paper, therefore, is whether, and how, the Income Tax Act should be amended so as to be consistent and compatible with the prevailing legal framework and economic realities pertaining to liability/expense recognition and the financing of mine reclamation activities in Canada. It is hoped that the following analysis of various options, and the tentative conclusions drawn therefrom, will serve as a useful basis for developing policy recommendations.

OTTAWA
May 24, 1989

EXECUTIVE SUMMARY

The Discussion Paper emphasizes that the mine reclamation issue is one that will not go away and that can only increase in importance in the period ahead. The issue is particularly significant now because proper solutions to past problems have not been found. This emphasizes the need now to really come to grips with the problem.

The analysis considers the current tax treatment of mine reclamation costs by reviewing relevant provisions of the Income Tax Act in the context of supporting policies and principles thereof. There is an examination of those expenses that are currently disallowed a deduction for tax purposes, as well as an explanation of those amounts that are currently allowed a deduction.

Apart from specific provisions of the Act, which specify the requirements for being considered as eligible deductions, two cases that went before the courts are examined in order to determine why one case ended up with the court ruling in favor of a tax deduction for mine reclamation levies, while in the other it ruled against. Our understanding of the present treatment and experience in the United States is also reviewed for comparative purposes.

Three options for changing current tax provisions in the Canadian Income Tax Act are examined. These are: extension of the loss carryback period; allowing a current deduction for accounting-based reserve provisions for estimated future reclamation obligations; and, allowing current deductions for contributions to a government-mandated fund for future reclamation activities. The advantages and disadvantages of each of these options are also set out.

Arguably, the preferred option would be to allow a deduction for mandatory contributions to a provincially established mine reclamation fund. This seems, at this stage, to be-a reasonable route to follow in the context of Canadian income tax policy and tax reform-directions. Arguably, this would require action by the provinces to first establish, by statute, the requirement for a fund. Provincial and federal authorities could then take the next step, which would be to make appropriate amendments to the Income Tax Act. In any event, before final action could be contemplated, a serious attempt would have to be made to estimate the likely tax expenditure implications of a change in the taxation rules.

The issue of tax expenditure costs raises the question of the need to agree on the extent to which costs of mine reclamation are borne by governments through the various federal and provincial corporate income and mining tax acts.

The authors of this report realize that this is an extremely complex subject, and they recognize that the arguments presented should be further discussed and amplified. However, it is considered important to issue the report as it now is, in order to be able take the next step, whether that would be to recommend concrete measures, or to put forward and consider further arguments.

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1. Background

1.1 Mine Reclamation as a Political/Economic Issue

Protection of the environment has become a significant issue on the political agenda in Canada. The mining industry is increasingly under pressure to incur mine reclamation costs as a condition to sustaining existing operations. Many provinces require that a mine reclamation plan be submitted as a condition of granting a mining lease or licence. Mine reclamation is thus fast becoming an essential and unavoidable cost of conducting mining business in Canada.

1.2 Nature, Scope and Technical Aspects of the Mine Reclamation Problem

Reclamation, by definition, takes place after most of the mining is completed although, depending on the structure of the particular mine, some final reclamation may be undertaken during the operating life. Final reclamation includes removal of all buildings utilities and equipment, sealing all openings, restoring all haul roads to a natural state, and securing waste piles and tailings ponds so that no contaminants escape into the environment. In a situation where the waste and tailings are not reactive, establishing a self-sustaining vegetative cover to prevent erosion and dust problems may be all that will be required to make them harmless.

Reactive wastes are much more difficult and costly to reclaim. Solid wastes from the mining and processing of sulfide ores pose a particularly difficult problem. Upon weathering, these wastes produce sulfuric acid which in turn can hasten the release of heavy metals and other toxic elements into solution. Unless this weathering is prevented, or the water treated, the resulting mine acid drainage can pose a threat to human health as well as to the environment. Most base metal, precious metal and uranium mines contain sulfide mineralization either in the ore or the surrounding country rock. Essentially, sulfide minerals are unstable when exposed to oxygen and water and begin to decompose almost immediately. The initial reactions yield sulfuric acid, which in turn promotes the leaching of heavy metals. Untreated, acidic effluent can contaminate ground water and local water courses, damaging the health of plants, wild life and fish. Drinking water supplies can also be adversely affected in the process.

In the case of mine acid drainage control, final reclamation may consist of building a system to contain or capture the runoff and treat it. A water treatment plant would theoretically have to be operated in perpetuity.

Alternatively, the reactive waste could be covered by an impervious seal to prevent water infiltration. Such a seal would be covered with topsoil and vegetated. Either alternative represents a costly undertaking.

In any event, mine reclamation costs will represent an increasingly significant economic aspect of non-ferrous and other mineral investment in Canada. Cooperative work to assess the economic and financial dimensions of the mine acid drainage problem was recently carried out by the federal government (MPS and CANMET), provincial governments and the mining industry. As a result of that work, it is roughly estimated that the cost of reclamation at current and prospective non-ferrous metal mining sites could amount to some $3 billion over the next twenty years. Assuming that the value of production were to be maintained at the recent (1987) rate of about $6.3 billion, it is estimated that this cost of reclamation, allocated over twenty years, could annually amount to about 2.4 per cent of gross revenues and 10 per cent of mining profits of Canada's nonferrous metal mining sector.

Governments, at all levels, are becoming increasingly concerned about developing ways and means of assuring that financing will be in place for post-production mine reclamation. Several provinces already require some form of security guarantee prior to commencement of production. A couple of provinces are also considering having mining companies compulsory contributions to a reclamation fund (British Columbia, New Brunswick). Another province (Nova Scotia) "is considering allowing post-production reclamation costs to be carried back and allowed as a mining tax/royalty deduction. Posted environment bonds funding would be reviewed annually, and held in trust by the province to ensure that sufficient funds are available to permit reclamation."

Aspects of current mine reclamation laws in Canada are described below and detailed in Appendix D.

Many provinces, as discussed below, also require a reclamation plan at the feasibility report stage for new mining projects. Reclamation planning and cost estimation are therefore integral components of mine project evaluation in Canada.

1.3 Overview of Mine Reclamation Laws in Canada

Approved reclamation plans before starting production from a mine are a mandatory requirement in British Columbia, Alberta, Manitoba, New Brunswick, Quebec (open pit mines only) and under the jurisdiction of the Atomic Energy Control Board. Approved reclamation plans before starting

production are discretionary requirements in Saskatchewan, Yukon Territory and Northwest Territories. Submission of reclamation plans at a specified time period, before the scheduled closing of the mine, is a mandatory requirement in Ontario and by the Atomic Energy Control Board. Reclamation plans are not required in Prince Edward Island.

Compliance with the reclamation plan is an important condition of the mine operating permit(s) in all jurisdictions that require the submission of a reclamation plan.

Security guarantees (in the form of a cash deposit, irrevocable letter of credit, promissory note guaranteed by a bank or a performance bond) to ensure that the mine site is in fact reclaimed prior to abandonment are mandatory before starting production in British Columbia, Alberta, New Brunswick and for pits and quarries in Manitoba.

Discretionary requirements for upfront security guarantees exist in the Northwest Territories, Yukon Territory, and Quebec (pits and quarries only) and Manitoba (other than sand and gravel). Progressive security guarantees, created by a cash levy on each unit of production, are mandatory for coal mines in Alberta (in addition to an upfront cash guarantee) and for sand and gravel pits in Ontario).

In Newfoundland, reclamation plans "are required for all mining operations . . . as part of the Environmental Impact Statement before the project is released by the Minister of the Environment under the Environmental-Assessment Act" . All pits and quarries "require rehabilitation as terms and conditions of the quarry permit or lease".

Formal requirements for reporting, monitoring and inspection of mine site reclamation are mandatory in British Columbia, Alberta, Saskatchewan, Ontario (sand and gravel pits only), New Brunswick (and under provisions of the Atomic Energy Control Board), but are discretionary in Quebec. Requirements for reporting, monitoring and inspection are not specified in Manitoba, Ontario (except sand and gravel pits), Nova Scotia, Newfoundland, prince Edward Island, Yukon and the Northwest Territories.

Salient details of current mine reclamation laws in Canada are summarized and tabulated in Appendix B.

2. Current Tax Treatment of Mine Reclamation Costs

2.1 Basic Income Tax Principles and Provisions

The present provisions of the Income Tax Act are administered to allow a deduction for reclamation costs in the year that they are incurred. There is no specific provision allowing such a deduction. Like many other expenses, the deduction is allowed in computing the income from a source or business in accordance with generally accepted accounting principles as established by professional accounting bodies and as interpreted by Revenue Canada and the courts.

A key test applied by the courts and by Revenue Canada is that an expense must be incurred for the purpose of earning or producing income in order to be deductible. If an expenditure does not meet this test it is disallowed by the general provisions of paragraph 18(l)(a) of the Income Tax Act which states that no deduction shall be made in respect of

> "(a) an outlay or expense except to the extent that it was made or incurred for the purpose of gaining or producing income from the business or property;"

Since reclamation costs have been allowed as a deduction when incurred, it would appear that they meet this test.

The word "incurred" for income tax purposes means that there has been a transaction in which a good has been obtained or consumed or a service has been rendered in exchange for expending cash or incurring a legally enforceable liability or obligation to pay monies in the future.

A key accounting principle is the so-called matching principle which states that an expense should be recognized and matched against revenues in the year that it is incurred or relates to or contributes toward revenues. Proper matching is especially required where there is a causal relationship between revenue earning activities and expenses that will result currently or at some future time. The matching principle is the basis for the accrual method of accounting, which requires that an expense be charged to the year and a liability set up at the year-end for any expense that has been incurred but not yet paid. The matching principle is applied to known and measurable amounts at year-end, e.g. accrued interest, as well as to expenses that are subject to estimation only as to when and how much will be paid out at some time in the future, e.g. manufacturers' warranty expenses.

The wording of paragraph 18(l)(a), especially the word "incurred", means that the actual incurring of an expense by expending cash or incurring a liability or enforceable obligation to pay monies is thus set up as a test that overrides the matching principle.

2.2 Expenses Currently Disallowed a Deduction

The Income Tax Act is very strict in allowing deductions for future expenses that are based on estimates or for which an enforceable liability does not exist. The key provision of the Income Tax Act involved is paragraph 18(l)(e) which states that no deduction shall be made in respect of

> "(e) an amount as, or on account of, a reserve, a contingent liability or amount or sinking fund except as expressly permitted by this Part;"

This general provision effectively disallows any expense:

a) that is a reserve, that is an accounting estimate of an expense that will be incurred in the future, however accurate the estimate may be or however certain it is that the expense will be incurred. For accounting and tax purposes the reserve is treated as a liability, but there is not yet an enforceable obligation to pay monies at a fixed or determinable future time. The reserve is in the nature of an estimate of a liability that arises out of present events that will become an enforceable obligation at some time in the future.

b) that relates to a contingent liability, which by definition is a liability that may arise in the future depending on future events arising out of present circumstances. This test denies a deduction to any expense unless it has been incurred (goods have been delivered or services have been performed) and in exchange there has been a payment of cash or there has been created a legally enforceable obligation or liability to pay cash in the future. Generally accepted accounting principles do not match expenses where there is a contingent liability, but such contingencies are disclosed in a footnote to the financial statements.

c) that is a payment into a fund even though the amounts in the fund may be used at some future time to incur deductible expenses. A fund or sinking fund is an amount of cash set aside by the taxpayer or in trust, either voluntarily *or* by contract or statutory obligation. The fund is used at some future time to acquire an asset, to retire an obligation, e.g. a bond

redemption at maturity, or to incur an expense, e.g. pension payments under a pension plan agreement. Payments into a fund or sinking fund are considered to be in the nature of a deposit or prepaid expense rather than an expense that has been incurred.

2.3 Amounts Currently Allowed a Deduction

Because of the sweeping exclusions of paragraph 18(l)(e), the Income Tax Act has been amended through time to specifically allow certain deductions for items that would otherwise be excluded. Thus section 20 of the Income Tax Act specifically allows a deduction for the following reserves:

Reserves for Measuring Expenses

a) A reserve for bad debts, by paragraph 20(l)(p). This deduction would be based on the matching principle and the idea that losses from credit sales should be offset against the revenue from the year of sale that created the receivable and the bad debt, rather than in a future year when a receivable becomes uncollectible.

b) A reserve in respect of goods or services to be delivered or rendered in the future by a manufacturer under the terms of an extended warranty agreement where an amount in respect of the agreement has been included in the income of the manufacturer by the Income Tax Act, by paragraph 20(l)(m.l). This reserve is also concerned with the matching principle and matches the estimated future warranty costs against the revenues of the year from the sale of the warranty agreements that will give rise to the future costs.

c) A reserve for quadrennial survey, by paragraph 20(1)(0). The Canada Shipping Act requires a quadrennial survey, which involves having a vessel dry-docked and inspected, etc. every four years. The matching principle, and the Income Tax Act, allows one quarter of the estimated cost to be spread over the first three years of the four year period. The balance of the actual costs in excess of the amounts deducted in the previous three years is deductible in the year that the survey is carried out.

Reserves for Measuring Revenue

d) A reserve in respect of goods and services that will be provided in a future year where an amount has been received and included in income, by paragraph 20(l)(m). This reserve is consistent with the matching principle which recognizes revenue in the period that it is

earned rather than received. Examples would be prepayment of a future period's rent, receipt of a deposit on goods to be delivered after the year end and receipt of a retainer for services to be performed after the year end. This reserve puts revenue in the year that it is earned and matches it against costs incurred in delivering the goods or performing the service.

e) a reserve for an amount not due until a later year by virtue of a debt instrument received on the sale of property that is included in computing income from a business activity. This reserve recognizes that the gross margin on the sale of property, e.g. land or cars, should be spread over the life of a debt instrument taken in exchange. This reserve is consistent with the accounting treatment of property sold in exchange for long term conditional sales contracts or mortgages.

In all of these cases an estimate of future expense or revenue is involved and is recognized *in* the current year. In all cases the matching of costs and revenues overrides the incurring of an expense or the collection of a revenue.

The reserves allowed by section 20 cover only situations where the amount of the expense is reasonably determinable and where the expense will be incurred in a relatively short period of time, e.g. four years for quadrennial survey expenses, the length of the extended warranty period for manufacturers' warranty expenses and one year for bad debts. This may send a message that any reserve for reclamation expenses would have to be based on estimates that are reasonably verifiable, that have a very high probability of being incurred and that will be incurred not too far into the future.

2.4 Contributions to Funds Currently Allowed a Tax Deduction

The Income Tax Act specifically allows a deduction for certain amounts paid to a fund that would otherwise be denied a deduction by the general rule of paragraph 18(l)(e). Thus, specific provisions allow a deduction for the following payments to a fund:

a) Employer's contribution to a pension fund by paragraph 20(l)(q). The deductible portion must be actuarially based and must be in respect of a plan that is approved by Revenue Canada and that meets the criteria set out in an Information Circular by Revenue Canada. The rationale for this deduction would be that an expense is incurred by the employer in terms of making an

outlay, and the expense is another component of salary and benefits for services provided by employees in the current period and should be matched against that period.

b) Employer's special contributions to a pension fund, by paragraph 20(1)(s). A deduction is allowed for payments that are actuarially determined to be required to "top up" a pension fund in order to meet future pension obligations. This deduction has rationale in that the "top up" is essentially a correction of previous estimates and contributions.

c) Employer's contribution under a profit sharing plan, by paragraph 20(1)(w). The payment must be to a fund (trustee) that is held in trust for the benefit of employees. The rationale for this deduction is that the payment relates to current services provided by employees and should be matched as an expense of the period, even if the amount will not be received by and be taxable in the hands of the employee until some time in the future.

d) Employer's contribution under a registered supplementary unemployment benefit plan, by paragraph 20(1)(x). The payments must be made to a trustee under a registered plan. These payments are a form of employee remuneration, and deduction allows a proper matching against the period that employee services are rendered. Also, the payments are incurred in that they vest in the employees.

e) Employer's contribution under a deferred profit sharing plan, by paragraph 20(l)(y). The payments must be made to a trustee. The payments are a form of employee remuneration related to the current period. Deduction effects a matching of the expense or outlay incurred to the year that services are provided.

f) An amount paid as a levy under the Western Grain Stabilization Act, by paragraph 20(1)(ff). These payments are not a statutory obligation. A farmer may make the payments as a form of insurance or income levelling. The farmer pays a levy to the fund of 4 per cent of the value of grain deliveries. This amount is deductible from the receipts that are included in income. Payments made from the fund to the farmer in subsequent years are included in taxable income. The levy is thus a revenue adjustment that works to defer income to future years when it is received.

Note that all of these deductible contributions, except the last, are in respect of amounts: that are a business expense; that conform with the matching principle; that are incurred by way of a cash payment that is not a deposit; that are generally held by a trustee; and, that are not for the benefit of the contributor.

2.5 Canadian Jurisprudence Relating to the Income Tax Treatment of Mine Reclamation Costs

Two recent cases deal respectively with (a) government-mandated levies for reclamation purposes (Nomad Sand & Gravel Ltd., 82 DTC 1070) and (b) accounting estimates of obligation to incur reclamation costs. (Burnco Industries Ltd., 84 DTC 6348).

The key provisions of the Income Tax Act involved in these cases are paragraphs 18(l)(a) and 18(l)(e), which read as follows:

> "18(1) In computing the income of a taxpayer from a business or property no deduction shall be made in respect of
>
> (a) an outlay or expense except to the extent that it was made or incurred by the taxpayer for the purpose of gaining or producing income from the business or property;
>
> .....
>
> (e) an amount as, or on account of, a reserve, a contingent liability or amount or a sinking fund except as expressly permitted by this Part;"

Her Majesty the Queen v. Burnco Industries Ltd. (80 DTC 1705; 82 DTC 6001; 84 DTC 6348)

The taxpayer carried on the business of gravel mining and, as was its normal practice, excavated gravel from a certain pit during its 1974 taxation year. The taxpayer was under obligation to backfill the area excavated pursuant to an agreement with the local municipality. In the course of meeting that obligation, preparatory work was carried out after the course of the taxpayer's 1974 taxation year. However, the actual backfilling was not completed or paid for in that year. When the taxpayer deducted an estimate of the cost of backfilling from its 1974 revenue, it was disallowed by the Minister. Actual expenses were incurred in 1975 in respect of the 1974 estimates.

Revenue Canada disallowed the deduction on the grounds that the amount was not an actual liability at the year end or an expense incurred during the year for purposes of paragraph 18(l)(a), but rather was an amount credited to a reserve (a liability account) or a contingent account (a contingent liability) within the meaning of paragraph 18(l)(e) of the Act.

The taxpayer argued that generally accepted accounting practice requires that revenues and expenditures jointly attributable to the same transaction must be recognized at the same time, i.e. result in a proper matching of revenue and expenses in determining income.

The Tax Review Board allowed the 1974 deduction. On appeal, The Federal Court - Trial Division also allowed the deduction in 1974 of estimated costs to be incurred in 1975. The Federal Court addressed the question as to whether or not an expense had been incurred in the year (1974) . The Court ruled that the fact that the amount of the expense was not ascertained at the year-end was not a determining factor. Nor was the fact that the basis for its most reliable estimation was not all in existence as at the year-end. The Court found that:

> "The obligation to backfill arose as the gravel was removed. It was certain that there would be a cost. That cost was 'an expense incurred during the year' as that term is recognized in the accrual method of accounting which is the only method acceptable in the circumstances for purposes of the Income Tax Act".

The Court also ruled that the deduction was clearly not a transfer to a reserve or a sinking fund that would be denied by paragraph 18(l)(e). Also, the fact that the cost had to be estimated did not render it a contingent liability in the Court's view.

On appeal to the Federal Court of Appeal the decisions of the lower courts were reversed. The Court held that

> 'The amounts were not expenses in 1974 within the meaning of paragraph 18(l)(a). An obligation to do something in the future which may entail payment is not an expense".

The Court stated their opinion that an expense, within the meaning of paragraph 18(l)(a) of the Act, is an obligation to pay a sum of money and that an expense cannot be said to be incurred by a taxpayer who is under no obligation to pay money to anyone.

The essence of the decision is that an estimate of expenses incurred and an estimated future liability is not an expense that is incurred nor an actual obligation to pay.

Nomad Sand & Gravel Ltd. v. The Minister of National Revenue (82 DTC 1070; 87 DTC 5343)

Nomad was in the gravel business and its operations consisted of excavating raw material from a gravel pit and transporting it for cleaning and loading. Pursuant to provincial legislation (Ontario) the taxpayer was required to provide for the rehabilitation of the pit area by paying an annual levy to the government. The funds were held to be applied to the cost of the rehabilitation whether undertaken by the taxpayer or left to the government. The taxpayer treated the levy as a deductible outlay or expense incurred for the purpose of earning income from its business for the years 1974 to 1977. The levies were calculated each year on the previous year's production. It was estimated that further levies would result in a total levy of from $35,000 to $40,000. The pit could not be progressively rehabilitated. Rehabilitation could only take place once the pit was exhausted and was estimated to cost $136,000. The levy was refundable if and when rehabilitation of the pit was completed. If the pit were abandoned? and the rehabilitation was not completed, the Province had the discretion to forfeit the levies paid and/or to refund the balance after paying the costs of rehabilitation out of the fund.

Revenue Canada argued that the levies were a deposit, that the deposit may be forfeited, that the loss of the deposit was contingent upon the discretion of the Crown and that the obligation to rehabilitate the pit area was for a future time and no liability existed to insure the related expenses immediately. Revenue Canada argued that the levies were therefore a refundable security deposit or a reserve that was not deductible by paragraph 18(l)(e).

Nomad pointed out that the expected rehabilitation costs exceeded the expected levies and that therefore there would not be any refund that could be treated as a receivable. Nomad argued that the most logical approach to the generally accepted accounting principle of matching revenues and expenses would be to treat the levy as an expense of doing business and applying it in the year in which income was earned.

The Tax Review Board found that Nomad had an obligation to pay the levy but it did not have an obligation to carry out the rehabilitation of the pit and incur the costs of same. The Board found that the only obligation was to pay the levy and that the obligation was not a future or contingent liability. The Board found that there was a causal relationship between the levies, which were a requirement to operate the pit, and the earning of income. The Board also found that the yearly levies did not necessarily constitute, for the operators, a security deposit, a reserve or a sinking fund principally because there was no obligation on operators to carry out the rehabilitation program. The Board found therefore that Nomad did not have a right to a refund, especially since Nomad was most unlikely to incur rehabilitation expenditures far in excess of its total levies paid.

The Board ruled that the annual levy payments were an integral part of Nomad's current operating expenses and were deductible under paragraph 18(l)(a) of the Act.

On appeal, the Federal Court - Trial Division confirmed the findings of the Tax Review Board.

The essence of this case seems to be that the annual levies are not necessarily in the nature of a non-deductible deposit if there is no viability on the operator to conduct future rehabilitation and if the right to a refund is contingent upon an unlikely decision to incur rehabilitation costs.

2.6 Foreign Tax Provisions for Mine Reclamation Costs

2.6.1 U.S. Tax Provisions for Mine Reclamation and Closing Costs

A taxpayer may deduct mine reclamation and closing costs as they are incurred, or he may elect to use a reserve system and make current deductions for estimated future costs.

The key features of the reserve system are that the reserve is increased by estimated costs applicable to the year and by an amount of imputed interest, and the reserve is decreased by amounts paid during the year. Each year-end any excess in the reserve is brought into income. Certain recapture rules apply.

A taxpayer may elect to use the reserve system for any particular mining or solid waste disposal property. A reserve must be set up for each property elected, and separate reserves must be set up for each of reclamation costs and closing costs. The reserve for reclamation

costs is increased by, and a deduction is allowed for, the estimated current cost of future closing costs apportioned on the basis of production (unit of production) from the property during the year. Current costs means the amount that a taxpayer would pay if the reclamation or closing activities were performed in the current year.

The reserve is adjusted in the year by two items. The reserve is increased by, but no deduction is allowed for, an imputed interest equal to the amount that the opening balance in the reserve would earn at the Federal short-term interest rate compounded semi-annually. The reserve estimated current cost of future reclamation activities related to the portion of the property that is disturbed in the taxation year.

The reserve for closing costs is increased by, and a deduction is allowed for, the is decreased by any amount paid in the year for reclamation or closing costs. If the amount paid exceeds the balance in the reserve, including imputed interest for the year, the excess is deductible in the year.

At each year-end, the reserve is increased by, and a deduction is allowed for, the reclamation or closing costs related to the year. The deduction for reclamation costs is base on current costs for reclamation of all property disturbed to date. The deduction for closing costs is based on all production from the property to date. If the total of the reserve exceeds the current costs, the reserve is reduced to the amount of the current costs and the excess is brought into income. (This is equivalent to bringing the adjusted previous year's reserve into income and setting up a new reserve).

A taxpayer may revoke an election made with respect to any property, and such revocation is irreversible. If an election is revoked, or if a mine site or waste disposal site is disposed of, the outstanding balance in the related reserve account must be brought into income of the year.

The reserve system is effective generally for costs incurred after July 18, 1984. If a taxpayer was regularly computing and claiming deductions for mining reclamation activities under a current cost method of accounting prior to that date, any liability for reclamation activities for land disturbed before July 18, 1984 is treated as having been incurred (and not subject to the reserve rules) when the land was disturbed.

The reserve system may be used only for reclamation and closing costs incurred under the Surface Mining Control and Reclamation Act of 1977, the Solid Waste Disposal Act, or any other Federal, State or local law which imposes substantially similar requirements.

Comments on the U.S. Reserve Rules

The reserve system may only be used in the U.S. where a mine operator is under a statutory obligation to conduct reclamation and/or closing activities. An obligation to conduct reclamation existed in the Burnco case, but did not exist in the Nomad case.

The U.S. reserve system results in a good matching of costs and revenues. The deduction for reclamation costs is related to the time and extent that land is disturbed, and reflects a clear causal relationship. The deduction for mine closing costs is effectively amortized over the units of production of the mine, and this appears to be an appropriate way of matching these once-only costs against the revenue from the mine.

The requirement to base a deduction on current costs effectively prevents a deduction for future costs that can be inflated by price index factors. At the same time the deductible estimate in current dollars works to automatically adjust for inflation, technology and other factors that may affect costs.

The use of an imputed interest factor works to reduce the present value of the tax deductions. The rules effectively bring the imputed interest into income each year. The idea is that there should be an offset because current tax deductions and related tax savings are given in respect of an outlay that will be made in the future.

The U.S. experience with the reserve system, and estimating reclamation costs, is that they have had little trouble administering the rules.

2.6.2 Australia Tax Provisions for Mine Site Rehabilitation Costs

Mining companies are now generally obliged for environment reasons to undertake major expenditures on site rehabilitation. These obligations are written into the conditions under which mining tenements are issued by State Governments. Where projects are the subject of legislation, site restoration programmes must be submitted and approved, before a lease is issued. In some cases, companies are required to lodge some form of security to guarantee their successfully carrying out rehabilitation.

Under present income tax law, deductions for expenditures on mine site rehabilitation area available, but only in the year in which the expenditures are incurred. Bank changes related to security bonds are deductible for tax purposes. Deductions may not be transferred among corporations.

The taxation aspects of company expenditures on mine site rehabilitation were considered in the Asprey Report (1975) and the IAC Report on the Petroleum and Mining Industries (1976). Both reports recommended the carryback of losses for a specified period and, in addition, the Asprey Report recommended that provisions (reserves) made by companies for future costs of restoring mine sites be available as deductions from assessable income. The IAC recommendation on carryback of losses was not accepted by the Government when it considered the IAC Report in 1976. The Government has not seriously considered the Asprey Report recommendation relating to provisions for rehabilitation costs for the following reasons:

1. The existing system has not caused problems in practise.

2. The deductibility of provisions would involve a major departure from long standing principles of income tax assessment and should be considered in a wider context than mining alone.

3. Allowing deductions for provisions for mine site rehabilitation based on estimates may induce taxpayers to reduce income for tax purposes.

2.6.3 South Africa Tax Treatment of Mine Closing Costs

South Africa has extremely onerous legal requirements concerning the pollution of the atmosphere, water and land. Generally speaking, any mine, on closing down, must restore the habitat to what it was previous to the mining venture. This includes agricultural restoration, long term projects to prevent pollution by seepage into water supplies, etc.

In order for a revenue expense to be deductible under South African income tax law, the expense must be incurred in the production of income, and must not be a capital nature. If an expense is incurred after the mine has closed, then that expense is considered not to have been incurred in producing income. Also, if an expense is incurred with a view to closing down a mine, that expense is considered not to have been incurred for the purpose of producing income. While there are some limited opportunities, as a general rule, revenue expenditures incurred for the purpose of closing a mine are not deductible for South African tax purposes either because it is not been incurred in the production of income or because it constitutes a capital expense. This conclusion is reached by reference to Section n(a) of the South African Income Tax Act 1962 (the Act).

Capital expenditures is deductible under the provisions of Section 15(a) as calculated by reference to Section 36 of the Act. A series of problems face a claim in respect of capital expenditure relating to the close down of the mine. First of all, there is the practical problem of finding an income base against which the capital expenditure can be deducted. With a few exceptions, mines in South Africa are "ring-fenced", i.e. the capital expenditure incurred in relation to one mine cannot be offset against profits produced by another mine. Section 15 of the Act also demands that the taxpayer produce mining income before he can obtain a deduction for capital expenditure at all. Further the definition of capital expenditure in Section 36 of the Act may not encompass many of the capital items relating to pollution rather than to mining. The definition is very broad in mining terms, e.g. shaft sinking, and mine equipment, the latter phrase encompassing anything necessary to equip a mine such as roads, railways, hospitals, sports facilities and all mining equipment as more narrowly understood. The definition also includes development, general administration and management prior to the commencement of production or during any period of non-production. However, equipment purchased purely to prevent pollution after the close down of a mine does not constitute mining equipment. As a general rule capital equipment purchased after the close of the mine would not be deductible.

The Revenue authorities have nevertheless being extremely sympathetic in relation to this problem. Essentially the question has been solved by reference to the gold and coal mining industry by the use of a tax exempt trust. Each mining house has formed a separate trust relating to its gold mines and its coal mines. Each year, a consulting engineer evaluates the possible liability of the mine to incur expenditure relative to the pollution laws on close down. A payment is made to the trust to ensure that the trust can meet such a liability at the end of the life of the mine. That payment is deductible for tax purposes on the basis that the company has actually incurred the payment in the course of carrying on its trade and that the payment can be closely enough associated with the income earning activities of the taxpayer to fall within the provisions of Section n(a) of the Act. In the following year, this provision is re-calculated.

This arrangement may be outside of the strict wording of the law, but it is very typical of the way in which South African Revenue solves difficulties that arise because of legal interpretation rather than government intent. Both parties are happy with the arrangement and in consequence it works.

2.6.4 Mexico Tax Treatment of Mine Closing Costs

Up to the present, mining companies have not been required to incur special expenses at the time of closing, to restore and safeguard the environment. Mexican tax law is similar to Canadian tax law in that, if such expenses were to be required, and provisions for these costs were to be recorded currently over the operating life of the mine, these provisions for estimated future expenses would not be allowed as deductions for tax purposes.

However, if the amounts provided were paid into a trust fund set Up to cover such costs, there is a reasonable probability that a special ruling could be obtained from the tax authorities allowing the current deduction of payments into the trust fund. These amounts would have to be invested in a limited number of securities approved for this type of fund and would not be available for use by the company. The earnings of the fund might be exempted from tax so long as they were reinvested in the fund or used to pay trustees' fees and other operating expenses. There would of course, have to be some way to reasonably estimate the amount of expenses to be incurred upon closing that could be independently certified to the tax authorities, and any excess provision would be treated as taxable income when returned to the company. Rulings of this king have not been made, but if expenses of this nature were to be required by Federal or State legislation, it is believed that a ruling of the type briefly outlined might be obtained.

2.7 Conclusions

The Canadian income tax treatment of reclamation expenses is not as generous as the treatment accorded other estimated expenses that will be incurred in the future but are allowed a current deduction. The Burnco case clearly reinforces the tax treatment that a deduction/reserve is not allowable under the Income Tax Act even though generally accepted accounting principles (the matching principle) may require that costs to be incurred in the future related to present operations should be expensed. The U.S. tax system allows taxpayers to elect a deduction/reserve estimate of the current cost of future reclamation activities. An amendment to the Income Tax Act would be required to allow a deduction/reserve treatment.

The Canadian tax system allows a deduction for a variety of contributions to funds. The Nomad case allowed contributions to the Ontario gravel pit reclamation fund. The tax status of other cash forms of security is unclear, but the Income Tax Act would ordinarily disallow any payment that is in the nature of a deposit or prepaid expense. For certainty and clarity, an amendment to the

Income Tax Act would probably be required to allow a deduction for contributions to a mine reclamation fund.

3. Evaluation of Various Income Tax Options

There follows a discussion of three options to amend the tax system in order to provide a fairer and/or more favorable tax treatment to reclamation costs.

3.1 Option A: Extending the Loss Carryback Period

This proposal would involve amendments to the Income Tax Act to allow the carryback of losses for a period greater than three years. Income of previous years would be reassessed and any tax refunds would provide cash that would offset some of the reclamation costs.

Nova Scotia is contemplating the indefinite carryback of losses in their mining tax regime. They feel that this would require minimal adjustment, and in connection with their Department of Environment, would place a closer tie between reclamation costs and posted security requirements.

Advantages

(a) This option would utilize current concepts and provisions of the Income Tax Act.

(b) For corporations the provision would be easy to administer. Income of previous years would be reassessed until the loss created by the reclamation costs is used up.

(c) This option would provide immediate cash relief by accessing tax refunds related to previous years rather than waiting up to seven years into the future to utilize a loss, or possibly even losing the loss or part of it if it is not used in the carryforward period.

(d) This option, if coupled with the posting of environmental securities, would ensure that an operator has sufficient funds at post production to guarantee reclamation.

(e) This option minimizes government involvement.

(f) This option would eliminate the need to make estimates of reclamation expenses for purposes of deductible reserves.

Disadvantages

(a) Extending the loss carryback period to a specific mining cost may set a precedent and a request by other industries for similar treatment for non-recurring expenditures, e.g. plant closures.

(b) Setting a maximum loss carryback period of say 10 years may not benefit all corporations, e.g. those with poor profits or with large cost-pool writeoffs in that period, and there may be pressure to extend the period to a longer time frame.

(c) The rules might work for corporations because their tax files are maintained indefinitely. However, the tax files of individuals are destroyed after a relatively short period of time and reassessment would be difficult or impossible for a lengthy carryback period.

(d) Refunds would be based on tax rates prevailing in the years that taxes were assessed and these may be higher or lower than rates prevailing when the reclamation costs are incurred.

(e) Amalgamated corporations could not be reassessed for profits prior to amalgamation of a predecessor corporation. This would limit the carryback period to the period since amalgamation.

(f) Where mineral resource properties are sold to another corporation the successor rules apply. The successor rules do not allow claiming a loss against a predecessor's income. In these cases, the loss carryback would be limited to the period since the mineral properties were acquired.

3.2 Option B: Allowing Current Deductions for Accounting-Based Reserve Provisions for Estimated Future Reclamation Obligations

This proposal would allow an annual deduction in computing taxable income of a reasonable amount set up as a reserve during the operating life of a mine.

A reserve is a bookkeeping amount or a notional amount that is created by an accounting or notional entry that charges an amount against income in respect of an estimated future expense and credits the amount to a reserve. The reserve is essentially in the nature of an obligation to incur expenditures in the future. No monies are generated or put aside by the reserve. However, the expense, if allowed as a tax deduction, would result in

current tax savings. The increased cash flows could go into general corporate funds and be used currently for any purpose. Alternately, the tax savings could be put aside by a company on a voluntary basis to provide a fund that would be available to help finance reclamation expenditures. However, the spending currently or the putting aside of the tax savings are unrelated to the deduction/reserve system.

The amount of the reserve and the related deduction would have to be based on a reasonable estimate of the expected future reclamation costs resulting from land disturbed or other mining activities of the year. Any payments in the year for progressive reclamation would be charged to and would reduce the reserve. Any payments in excess of the balance in the reserve would be allowed as an expense. Any remaining balance in the reserve prior to the year-end would be brought into income at the year-end. At the year-end a new reserve would be estimated and set up to reflect the revised cost of future reclamation activities at the year-end. A deduction would be allowed for the amount of the new reserve.

Advantages

(a) This proposal would effect a better matching of costs and revenues in determining taxable income than current tax treatment.

(b) This proposal would be consistent with the accounting practice required by some practitioners.

(c) There is some tax precedent for a deduction for a reserve. A reserve would be somewhat similar to the reserves allowed for warranty expenses and quadrennial surveys (paragraphs 20(1)(m.1) and 20(1)(0) of the Income Tax Act).

(d) This proposal would be essentially similar to the tax treatment that may be elected-in the U.S.

Disadvantages

(a) It is difficult to make reasonably accurate estimates of future mine reclamation costs, especially for mines with expected long lives.

(b) The use of a reserve would give current tax savings and cash flows to mining companies but would not of itself provide cash for future reclamation if the cash were used for other purposes and not saved in a fund for reclamation purposes.

(c) It may be difficult for Revenue Canada assessors to evaluate the reasonableness of a deduction/reserve because of the technical nature of the matter. It may be difficult therefore to administer the law and protect government revenues in terms of annually verifying the revised year-end reserve. Put another way, the reserve may lend itself to manipulation and/or understatement of taxable income.

(d) Recapture of a reserve in the future may result in a tax liability that the government may not be able to recover. The company may simply not have enough assets to pay the tax on the recapture.

(e) More generous tax treatment of mine reclamation costs will involve increased current tax expenditure costs to the federal government. The resulting revenue losses would not be consistent with the government's high priority to reduce the deficit. Also, the provinces may resist this option since it would reduce their revenues and conflict with their budget control and deficit reduction plans.

(f) A basic principle of Tax Reform has been the elimination of tax preferences. This option would give generous tax treatment to reclamation expenditures and may be perceived by governments, and by other industry sectors, as an overly generous tax concession to the mining industry.

(g) If special treatment is extended to the mining sector, other industry sectors will demand current deductions for non-current costs, mandated or otherwise such as plant shut downs, employee. retraining programs, employee retirement packages and other possible or anticipated future costs. In other words, a precedent may be set that may make it difficult to deny similar deductions to other industry sectors.

3.3 Option C: Allowing Current Deductions for Contributions to a Government-Mandated Fund for Future Reclamation Activities

Reclamation laws in Canada are the responsibility and prerogative of the provinces and/or municipalities where delegated. The Province of Ontario presently requires gravel pit operators to make contributions based on production to a fund administered by the province to ensure that some measure of reclamation is carried out. The provinces of British Columbia and New Brunswick are contemplating similar fund requirements. (See Appendix A).

This option would allow a tax deduction for the amount of actual cash contributions that are required by a province/municipality to be paid into a fund that would subsequently be used for mine reclamation activities. Presumably the province/municipality would make an estimate of the reclamation costs that would be incurred in the future as a result of land disturbed and mining activities in the present year. Alternatively, the estimate of future mine reclamation costs could be based on cumulative estimates of land disturbed. Levies or contributions would be required during the operating life of a mine or as land is disturbed. Since the contributions are somewhat in the nature of a deposit, the fund should earn interest on behalf of a contributor. Since each reclamation project is mine specific, it would appear to be reasonable to have a separate fund (at least notionally) for each mine. The fund could be administered to reimburse the mine operator out of the fund for reclamation expenditures as they are incurred. Alternately, the province/municipality could have the reclamation activities performed and pay for them out of the fund. Any amount in the fund in excess of the reclamation expenditures should be returned to the mine operator and would be included in income. Any shortfall in the fund would have to be collected from the mine operator or be borne by the province.

Advantages

(a) A deduction for contributions to a reclamation fund may be acceptable and have rationale in terms of other provisions of the Income Tax Act and court decisions because there has been a cash outlay or amount incurred by a company for a legitimate business expense.

(b) A deduction for contributions to a reclamation fund would encourage the use of such funds by a province/ municipality as an initiative to accomplish environmental control.

(c) There is some tax precedent for a deduction for a contribution to a fund, viz. amounts paid under the Western Grain Stabilization Act (paragraph 20(1)(ff) of the Income Tax Act) and amounts deductible for levies for gravel pits in circumstances similar to the Nomad case.

(d) There is a tax precedent for allowing a deduction for current contributions used to fund a long-term liability, e.g. the deduction for contributions to a pension fund.

(e) If the funds are held in trust and devoted only to reclamation there is less chance of abuse than a deduction/reserve system.

Disadvantages

(a) Arguably, a province/municipality could have difficulty in making an estimate of future reclamation costs that would be used as a basis for determining periodic contributions to the reclamation fund. The problem of estimation here would appear to be identical in nature and scope with the problem of estimating for purposes of a reserve. The question that arises is the different consequences of being too high or too low in the estimate. Periodic reviews and adjustments of estimates could be part of the process to deal with this concern.

(b) If the funds are not held in trust (e.g. if contributions go into provincial/municipal general funds) there may be no assurance that the funds will be used or even available for reclamation purposes.

(c) The fund may be used by the province/municipality to impose a form of taxes on mining companies, e.g. if the required contributions exceed the amounts estimated to be required for reclamation. *Allowing* a tax deduction for such excess would be in conflict with the intent of paragraph 18(l)(m) of the Income Tax Act which disallows a deduction in computing income for crown royalties and mining taxes. (The resource allowance provides an offset for these).

(d) A province/municipality may not like the idea of computing and imposing a levy based on land disturbed or other mining activities in the year. A province/municipality may be more inclined to base the year's contribution on profits for the year, e.g. by using a progressive rate structure, and/or ability to pay, e.g. by not requiring contributions in low-profit years. These methods of determining the contribution may be at variance with the purpose for which the contribution to the fund is made, viz. to pay for future reclamation activities that result from present mining activities.

(e) Administration is complicated if a fund is set up for each and every mine, as would seem desirable.

(f) The treatment of interest earned in the fund may present a tax problem, e.g. would it be taxable as it is earned? or only on withdrawals from the fund?

(g) This option would not be of universal or even broad application to mines in Canada since only two provinces contemplate a mandatory system of contributions to a reclamation fund that is applicable to all mines in the province.

(h) This option is subject to the same comments about tax expenditure costs, elimination of tax preferences and special treatment for the mining industry discussed in disadvantages to Option B, but to a much lesser degree since companies would be putting up a substantial amount of after-tax cash even after earning a deduction for contributions.

(i) There could be criticism of greater government involvement.

(j) It could give the perception that responsibility for reclamation is transferred to government along with the transfer of funds.

3.4 The Difficult Task of Making Estimates of Future Mine Reclamation Expenditures: A Problem Common to Options B and C

The most critical aspect of Options B and C is that of making an estimate of future reclamation costs. Option A does not involve making estimates since it is merely a way of handling the deduction for reclamation expenditures incurred.

The Income Tax Act, for the most part, allows a deducti-on for known and measurable amounts, ordinarily the transaction value in dollars for goods acquired or services performed. Where estimates are allowed in the Income Tax Act they are usually capable of reasonably accurate estimation and verification.

For example, the actuarial reserves allowed an insurance company can be estimated with a great deal of accuracy by the actuarial science. The reserve for bad debts can be estimated quite easily and closely by using experience factors and aging of accounts receivable. The deduction/ reserve for manufacturers' warranty expenses can be based on historical experience factors. The deduction/reserve for quadrennial surveys is based on an estimate of costs four years hence, but the work done in the survey and its current cost is reasonably determinable and need be

adjusted only by a price index factor. In summary, the deduction/reserves allowed by the Income Tax Act are all short term estimates (except actuarial reserves) and they are capable of fairly accurate determination and verification.

The problem of making estimates of future reclamation costs is complicated by several factors.

1. The reclamation activities may not be carried out until many years into the future. Any attempt to use distant future costs to determine a deduction/reserve or to determine fund contributions will give figures that may be at considerable variance from what the actual costs will eventually be. Tax legislators and administrators may be very uncomfortable with the idea of allowing tax deductions for what may be more of a "guesstimate" than an estimate.

2. The future reclamation costs may not vary directly with land disturbed or tons of ore processed, etc. Other characteristics (physical, chemical and geological) may vary and/or become apparent at different stages of mine development and extraction. Some factors may be quite unpredictable, and some may not turn out to cause as much rehabilitation as earlier estimated.

3. Mining technology and reclamation technology may change significantly through time and result in substantial reclamation cost variances from earlier estimates.

4. Statutory reclamation requirements may change through time. More stringent requirements will increase the eventual cost of reclamation.

The estimation problem applies equally to both Options B and C. The deduction/reserve option gives a yearly notional amount that would be deducted in computing taxable income, regardless of the accounting methods used. A deduction for contributions to a fund should in turn be based on a requirement that the contributions to the fund be based on reasonable and verifiable estimates of future reclamation expenses to be paid for out of the fund and interest expected to be earned by the fund.

3.5 Conclusions

All of the options are workable. Each of the options has a major advantage, viz.

1. The extended loss carryback period would relate the tax deduction to the incurring, and the amount, of the expense and would provide cash shortly after the incurring of the reclamation expenses.

2. The deduction/reserve option would result in a good matching of revenues and expenses, as was the finding of the first two court hearings of the Burnco case. It would also conform with the accounting standards required by some practitioners.

3. The option to allow deduction for contributions to a cash fund as incurred would be consistent with the Income Tax Act treatment of most business expenses.

Each of the options has major disadvantages, viz.

1. The extended loss carryback option may not provide tax relief where taxes payable have been minimized by poor profits and/or accelerated write-offs of cost pools in the past. The amalgamation rules and the successor rules may prevent an extended loss carryback in some cases.

2. The deduction/reserve option could be quite costly to federal and provincial treasuries and it may be difficult to administer (verify) and to prevent abuses.

3. The contribution deduction option may have very limited application. There are no general provincial/municipal fund systems now in place, and only two provinces (B.C. and New Brunswick) contemplate such funds.

3.6 Provincial Views

Newfoundland

"The Discussion Paper in its present (March 1, 1989) format is a very good review of the problem . . . but is perhaps too focussed on the acid mine drainage problem. The problem also exists for non-metal mines, iron ore mines, processing plants and other industries not at all related to mining".

Nova Scotia

"Many provinces have problems with tailings that have been abandoned years ago . . . there should be incentives to clean them up. Fewer problems are associated with current producers as reclamation or rehabilitation programs are, or should be, integral parts of mining leases. Research on methods of dealing with tailings is certainly warranted and producers should be encouraged to find ways to leave the site in an environmentally sound condition".

Saskatchewan

"Concerning the advance income tax deductions for Government mandated reclamation work we are strongly opposed to the changes suggested. (a deduction/reserve system) . The fact that the government requires reclamation is irrelevant, the timing of the expenditures is the critical factor. Generally accepted accounting principles are just that and do not necessarily provide an acceptable mechanism for taxation purposes." (Words in brackets added) .

"The only argument in favor of the proposal is that conceptually there is a matching of funds (costs), however in reality we are dealing with an unknown cost which is estimated, often with very little knowledge of the eventual situation. For accounting purposes an adjustment is easily made at some later date with a footnote in the financial statements but for tax purposes it could be necessary to re-file back to the beginning, an horrendous thought." (Words in brackets added).

"our list of objections (includes):

- Revenue uncertainty - revenue flow is impeded because accuracy of estimates is unknown.
- Tax avoidance - estimates can be manipulated easily unless excessive cost in policing the estimates is incurred.
- Loss of monies - there is no guarantee that the money would be there at the end of the project - a time when there are no earnings to support the costs and assets presumably worn out. This could be overcome if a sinking fund were set up in trust for the reclamation costs and since this would be a real cost for the '- companies we would have no objection to a tax deduction for such payments.
- Moving target - environmental requirements are not static and therefore estimated costs will change from time to time leading to exacerbation of (the above points)." (Words in brackets added)

"Overall we think it is a poor idea which is fraught with difficulties".

British Columbia (from proposal - see Appendix A)

"The nature of mining is such that reclamation work is largely precluded until after the cessation of ore extraction . . . Currently there are mines . . . whose post-closure reclamation and mitigation costs are not

adequately provided for - so the full burden of those costs could default to the Province. This is of particular concern as mitigation costs can easily exceed a million dollars per year per mine . . . The establishment of adequate provisions for these costs, by the companies, is hindered by the fact that such provisions would not currently be a deductible expense - and would therefore come out of after-tax income. Similarly, after the mine closes, if the companies remain to do the reclamation and mitigation work, they often do not have any income against which to deduct those expenses. In summary, the current situation works against the satisfactory resolution of serious environmental problems".

"(There should be legislation) which will ensure that all environmental costs associated with a mining operation are completely 'internalized' (mining companies make payments to a reclamation fund) for as long as they occur . . . Since these costs are related to the operation of mine, they should be deductible from the operating income of the mine." (Words in brackets added).

Based on informal feedback from members of B.C. mining companies, we believe that a fund mechanism should be such that, upon ministerial approval, responsible operations can:

1) Post commercial letters of credit (CLC's) and deduct the associated expense, rather than make fund payments of the same amount,

   - this will reduce the cash requirements and not adversely affect the security.

2) Be subject to performance and fund review every three or five years, rather than yearly,

   this would reduce the associated bureaucracy.

Quebec

"We are not in favor of the recommended option to allow tax deductions to companies only for compulsory contributions to a reclamation fund established by a province. This approach would impose on the provinces the obligation to establish such funds without the Income Tax Act having been necessarily amended so as to allow such deductions to a fund, or a reserve provision in respect of mine reclamation work in the post production period. Companies would be reasonably expected to put up a very strong resistance if annual contributions to a fund were not deductible. Moreover, there are not many provinces presently approaching the implementation stage for reclamation funds such as proposed".

"There would be the risk therefore that many years would go by before we could really address the problem of reclamation at mines sites, and those mineral producers that are currently willing to take measure in order to assure that the environment is better protected, would be penalized".

"On the other hand, Minister Lucien Bouchard has indicated at the beginning of this year that protection of the environment is a federal government priority. It would therefore be an opportune time for federal authorities to address this concern in their tax policies and amend the Income Tax to allow mining companies to deduct all types of reserves for a future reclamation of mine sites, and not only compulsory contributions to possible provincial mine reclamation funds".

"Finally we are of the opinion that the deductibility of future expenses pertaining to the protection of the environment should be applicable to all initiatives concerning the protection of the environment, and not only the reclamation of mine sites. Furthermore, we should seriously examine the possibility of according accelerated depreciation allowances to environmental protection of pollution abatement assets".

New Brunswick

"We would like to see some form of reclamation fund established for each mineral property, and using the tax system allows both industry and government to contribute to the solution. . . The province has done some preliminary work on establishing a mine reclamation fund funded by the province. Initial review was aimed at solving the problem of abandoned mineral properties".

(See details of proposal in Appendix A).

The following comments were made by New Brunswick in response to the first draft of the Discussion Paper and issues raised at the March 1, 1989 meeting of the Tax Sub-committee in Ottawa:

> "New Brunswick supports the mine reclamation fund option".
>
> "New Brunswick would like to receive support under the federal Income Tax Act in allowing contributions to such a funds as a deduction against current income".
>
> "New Brunswick would recommend changes to the Metallic Minerals Tax Act to allow contributions to such funds as a deduction against current income".

"New Brunswick agrees with the point raised at our Ottawa meeting regarding placing an upper limit on the deductions allowed in any one tax share. We should not allow large deductions for passed **mistakes".**

"We do not agree with comments made by the federal Department of Finance that the resource allowance might be considered to have sufficient surplus (over provincial royalty payments) to cover the federal government's contribution to a mine reclamation fund".

"The fund concept permits each province to either participate or, like Nova Scotia and Newfoundland, follow their own reclamation plan".

Ontario

"Chapter II of the Green Paper, 'Ontario Mines and Minerals Policy and Legislation' . . . addresses the vital issue of the responsibility for reclamation. Two recommendations apply, in particular, to the subject matter . . . and I cite the specific wording.

'Where a new mine is to be developed, require the proponent to file with the Ministry of Northern Development and Mines an outline of the development and a closure plan with the estimated cost.' (p. 24)

'Once a **closure** plan has been accepted by the Government, require a financial assurance to be deposited (based on the cost estimate of the closure plan), to be held until reclamation is complete.'"

"Tax legislators are concerned with perceived revenue benefits foregone and have to balance that out with corporate operational (environmental) responsibility and project viability. The mining industry cannot make **too** strong a case for uniqueness of a high terminal rehabilitation cost. In fact, it could perhaps be argued that the industry has a better handle on these costs than other established industries (e.g. chemical) and developing industries (e.g. biotechnology). ,

Ontario mining legislation, as planned, would call for cost estimates which would be subject to review and revision annually. There is all reason to expect such a cost database to improve dramatically over a matter of years."

"Tax planners would like to have an 'up front' estimate of the fiscal impact, prior to moving on reform. How can these time frames be brought closer together? The committee should address that in its discussions."

3.7 Option C: Arguably, the Most Reasonable Solution

The preferred option would appear to be Option C, i.e. allowing a deduction for mandatory contributions to a mine reclamation fund. This approach most closely conforms with current income tax rules that generally allow a deduction only when an expense is incurred. It also would have the government co-finance an expense at the time that it is incurred by the taxpayer. It would also have a much smaller tax expenditure cost than the deduction/reserve option and therefore be acceptable to federal and provincial governments that are trying to reduce deficits. This option would probably require an amendment to the Income Tax Act since no specific provision allows contributions to a mine reclamation fund (to override paragraph 18(l)(e)) and because the Nomad case may not be a sufficient precedent to permit deductions.

The provinces have a range. of requirements for mine reclamation, from statutory to discretionary to general environmental protection rules. Only Ontario (for gravel pits) and Alberta (for coal mines) have a mandatory requirement to make contributions based on production to a mine reclamation fund. To make Option C workable on a general basis would require the provinces to establish mandatory funding requirements. Mining companies will surely resist such a prospect because they would have net current cash outlays after tax deductions. They may well prefer instead the status quo and negotiate with the provinces to use other forms of security, such as performance bonds or letters of credit.

The funding of retirement pension funds, and the income tax treatment thereof, may be considered as a possible conceptual model for mine reclamation funds. A rudimentary portrayal of important fiscal, legal, valuation and administration issues, applying aspects of the pension fund model, is summarized in Appendix C.

Before any tax change could be seriously contemplated? it would be essential for the provinces and territories to undertake to make detailed estimates of the tax expenditure implications of facilitating the advance funding of projected mine reclamation expenditures within their respective jurisdictions.

APPENDIX A

The British Columbia and New Brunswick

Reclamation Fund Proposals

British Columbia

Proposed Structure of Company-Specific Reclamation Funds

Problem:

The nature of mining is such that reclamation work is largely precluded until after the cessation of ore extraction.

Currently, there are a number of mines operating in B.C. (and in other parts of Canada) whose post-closure reclamation and mitigation costs are not adequately provided for - so the full burden of those costs could default to the Province (unless corporate responsibility and goodwill dictate otherwise). This is of particular concern since mitigation costs can easily exceed a million dollars per year per mine and last for hundreds of years. The establishment of adequate provisions for these costs, by the companies, is hindered by the fact that such provisions would not currently be a deductible expense and would therefore come out of after-tax income. Similarly, after the mine closes, if the companies remain to do the reclamation and mitigation work, they often do not have any income against which to deduct those expenses. In summary, the current situation works against the satisfactory resolution of serious environmental problems.

Objectives:

1) The Province of British Columbia (the "Province") seeks to develop legislation that will ensure that all environmental costs associated with a mining operation are completely "internalized" for as long as they occur.

2) Since these costs are related to the operation of a mine, they should be deductible from the operating income of the mine.

Features:

1) The Province sets the environmental standards.

2) Annually, the Province determines the financial costs associated with meeting those standards.

3) Annually, the Province reviews and approves the reclamation work to ensure that those standards are met.

4) The individual mining companies make payments to mine-specific Funds established to ensure that associated reclamation and mitigation costs are provided for. These payments are based on annual assessments and reviews done by the Province. These annual assessment and reviews will be incorporated into an annual report to the B.C. legislature.

5) The Crown controls the Funds and all earnings are retained within the Funds.

Principles and Structure of the Fund:

1) A problem arises from the need to ensure that mine operators provide for potential damages to public resources. An objective of the Fund concept is to ensure that associated costs are internalized by the operators. Payments to the Fund are required before the mining-related disturbances occur.

2) Environmental standards will be established by the Ministry of Energy, Mines and Petroleum Resources (EMPR) and the Ministry of Environment and of Province of British Columbia, and shall comply with those of the Waste Management Act, the Federal Fisheries Act, and the Mines Act .

3) Prior to the issuance of a permit to work, mitigation measures and reclamation plans that are consistent with 2) are developed by the operator and reviewed and approved by the Province. Prior to commencement of work, funds sufficient to provide for the required mitigation measures and reclamation plans associated with that work will be paid to a mine-specific fund (Fund).

For example, a mine with a two-year preproduction period, wherein most of the environmental impacts will occur in those two years will:

a) provide a report on the environmental impacts of the entire project prior to being issued a permit,

b) pay sufficient funds into the Fund to provide for all of the reclamation and mitigation costs that will be necessitated by Year no. 1 of the preproduction work prior to undertaking that work, and

c) make a similar payment prior to the issuance of Year no. 2's permit (say by September 30 of the preceding year) .

The above also applies for the re-opening of a mine that has been closed.

4) Both developing and operating mines require annual "Work Permits". Fund decreases and increases will be considered at the time of issuance. Changes in the Fund will be made on the basis of:

expected future reclamation and mitigation costs for the property, and

the expected ability of the Fund to meet those costs.

Annual Fund payments and issuance of associated permits to work are recommended so that payments will not be required too far in advance. This will reduce the possibility of "Downward Adjustments".

Responsibility for the establishment, administration, and control of the Funds will rest with the Province. Company input will be allowed into the investment policy that the Funds are subject to and which institution (e.g. trust company) implements that policy.

5) This proposal will apply to all mines currently operating in B.C. or that are developed in the future. The funds for each mine project will be identified separately within the Fund.

6) The following are fundamental to this proposal:

a) access to the residuals of the Funds will be a function of the amount of risk that is accepted,

b) since the operator always has the option to default on its obligations to mitigate and/or reclaim, and "walk away from the mine", all risks ultimately reside with the Crown. If this option is selected, the operator forfeits any claim on the Fund.

c) It is in the long run interests of both t-he Crown and the operator for the operator to remain in the Fund until completion of the mine's reclamation and mitigation work. Furthermore, by judicious mining practices and/or research to reduce reclamation and mitigation costs, the operator can affect the amount required at the time of closure, and the Fund should not discourage this. Accordingly, it is proposed that, at the time of mine closure, the operator be allowed to enter into an agreement with the Crown to perform the required work. Successful performance of the work will allow the operator to claim the difference between the amount that is required to be in the Fund (to cover

expected future costs) and the amount that is actually in the Fund. Under this option the risks that actual mitigation and reclamation costs will be different from expectations are assumed by the operator.

A concern is that "6)c)" may be perceived as containing the risk that the "bureaucrats will unnecessarily change the environmental standards so as to be more stringent and thereby eliminate the possibility that the operator will be rewarded for risk-taking behavior. This perception would hinder the mining industry's acceptance of the Fund. Provision will be made for the right of appeal to the Assistant Deputy Minister of EMPR to assuage these concerns.

Other risks that the operator would have to recognize and accept are treatment risk (the problem may be worse than expected or cost more to treat than originally forecast) and investment risk (the Fund's earnings may be less than expected).

7) Legislation for the Fund will ensure that it is not attachable by creditors (e.g. banks, etc.) or as a result of court proceedings (e.g. bankruptcy).

8) In the absence of advances in knowledge, improved understanding of the problem and/or technological innovations related to reclamation and mitigation? there are not expected to be any *downward* adjustments in the Fund during the operating life of the mine.

New Brunswick

Proposal for Dealing with Reclamation Costs for Current and Future Mineral Producers

1) Each jurisdiction would establish a number of reclamation trust funds depending upon the number of companies required to contribute to the system.

2) Each province would determine the cost **of** reclamation in current dollars using current technology of each property (estimate only). This current cost would be inflated to some future value depending upon the expected mine life. Based on this future cost, a yearly contribution would be computed for each property. For example, if it cost $1,000,000 in current costs to reclaim company X in New Brunswick this cost would have a future value of $2,650,000 (20 years, using an **annual** inflation rate of 5%). Using an interest rate agreed upon, company X would have to make sufficient yearly contributions to the fund to allow the fund to grow to $2.65 million by year 20.

3) The contributions to the reclamation trust fund would be deductible for income tax purposes. They would also be deductible for provincial mining tax purposes at a rate of 150 per cent of yearly contributions, or as needed by a contributor to reduce mining taxes payable.

4) The monitoring and policing of the funds would be the responsibility of each province.

5) Each company would still be responsible for reclamation but would use dollars from their reclamation trust fund.

6) No security bonds would be required from producing properties.

7) Periodic review of reclamation costs would be required as technology and costs change over time.

Former Mines and Other Abandoned Sites of Mineral Activity

It is New Brunswick's view that the responsibility for the reclamation of these properties will likely fall onto the taxpayers of each province in which the property is located.

There would appear to be little argument to favor imposing charges on current producers to pay for past mistakes of others, both government and industry.

New Brunswick has been successful in locating previous owners and in having the previous operators reclaim the properties.

APPENDIX B

SUMMARY OF CURRENT MINE RECLAMATION LAW IN CANADA [Source: J. Scarth, "Draft Report on Reclamation Law in Canada"]

JURISDICTION	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA
"One Window" Procedure	Yes, Ministry of Energy, Mines and Petroleum Resources	Yes, Energy Resources Conservation Board	No	Yes, Department of Environment and Workplace Safety
Environmental Impact Assessment	Yes	Yes, with application for mine permit	Yes	Yes
Public Hearings	Yes	Yes	Yes	Discretionary
Reclamation Plan	Before commencing preparatory work for production from a mine	Yes - before starting exploration and in application to develop a new mine	Yes	Yes
Security Guarantee	Yes, up to $2500/hectare	$5000 or $2500 plus 25¢ per ton of coal produced	No	Authorized, but not COllected for hardrock mines. Cash deposit required for pits and quarries
Progressive Reclamation	Yes	Yes	Yes, site-specific conditions of ministerial approval	Yes, must be updated every 3 years for pits and quarries - condition of development licence
Reporting, Monitoring and Inspection	Submit annual reports. Five-year projections must be submitted at 5-year intervals	Yes - regular inspections by Land Conservation and Reclamation Council (ICRC) inspectors	Inspectors issue reclamation approvals every 12 months.	Yes. frequent inspections by environmental officers
Procedure to Abandon		Applicant requests reclamation certificate from LCRC. LCRC inspects and issues certificate or orders further work.	Ministerial approval is required prior to the abandonment of a mine site	Approved by Deparment of Environment
Liability for Old Abandoned Minesites	Owner of Mineral claims is liable	Govt. assumes liability following issuance of e final reclination certificate		Crown assumes liability
Types of Mines Covered	Mandatory for Exploration, metal and coal mines and sand and gravel pits. Placer mines at discretion of Chief Inspector.	Coal, Oil sands, exploration. Simplified procedure for sand and gravel.	All mines except sand and gravel	All mines
Penalties for Violations	Cancellation of the reclamation permit			Cancellation of environment license
Applicable Legislation	Mines Act 1980 - Waste Management Act 1982	Land Surface Conservation and Reclamation Act - Coal Conservation Act - Public Lands Act	Environmental Assessment Act - Environmental Management and Protection Act - Mineral Industry Pollution Prevention Regulations	The Environment Act - The Mines Act - Quarrying Minerals Regulations

JURISDICTION	ONTARIO	QUEBEC	NEW BRUNSWICK	NOVA SCOTIA
"One Window" Procedure	No	Yes, Minister of the Environment		No
Environmental Impact Assessment	No	Yes	Discretionary by Minister of Municipal Affairs and Environment	
Public Hearings	No	May be requested by member of publ ic	Yes	
Reclamation Plan	Requi red wi thin a specific period prior to the end of production. Not needed for exploration work	Required for both open-pit and underground mines	Required to obtain a ■ ining lease on Crown land	Applicant for mining lease ■ ust describe reclamation method. Reclamation Plan to be submitted at a specific interval prior to abandonment
Security Guarantee	Pits and quarries - 8 ¢/tonne of material removed up to maximum $3000/hectare disturbed	No, ● xcept pits and quarries which requi re security deposit in proportion to ● rea disturbed.	Yes, prior to starting ■ ining.	At discretion of the Minister
Progressive Reel-tie@	Pits and quarries may draw from security fund but not reduce it below $1000/hectare		Yes	
Reporting, Monitoring and Inspection	Pits and quarries licences are reviewed annually	Regular reports usually a condition of the authorization certificate. Companies general 1 y required to submit periodic analysis of effluents	Surface plans updated every three months - must be submitted annual 1 y	
Procedure to Abandon		Operator most apply to Minister of Energy and Resources (who consults with Minister of the Environment) to obtain an authorization	Lessee must notify the Minister of Natural Resources and Energy 90 days in advance of the closure and provide updated copies of the surface plans	
Liability for Old Abandoned Minesites				
Types ● f Mines Covered	Sand and gravel pits and quarries ,	All except sand and grovel which must have reclination plan and security deposit proportionate to area disturbed	All	
Penalties for Violations	Punishable by a fine			
Applicable Legislation	Mining Act - Ontario Water Resources Act - Pits and Quarries Control Act	Environmental Quality Act - Mining Act - Special Regulations for James Bay and P.Q. north of 55°N	Mining Act	Mineral Resources Act - Environmental Protection Act

JURISDICTION	NEWFOUNDLAND(1)	PRINCE EDWARD ISLAND	YUKON TERRITORY	NORTHWEST TERRITORY
"One Window" Procedure	Yes		no	No
Environmental Impact AssessRot	Severely required	At discretion of Minister	No	Yes
Public Hearings	Yes		Yes. In application for a water licence	Discretionary
Reclamation Plan	Yes	Minister of Environment has power to order remedialaction or reclamation	Discretionary condition of water licence or surface lease	May be a condition of surface lease
Security Guarantee	Yes - at discretion of Minister		Discretionary condition of surface lease. Required for exploration	Yes, discretionary condition of surface lease
Progressive Reclamation	Where possible		Discretionary condition of surface lease or water licence	Discretionary condition of surface lease
Reporting, Monitoring and Inspection	Yes		Periodic reporting and inspection for ● xplomtion	Periodic reporting and Inspections for exploration
Procedure to Abandon	Yes, may require Environmental Impact Statement			
Liability for Old Abandoned Minesites	Rests with leaseholder or landowner			
Types of Mines Covered	All Dines snd quarries		Hardrock ■ ines by conditions of surface lease - Placer ● ines by conditions of water licence	All
Penalties for Violations	Cancellation of licence, permit, bond or a fine	Punishable offense	Cancellation of licence or fine <$5000/day	Cancellation of licence or fine of <$5000/day
Applicable Legislation	Environmental Assessment Act -Waste Material (Disposal) Act -Department of Environment Act -Quarry Materials Act	Planning Act - Excavation Pits Regulations - Environmental Protect{on Act	Yukon Placer Mining Act - Yukon Quartz Mining Act - Territorial Lands Act - Northern Inland Waters Act	Territorial Lands Act - Northern Inland Maters Act

(1)Information directly from Department of Mines

JURISDICTION	ATOMIC ENERGY CONTROL BOARD
"One Window" Procedure	No
Environmental Impact Assessment	No
Public Hearings	No
Reclamation Plan	Yes - conceptual at time of application for mine licence - detailed at least one year before scheduled end of operations
Security Guarantee	No
Progressive Reclamation	
Reporting, Monitoring and Inspection	Annual reports, reports of incidents, Inspections
Procedure to Abandon	Apply to AECB for approval to abandon
Liability for Old Abandoned Minesites	
Types of Mines Covered	All uranium and thorium mines
Penalties for Violations	$10,000 fine or 5 years in jail
Applicable Legislation	Atomic Energy Control Act - Atomic Energy Control Regulations - Uranium and Thorium Mining Regulations

Appendix C

Rudimentary Conceptual Model For Mine Reclamation Funding:

Private Retirement Pension Funds

	Some General Elements	Private Retirement pension Fund	Possible Mine Reclamation Fund Parallels
1.	Legally binding obligation to fund a future liability	Pursuant to a pension plan (contractually-mandated)	Pursuant to a Mine Reclamation plan (government-mandated)
2.	Current funding requirements and related eligible deductions based on professionally certified estimates of future liability	Pursuant to independent actuarial calculations	Pursuant to independent engineering calculations
3.	Legal status required for allowing tax deductions	Duly registered pursuant to Revenue Canada specifications	Duly registered pursuant to Revenue Canada specifications
4.	Administrative rules	Information circulars	Information circulars
5.	Fund adminisration and disposition of proceeds thereof	Third party trust	Third party trust

REPORT ON THE ECONOMIC AND POLICY ASPECTS OF ACID DISCHARGE

BY THE FEDERAL/PROVINCIAL/INDUSTRY SUB-COMMITTEE ON MINE WASTE

INTERGOVERNMENTAL WORKING GROUP ON
THE MINERAL INDUSTRY

August 29,1988

EXECUTIVE SUMMARY

The Canadian mining industry produces in excess of 500 million tonnes of solid waste each year. Rock dumps and tailings ponds are the most visible environmental impact of this waste. For the most part, however, this visual pollution can be effectively managed through the recontouring and revegetation of waste sites during ongoing operations and upon abandonment. The technology for this is available at a cost that the mining industry can meet.

Solid wastes from the mining and processing of sulphide ores however, pose a particularly difficult problem. Upon weathering these wastes produce sulphuric acid which in turn can hasten the release of heavy metals and other toxic elements into solution. Unless this weathering is prevented or the water treated, the resulting acid mine drainage can pose a threat to human health and the environment. Current technology does not provide reliable, cost effective passive treatment measures to prevent acid mine drainage. While the alternative of water treatment plants is efficient and effective during the operating life of a mine, acid generation can persist for many hundreds and even thousands of years. Research and development of long term, walk-away solutions to acid mine drainage must be recognized as a priority.

Sound environmental regulation and early mine reclination planning can play a significant role in minimizing the costs of dealing with mine waste. Appropriate fiscal incentives which recognize the costs of mine reclamation complement regulation and are important in maintaining the industry's competitiveness. Measures to finance the costs of reclaiming Canada's legacy of abandoned mines are also required.

This report, prepared by the Lntergovernmental Working Group on the Mineral Industry Sub-Committee on Mine Waste, contains eleven recommendations which, taken together, constitute a comprehensive strategy for dealing with mine waste problems.

Research

There is an urgent need for both levels of government and industry to agree on a cooperative approach to the funding and implementation of a comprehensive research program on effective technologies to control acid mine drainage.

Reclamation Law

A single window approach for mine approvals represents an

Reclamation planning should be an early requirement in the mine approvals process and plans should be subject to review in light of changing information, technology, economics and other factors.

The Department of Fisheries and Oceans and industry should jointly review the **Metal** Mining Liquid Effluent Regulations and Guidelines, to establish a standardized methodology for determining the location of the sample site that best demonstrates the absorptive capacity of the environment

Greater discretion is required in methods of meeting standards in order to achieve an appropriate balance between economic and environmental objectives.

Decommissioning monitoring should be part of the reclamation plan. It should be the responsibility of the company to ensure that all environmental conditions relevant to the site are met.

Satisfactory performance guarantees should be required for all mine approvals to ensure reclamation. The form of these guarantees should be as flexible as possible.

In the view of the Sub-Committee, the arrangements for performance guarantees and tax relief for reclamation expenditures should be kept separate.

Abandoned Mines

There is an urgent need for measures to deal with the reclamation of abandoned mine sites. Government's first recourse is to the operator once responsible for the site. Where liability cannot be established, consideration should be given to the establishment of reclamation funds, financed either by government, industry or both.

Tax Treatment

The unique nature of reclamation costs incurred at the end of mine life, and the special difficulties they create from a tax standpoint should be recognized with a specific amendment to the Income Tax Act such as extended loss carry-back or a reclamation tax account during operations as described.

Conclusion

Ministers are urged to act promptly on the recommendations of this report.

PREFACE

At the 1987 Conference of Federal and Provincial Ministers of Mines, the Mining Association of Canada (MAC), drew attention to the serious environmental problems associated with mine waste and minesite abandonment and called on Ministers to undertake a full study of the policy and economic implications. Accordingly, Ministers directed the Intergovernmental Working Group on the Mineral Industry (IGWG) to prepare a report on the issue for consideration at the 1988 Mines Ministers' Conference.

The ten provinces, two territories and the federal departments of Energy, Mines and Resources (EMR) and Indian Affairs and Northern Development (DIAND) were invited to nominate a representative to the IGWG sub-committee established to prepare the report. Alberta and Prince Edward Island, which do not have a history of metal mining, declined to participate but expressed interest in being kept informed of the sub-committee's work. The mining industry was represented by a MAC staff member and officials from individual mining companies.

The sub-committee drew upon a wide range of domestic and foreign experience in drafting its report. Of particular help was "Reclamation Law in Canada", an unpublished 1986 report by Jonathan Scarth of the Canadian Institute of Resources Law.

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DIMENSIONS OF THE PROBLEM

Most Canadian base metal, precious metal and uranium mines contain mineralization, either in the ore or the surrounding waste rock, which is a combination of elemental metal and sulphur. These sulphide minerals (lead, copper, nickel, zinc, iron, silver) are unstable when exposed to oxygen and water, and begin to decompose almost immediately. The initial reactions yield sulphuric acid which in turn promotes the leaching of heavy metals. As the reactions proceed, temperature and acidity increase, resulting in an increased rate of reaction. Between pH levels of 2 and 4 (very acidic), bacteria catalyze the reactions, and rates can be as much as 1000 times faster than the original chemical reaction rate. If the seepage is left uncollected and untreated, rainfall and snowmelt will flush the toxic solutions into the downstream environment. Untreated acidic effluent can contaminate groundwater and local watercourses, damaging the health of plants, wildlife, and fish and contaminating drinking water supplies.

Besides the wastes produced by mining operations (waste rock and tailings), the walls of underground mines and open pits also have exposed sulphide mineral surfaces which react and produce contaminated water. The combined flows from all of these sources must be captured and treated to prevent environmental damage.

At active sites, mining companies operate comprehensive systems to collect and treat effluent from all sources. With few exceptions, these facilities are sufficient to prevent downstream environmental impact. But acid generation may persist for hundreds and even thousands of years following mine closure. The operation of treatment plants in perpetuity is prohibitively expensive, yet currently available passive treatment technologies are unproven as a long-term solution.

No comprehensive survey of acid generating waste sites has been completed in Canada, *nor* has there been an assessment of the long term economic and environmental effects. British Columbia, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Yukon and Northwest Territories all have existing and abandoned acid generating mine sites. A recent Ontario survey identified 100 abandoned *mine* sites, of which about 20 pose an AMD problem. In Quebec, about 67 abandoned mine sites exist, 21 of which have been classified as hazardous waste sites because of A,MD.

Recently, CANMET and industry have co-sponsored two projects to define the extent of acid-generating mine waste in Canada. A minimum of 15000 hectares (37 000 acres) of acid generating mine waste and tailings were identified (Tables 1 & 2, Figure 1), mostly at operating mines. These wastes are largely the accumulation of forty years of non-ferrous base metal mining since World War II. As for the future, it seems reasonable to assume that the mining of lower grade ores together with the likelihood of increasing annual mineral production could lead to the accumulation of an equal quantity of acidic tailings over the next twenty years.

The cost of stabilizing these wastes will vary greatly from site to site, depending upon the conditions encountered. Under the most difficult conditions and applying existing technology, the costs of stabilizing some sites have been estimated to be as high as $410000 per hectare. Applying an average cost of $125000 per hectare to the existing and future accumulation of acid generating waste, the costs of reclamation at non-ferrous metal minesites is $3 billion over the next twenty years. In addition, funds will be required to deal with abandoned sites where the mineral rights have reverted to the public domain and liability cannot be established.

To put this cost in perspective, if the value of production of non-ferrous base metals continues at the 1987 rate of about $6.3 billion annually, the cost of reclamation spread evenly over twenty years ($150 million annually) would be equivalent to about 2.4% of the industry's gross revenue. The burden of these reclamation costs on the mining industry would be significant. The 2.4% of gross revenue dedicated to reclamation represents about 10% of normal operating profits at the mine level. The impact is comparable to the imposition of a provincial mining tax in the range of 18 to 20% of mine operating profits. However, the reclamation costs would be payable whether or not the mine is profitable.

TABLE 1
SOME MAJOR SULPHIDE TAILINGS DEPOSITS

Mine Name/Location	Mine Status	Sulphide Tailings Disposal
New Brunswick		
Brunswick Mining	In operation since 1964, expects to operate at least to 2005	607 ha tailings disposal area, dams are constructed of tailings, some revegetation trials. massive sulphide tailings, highly acid generating
Heath Steele Mines	In operation 1955-1958 and 1962 to 1983, closed, future uncertain	202 ha tailings disposal area, borrow material dam, some revegetation trials, massive sulphide tailings
Quebec		
Campbell Resources Ltd. Cedar Bay & Henderson Mines	In operation since 1955	138 ha tailings disposal area, revegetation is being attempted
East Malarctic Mines	In operation from 1938 to 1979	170 ha tailings disposal area has been revegetated
Falconbridge Copper	In operation since 1964	77 ha tailings disposal area containing *massive* sulphides, revegetation test plots have been established
Falconbridge Copper	In operation since 1954	153 ha tailings disposal area formed by draining of lake
Noranda Murdochville	In operation since 1952	316 ha tailings disposal area
Lamaque Mines	In operation from 1935 to 1985	280 ha tailings disposal area, revegetation test plots
Matagami	In operation since 1963	200 ha tailings disposal area in drained lake, large scale revegetation tests, massive sulphide tailings
Sigma Mines	In operation since 1957	126 ha tailings disposal area. some areas have been revegetated
Ontario		
Mattabi Mines Sturgeon Lake	In operation since 1972	160 ha tailings disposal area
Geco Division, Noranda	In operation since 1957	130 ha tailings disposal area
Kidd *Creek* Mines	In operation since 1966	1200 ha tailings disposal area, use cone discharge disposal method
Sudbury District Mines of Into	In operation since 1930s	2400 ha tailings disposal area. extensive areas of revegetation
Sudbury Area operation of Falconbridge Ltd.	In operation since 1930s	70 ha tailings disposal areas, extensive areas of revegetation
Manitoba		
Fox Mine - Sherritt Gordon	In operation 1970 to 1983	Tailings will be flooded to stabilize
Lynn Lake - Sherritt Gordon	In operation 1953 to 1976	12S ha tailings disposal area containing massive sulphides
Ruttan Mine –Sherritt Gordon	In operation since 1973	Tailings discharged into Ruttan Lake
Thompson Mine - Into	In operation since 1960	1800 ha tailings disposal area containing massive sulphides
Stall Lake – HBMS	In operation since 1964	Tailings discharged into Anderson Lake (365 ha)
Anderson Lake Mine- HBMS	In operation since 1970	Tailings discharged into Anderson Lake (365 ha)
Flin Flon Mine- HBMS	In operation since 1970	230 ha tailings disposal area
British Columbia		
Sam Goosly	In operation since 1979	230 ha tailings disposal area, revegetation test plots have been established
Westmin Resources	In operation since 1975	Tailings discharged into Buttle Lake, tailings contain massive pyrite
Gibraltar Mines	In operation since 1972	S33 ha tailings disposal area, small area has been reclaimed
Sullivan Mine – Cominco	In operation since 1910	370 ha tailings disposal area, very extensive revegetation research
Yukon, NWT		
Anvil Mine	In operation since 1969	23 ha tailings disposal area containing massive sulphides

KNOWN REACTIVE WASTE RO

Province/Property	Metals Mined	UG OR OP	Cur Act
British Columbia			
Gibraltar	Cu	OP	Y
Equity Silver	Cu, Ag, Au	OP	Y
Westmin,	Cu, Zn	OP & UG	Y
Noranda Bell	Cu	OP	Y
Sullivan	Zn, Pb	UG	Y
Brittania	Cu	UG & GH	N
Anyox	Cu	UG	N
Mount Washington	Cu	OP	N
Tulsequah	Cu, Pb, Zn, Au	UG	N
Alberta			
No base metal mines.			
Saskatchewan			
No base metal mines			
Manitoba			
Flin Flon	Cu, Zn	OP & UG	Y
Ruttan	Cu, Zn	OP & UG	Y
Dickson	Cu, Zn	UG	N
Pipe	Ni	OP & UG	Y
Thompson	Ni	OP	Y
Maskwa	Ni, Cu	OP	N
Dun Barton	Ni, Cu	UG	N
Manibridge	Ni, Cu	UG	N
Don-Jon	Cu, Zn	UG	N

Ontario			
Kidd Creek	Ni, Cu	OP & UG	Ye
Frood Stobie	Ni, Cu	OP & UG	Ye
Murray-Clarabelle	Ni, Cu	UG	Ye
Creighton	Ni, Cu	OP & UG	Ye
Garson	Ni, Cu	UG	Ye
Levack	Ni, Cu	UG	Ye
Strathcona Creek	Ni, Cu	UG	Ye
Fraser	Ni, Cu	UG	Ye
Fecunis	Ni, Cu	UG	Ye
Onaping-Craig	Ni, Cu	UG	Ye
Sherman	Fe	OP	Ye
Mattabi	Cu, Zn, Pb, Ag	OP & UG	Ye
Lyon Lake	Cu, Zn, Pb, Ag	UG	Ye
F. Group	Cu, Zn, Ag	OP	N
Geco	Cu, Zn, Ag	OP & UG	Ye
Kam Kotia	Cu, Zn	OP & UG	N
Other	Varies	Varies	N
Quebec			
Gaspé	Cu	OP & UG	Ye
Weedon	Cu, Zn	OP	N
Solbec Cupra	Cu, Zn	UG	N
Doyon	Au	OP	Ye
East Sullivan	Zn, Pb, Cu, Ag	OP	N
Manitou-Barvue	Zn, Pb, Cu, Au, Ag	OP & UG	Ye (mill
Poirier	Cu, Zn	UG	N

TAI

KNOWN REACTIVE WASTE RO

Province/Property	Metals Mined	UG OR OP	Curr Act
Quebec (cent'd)			
Lac Watson	Cu, Zn, Ag	UG	Y
Normetal	Cu, Zn, Ag, Au	UG	N
New Brunswick			
Brunswick No. 6	Pb, Zn, Cu	OP	N
Heath Steele	Pb, Zn, Cu	OP & UG	N
Caribou, NB	Pb, Zn, Cu	OP & UG	N
Key Anacon	Pb, Zn	UG	N
Wedge	Cu	OP	N
Northumberland	Pb, Zn, Au, Ag	OP	Prop
Nova Scotia			
No base metal mines with AWR. .!			
Prince Edward Island			
No base metal mines			
Newfoundland and Labrador			
Rambler	Cu	UG	N
Buchans	Cu, Pb, Zn.	UG & GH	N
Whales Back	Cu	UG	N
Gullbridge	Cu	UG	N
Yukon			
Curragh Resources	Pb, Zn	OP	Y
United Keno Hill	Ag, Pb, Zn	UG	Y

Northwest Territories					
Nanisivik	P⊐, Zn	UG	Yes	Not known	Acid development rock on si e.

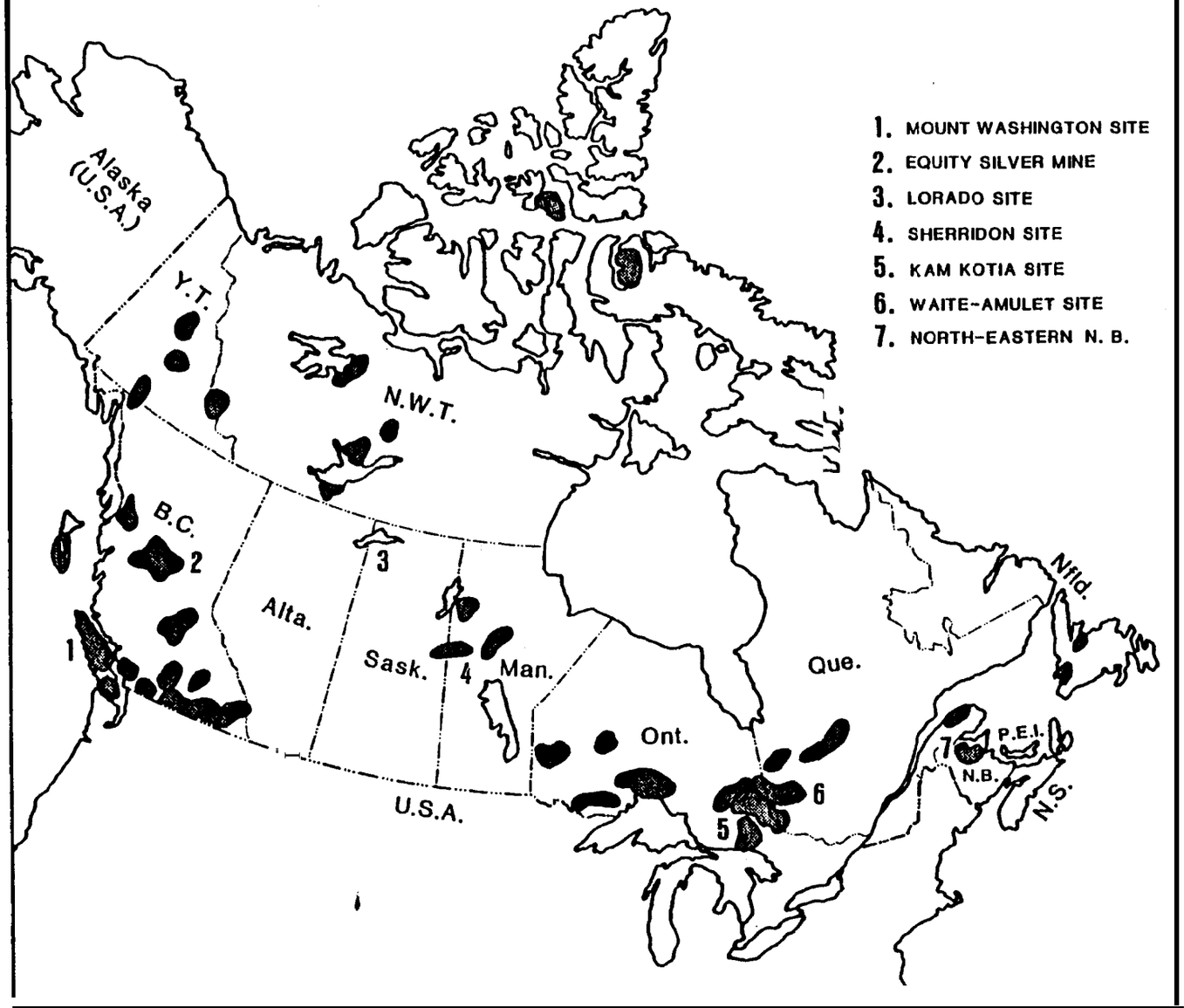
AWR: Acid Waste Rock
WR: Waste Rock
OP: Open Pit Mine
UG: Underground Mine
GH: Glory Hole

*Acid drainage treatment maintained.

[a]Total volume approx. 30 x 10^6 tonnes but not included in inventory total due to not being a base metal property.

[b]Total volume of WR is 200 × 10^6 tonnes but only 5% is acid producing.

FIGURE 1: BASE/PRECIOUS METAL MINING OCA ONS



SOME EXISTING ACID SITES

In British Columbia, waste dumps at the abandoned Mount Washington site cover only 3 hectares, yet release copper which is responsible for eliminating salmon runs in the Tsolum River some 10 kilometers away. Estimates for reclaiming this site vary from $800000 to $2.5 million, with no guarantee of success.

Equity Silver Mines Ltd. is operating a silver-gold mine in northern British Columbia. The company is collecting and treating acid effluent at a cost of $1.5 million annually. If this effluent were uncontrolled, it is estimated that all fish in the Bulkly River could be destroyed with a loss of fisheries benefits of $4.3 million per year. Treatment may be required for another century.

In Saskatchewan, the Lorado site was a uranium custom mill that operated from 1957 to 1960. Approximately 360000 tonnes of tailings were discharged at pH 2 directly into Nero Lake. Nero Lake now has a pH of 2.3 and impacts on the water quality of Beaverlodge Lake which is immediately adjacent to it. The site has an exposed dry tailings surface area of approximately 10 hectares, which has considerable acid generating potential.

In Manitoba, an abandoned sulphide tailings site near Sherridon has been the source of acid drainage since the mine closed in 1951. One lake adjacent to the mine site has been acidified. Downstream, detrimental effects have been noted in a large sports fishing lake. A community on this lake has had to relocate its source of drinking water 1.5 kilometers to an upstream site. Following research studies begun in 1985 under the Canada/Manitoba Mineral Development Agreement, corrective measures have been initiated.

In Ontario, the Kam Kotia site is a major source of acid discharge now controlled by the Crown. Bids are currently being evaluated by the Ontario Ministry of Natural Resources for the reclamation of the site. The cost is estimated at between $12 and $20 million. Although reclamation will focus primarily on the large area of confined and unconfined tailings, a volume of approximately 200000 tonnes of acid waste rock will also have to be dealt with.

In Quebec, in the mid to late 1970s, Noranda Inc. revegetated a 40 hectare tailings site known as Waite-Amulet in an effort to eliminate AMD. The revegetation program, which cost about $1.7 million (in 1988 dollars), was successful in producing dense lush vegetation on the tailings surface but no improvement in seepage quality has been observed. A modern lime treatment plant was constructed at a cost of about $2.2 million. Annual operating costs for the facility are about $500000 and the tailings could generate acid for another 500 years.

In New Brunswick, four rivers have been impacted by acid mine drainage. Each of these rivers are spawning grounds for Atlantic salmon. If the mine sites were abandoned, acid mine drainage would result for several hundred years, eliminating the salmon fishery associated with the rivers. This would mean a financial loss of $500000 annually in the province from the recreational fishery alone.

STATE OF TECHNOLOGY

Presently, AMD is treated in lime treatment facilities, which neutralize the seepage and precipitate heavy metals. However, the treatment sludges from these operations retain water and may occupy up to 40 times more space than the treated waste. The long term stability of the sludges has been questioned and some provinces have classified them as hazardous waste materials.

No proven technologies exist that will abate AMD and allow mine operators and government agencies to walk away from mine sites secure in the knowledge that the environment will be protected. The key to preventing AMD appears to be the prevention of oxygen from coming into contact with sulphide bearing waste material. Research into the fundamental mechanisms of AMD formation is required to confirm our current understanding of the problem.

Prediction technology is in its infancy. Not all sulphide bearing material produces AMD because nature has struck a balance between the amount of sulphide and alkaline minerals in the waste. Some 40 techniques to predict AMD formation have been developed, but none have been shown to be accurate in all cases. Thus, work is required to further develop an understanding of AMD formation mechanisms such that accurate predictions can be made. This information will, in turn, be incorporated into computer models so that various abatement techniques can be assessed and correlated with field results.

Technologies which require investigation include water cover, organic covers, wetlands, impermeable soil covers and cementitious covers. The choice and cost of these technologies depend upon site specific characteristics such as climate, geology, topography and proximity to population centres.

In response to the need to develop appropriate technologies for AMD prevention and control in Canada, the Mine Environment Neutral Drainage (MEN?). program (formerly Reactive Acid Tailings Stabilization (RATS) program) was initiated in 1986 with participation from industry and federal and provincial governments:

Research objectives were defined as follows:

> To provide a comprehensive scientific, technical and economical basis for the mining industry and governmental agencies to predict, with confidence, the long-term management requirements for reactive tailings and waste rock;
>
> To establish techniques that will enable the operation and abandonment of acid-generating tailings and waste rock disposal areas in a predictable, affordable, timely and environmentally acceptable manner.

In order to meet these objectives, a comprehensive plan of some 40 projects grouped under 5 major topics has been developed. A budget of $12.5 million dollars, spread over 5 years, is required to fund the MEND research plan.

It is proposed that research be conducted through contracts issued to universities, consultants, government laboratories and mining companies. Centres of excellence may be established, and one has been proposed at the University of British Columbia for AMD prediction techniques. New insight into the processes of sulphide mineral reactions, biotechnology and the prevention of AMD will be gained from the work, which will ultimately provide long term environmental protection while" enhancing the profitability and competitiveness of the mining industry. .,

MEND is an example of industry and government working together to solve a common problem. MEND is also an example of the need for environment-economy integration in decision making. .

> There is a need for both levels of government and industry to agree on a cooperative approach to the funding and implementation of a comprehensive research program on effective technologies to manage acid mine drainage.

THE LEGISLATIVE REGIME

The regulation of land use in Canada is primarily the responsibility of the provincial governments and as such, the bulk of mine reclamation law has been developed at the provincial level. A number of different approaches to mine reclamation have been adopted in response to different circumstances, including the economic importance of the mining industry to the provincial economy, the diversity of mining operations and the environmental factors which affect them and the level of public interest and concern. Some provinces have developed legislation and regulations to deal specifically with mine reclamation. For the most part, however, mine reclamation is addressed in general environmental legislation.

Elements of both specific and general environmental approaches are evident in New Brunswick and British Columbia. Both provinces refer specifically to mine reclamation in their legislation for mine regulation, making it an integral requirement for obtaining mining approvals. However, the legislation is of a generic nature allowing a degree of flexibility for site specific problems.

New Brunswick was the first Atlantic province to amend its Mining Act to establish reclamation requirements. The three major aspects of the N.B. Mining Act are:

1) an operator requires approval of a reclamation plan before a mining lease can be obtained.
2) concurrent reclamation is usually a condition of the approved reclamation plan.
3) the operator must carry out a reclamation and protection program once an operation is abandoned.

The B.C. Mines Act legislates reclamation for all mining developments. A reclamation plan must be submitted to the Minister prior to the commencement of operations and is a requirement for obtaining a surface work permit.

Measures adopted to mitigate adverse environmental impacts include requirements for the preparation and review of environmental impact assessments for new mines, licensing the release of contaminants from operating mines and the application of bonding or close-out requirements to ensure satisfactory reclamation and safe abandonment. This more general approach is followed by most of the provinces.

It is the view of the Sub-committee that no one approach is more effective than the other. Each province has developed a system that generally satisfies the needs of the industry in that province.

Federal government legislation and regulation bearing on the environmental effects of mining, stem principally from its responsibility for the fishery. The federal Fisheries Act prohibits the discharge of substances to fish habitat which are deleterious to fish or man's use of fish. The federal Metal Mining Liquid Effluent Regulations and Guidelines developed under the Fisheries Act prescribe *limits* for

pH, metals and suspended solids from mine effluents. The Fisheries Act also prevents the harmful alteration, disruption or destruction of fish habitat.

Other federal legislation and regulations relating to transboundary waters, arctic waters and uranium mining also bear on mine environment problems. The federal government maintains provincial type responsibilities for mining and the environment in the Yukon and the Northwest Territories.

COMPONENTS OF AN IDEAL RECLAMATION LAW

Approaches to reclamation regulation were first formulated in the late 1960s, as interest in environmental management developed. Since that time, the level of knowledge and the concerns of the public, industry and the provincial governments have evolved. Refinement of reclamation legislation and regulation has paralleled these changes and attempts have been made to correct the inadequacies and oversights of some of the original legislation. Some Canadian and foreign jurisdictions have developed very advanced regimes to keep pace with the level of knowledge and ecological awareness.

The following is an attempt to consolidate the more effective elements of Canadian and foreign systems in order to formulate the components of an ideal approach to reclamation legislation and regulation.

Single-Window Approach

New mines must meet a myriad of engineering, environmental, fisheries and health and safety requirements administered by several different departments in all levels of government. Currently, several provinces are attempting to organize and simplify the regulatory process by introducing the concept of a "single-window" administrative arrangement. This will provide for a much needed cooperative approach between departments.

British Columbia has developed the Mine Development Review Process, which provides a single window approach with the purpose of project review. All mining companies wishing to operate in British Columbia are required to enter this process. A steering committee composed of provincial and federal representatives is the primary contact between the proponent and the review agencies. The process ends with a Cabinet Approval in Principle.

In most provinces, overlap occurs between various provincial departments and, in some cases, between federal and provincial departments. In many cases this is unavoidable and may even be desirable. However gaps and conflicts with regard to what is actually required from the proponent must be avoided.

To provide industry with a better understanding of the approvals process, some provinces have published a guide to environmental and mining legislation.

The final report of the "Inquiry on Federal Water Policy" (the Pearse Commission) concluded that the overlap and interdependence of responsibilities suggests the need for greater delegation of administrative responsibilities to eliminate conflict, enhance consistency and improve efficiency. The report also concluded that intergovernmental coordination was inadequate to cope with the complicated interdependence of federal and provincial responsibilities in water matters. Jurisdictional difficulties between the Federal Department of Fisheries and Oceans and provincial departments concerned with water quality are a case in point. The

impediments to information exchange, and the resulting duplicated effort and inefficiency are undoubtable considerable.

In keeping with the recommendations of the "Report of the National Task Force on Environment and the Economy", improved departmental communications and an appreciation of the varied issues involved is a way of achieving economic/environmental integration.

> A single window approach for mine approvals represents an appropriate administrative objective for regulators and operators alike. Legislative frameworks for reclamation law should consider this objective in their administrative design.

Reclamation Planning Early in the Approvals Process

Early consideration of the measures proposed to reclaim the minesite and the costs of those measures are important features of the most effective reclamation regimes. Most provinces require that a reclamation plan be prepared before actual mining begins, but this is often after the issuance of approvals and the commitment of substantial development investment. The least satisfactory arrangements are those which require reclamation plans only a few months prior to abandonment.

New Brunswick and B.C. require a reclamation plan at the feasibility report stage. In this way, reclamation planning becomes an integral part of mine planning and the costs are factored into the assessment of the project's financial viability.

In Saskatchewan, the concept of decommissioning is implemented at the design stage and carried through the entire life of the mine operation.

Similarly, the Federal Republic of Germany and Sweden require an approved reclamation plan before site development is allowed to proceed. In Sweden, reclamation plans are subject to review every ten years, at which time they may be altered in the light of new information or technology, changed economics or other factors.

While it is essential that reclamation plans be addressed early in the planning phase, enough flexibility must be allowed to modify the conceptual plan as environmental and technological factors change. Periodic review of the plan ensures that it is updated as necessary. Continued review provides industry with the opportunity to seek new technology that would generate greater environmental and economic benefits.

As will be discussed later, the existence of an approved reclamation plan also facilitates the calculation of performance bond requirements and the tax treatment of a company's liability for future reclamation expenditures.

Reclamation planning should be an early requirement in the mine approvals process and plans should be subject to review in light of changing information, technology, economics and other factors.

The Use of Standards and Site Specific Negotiations

There is considerable debate over the degree to which reclamation requirements ought to be detailed in legislation and regulation or allow flexibility for site specific conditions. The issue is not so much the standards per se but the over-specification of the methods to arrive at the standards.

Detailed legislation and regulation has the advantage of certainty, predictability and simplicity from an administrative point of view. The system also tends to be more transparent and hence less subject to criticisms of special treatment. The alternative of negotiating site specific requirements has the benefit that both the government and the mine proponent must justify their position in negotiation. It avoids the *economic costs* of imposing excessive standards or inappropriate technologies when not required by the characteristics of the site.

The Federal Fisheries Act has been criticized for the inflexible requirements it imposes on mine effluent and its failure to take account of the value of mineral resource exploitation. Officials of provincial and territorial governments have expressed concern over the adverse impacts that strict enforcement of Section 31, which demands absolute protection for fish habitat, and Sections 33 and 34 which prohibit the discharge into waters of any substance harmful to fish, has had on efforts to expand the economic base through resource development projects.

To address the difficulties posed by the wording of Section 31, the Department of Fisheries and Oceans in 1986 adopted a Fish Habitat Policy which appears to provide some room to negotiate alternatives to the way that fish maybe protected on a case by case basis. Although this is a positive development, experience with the administration of the policy is limited. It is impossible to conclude, at this time, that the concerns of industry have been resolved.

The restrictions posed by Sections 33 and **34** were addressed by developing the Metal Mining Liquid Effluent Regulations and Guidelines (MMLER), which permit discharge of limited quantities of metals into a receiving water body. While these limits are obtainable during the operational phase, problems develop upon decommissioning. No existing technology, nor any currently being developed, will adequately treat runoff once the mine's water treatment plant has shut down.

While the MMLER are acceptable as a working standard, Section 6 (l)(d) specifies that samples of undiluted effluent be taken at the final discharge point. However, samples taken downstream provide a better indication of the receiving capacity of the environment and should be considered as the more viable test site.

The Department of Fisheries and Oceans and industry should jointly review the Metal Mining Liquid Effluent Regulations and Guidelines, to establish a standardized methodology for determining the location of the sample site that best demonstrates the absorptive capacity of the environment.

The absolute prohibition in the Fisheries Act of discharging a significant level of suspended solids into a natural water body, eliminates the possibility of adopting promising underwater disposal technologies. There is a steadily accumulating volume of field evidence that disposal of reactive mine wastes under water reduces oxidation to virtually zero levels, thereby reducing acid generation.

The final report of the "Inquiry on Federal Water Policy" noted that, as it is presently administered, the Act ignores all other legitimate uses and users of water except to prohibit them from disturbing fish and is therefore an obstacle to modern, integrated resource development. The assumption of the preeminence of fish also forces Fisheries officials into confrontation with other government agencies, resource developers and other levels of government. The "Inquiry" recommended that the Fisheries Act be amended to enable fishery requirements to be considered within the framework of integrated resource management.

Greater discretion is required in methods of meeting standards in order to achieve an appropriate balance between economic and environmental objectives.

Monitoring Decommissioned Mine Sites

Ongoing monitoring and review of operating mines is practiced by most provincial mining departments. Problems arise, however, upon decommissioning, when monitoring is no longer conducted and treatment facilities are closed.

Saskatchewan has developed a procedure for monitoring the decommissioning of sites to reduce the likelihood that problems will develop once the operator has left the area. When a company decides that a mine will close, the reclamation plan is modified to serve as the final decommissioning plan for the complete mine\mill facility. Once the final plan has been approved by the regulatory agencies, the operator implements the activities necessary to reclaim the site. Following satisfactory completion of this work, the site is allowed to stabilize during a transition monitoring phase which usually lasts for a minimum of five years. During this time, the operator continues to be responsible for the monitoring and inspection of the site and correction of any problems that may develop. After the transition monitoring has been completed, the company prepares a final post-decommissioning environmental report outlining the performance of the reclaimed

site. In the event that the site has recovered as predicted, the Minister of Environment and Public Safety authorizes the final abandonment of the property by the operator.

> Decommissioning monitoring should be part of the reclamation plan. It should be the responsibility of the company to ensure that all environmental conditions relevant to the site are met.

Performance Guarantees

While reclamation legislation and regulations impose certain obligations on mining companies, they do not guarantee compliance. Operators may be reluctant to spend large amounts of money for what is to them a depleted asset. In some cases, companies may be unable to fulfill their reclamation obligations due to bankruptcy. In order to avoid these situations, governments will commonly require a performance guarantee of some kind. A performance guarantee ensures that money will be available to the government to complete reclamation work in the event the operator fails to meet his obligations.

Performance guarantees can also go a long way towards satisfying public concerns about environmental controls at an early stage in project approval. Environment agencies also tend to be more co-operative when funding for reclamation is secured.

British Columbia, Ontario, Nova Scotia and New Brunswick have statutory authority to require performance guarantees as a precondition to the issuance of mine approvals. In most cases the imposition of a security deposit is discretionary, depending upon the track record or financial stability of the operator.

An acceptable performance guarantee may take any one of a number of forms; an up front cash payment, certified cheque, irrevocable letter of credit or performance bond. The key feature of an acceptable security is that payment is guaranteed. As long as this requirement is met, the actual choice of instrument is often left to the operator. The amount of performance guarantees may be adjusted as mining proceeds in the light of changes to the reclamation plan, the development of new technology etc.

In those provinces which require a performance guarantee, the amount of security required is commonly set at a flat or maximum rate irrespective of the potential liabilities for reclamation. This rate varies from jurisdiction to jurisdiction ranging from $1500 to $3000 per hectare. In no cases have performance guarantees approached the costs, estimated at $125000 per hectare, of reclaiming an acid generating minesite. The inadequacy of existing security deposits could be remedied by requiring an approved reclamation plan before the commencement of mine operations and using the plan as the basis for calculating an appropriate security deposit. The very high costs associated with reclaiming acid generating sites

suggests than the imposition of performance guarantees on larger operators maybe "- appropriate as a matter of course.

> Satisfactory performance guarantees should be required for all mine approvals to ensure reclamation. The form of these guarantees should be as flexible as possible.

ABANDONED MINES

While the Sub-committee believes that adopting a sound regulatory approach to new and operating mines will do much to avoid future reclamation problems, there remains a legacy of abandoned mines that pose serious safety or environmental risks. As an example, Nova Scotia recently conducted a survey identifying over 5,000 abandoned shafts, adits, ventilation raises and other surface openings that pose a potential hazard to public safety. Uncapped shafts, unstable crown pillars, and weakened tailings dams are among the most serious hazards. Many of these sites are also acid generating.

Most of these sites were abandoned prior to the introduction of modern environmental legislation. Other more recent sites, abandoned in accordance with the prevailing standards at the time, fail to meet the higher standards of more recent legislation and regulation. Responsibility for clean-up of such sites is a legal grey area. In cases where the company once responsible for the site can be traced, provincial authorities have often been successful in persuading it to undertake remedial work. In some cases, however, dissolution or bankruptcy renders the pursuit of the operator an impossibility. The question of who pays for reclaiming these sites - the taxpayer or the mining industry -is a contentious issue.

The Government of Saskatchewan has established the "Environmental Protection Division" of the Heritage Fund to pay for the cleanup of unforeseen problems which may arise at abandoned uranium mine/mill sites. The money for this fund is derived from provincial revenues.

The U.K. has a legacy of abandoned mines mostly dating from Victorian times. Since these sites pre-date the introduction of planning consents, responsibility for clean up remains with the government. A system of Derelict Land Grants has been established to assist private industry and local government in reclaiming abandoned industrial sites including minesites. However, available funds severely limit the pace at which abandoned sites can be reclaimed.

Some jurisdictions have shifted the cost of reclaiming abandoned sites back to industry through the establishment of a reclamation fund financed by special levies. Understandably, industry feels that it is inequitable to impose a special levy on companies which bear no responsibility for an abandoned site. The impact of an additional levy on the competitiveness of its export dependent metal mining operations is also an important consideration.

In Sweden, demands that proponents of new mining projects assume the costs of reclaiming old mine sites in the vicinity have resulted in mine development proposals being abandoned. The Swedish Parliament is also considering the establishment of a mandatory insurance scheme, to cover environmental disasters when liability cannot be assigned. A framework is currently being negotiated between private insurance companies and the Swedish government.

In the United States, the Hazardous Substance Response Trust Fund ("Superfund") was established under the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA). Funds are appropriated to the Superfund under provisions of the Internal Revenue Code, from amounts recovered from producers of materials designated hazardous under CERCLA, and penalties and punitive damages awarded under CERCLA. Federal authorities are empowered and required to investigate sources of environmental impact, implement remedial actions, compensate those who have suffered significant damage and recover the costs of these actions from those responsible for causing the environmental damage. Damage resulting from AMD currently totals billions of dollars.

Sub-committee members view the problem of abandoned mines as a matter for both government and industry. Cooperation is needed, particularly in the areas of funding and research. Industry has pointed out that continued changes in legislated standards create problems where companies which performed to the standards set at the time of operation are in violation of the new, more rigorous standards. While actual measures taken by each province to solve this problem will vary, it should include adequate consultation with industry.

> There is an urgent need for measures to deal with the reclamation of abandoned **minesites.** Government's first. recourse is to the operator once responsible for the site. Where liability cannot be established, consideration should be given to the establishment of reclamation finds, financed either by **government,** industry or both.

TAX TREATMENT OF RECLAMATION EXPENDITURES

The income tax system represents a complex and sometimes unintentional set of incentives and disincentives to almost all aspects of economic activity. The tax treatment of reclamation expenditures is no exception.

Although the Income Tax Act is ambiguous on the point, in practice tax administrators have accepted that reclamation expenditures, which are required by law, are deductible from income in the year in which they are incurred. Accordingly, the tax system provides an appropriate incentive for reclamation work undertaken during the operating life of a mine. However, by its nature, much of the reclamation work must await final closure of a rninesite. Since the mine at this point generates little or no income, the operator maybe unable to fully utilize these expenditures for site reclamation as deductions. Nor do the loss/carry over provisions of the Income Tax Act provide an adequate mechanism for cost recovery, since profits typically decline prior to closure and non-capital losses may only be carried back to the previous three years. Unless the operator has substantial earnings from other operations, the full burden of post production environmental measures must be borne by the corporation and its shareholders.

There are at least two potential solutions to this problem:

- firstly, the carry-back period for reclamation expenditures could be increased from three years to five, seven or even ten years.
- secondly, tax deductions for reclamation at closure could be provided for during the course of extraction (the accounting solution).

A possible disadvantage is that other industries might insist upon similar tax treatment. This could apply especially to the carry-back extension option. Prima facie, this does not seem likely as other industries do not have the same need for it as the mineral industry which is characterized by finite mine life. It should be possible to restrict application of any proposal accordingly.

Increasing the carry-back period could largely overcome the current problem of insufficient time for 1oss carry-back. It carries with it the administrative advantage of relative simplicity and tax assessments based on known reclamation costs rather than projected reclamation costs.

It is, however, not clear how long a carry-back period would be optimal, bearing in mind that a prolonged period of tax loss may be the reason for closure. It is also unclear whether carry-back extension would result in unforeseen tax administrative problems.

The accounting solution to this problem begins with the recognition that the extraction of minerals generates not only revenues and present costs, but also liability for future reclamation expenditures. Since the "matching principle" of accrual accounting demands that revenues be matched with all of their associated

expenses, it is logical to deduct reclamation costs, not necessarily when they are "- spent, but rather during the year in which the mineral is extracted and the liability to reclaim is actually incurred. Commercial accounting practices such as this, however, are not always acceptable for use in tax accounting. While the general principle of matching revenues and expenditures has been recognized and approved by the courts, the current recognition of future reclamation costs has not been so clearly accepted.

It is a general principle of income tax law that only amounts that can be exactly determined can be included or deducted in computing taxable income. Subsection 18(l)(e) of the Income Tax Act reinforces this principle, as it prohibits deductions of provisions for contingent or uncertain liabilities or losses. The general dislike of uncertainty in income tax law poses the greatest problem for operators seeking to deduct future costs for reclamation. While the concept of deducting future costs has been accepted, the courts would likely be unwilling to allow particular deductions unless they are presented with reliable assessments of the future liabilities. Thus reclamation costs would only be accepted as deductions when the operator could demonstrate a definite liability to expend a certain amount of money in the future. The difficulties inherent in this process of proof have led to suggestions for statutory reform as the preferable solution, and, in this vein, it is instructive to examine recent changes in the United States tax structure.

Prior to the Tax Reform Act of 1984, the treatment of reclamation costs under United States tax law was similar to the current situation in Canada. Several judicial authorities had given qualified acceptance to the application of the matching principle to reclamation costs, and the consequent deduction of these costs at the time of mineral production rather than in the year of actual reclamation.

The Tax Reform Act of 1984 replaced this judicial approach with specific statutory procedures dealing with reclamation costs. The system operates in the following manner. Operators who elect to take advantage of advance deductions must set up a separate reserve account for the reclamation costs associated with each individual mineral property. Tax deductible contributions to the account equal the cost of restoring the land" disturbed during that taxation year. For example, if in 1988 an American mining company had strip mined a thousand acres of land, it would be entitled to claim, as a 1988 deduction, the estimated costs of reclaiming that thousand acres just as if the reclamation work had actually been done during 1988.

Each year's allowable deduction is placed into the mine's reclination account, along with a figure representing interest (at a specified rate) that would be earned on the opening balance in the account for that tax year. Amounts actually spent on reclamation during a given tax year are subtracted from the account on the last day of that tax year.

In addition to this deduction, the taxpayer is entitled to deduct the amount by which its actual reclamation expenditures exceed the year-end balance in the reclamation account (this calculation is made before the actual reclamation expenditures for the year are subtracted from the account). The amendments also provide for subsequent adjustments of overestimates of reclamation costs.

The U.S. system just described and a similar system in place in the Federal Republic of Germany suggest that this may be a workable solution to the problem of deductibility of reclamation costs following mine closure. Deductibility of post operating reclamation expenditures should also be extended in a similar fashion to provincial royalties. Since most provincial regimes utilize federal corporate income tax rules in calculating income and deductions, this should be easily accomplished in tandem with changes to the federal tax system.

> The unique nature of reclamation costs incurred at the end of mine life, and the special difficulties they create from a tax standpoint, should be recognized with a specific amendment to the Income Tax Act such as extended loss carry-back or a reclamation tax account during operations as described.

The adoption of tax measures to permit operators to make contributions to a reserve account for reclamation would not eliminate the continued need, noted earlier, for some form of performance guarantee. In general, the time at which a mine is most likely to fail is in the initial 2-3 years of operation. At this point the costs of reclaiming lands disturbed would far exceed any funds which could be set aside in a reserve account. Even at the more mature stages of a mine's life, the added complexity and rigidity in the administration of the reserve account would outweigh the benefits of integrating a performance guarantee feature.

> In the view of the sub-committee, the arrangements for performance guarantees and tax relief for reclamation expenditures should be kept separate.

CONCLUSION

It is the opinion of the Sub-committee that acid discharge from mining operations constitutes a serious environmental problem. Development of an effective and economic passive treatment technology to prevent acid discharge is urgently required, so that existing and future minesites can be safely decommissioned. Besides acid discharge, unreclaimed abandoned sites also pose a threat to public safety. While the cost of rehabilitating abandoned sites is significant, the task should be faced now as costs will escalate the longer the impacts are allowed to continue.

Ministers are urged to act" promptly on the recommendations of this report.

APPENDIX A

Terms of Reference for IGWG Sub-committee on Mine Waste

Charge to Committee

To examine the economic and policy implications to both industry and government of acid-generating mine waste.

Problem Definition

Much of the Canadian production of base metals, gold and uranium comes from ores with a high sulphide content. Mining and ore processing result in sulphide wastes which, upon weathering, produce acid drainage. This in turn can leach heavy metals from the waste. Coal mine wastes can yield similar conditions. Uncontrolled acid drainage can cause contamination of groundwater, surface water and local watercourses. This may result in darnage to the health of plants, wildlife and fish, and perhaps of people.

Current technology is limited in enabling mining companies to walk away from sulphide tailings, waste rock dumps and mine drainage upon closure of operations. The long-term drainage of acid and heavy metals requires the incorporation of ongoing treatment to meet regulatory criteria.

In cases where mineral rights have reverted to the Crown, provincial governments are responsible for the control of acid discharge. North of 60°, the federal government is responsible for abandoned sites. Governments have an interest equal to that of industry in finding effective and affordable technology to enable abandonment of sulphide wastes.

The problem of acid mine drainage (AMD) has been recognized and defined in a number of studies initiated by CANMET. In the Pit Slope Stability Study, Chapter 10 was devoted to 'Environmental Planning' and Supplement 10-1 Volume I was entitled "Mine Waste Description and Case Histories". A study jointly funded by industry (INCO Limited, Noranda Inc. and Cominco Ltd.) entitled 'Sulphide Tailings Management Study' carried out by Monenco Ltd. in 1984 identified some 9000 hectares of sulphide tailings and outlined an approach to addressing the AMD problem. A 1987 study by Nolan, Davis and Associates provided a similar analysis of AMD producing waste rock. The National Uranium Tailings Program concluded that AMD was perhaps the most serious environmental concern in the disposal of uranium tailings.

In 1986, a cooperative research program was initiated by industry and federal and provincial governments to address the AMD problem. The Reactive Acid Tailings Stabilization (RATS) group was formed with representatives from eight of the major mining companies, the federal government and five provinces. A comprehensive program of research has now been defined. However, sufficient funding to accomplish this program has not been allocated.

Action Required

The Sub-committee needs to put the problem in an economic and policy perspective in order to make recommendations to Mines Ministers. To this end, the sub-committee is directed to conduct the studies required to produce a report by August 1988. The report will address the following topics:

1. Dimensions of the Problem
   - the probable number of sites to be dealt with
   - the range of possible costs of containment
   - local impacts, eg. on drinking water, agriculture, recreation, etc.

   Information on both active and abandoned sites of tailings and waste rock is available in a number of studies. Although these data may not be complete, they may be sufficient for purposes of this analysis.

2. Current Regulatory Practice

   Federal legislation and regulation
   - north of 60°
   - Fisheries Act
   - Canadian Environmental Protection Act
   - other

   Provincial Legislation and Regulations
   - by Province

   Legislation and Regulation in other countries
   - United States
   - Europe

State of Technology
   - status report
   - objectives

Considerations

In formulating recommendations for approaching the problem, the Sub-committee will address the questions of;

the manner in which the requirements for containing acid discharge will affect the competitive position of the industry;

simplicity of application of the proposal

economic efficiency, eg. high initial cost versus long term upkeep.

Options

The Sub-committee should:

examine the relative merits of a site specific regime over a generic regime;

review and comment on the merits of existing or proposed regulatory instruments such as:
- taxes
- performance bonds
- perpetual maintenance
- insurance

consider the impact of delays in perfecting improved technologies

Recommendations

APPENDIX B

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APPENDIX C

Provincial and Territorial Legislation

BRITISH COLUMBIA

Introduction

Following the development of several open pit metal mines in the early 1960s, and an open pit coal mine in 1968 the Government of British Columbia enacted mine reclamation legislation. In 1973, the scope of reclamation legislation was expanded to include exploration, placer mines, sand and gravel pits and quarries. Although it has evolved through a series of amendments, the intent of reclamation legislation has remained relatively constant for almost twenty years.

Mining Legislation

Provincial legislation pertaining to reclamation is vested under Sections 7,8,9,10,11 and 30 of the Mines Act. It is administered by the Engineering and Inspection Branch of the Ministry of Energy, Mines and Petroleum Resources.

The legislation provides for:

1) A reclamation plan submitted to the Minister of Energy, Mines and Petroleum Resources prior to the commencement of operations.

2) Publication of a Notice of Filing in the B.C. Gazette and a local newspaper to allow for public input.

3) Review of the report by the Reclamation Advisory Committee composed of several other resource agencies and chaired by the Chief Inspector of Mines.

4) An initial bond not exceeding $2,500 per hectare of land to be disturbed during the course of mining.

5) Issuance of a Reclamation Permit with such special terms and conditions as the Minister sees fit to prescribe.

6) Progressive reclamation over the life of the mine and the annual submission of a report on reclamation operations.

7) Closure of the mine. In case of non-compliance with any sections of the Actor Reclamation Permit, the bond is forfeit.

Reclamation Guidelines

Formal reclamation guidelines were issued in March, 1984 outlining the criteria for reclamation as set by the Minister, pursuant to Sections 7, 8 and 9 of the Mines Act. "Areas disturbed by mining shall be left in a neat and tidy condition and reclaimed so that the land and watercourses are left in a manner which ensures an acceptable productive land use consistent with the safety and health of the public." Prior to this, the less formalized approach involving government/company consultations on a case by case basis, had led to very uneven industry performance,

Abandoned Sites

There is no legal mechanism compelling the reclamation of sites abandoned prior to the enactment of reclamation legislation other than by special funding by the province.

The B.C. Ministry of Energy, Mines and Petroleum Resources reclaimed a small acid generating tailings pond at the Duthie mine in 1987, and has committed at least $525,000 to treat acid waste rock dumps at Mount Washington during 1988.

Review Process

All new mine proposals in British Columbia must enter the Mine Development Review Process. This process gives proponents a one-window project review, embracing all levels of government. The objectives of this process are:

- To organize expeditious project reviews, based on effective coordination and custom-tailored government requests for project details and impact assessments.

- To ensure the consistent application of government policies and regulations to project reviews and approvals.

- To provide affected government agencies at all levels with information adequate to assess the significance and acceptability of project proposals from their perspective on a "need to know" basis.

- To gauge public reaction to project proposals.

- To assess the impacts of mine developments on resources not protected by strong legislation, and to develop protection and mitigation strategies where impacts are projected to occur.

- To guide proponents towards the information required in support of the various permits and licences needed to construct and operate amine.

- To ensure that all components of environmental impact assessments and the mitigation programs proposed in those assessments are integrated with mine design and construction, and operating and abandonment practices.

Conclusion

Current legislation, although generally effective, does not fully take into account the magnitude, expense and long-term liability of acid drainage.

The Minister through the Mines Act may impose a security deposit sufficient to cover the cost of controlling acid mine drainage, but full bonding at the start of mining is considered too onerous and has not been requested. The Ministry, in consultation with industry, is now investigating methods of ensuring that funds are available at mine closure for the long- term control and treatment of acid mine drainage.

Where acid drainage potential exists, projects now subject to the Mine Development Review Process are required to formulate an adequate management program prior to any mining approvals, with the emphasis clearly placed on prevention. Cure has proven to be very expensive.

MANITOBA

Introduction

Legislation pertaining to the environmental impacts of mines focuses on air and water pollution control. The reclamation of acid mine waste disposal areas is regulated specifically by the 1) Environment Act and 2) Mines Act.

Environmental Legislation

Manitoba's new Environment Act was enacted on April 1,1988. Its purpose is to consolidate the much-amended Clean Environment Act and streamline the environmental assessment process. Changes were made to the licencing prodedure for mines and the responsibility for development proposal approval became one shared by the Department of Energy and Mines, and the Department of Environment and Workplace Safety and Health. Despite these administrative changes, the Manitoba reclamation process continues to operate on a site/case specific basis. A policy guidelines and permit approvals system is used to design and enforce reclamation requirements.

Prior to the enactment of the Environment Act, these mine reclamation requirements were administered through the Clean Environment Commission under the authority of the Clean Environment Act (1972). The Clean Environment Act (S.M., 1972 c.76) applied to both private and *Crown* land. The Commission required the submission of a preliminary rehabilitation plan prior to mine approval. A detailed rehabilitation plan was then required twelve months prior to the termination of the mining operation. The Mines Branch and the Environment Department held joint reviews of these submissions.

The new Environment Act requires the company to provide a description of all studies and activities relating to feasibility, potential environmental impacts, the proposed environmental management practices and a description of final rehabilitation plans for the site. Penalties under this Act are established at no more than $100000 for a first offence and not more than $200000 for each subsequent offence.

With the passage of the new Act, The Clean Environment Commission was relegated to an advisory and hearing role, providing advice and recommendations to the Minister. It consists of a maximum of ten members of varied backgrounds, who are appointed by the Lieutenant Governor in Council. The Commission deals with hearings pertaining to specific matters requiring regulation.

Mining Legislation

There is provision under the Mines Act for the development of a regulation setting standards for reclamation. Although discussions were held with industry on the general scope and content of such regulation, it is yet to be developed. For day to day matters, the Mines Branch works jointly with the Environment Department to review the plan submissions.

Conclusion

Only one mine has closed since enactment of the Clean Environment Act. The Fox Mine, owned by Sherritt Gordon Mines Ltd., constructed a liming plant for the perpetual treatment of effluent from the tailings basin. Should the company cease to operate within one hundred and fifty km of Lynn Lake, the Department of Environment and Workplace Safety and Health will assume responsibility for the continuation of liming treatment financed by the conversion of a Letter of Credit into cash. While this agreement is precedent setting, it remains the lowest cost solution for the operator. The Manitoba government is not committed to this course of action in the case of future mine closures.

NEW BRUNSWICK

Introduction

In New Brunswick, acid mine drainage is being produced from tailings and waste rock at the Brunswick No. 6 and No. 12, Heath Steele Mine, and the Caribou Mine. Acid discharge is being managed by the addition of lime. Watercourses have been affected by the acid discharge, and, as a result of this and other considerations, including future land use and public safety, the reclamation of mine lands in New Brunswick has become a major issue.

Environmental Legislation

The Clean Environment Act is administered by the Department of Municipal Affairs and Environment. The regulations under this Act which relate to mine reclamation include the Water Quality Regulation, the Watercourse Alteration Regulation and the Environmental Impact Assessment Regulation.

Under the Environmental Impact Assessment (EIA) Regulation, all projects involving the commercial extraction of a mineral must be registered and screened. The screening determines whether a project has potential for significant environmental impact and whether the project will be subject to the formal EIA process which includes preparation of a detailed report and public meetings.

The Water Quality Regulation manages sources of water contaminants, including mining operations with discharges directly or indirectly related to mining. Before the commencement of operations, the proponent must apply for and obtain an approval under the Water Quality Regulation. The Minister may require a public hearing(s) and a rehabilitation bond as conditions for obtaining an approval.

If the proposal is approved, a Certificate to Construct is issued and, upon demonstration of acceptable conditions during start up, is followed by a Certificate of Approval to Operate. These certificates specify water quality standards for discharge, as well as monitoring and reporting standards. Requirements for rehabilitation, including bonding, may be specified to ensure that acceptable water quality will be maintained after a mine has shut down. The approvals are issued for a period of not more than five years and are then reviewed and may be renewed by the Minister.

Under the Watercourse Alteration Regulation, a watercourse alteration may not be carried out unless the Minister has authorized the work. A security to ensure the completion of the alteration and the restoration of the watercourse may be required as a condition of approval for a watercourse alteration.

Mining Legislation

New Brunswick was the first Atlantic province to include reclamation requirements in an amended Mining Act. Under the Act, the submission of a feasibility study is a condition for obtaining a mining lease. A mine reclamation plan for the proposed operation must be included.

Under the Act, it specifies that ". ..a mining lease shall not be granted until the Minister, having obtained the approval of the Minister of Municipal Affairs and Environment and the Minister of Agriculture, insofar as the program may affect their responsibilities, has approved the applicant's program for protection, reclamation and rehabilitation of the environment as set forth in the feasibility study report..."

The underlying intent of all reclamation plans is that, if technology permits, the plan is to be walkaway by nature. The plan should be implemented on an ongoing basis, if operations allow. A reclamation plan must include information on the pre-mining condition of the area, a mining plan indicating the area to be disturbed and the plan for rehabilitation during and after mining operations.

The Mining Act addresses the rights of the landowner (both private and Crown) from the aspect of prospecting and staking of claims. Where private land is involved, a prospector must make personal contact with the owner and reach a compensatory agreement for any property damage to be done . If no agreement is reached the prospector may post bond and proceed, and the landowner or prospector may approach the Mining Commissioner for settlement of any dispute.

Similar procedures and responsibilities are required of the prospector by the Province of New Brunswick for any damage to be done to Crown land. The prospector is required to submit and receive approval of a reclamation plan for the property in question. The Minister must approve the plan and may also ask for damage security before work can commence.

The specific security for claim staking is $1000 plus $30 per claim on private property, and $1 500 per hectare to be disturbed on Crown lands. This area is determined from the approved reclamation plan.

Reclamation security for a Mine Lease amounts to $1500 per hectare of Crown land to be disturbed, and $3000 per hectare of private land. In addition, damage security "is considered separately in the amount of $10000 per Mine Lease.

In the event of a dispute arising over some aspect of the Mining Actor Regulation, "...the Mining Commissioner has the exclusive jurisdiction to hear and determine all questions, disagreements, matters or claims arising out of the Mining Act and Regulations.

Conclusion

New Brunswick has attempted, in its mining legislation, to come to terms with the concerns of mine reclamation and acid mine drainage in a fair and just manner for all those concerned. In its efforts to achieve this, it has recognised such limiting factors as economy and state of the art. Only a concerted effort by industry and government through responsible research and development will effectively eliminate these major obstacles. -

NEWFOUNDLAND

Introduction

Reclamation projects are not considered a priority in Newfoundland, due to the moderate to low acid contamination potential of mine sites. These sites have insignificant waste volumes or are located in areas not conclusive to acid generation. Six non-operating mines have recorded acidic tailings and other acid generating wastes. However, the sites are not considered to be significant problems. The focus has been on effluent discharge control. The Department of Environment is in the process of developing mine reclamation regulations.

Environmental Legislation

The Environmental Assessment Act requires that most proposed mining activities be registered with the Department of Environment. The proponent is required to file a proposal with the Department of Environment, outlining the nature and intent of the operation. A decision is then made as to whether an Environmental Impact Statement is required. In most cases, an EIS is a requirement. An Environmental Assessment Committee, which includes representatives from interested provincial and federal departments, reviews the proposal and decides what issues will be dealt with in the EIS. The proponent then meets with the Department of Environment to set the final agenda for the EIS. Once the final EIS report is approved by the Environmental Assessment Committee and the Minister of Environment and Lands, the proponent may proceed with development. The Minister of Environment and Lands may require environmental monitoring and rehabilitation studies of the site.

Mining Legislation

The Newfoundland Mineral Act does not contain specific provisions for mine reclamation. It does, however, provide the Minister with the power to require lease holders to fulfill the criteria of federal and provincial statuates and regulations pertaining to environmental management. As well, it empowers the Minister to cancel the mining lease for failure to fulfill the conditions and terms of that lease. Reclamation requirements may be appended to the mining lease.

Conclusion

Few pieces of provincial legislation regulate mine sites that were in operation prior to the enactment of the Environmental Assessment Act and the Environmental

Control Regulations (which deal primarily with acceptable effluent levels.) Newfoundland has relied mostly on general clauses which give the Ministers discretionary power. Administrative problems do exist with the lack of reclamation regulations and guidelines. There are-approximately six unreclaimed mine sites not covered by the existing legislation. However the provincial Department of Environment and the Department of Mines is attempting to remedy the situation.

NORTHWEST TERRITORIES AND YUKON

Introduction

The federal government retains jurisdiction over land use in the Northwest and the Yukon Territories including mine regulation. Neither the federal nor the Territorial governments have enacted legislation dealing with acid mine waste. A variety of federal environmental statutes, which are generally water/fish related, are used to deal with mine reclamation. Awareness of acid mine waste discharge as a potentially serious problem in northern Canada is increasing.

Northern Inland Waters Act

The Northern Inland Waters Act (NIWA) is the basic vehicle for licencing of all types of mining operations in the Yukon and Northwest Territories. (NIWA is presently under revision.) Water use and waste disposal (including acidic mine waste) are controlled by Territorial Water Boards established under the provisions of NIWA. Mining operations must apply to the Boards to obtain water licences. Applications usually must include baseline environmental information as well as operational, pollution control, waste management, contingency, abandonment and reclamation plans covering the area to be affected by the proposed mining operation. The water licences, issued by the Territorial Water Boards with the approval of the Minister of DIAND, are monitored and enforced by DIAND. Fines of up to $5000 per day are specified for offences and licensees maybe required to post security of up to $100000 or 10% of the project's capital cost.

Territorial Lands Act

The Territorial Lands Act is the principle Act used to regulate surface land uses on Crown Lands in the north and is administered by DIAND. In the NWT all mining operations are covered under the provisions of the Act and its annexed Canada Mining Regulations.

Territorial Land Use Regulations regulate through issuance of permits, certain short term activities on lands within the Yukon and the Northwest Territories such as explosives, heavy vehicles, drilling equipment, campsites and earth moving equipment.

The Territorial Lands Regulations are a longer term version of the Territorial Land Use Regulations, in that they provide for the granting of an interest in the use of the surface of territorial lands. Terms and conditions may be attached to these leases as the Minister of DIAND deems necessary. This provides a means of

imposing reclamation conditions for mine abandonment and tailings management over the life of a surface lease.

Yukon Quartz Mining Act

In the Yukon, the Yukon Quartz Mining Act specifically exempts mining operations from the provisions of the Territorial Lands Act. In the Yukon therefore, the environmental aspects of the mining operation are controlled through NIWA.

The Act and its regulations are administered by DIAND and all land use applications must be submitted for approval prior to the issuance of a Land Use Permit. These Land Use Permits can place conditions on fuel storage, and the use, storage and handling or disposal of chemicals or toxic substances including acidic mine waste. A maximum $100000 bond can be required and it may be used to rehabilitate any lands disturbed by the permitted use.

Fisheries Act

The Fisheries Act is designed to control activities potentially impacting on fish and fish habitat throughout Canada. This Act, administered by the Department of Fisheries and Oceans, prohibits the deposition of deleterious substances in rivers and streams where fish live and deals with spawning grounds, fishing licences, pollution of fisheries and methods used to kill fish. Included under the Fisheries Act are the Metal Mining Liquid Effluent Guidelines, which cover all mines in existence in 1977 and the Metal Mining Liquid Effluent Regulations which apply to all new, expanded or reopened mines. (Gold mines are exempt in both cases.)

The Guidelines and Regulations provide national baseline standards for the protection of fish and other aquatic life. This legislation is administered by DIAND. Inspection is carried out by DIAND, often in conjunction with Environment Canada and Fisheries and Oceans.

Arctic Waters Pollution Prevention Act

The primary intent of the Arctic Waters Pollution Prevention Act (AWPPA), is to control pollution by ships. It may also apply to land based activity that may pollute Arctic salt-water. Polaris and Nanisivik are the only operating mines in northern Canada that may be subject to the provisions of AWPPA. While both of these mines have been licenced under NIWA, AWPPA could be applied to future mines.

Review Process

The possible environmental impacts of all proposed mining development projects (including the effects of acidic mine waste) must be assessed under the EnvironmentalAssessment Review Process. DIAND isthe lead agency in the north. All proposed developments in the north that are on crown lands, are federally funded, orhave federal proponents must be submitted to DIAND under the EAR process. The severity of the potential environmental impact determines the level of assessment that aproposed development mustundergo. The EAR process can result in recommendations as to whether the development can proceed or whether the development plan should be modified. Recommendations under the EAR assessment are implemented by the appropriate Minister, ie. conditions concerning the Fisheries Act are implemented by the Department of Fisheries and Oceans.

Conclusion

To date there is little information concerning specific local impacts of acidic mine waste discharge from northern mines, however it is clear that there is potential for acidic mine waste discharge at many of the northern mine sites. Although the mine sites are relatively few, commonly in remote locations and potentially affecting relatively small numbers of the population, the nature of the traditional life style and activities of that population make the potential concerns significant.

NOVA SCOTIA

Introduction

Nova Scotia has a variety of environmental legislation directed toward air and water pollution control. Involvement in mine reclamation is increasing.

Most of the acid drainage has been from the tailings and waste dumps of abandoned base metal and coal mines. Acid drainage from large construction sites is a problem in certain areas. Most mine tailings contain sufficient calcite to neutralize the sulphur content. The only base metal mine now operating in Nova Scotia is the Rio Kemptville Tin Mine near Yarmouth which has an ongoing monitoring program. Earlier environmental problems at this site have been overcome.

Tailings and waste rock from abandoned gold operations have compounded the significant arsenic levels from natural sources in well water in the Waverley area near Halifax. Some operations processed a high sulphide concentrate separately, creating small dumps of extremely high sulphide content.

Reclamation objectives in Nova Scotia are achieved through relatively non-specific environmental legislation. Reclamation conditions are attached to licences, permits and approvals and are subject to ministerial discretion.

Environmental Legislation

The Department of the Environment is the lead co-ordinating agency under the Environmental Protection Act. Under Section 23 of the Act, an Industrial Waste Discharge Permit is required prior to the construction of any facility that may result in an emission into the environment or by anyone polluting or removing material from the environment. The Minister has the power to stipulate conditions placed on these permits such as the submission of an Environmental Impact Assessment or to specify performance and/or reclamation bonding. However, no regulations pertaining to the content of an E.I.A. exist under the Environmental Protection Act.

An Environmental Assessment Act received Royal Assent on May 25, 1988. When it is proclaimed, this Act will give the Minister of the Environment greater power to assess environmental standards and request public participation.

Mining Legislation

The Mineral Resources Act and the Metalliferous Mines and Quarries Regulations Act "regulate the orderly management of exploration, development

"- and mining of all minerals within the province." These Acts empower the Minister of Mines and Energy to issue regulations pertaining to tailings disposal and the restoration, reclamation and rehabilitation of surface lands. Information supporting an application for a mining lease must include the location of waste disposal and control facilities locations and reclamation plans. No specific regulations are in existence. However, all mining leases require reclamation of the mine site as a condition of the lease.

While the Mineral Resources Act does not require a reclamation bond, ministerial policy has been to obtain some form of security deposit from companies. A new Mineral Resources Act is under consideration that will require site reclamation according to an approved plan and will contain a requirement for bonding.

Reclamation Guidelines

The Department of Environment has drafted the Environmental Guidelines for Surface Mining Operations to minimize the adverse environmental effects of surface mining. An operator is required to;

conduct environmental baseline surveys of the proposed mine site.

submit details of operating procedures and devices designed to protect the environment.

install a monitoring program to document the quality and quantity of effluents discharged into the environment.

submit a contingency plan to cover emergency situations.

submit and carry out a reclamation and rehabilitation plan.

Whenever possible, reclamation and rehabilitation are to be conducted on a progressive basis during the mining operation. Rehabilitated land should have a permanent vegetative cover or be otherwise stabilized to the satisfaction of the Minister of the Environment.

Review Process

Representatives from the Department of Environment and the Department of Mines and Energy meet in an informal Joint Review Committee to assess all applications and set operating conditions in the Permit to Operate. Reclamation requirements are a condition of permit approval.

Conclusion

Nova Scotia's current system of requiring a reclamation plan toward the end of the life of a mine, has not created problems. However, concerns remain over public safety and the aesthetics of abandoned mine sites.

ONTARIO

Introduction

Acid mine discharge from hardrock mining was first noted by the Ontario Water Resources Commission in the Elliot Lake uranium mining district. Similar problems were also noted in the copper-lead-zinc camp at Manitouwadge, the nickel camp at Sudbury and at numerous isolated base metal properties. The Ontario government is attempting to contain acid discharge from the abandoned Kam Kotia mine in the Timmins area.

Environmental Legislation

The legal requirements respecting mine reclamation in Ontario are general in nature. Environmental problems are addressed during the development phase through a series of permits and approvals under such environmental legislation as the Environmental Protection Act and the Ontario Water Resources Act. These Acts require approval for mine start up from the Minister of the Environment. He may also request that the Environmental Assessment Board hold a public hearing. ' Both the Environmental Protection Act and the Water Resources Act apply to operating mines and depending on the financial status of the mine owner may also have some relevance with respect to abandoned mines.

An application under the Ontario Water Resources Act, must include plans, specifications and an engineer's report on the planned tailings disposal system. Information should include the location, nature and possible duration of the mining operation, the area to be affected by tailings disposal and the potential effects on the water and soil. Proponents must also address the mode of stabilization of the tailings area.

The policy of the Ministry of Environment has been to use guidelines, objectives and federal regulations in assessing applications as there are no legally enforceable provincial limits on effluent levels that can be discharged into waterways.

Mining Legislation

Ontario's main legislative control on reclamation of mine sites is through the Mining Act. Section 161 requires that the tailings be stabilized by a vegetative cover or some other means, to the satisfaction of the district Engineer of Mines. The District Engineer is with the Ministry of Labour, but acts as an agent of the Ministry of Northern Development and Mines for purposes of administering Section 161.

.+ In accordance with subsection (2), the mine manager must submit a reclamation plan to the District Engineer one year prior to shut-down. The plan must include information on the extent of the tailings area on which planting of vegetation or stabilization must still be completed and the rehabilitation that is to be done in the mine or plant area, together with descriptive information.

The Chief Engineer of Mines has the authority to require a security deposit. There are no regulations or guidelines for determining the amount of the security, or when : it should be repaid. -.

Conclusion

Problems in dealing with bonding, bankruptcies, jurisdiction and in projecting closure dates should be dealt with in the Ministry of *Northern* Development and Mines Green Paper on mineral policy in Ontario. This paper is tentatively scheduled for release in the fall of 1988, and is meant to assist in the development of more efficient reclamation programs and the resolution of a number of mine development issues.

QUEBEC

Introduction

Since 1972, the government of Quebec has enacted legislation specifying conditions regarding the mining environment. These requirements have been designed to ensure that mine sites will be reclaimed. The present legislation applies only to mines operating at the time of enactment and there is no retroactive law, regulation or guideline dealing with sites abandoned prior to 1972.

Environmental Legislation

Section 23 of the Environmental Quality Act stipulates that before a permit is issued, reclamation plans must be submitted on a site-by-site basis as part of the Environmental Impact Assessment procedure. This applies to all mines developed after 1979 and all expansions to existing mines. Prior to the 1979 amendment, the Minister of Environment could demand a reclamation plan from an operation deemed likely to harm or destroy the surface of the soil.

Mining Legislation

The Quebec Mining Act was adopted in June, 1987 and will come into force in the Fall of 1988. Under this legislation, a mining lease and Certificate of Authorisation (operating permit) are required from the Ministry of Energy and Resources and the Ministry of the Environment respectively. Abandonment issues related to environmental integrity are the responsibility of the Ministry of Environment. Conditions attached to the operating permit are set following negotiations between the mine operator and the minister and follow, as closely as possible, Guideline No. 19 established by the Quebec Department of Environment. (See Reclamation Guidelines below.)

The Act requires the mine operator to submit, prior to abandonment, a written request to the Minister of Energy and Resources, as well as a certified report outlining abandonment plans and the location of mining waste deposits. Upon closure, the Minister of Energy and Resources consults with the Minister of Environment before authorizing abandonment to ensure that all environmental standards are met. Quebec does not at this time require a reclamation bond.

Reclamation Guidelines

The Quebec Department of Environment Guideline No. 19 lists all procedures to be completed and requirements that should be met prior to the temporary or definitive

abandonment of a mining operation. This guideline is not legally binding, except in the case where it refers to a norm prescribed by a regulation. The Department of Environment will refer to this guideline when using its discretionary power to issue an order or deliver a permit.

Conclusion

The issuance of Certificates of Authorization is a recent phenomenon. It' is too soon to evaluate its impact in terms of the reclamation of tailings areas. Environmental awareness has gradually increased among mining companies and the general public and several companies have proceeded with the reclamation of tailings areas, particularity those close to urban centers.

However, a survey of 100 tailings areas revealed that about 30% may present potential health or environmental risks. These areas constitute the majority of acid tailings for which proven stabilization technology does not exist, other than through lime treatment.

SASKATCHEWAN

Introduction

Acid mine drainage is not a major environmental concern in Saskatchewan. However several uranium and gold mines have been identified as acid producers. The major sites are the Hudson Bay Mining and Smelting property near Flin Flon and the abandoned Lorado tailings near Uranium City. In addition, several uranium and gold developments have been assessed as being potential acid producers and have been required to take this possibility into account during the design and construction of their facilities.

Saskatchewan relies on a combination of environmental assessment and general environmental legislation, permits and lease approvals to enforce reclamation requirements at new or expanded mine operations.

Environmental Management Legislation that pertains to mine reclamation includes: 1) Environmental Assessment Act, 2) Environmental Management and Protection Act and 3) The Government Organization Consequential Amendment Act 1988.

The Mineral Industry Pollution Prevention Regulations are available to enforce mine reclamation requirements. These regulations are presently being updated to reflect the decommissioning policy described below.

Environmental Legislation

In the event that a new mining operation is proposed or a significant expansion is identified at an existing operation, the proponent must first gain approval from the Minister of Environment and Public Safety under the provisions outlined in the Environmental Assessment Act (1980). Proponents normally file an Environmental Impact Statement (EIS) with the Coordination and Assessment Branch of Saskatchewan Environment and Public Safety. This group, in consultation with an inter-departmental review panel, assesses the proposal at a conceptual level to ensure that all potential environmental impacts have been identified and mitigative measures developed such that the detrimental effects of the proposed operation are kept to a minimum.

When the Minister is satisfied that the proponent has met all the requirements of the Environmental Assessment Act, he will either give Ministerial Approval to proceed, with or without conditions or refuse to approve the development. After receiving an approval for a mining development, the proponent then proceeds to obtain approvals required under legislation administered by the Mines Pollution Control Branch.

With regard to a mine/mill proposal, should the proponent be successful in receiving approval to proceed, the proponent is required to negotiate and sign a surface lease with the Province of Saskatchewan. This lease contains but is not limited to, specific requirements relating to environmental protection, decommissioning, occupational health and safety and land use.

Saskatchewan Environment Regulatory Program

The Mines Pollution Control Branch of Saskatchewan Environment and Public Safety is responsible for ensuring that satisfactory environmental protection measures are in place at all Saskatchewan mine sites.

Within the Branch, each operation under environmental scrutiny is assigned a Project Officer who in turn reports to the section manager. A primary responsibility of this position is to ensure that officers are intimately familiar with the operational and environmental status of their assigned property. This is achieved through the licensing process, regular site inspections, in-depth knowledge of site activities and company-generated reports.

Two types of regulatory documentation are utilized by the Mines Pollution Control Branch to enforce environmental affairs at a mine\mill facility, namely Construction and Operating Approvals. Construction Approvals are self explanatory and are issued to a proponent authorizing the construction of waste handling and treatment facilities after the Department has conducted a detailed review of the company's application. This approval may or may not contain specific conditions. However, they always require the submission of "as built" drawing after construction is complete.

Permits to Operate are issued pursuant to the Environmental Management and Protection Act and the Air Pollution Regulations. These documents expire on an annual basis. Prior to expiry, the Mines Pollution Control Branch initiates a thorough and detailed review of the environmental status of the operation. Based on this review a draft license is prepared and discussed with the company prior to-final authorization by senior Department staff.

Typically, a license will contain operating conditions common to the industry as a whole, site specific operating requirements and detailed environmental monitoring programs for surface and ground water, sediments, and biological media. The licences also require reports of monthly monitoring results, an Annual Environmental Report and various site specific problem oriented reports.

Decommissioning

The Mines Pollution Control Branch requires two actions from the operator. First, it is essential to have on hand an approved conceptual decommissioning plan for all

aspects of the operation. As the mine/mill facility changes, the conceptual plan is modified and updated as necessary. Secondly, Saskatchewan requires the early decommissioning of a facility or disturbed area that will no longer be utilized within an active operational site.

Once a shut down decision has been made and reclamation work completed by the operator, the site is allowed to stabilize while being monitored for a minimum period of five years. Once transition monitoring has been completed and the site has recovered as predicted, the final abandonment of the property by the operator is authorized by the Minister of Environment and Public Safety. At this time, the site comes under institutional control with regard to the future use of the site.

In the event that future remedial action is required, the Government of Saskatchewan has available the "Environmental Protection Division" of the Heritage Fund. The money for this fund was initially derived from provincial revenues and is available for cleanup of unforeseen problems which may arise at an abandoned mine/mill site.

Conclusion

Based on the mineralogy of Saskatchewan's ore deposits, the potential for acid mine drainage is not a major environmental concern. However, Saskatchewan does have mines in the uranium and gold sectors that are acid producers. Typically, these can be identified early in the development by requiring acid potential testing during the Environmental Assessment stage. If an acid problem is identified, then the proponent must include mitigative action within their operational planning and site design.

APPENDIX D

Reclamation Practice in the United States

In the United States, the federal government began to enact environmental protection measures in the 1970s. The Environmental Quality Improvement Act was passed by Congress in 1970, the Resource Conservation and Recovery Act (RCRA) in 1976, the Surface Mining Conservation and Reclamation Act (SMCRA) in 1977, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980 and the Superfund Amendments and Re-authorization Act (SARA) in 1986.

The bulk of the acid discharge problem in the United States is accounted for by the Appalachian coal fields in the northeastern United States. Acid discharge from coal mines is strictly regulated under SMCRA and whatever additional safeguards the state legislature chooses to impose. Acid drainage from metal mining is unregulated at the federal level, although the Environmental Protection Agency (EPA) is in the process of drafting regulations governing base metal waste management. Acid drainage from base metal mines has been seen as a less serious problem than similar discharge from coal mines for a number of reasons. Many orebodies are not high in reactive sulphides. The climate in the major base-metal mining areas is less humid. Metal mining is less extensive than coal mining and it is less concentrated regionally.

The Resource Conservation and Recovery Act of 1976 directed the Environmental Protection Agency to produce a comprehensive study on the adverse environmental effects of solid wastes from active and abandoned surface and underground mines. Amendments in 1980 required the EPA to report on the adverse effects, if an y, on human health of the disposal and utilization of solid wastes from the extraction, beneficiation and processing of minerals. Pending completion of these studies, solid wastes from exploration, mining, milling and smelting of ores and minerals were excluded from regulation under Subtitle C of RCRA which deals with hazardous wastes. As a result of its studies, EPA concluded that Subtitle C standards were likely to be environmentally unnecessary, technically infeasible or economically impractical if applied to mining wastes. Congress has determined that, with some specific exceptions, mining wastes will be regulated under Subtitle D which primarily addresses municipal and industrial solid wastes. EPA is preparing a program under Subtitle D that would be appropriate for mining wastes. The EPA decision to regulate under Subtitle D instead of Subtitle C now faces a court challenge from environmental interest groups.

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) established the Superfund program to deal with releases and potential releases of hazardous substances, including hazardous wastes. The Superfund program ranks sites where releases have occurred or where there is a substantial threat of release using the Hazard Ranking System (HRS). In general, Superfund is intended to be a remedial or reactive program rather than a preventive program.

The Surface Mining and Reclamation Act, which applies specifically to coal mining, was legislated in 1977, giving the Americans a decade of experience with a national legislative reclamation regime. This is sufficient to provide a basis for some conclusions as to the effectiveness of the legislation, what problems have emerged and what might be done to resolve them.

SMCRA sets minimum standards for the reclamation of land disturbed by coal mining and for the provision of performance bonds. States may legislate and enforce standards that are more (but not less) stringent than those contained in SMCRA. The Act is administered by the Office of Surface Mine Reclamation and Enforcement (OSMRE).

The basic requirement is to restore the land to its approximately original contours (AOC) and may even require the recreation of undesirable features. An AOC reclamation plan, because it is familiar, is most likely to be acceptable to regulators and to bonding institutions but it precludes the restructuring of the land to accommodate alternative uses. The more imaginative type of reclamation, landscape alteration or LA, is seen as risky because change is inherent. Regulatory agencies and bonding institutions avoid risk where possible and must be convinced that an innovative proposal will probably be successful before the necessary approvals and securities will be forthcoming.

It is also quite difficult to get mandated reclamation requirements modified in the light of accumulated experience or the results of extensive (and expensive) research programs. The bodies that hear applications for variences are highly sensitive to public opinion. Even though a proposal is well supported technically, the company may be instructed to undertake additional research, still with no assurance of ultimate approval.

Despite these problems, there is *no* pressure to propose amendments to the existing legislation. The fear is that to do so would open the Act for public review and give anti-mining groups an opportunity to lobby for changes that would make the situation more difficult for industry than it presently is.

The policy view of OSMIRE is that inspection is the key to making the regulations effective. Problems must be identified at the time they occur and measures taken to correct them before mining is allowed to proceed. The large volume of outstanding non-compliance orders often cited by environmentalists as evidence that SMCRA is inadequate consists almost entirely of orders written after the site had been abandoned by the operator.

Administration of SMCRA, which initially was retained at the federal level, has gradually been devolved to the states. This enables the states to encourage reclamation practices that they find particularly suitable from both an environmental and an economic point of view. However, it raises the possibility that some states will be less dilligent (or will be perceived to be less dilligent) than others in their enforcement of the Act.

In order to ensure that the taxpayer is not burdened with the cost of reclaiming mined areas, companies are now required to post bonds covering the estimated cost of reclamation prior to the start up of mining. The amount of the bond is set at a dollar amount per acre to be disturbed and varies from one state to another, from $1000 in Tennessee (which is under federal administration) to $13000 in North Dakota. The amount of the per acre bond may differ between sites within a state as well as between states and is not necessarily dependent on the actual cost of reclaiming the site.

In the western states, bond release takes place in stages over a number of years. In North Dakota, up to 40 per cent of the bond can be released at the first stage for backfilling and grading, another 20 per cent for respreading topsoil and subsoil and the remainder, except revegetation costs, for vegetation establishment. The final amount is not released until productivity standards have been achieved and the ten-year liability period has expired.

Technically, there does not seem to be any reason why full bond release should not be granted on some areas of reclaimed land which have been returned to full agricultural production for crops or grazing. However, the policy issue of whether full bond release should ever be granted is still being debated. While the mining companies and bonding companies want the earliest possible bond release to free up capital, public interest groups argue that the mining companies should never be completely released from liability in the event that something now unforseen requires remedial work twenty or thirty years hence. To the mining and bonding companies, perpetual liability is an appalling prospect.

When bonding became a universal requirement for coal mines, insurance and financial institutions moved to meet the demand. Many of these firms lacked experience with providing large bonds on a long term basis. Some firms went bankrupt and many that survived withdrew from that line of business. There are now a relatively small number of quite large companies to which miners can turn for bonds. In the case of bonding firms that went bankrupt, the bond was defaulted and in at least some instances, the liability for reclamation fell on the public sector.

APPENDIX E

Reclamation Practice in Europe

Generalizations as to the approaches of other advanced economies dealing with mine waste discharges are difficult to make. Conditions vary widely from country to country and indeed from minesite to minesite. The type of ore mined, geography, proximity to population centres, public attitudes to the mining industry and political traditions all play a role.

In the three European countries reviewed here, pragmatism appears to be the common denominator. Uniform national standards for mine runoff are avoided in favour of a case by case consideration of each situation.

United Kingdom

The coal industry dominates U.K. mining. Approaches to mine waste problems are influenced by the proximity of minesites to population concentrations, a high degree of environmental consciousness, particularly with respect to the preservation of rivers and streams for fishing and strong traditions of local government.

In the United Kingdom mine waste discharge as all other effluents are regulated by the Control of Pollution Act (1972). The Act confers regulatory responsibility on ten quasi-autonomious Regional Water Authorities. Scotland and Northern Ireland are treated differently.

The Water Authority's key consideration in issuing a consent to discharge effluent is the absorptive capacity of the receiving waterway. Uniform national effluent standards have been avoided and there are no special arrangements to deal with mine wastes. In practice, the conditions applied to a discharge consent are the product of discussion and negotiation between the applicant and the Water Authority. No levies are imposed on industry discharges.

Despite the flexibility of a case by case approach, the conditions accompanying a discharge consent can be very stringent. Nine out of ten applications stemming from proposals for new open pit mines are either refused or carry such onerous conditions that the project is rendered uneconomic. Decisions by the Water Authority may be appealed to the Secretary of State for the Environment but only on the grounds of the environmental "reasonableness" of the standards imposed. The costs of adherence are not a basis for appeal. Appeals are rare and successful appeals rarer still. In the trade-off between the environment and job creation, the environment is given considerable weight.

Mining in the U.K. is dominated by coal and the British Coal Corporation in particular. Because of its size and state ownership, performance bonds or other surety are not required to ensure appropriate reclamation measures following mine closure. For smaller operators, bonding may be required at the time of development plan approval. In one case cited, the proponent of an open pit operation was required

to post a bond equal to the net present value of the costs of operating a water treatment plant in perpetuity.

The U.K. has a legacy of abandoned mines mostly dating from Victorian times. Since these sites pre-date the introduction of planning consents responsibility for clean up remains with the government. A system of Derelict Land Grants has been established to assist private industry and local government in restoring abandoned industrial sites including minesites. However, available funds severely limit the pace at which abandoned sites can be restored.

There is considerable pressure for change in the U.K. system. The European Commission is seeking the imposition of uniform effluent standards to replace the current approach based upon the absorptive capacity of a water course. At the time of writing a bill is before Parliament which would privatize the water and sewer utility functions of the Water Authorities. Levies for industrial discharges may be introduced.

U.K. tax legislation permits site restoration costs to be deducted from income only when the work is actually performed. Provisions for restoration work as the obligation is incurred are disallowed for tax purposes. However, site restoration expenditures made within three years following the cessation of line operations may be treated as if made on the last day that mining was carried out. In such cases, the taxes payable by a company during its last year of mine operations maybe adjusted retroactively through repayment or other means.

Federal Republic of Germany

As in the U.K., mining in the Federal Republic of Germany is dominated by coal. Environmental regulation of the mining industry is influenced by the proximity of mine sites to population centres and the scarcity and high cost of land available for waste dumps. Although the coal industry is privately owned, the industry is heavily subsidized by the state. Mining is an important employment generator in the economically depressed regions of Northern Germany.

Unlike other industries in the FRG, virtually all aspects of the mining industry, including mine waste disposal and site reclamation, are governed by special legislation, the Federal Mining Law. The individual Lander or states are responsible for administering the legislation.

Measures for mine site restoration are an integral part of the mine operating plan which must be submitted before approvals for mine operations are given. Full environmental impact statements may be required for future approvals. Land restoration is carried out as soon as mining operations permit. As overburden is removed and coal extracted on one side of an open pit mine, reclamation measures are underway on the mined out side. The design of restored sites is carried out in close consultation with the community. Concerns addressed in design include surface water control, ground water impact, stability, fire risk and impact on the microclimate. Following restoration, land is generally sold for a minimal sum to local authorities for use in agriculture, forestry or recreation.

Until recently, restoration efforts have emphasized aesthetics. Concern with acid and salt discharges were limited to its effects on revegetation. In the last two years, concern has extended to the leaching of pollutants into ground water reservoirs. More attention is now given to the sealing of sites and the pumping of contaminated water to larger rivers. There is no requirement to treat contaminated water before dischage into a river. Water from West German coal mines is a major source of the "salt freight," of the Rhine River.

The Federal Mining Law requires mining companies to set aside funds for site restoration as the obligations for such measures are incurred during mining operations. These provisions are calculated annually based upon past costs incurred per cubic meter of waste material and adjusted for inflation. The amount of a company's taxable profit in any year is reduced by funds set aside for this and similar mine closure costs.

Sweden

Mining in Sweden goes back nearly one thousand years. Over this long history, it may be that the greatest challenge that the Swedish mining industry has faced is adjusting to the heightened environmental consciousness which has emerged over the past twenty-five years. With its diversified mineral base, relative remoteness of mining operations from major population centres and northern climate, conditions in Sweden have much in comon with Canada.

The National Environmental Protection Act (1969) provides the legislative framework for regulating all activities which can cause pollution, including the mining industry. The guiding principle adopted under the Act is that polluting activities be located in such a manner that the "purpose can be attained with the least possible interference and nuisance, without unreasonable expense." Mining operations are also subject to the National Resources Act and the Building and Planning Act. Under the National Environmental Protection Act, certain industrial activities including mining and mineral processing require a licence before development can proceed. Responsibility for issuing such licences is conferred upon an independent quasi-judicial organization, the Franchise Board for Environmental Protection. The conditions set out in a licence are established by the Franchise Board on a case by case basis. Within the broad principles set out in legislation, the Board must strike a balance between the value of the existing environment, the economic benefit of the polluting activity and the costs of abatement measures. Licences are generally issued for a period of ten years, after which they can be reviewed in the light of changed economics, technology and other factors.

The Franchise Board is advised by the National Environmental Protection Board which acts as the environmental advocate within government. In practice this arrangement dictates that a project proponent discuss and if possible agree with the Environmental Protection Board on pollution limits and the measures to achieve them before a proposal is brought to the Franchise Board for approval.

Acid mine discharges associated with the mining of sulphide ores are considered to be the most significant environmental problem facing the Swedish mining industry. For ongoing mining operations, water treatment measures have reduced discharges to levels consistent with the standard for drinking water. Nevertheless, the Environmental Protection Board is calling for a zero discharge level, a standard which industry argues is neither technically nor economically feasible. Increasing attention is now focussed on the problems of acid drainage from mine tailings and waste rock. The Environmental Protection Board in concern with industry is examining the costs and effectiveness of a number of site restoration alternatives including:

- moraine cover
- water cover
- addition of a buffer with dolomite; and
- sealing

Plans for site restoration are now an integral part of the conditions applied to environmental permits for new mine operations. Smaller companies may also be required to demonstrate that appropriate financial measures are being taken to ensure the availability of funds for clean-up.

Responsibility for drainage from abandoned sites is a matter of contention between industry and the Environmental Protection Board. The government has set aside some funds to deal with the problem but these are only sufficient to deal with one site per year. Industry has resisted demands that it bear the costs of restoring sites which were abandoned in accordance with the regulatory regime in force at the time. The legal question remains unresolved. At the time of writing, the Franchise Board is considering whether to require the proponents of a new project to assume the costs of restoring old mine sites in the vicinity as a condition of issuing a licence.

Overall, there appears to be a consensus in government and industry that the current Swedish approach to dealing with environmental problems associated with mine operations works well in protecting the environment and avoiding unnecessary costs. Nevertheless, industry is critical of the length and uncertainty of the process arguing that it constitutes a barrier to the establishment of new mining operations.