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THE IMPACT OF STATE AND PROVINCIAL TAX AND ROYALTY POLICIES ON NON-FERROUS MINING VENTURES: A COMPARATIVE ECONOMIC ANALYSIS

By

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ABSTRACT

This report summarizes a Natural Resources Research Institute supported study (Zanko, 1988) in which the tax and royalty policies of Minnesota, Michigan, South Dakota, Idaho, Utah, Nevada, and the Canadian province of Ontario were examined and their impact on the cost of mining evaluated. The evaluation was accomplished by applying the policies of each state and province to three hypothetical non-ferrous mining operations and performing an after tax economic analysis.

The analysis demonstrated that such policies have a profound effect on mining costs, and also showed that policy differences between each state and Ontario are potentially significant enough to influence mineral exploration and mineral investment decisions. However, and perhaps most importantly, the analysis also revealed that Minnesota is no longer a high tax state with regard to non-ferrous mining activity, and in fact compares very well with states recognized for their lower tax burdens.

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INTRODUCTION AND BACKGROUND

Study Justification

The effects of state taxation on the economics of mining have been studied and evaluated by Whitney and Whitney, Inc. (1985), Davidoff and Hurdelbrink (1983) and Laing (1977), and in each case it was demonstrated that the effects were significant. The Whitney and Whitney, Inc. study, titled "Impact of State Taxation on the Mining Industry - A Study of Fifteen States", reported Minnesota to have the highest, or near the highest, tax burden of the fifteen states considered. This finding essentially supported the beliefs of many in industry and in government that Minnesota's mineral tax policies were a potential impediment to the development of a Minnesota-based non-ferrous minerals industry. Furthermore, it clearly illustrated the paradoxical situation which existed in Minnesota in 1985, whereby the state was actively promoting its non-ferrous mineral potential while possessing one of the worst mining tax climates in the country.

Further work by Zanko and Barnes (1986) also found Minnesota's tax climate to be excessive relative to non-ferrous mining activity, based on a comparative analysis of Minnesota and Nevada tax policies. However, their study also determined that production royalty payments represented an additional, and potentially significant, cost of mining for operations located on state-owned land.

Much has changed since 1985, at both the state and federal level. However, the most significant changes have taken place in Minnesota. In the spring of 1987, major tax reform legislation was passed which resulted in a complete overhaul of Minnesota's non-ferrous mining taxes, while on March 2, 1988, the State Executive Council approved a revised metallic mineral leasing policy which modified production royalty rates.

All of these factors, when combined with the Federal Tax Reform Act of 1986, created a real need to re-evaluate not only the impact of state taxes, but also production royalties, on the cost of non-ferrous metal mining. Therefore, a new study, in the form of a Masters Thesis (Zanko, 1988) supported by the NRRI, was performed, and the results are summarized and presented in this report.

Approach

Choice of States

In addition to Minnesota, the following five states were chosen for analysis: Michigan, South Dakota, Idaho, Utah, and Nevada. While this is a smaller group of states than the fifteen presented in the Whitney and Whitney, Inc. (1985) study (those being Minnesota, Michigan, Idaho, Utah, Nevada, Alaska, Arizona, California, Colorado, Missouri, Montana, New Mexico, Oregon, Tennessee, and Washington), their respective tax policies are believed to be representative of the broad spectrum of non-ferrous mining taxes found in the United States today.

According to both Whitney and Whitney, Inc. (1985) and Davidoff and Hurdelbrink (1983), Idaho and Nevada were consistently low tax states, while Michigan and Utah were said to be moderate to high. South Dakota, while not included in either of these previous studies, was chosen because of its reputation for having generally lower business taxes.

Choice of Ontario

The Province of Ontario was also included in the study because none of the studies cited previously had evaluated and directly compared the impact of Canadian provincial taxation on the cost of mining to that attributable to state

taxation in the U.S. Ontario's inclusion was further justified by the fact that it has had a very active non-ferrous minerals industry, much of which is operating in a geological environment very similar to that of northern Minnesota.

Choice of Hypothetical Models

Three hypothetical non-ferrous mining operations were used as models in the study; an underground gold operation, a surface gold operation and an underground polymetallic (zinc, copper, lead, silver, and gold) base metal operation. All three are believed to represent operations which have the potential for development in Minnesota and elsewhere.

Assumptions

The following eight assumptions were made in performing the study:

- First, all features of the hypothetical models were considered identical for the six states and Ontario. This was done in order to eliminate any difference in cost that could be attributed to factors other than the defined tax and royalty policies of each state and province.
- Second, only those tax and royalty policies associated with the mining of non-ferrous metallic minerals were examined. Tax and royalty policies concerning energy minerals (petroleum, coal, and uranium), iron ore and taconite, and industrial minerals were not considered.
- Third, state royalties were considered only when the state in question owned significant amounts of potentially leasable acreage. For instance, consideration of Nevada's state royalty policy would have been unwarranted because only two-tenths of one percent (0.002) of the land in Nevada is state-owned (Merian, 1987).

- Fourth, capital expenditures were expensed whenever possible rather than being capitalized and amortized. This was done to illustrate some of the changes made by the Tax Reform Act of 1986, particularly with respect to the treatment of preproduction exploration and development expenditures.
- Fifth, the hypothetical models were evaluated as if they were individual projects. This was done for simplification.
- Sixth, all cost figures were presented in constant 1987 dollars. Since the primary objective of the study was to make a relative comparison of the impact of taxes and royalties from state to state, the decision to disregard inflation was a valid one.
- Seventh, all sales of mineral products were made outside the state in which the mining operation was located. This allowed for consideration of each state's income apportionment practice relative to corporate income taxation.
- Lastly, metal prices were assumed to remain constant throughout the lives of the three hypothetical operations used in the study. This is consistent with the inflation assumption, i.e., constant cost/constant price.

Data Collection

A considerable amount of information was collected and analyzed during the course of the study.

Officials in each state and Ontario were contacted personally for relevant tax information and to answer specific questions when the need arose. What was lacking in terms of statutory information was obtained from the University of Minnesota's law library. Valuable background and procedural information was also found in the Whitney and Whitney, Inc. (1985), Davidoff and Hurdelbrink (1983) and Laing (1977) studies.

Method of Data Analysis

The quantitative mine modeling approach was used in the study. Both Whitney and Whitney, Inc. (1985) and Davidoff and Hurdelbrink (1983) used this approach in their respective evaluations of state taxes. With this approach, a hypothetical mining operation is set up, and production rates, tonnage, ore grades, mill recovery rates, and smelting and refining terms (if applicable) are defined and capital and operating costs estimated. Tax and royalty policies are then applied to the hypothetical operation, and a detailed cash-flow analysis is performed. In this fashion, the tax and royalty burden of each state can be quantified over the life of the hypothetical operation so that direct comparisons can be made between them.

Commercial spreadsheet software greatly simplified the quantitative mine modeling approach. Detailed spreadsheets for each state and Ontario were constructed with Lotus 123, Releases 2.0 and 2.01, on IBM XT and AT personal computers. The relevant data for each of the hypothetical operations were entered into the spreadsheets and the cash-flow analysis was performed. Complete tax and royalty summaries were generated, as well as the internal rate of return, payback period, and net present value of each operation.

THE HYPOTHETICAL MODELS

Introduction

The three hypothetical models used in the study (underground gold, surface gold, and underground polymetallic base metal) were chosen because they were believed to provide a fair representation of the type of mining operation one could realistically expect in Minnesota. A brief summary of each model follows. Additional information about each model is presented in greater detail in Appendix A.

Underground Gold Model

The first hypothetical model, the underground gold operation, represents the most likely form of gold mining that would be undertaken in Minnesota, given the nature of northern Minnesota's Archean terrane and the relative profusion of underground gold mines in similar terrane just to the north in Ontario.

A deep, steeply dipping, relatively narrow ore deposit was assumed, one that would be amenable to the cut and fill mining method. While more costly than most stoping methods, the cut and fill method is also more selective and keeps dilution to a minimum (Hamrin, 1982).

Total mineable ore reserves for the deposit were set at 5,000,000 short tons and an average mill head grade of 0.30 troy ounces gold per short ton of ore assumed. A total of 250,000 short tons of ore were assumed to be mined and milled annually, giving an operating mine life of 20 years.

Surface Gold Model

The second hypothetical model, the surface gold operation, while less likely to be developed than an underground gold operation in Minnesota, is still

within the realm of possibility. For example, the "C-Zone" of the disputed Page-Williams property near Hemlo, Ontario contains possible reserves of over 5 million short tons of gold ore, much of which is potentially open-pitable (Mining Magazine, 1985; Patterson, 1987). The inclusion of an open pit operation in the study also provided a decidedly lower cost counterpoint to the two underground operations.

A relatively large, near surface ore deposit was assumed, suitable for surface mining. A 5000 ton per day, 4:1 waste-to-ore, surface mine model was used (Schumacher, 1987).

Total mineable ore reserves for this deposit were set at 10,500,000 short tons, and an average mill head grade of 0.10 troy ounces gold per short ton of ore was assumed.

A total of 1,500,000 short tons of ore were assumed to be mined and milled annually, giving an operating mine life of 7 years.

Underground Polymetallic Model

The third hypothetical model, the underground polymetallic base metal operation, was chosen because the polymetallic nature of its ore naturally allowed for a more complete test of state and provincial tax and royalty policies, particularly where the assumed sale of concentrates for smelting and refining was concerned.

This massive sulfide ore deposit was assumed to be moderately to steeply dipping, fairly regular in shape, well defined, surrounded by strong country rock, and of sufficient thickness so as to be mineable by the blasthole stoping method (Lawrence, 1982).

Total mineable ore reserves for this deposit were set at 25,000,000 short tons, and the following mill head grades were used, which are after Malcolm (1986):

Zn: 6.53%
Cu: 2.66%
Pb: 1.12%
Ag: 1.32 oz/st
Au: 0.09 oz/st

From a geological perspective, lead-bearing sulfide occurrences in rocks of Archean age are rare. Nonetheless, there are a few in the Abitibi greenstone belt in Ontario, with the lead usually being associated with copper and zinc but subordinate to both (Windley, 1984). Therefore, the grades shown above are not unreasonable with respect to Minnesota.

A total of 1,250,000 short tons of ore were assumed to be mined and milled annually, giving an operating mine life of 20 years.

Information Sources for Models

The mine and mill models used in the study and their respective capital and operating costs were, for the most part, based upon models presented in Schumacher (1987). However, information for the polymetallic base metal model was largely based on material furnished by Mr. John B. Malcolm, Professional Engineer and mining consultant. Additional model background was supported by other mining publications.

Determination of Capital Costs

Mine and mill capital costs were apportioned between real property, personal property and labor. The capital costs for personal property were further apportioned between 5- and 7-year property classes, two property classes which are representative of the type of personal property found at most mining

operations (Internal Revenue Code, 1986, Sections 168(e)(3)(B) and 168(e)(3)(C)). The apportionment of capital costs was based on a synthesis of information in Clement, et al. (1981).

Determination of Operating Costs

Operating costs for each of the models that were obtained from Schumacher (1987) and Malcolm (1987) were also adjusted, due specifically to the modification of their labor cost component. This modification was achieved by rolling into the given mine and mill labor costs each state's (and Ontario's) unemployment tax and workers compensation policies. Labor costs were then recalculated, giving overall mine and mill operating costs which were both state- and province-specific.

This approach differed from previous tax evaluation studies in which a fixed operating cost would be assumed, regardless of the state being evaluated. With the approach used, the impact of unemployment taxes and workers compensation in each state and province was more accurately represented and quantified.

Again, further discussion of model costs as well as representative cost calculations can be found in Appendix A.

Additional Model Assumptions

To keep the study from becoming too unwieldy, the following basic assumptions were made about the hypothetical models:

- First, taxes and royalties were evaluated only during the preproduction and production periods. The post-production period, while a very important component of any mining project's economics, is affected more by a state's

environmental regulations than by its taxes. Therefore, the post-production period was not examined in this study.

- Second, the preproduction period was set at four years, with the first two years representing the ore body delineation and project engineering and evaluation phase, and the final two years representing the mine development, plant construction and equipment installation phase.

- Third, a predetermined replacement schedule was established for all capital equipment.

TAXES AND ROYALTIES

State Taxes

State taxes were placed into three categories:

1) Corporate Income Tax

2) Mining Taxes

3) General Business Taxes

A discussion of each follows.

Corporate Income Tax

A corporate income tax is, very simply, a tax imposed on income derived from doing business. Most, but not all, states impose a corporate income tax, or a reasonable facsimile thereof.

In states where a corporate income tax is imposed, it is common practice to tax only that portion of income which is attributable to the state. For all the states considered in the study, except for Minnesota, an equally weighted three-factor (sales, property and payroll) income allocation formula was used to make that determination. The formula is as follows, with the Income Allocation Factor equalling:

$$\frac{Wt1 * \left[\frac{\text{Sales in state}}{\text{Total Sales}}\right] + Wt2 * \left[\frac{\text{Property in state}}{\text{Total Property}}\right] + Wt3 * \left[\frac{\text{Payroll in state}}{\text{Total Payroll}}\right]}{\text{Sum of the Weights (Wt1 + Wt2 + Wt3)}}$$

Given the prior assumption of evaluating each mining operation individually with respect to each state's particular taxing policies, the sales, property and payroll factors used in the study were based only on the total sales, property

and payroll attributable to the operation. Since it was further assumed that all mineral products were sold out-of-state, the sales component of the formula was reduced to zero. On the other hand, each operation's payroll and property were attributable to the state in which they were located. Consequently, the payroll and property factors were each equal to 33.33 percent. Taken together the sales, property and payroll components resulted in an income allocation factor of 66.67 percent.

This factor is correct if each component of the formula is weighted equally, which is the practice in each state except Minnesota. In Minnesota, the sales, property and payroll components are weighted at 70.00, 15.00 and 15.00 percent, respectively. As a result, given the out-of-state sales assumption, the percentage of income allocable to Minnesota was 30.00 percent rather than 66.67 percent when the corporate income tax was calculated.

Mining Taxes

Mining taxes have been classified as those taxes which are imposed on mining activity exclusively. They go by many names, such as net proceeds tax, gross proceeds tax, mine license tax, and occupation tax. Some have roots in property taxation, with the value of the mineral property itself as a basis for taxation, while others are more closely related to an income tax. Whatever the basis, they are unique to mining and are frequently imposed <u>in addition</u> to the more "traditional" state taxes like corporate income taxes, property taxes and sales and use taxes, primarily to compensate the state or province for the removal (severance) of its mineral wealth.

General Business Taxes

In the study, general business taxes included the following:

1) Property taxes

2) Sales and use taxes

3) Unemployment insurance tax

4) Workers compensation insurance

A brief discussion of each follows.

Property Taxes

Property taxes, while mandated by statute, are usually levied at the county or local level. The state sets specific limits and issues guidelines relative to assessment procedure and property valuation, but individual counties and municipalities determine at what rate that property is taxed. That rate is frequently expressed in "mills" (thousandths of a dollar or dollars per one thousand dollars) and applied to a property's assessed value, thus giving the property tax. However, (and depending on the state or even county in which the property is located) the property's assessed value is often reduced by a percentage, called an "assessment ratio". Therefore, the resulting property tax can be considerably lower than what it would have been had no assessment ratio been applied.

Because property tax rates (or mill rates) are generally set at the county level, wide variations can exist within a state. Therefore, when property taxes were calculated in the study, an effort was made to use property tax rates from areas in each state or province that did have, or had the potential to have, non-ferrous mining activity. Using a statewide average property tax rate may be acceptable in general, but it can also be misleading if that average rate is significantly higher or lower than rates in areas having the greatest mineral potential.

Property Classification

Property is normally classified as being either real or personal for taxation purposes. Real property includes land, buildings, structures, or improvements which are affixed to the land. Personal property is property other than real property and includes mobile equipment and machinery (Gentry and O'Neil, 1984). (In some states, ore reserves are treated as real property and subsequently subject to taxation. As mentioned earlier, however, this form of property taxation is mining-specific and was, therefore, treated as a form of mining taxation rather than property taxation in the study.)

All six states and Ontario tax real property. However, not all of them tax personal property, and some offer forms of property tax abatement.

These and other details are covered individually, by state, in Appendix B.

Assessment Practice

A mining operations's taxable property is assessed at the county or local level so as to determine its value for taxation purposes. A number of valuation methods are used, but a decision was made to use the widely accepted depreciated replacement-cost method for determining the value of property in the study. With this method, the cost of replacing a piece of property with a new piece of like property is determined and, depending on the property's age, depreciation is subtracted from the value of the new piece of property (Whitney and Whitney, Inc., 1985). While this method may not have coincided precisely with actual assessment practice in every state, it was at least an objective and equitable approach and, therefore, allowed for the generation of more meaningful comparative results.

In the study, personal property was depreciated over its class life as defined in the Internal Revenue Code (5 and 7 years), using the straight-line method and an assumed salvage value of ten percent. Property considered real property (buildings and plant) was depreciated using a modified straight-line method (Stevenson, 1987). Basically, real property was assumed to retain its full original value for the first five years of its life, and then depreciated straight-line over its remaining life.

Sales and Use Taxes

Each state in the study, and Ontario, has a sales and use tax. A sales tax is imposed on the sale of goods (equipment, supplies, tools, etc.) and is based on a percentage of the purchase price. A use tax is applied to goods that are purchased outside of a state and are then brought into the state. The net effect of this is the same as if the goods were purchased within the state and subject to the sales tax (Schumacher, 1987). However, a use tax is not imposed in addition to a sales tax if the sales tax has already been paid in full. It is only imposed if, 1) no sales tax has been paid, or 2) the sales tax paid for goods purchased in a different state was less than what would have been paid within the purchaser's home state.

Each state has a unique sales and use tax policy. Rates differ, as do the categories of items actually subject to taxation. Furthermore, some states offer extensive mining-related exemptions while other states do not.

Unemployment Insurance Tax

Unemployment taxes at the state and provincial level are paid by an employer on an employee's wages up to a maximum amount, or wage base, e.g.,on the first $10,000 dollars of wages paid, as specified by statute. The tax rates

vary from state to state, as do the maximum taxable amounts. Furthermore, these tax rates generally do not remain constant but can vary depending on an employer's employment history and the status of a state's unemployment fund (Schumacher, 1987). For new employers having no employment history on which to base the tax rate, a predetermined rate is used. After a period of time, and once the employer has established an employment history, a new rate can be used which is based upon that employment history.

For the study, the rate assigned to a new employer, as specified by Schumacher (1987), in each state was used throughout the operational life of each hypothetical model. Attempting to anticipate what the tax rates might be in later years would have been speculative.

Workers Compensation Insurance

Like the unemployment insurance tax, workers compensation insurance is paid by an employer and is based upon wages paid to employees, usually at a rate given in dollars per one hundred dollars of payroll. But, unlike the unemployment insurance tax, workers compensation insurance is much more costly because rates are generally higher and, in many states, there is no maximum wage limit.

Workers compensation insurance rates, or premiums, are industry-specific and are based on the risk involved in the type of work being performed (Moffat, 1987). For example, the rate specified for underground metal mining is different than the rate specified for underground coal mining.

All states in the study act as carriers of workers compensation insurance and also set rates. However, more and more states allow businesses to use a private carrier if they so choose (Schumacher, 1987). For the study's purposes, it was assumed that each state and province would be the insurance carrier.

This further allowed for the quantification of costs attributable solely to the six states and Ontario.

Royalties

As Zanko and Barnes determined in 1986, the impact of Minnesota's state royalty policy on mining costs was considerable. Therefore, a decision was made to incorporate royalties, including state royalties, in the study.

Royalties

All six states in the study have a production royalty policy for metallic minerals taken from state land. A production royalty based on the ore's value per ton is the general approach, with some states using a fixed percentage royalty rate (Utah, Nevada and South Dakota) while others use a sliding rate (Idaho) or a modification thereof (Minnesota and Michigan). Each states' royalty policy, and the weight given to them, was highly dependent upon the amount of state land that was realistically available in each state for mineral leasing. A brief discussion of individual state royalty policy is presented in Appendix B.

Royalty Evaluation Methodology

So that a more complete assessment of taxes and royalties could be made, the following scenarios were evaluated, ranging from what was believed to be the most likely case to the least likely. For each scenario, taxes remained the same; only royalties differed.

SCENARIO 1

Only Minnesota and Michigan's state royalty policy evaluated. No state royalties assumed for the four western states and Ontario (due to the ability to stake mining claims).

SCENARIO 2

State royalties evaluated in all states having sufficient amounts of state land available for non-ferrous metallic mineral leasing. In addition to Minnesota and Michigan, this included Utah and Idaho. South Dakota and Nevada were excluded.

SCENARIO 3

A uniform 5% net smelter return royalty applied to each state and Ontario. It was assumed that the royalty was paid to a private entity rather than to a governmental body.

SCENARIO 4

No royalties. This scenario allowed state taxes to be evaluated and compared on their own merits.

The leasing policies of each state require that annual rentals be paid for leased state land. Generally, the rentals amount to a few dollars per acre in the early years of a lease, increasing over time. While they represent a cost to mining, the amounts were considered insignificant relative to the production royalties and taxes considered in the study, and were, therefore, ignored.

Finally, in all states but Minnesota, leases are often awarded on a cash bonus bid basis. If X number of acres is desired, a bid is submitted for that acreage. The total bid must be greater than or equal to one-year's rental on that acreage. Again, while representing a potential cost to mining, the amounts were considered insignificant relative to the study performed.

Federal Taxes

In a study like the one summarized here, federal taxes are less critical than taxes at the state level, simply because their application is equitable regardless of the state in which a mining operation may be located. Nevertheless, a brief discussion of federal taxes, in particular the federal corporate income tax, is necessary because the starting point for many state taxes is federal taxable income.

The Tax Reform Act of 1986

The following changes brought about by the Tax Reform Act of 1986 (IRC, 1986) were incorporated into the study's determination of federal corporate income tax:

1. Reduction in the tax rate.
2. New alternative minimum tax.
3. New depreciation guidelines.
4. Elimination of regular investment tax credit.
5. Modification in treatment of exploration and development expenditures.
6. Sales and use taxes no longer a deductible item.

A brief presentation of each follows.

New Tax Rate

The tax rate for corporations was reduced from 46 to 34 percent of regular taxable income.

Alternative Minimum Tax (AMT)

A new alternative minimum tax was adopted so as to guarantee the payment of some amount of tax by those corporations who, through the various preferential deductions and credits that are allowed for the regular calculation of income tax, might otherwise pay little or no tax.

Essentially, a corporation must calculate a separate basis for taxation, called alternative minimum taxable income (AMTI), as a starting point for determining what, if any, alternative minimum tax it may have to pay. This AMTI figure is arrived at after comparing regular tax deductions and preferences to

an entirely different set of tax deductions and preferences. The AMTI is then taxed at a flat rate of 20 percent, giving the tentative minimum tax, and the amount by which the tentative minimum tax exceeds a corporation's regular tax is, finally, the alternative minimum tax (IRS, 1987).

A corporation can recoup what has previously been paid as an alternative minimum tax if, in a subsequent tax year, the regular tax liability exceeds the AMT calculated in that year. This is accomplished by subtracting from the regular tax liability the amount previously paid as an AMT as long as that subtraction does not result in a tax liability which is less than the AMT for that year. Any excess AMT is carried forward for possible use in later tax years.

The alternative minimum tax is an extremely complicated part of federal tax policy. A corporation must calculate its federal taxes twice, the first time according to regular tax guidelines and the second time according to alternative tax guidelines. The bottom line, however, remains that a corporation must pay some tax.

Depreciation Guidelines

The old Accelerated Cost Recovery System (ACRS) was done away with by the Tax Reform Act of 1986 and replaced by a new ACRS. Depreciation of all tangible assets placed in service after December 31, 1986 fall under the new ACRS guidelines specified in Section 168 of the Internal Revenue Code (IRC, 1986).

With respect to the mining industry, the following depreciation rules are most important:

1. Most mining assets (other than real property) are assigned to 5- or 7-year property classes. Five-year property includes cars and light duty truck, ore trucks, computers, property used in connection with research and experimentation, and office machinery. Seven-year property includes property with a class life of 10 years or more but less than 16 years, and property that has not been

designated by law as being in any other class (IRS, 1987). Relative to the mining industry, such property includes assets used in the mining and quarrying of metallic and nonmetallic minerals and the milling, beneficiation and other primary preparation of such materials (IRS, 1985).

2. For both 5- and 7-year property classes, regular depreciation is determined using the 200 percent declining balance method, switching to straight-line, with the half-year convention and no salvage value.

3. Non-residential real property is treated as a 31.5 year property class, and depreciated using the straight-line method. This is a major change from its former classification as 19-year property, subject to depreciation using the 175 declining balance method.

Investment Tax Credit

Very simply, the 10 percent investment tax credit was repealed, effective January 1, 1986. It was, therefore, of no consequence in the study.

Exploration and Development

Both exploration and development costs can still be expensed in the year incurred. However, the Tax Reform Act of 1986 (IRC, 1986) changed, from 80 to 70 percent, the amount of such costs that can be expensed in the year they are incurred. The remaining 30 percent must be amortized over 60 months, beginning with the month in which the costs are paid or incurred (Internal Revenue Code, 1986, Section 291(b)(1)&(2)).

Sales and Use Tax Deductibility

Under previous law, sales and use taxes were allowed as a deduction in the calculation of income tax. Under current law, these taxes are no longer directly deductible. However, if the taxes were paid on the acquisition of depreciable property, the amount of taxes can be added to the basis of the property and treated as part of the cost for depreciation purposes (IRC, 1986,

Section 164(a); Wakefield, 1987). Therefore, this allows for an indirect deduction of sales and use taxes.

Other Federal Taxes

Primarily for illustrative purposes, the Social Security Tax (FICA) and the Federal Unemployment Tax (FUTA) were also included in the study. Both taxes are based on employee wages and must be paid by both the employer and employee. In the study, only those taxes paid by employers were examined.

FICA

There are two rates associated with the Social Security Tax. The first rate is for old-age, survivors, and disability insurance and, for 1988 and 1989, equals 6.06 percent. This rate increases to 6.2 percent in 1990 (IRC, 1986, Section 3111(a)). The second rate is for hospital insurance and, with respect to wages received after December 31, 1985, equals 1.45 percent (IRC, 1986, Section 3111(b)(6)). Taken together, the two rates amount to an FICA tax of 7.51 percent of wages in 1988 and 1989, and 7.65 percent for 1990 and beyond. Wages up to a maximum of $43,800 are subject to the tax (Schumacher, 1987). For the study, the 7.65 percent rate was used.

FUTA

In addition to state unemployment tax systems, the federal unemployment tax system provides for payments of unemployment compensation to workers who have lost their jobs. The federal unemployment tax (FUTA) is figured on the first $7,000 dollars in wages paid to employees (IRS, 1985; IRC, 1986, Section 3306(b)(1)). The tax rate is 6.2 percent (IRC, 1986, Section 3301(1)), subject to a credit of 5.4 percent of state unemployment taxes paid (IRC, 1986, Section

3302(b)). Consequently, the effective rate can be reduced to 0.8 percent. For the study, the full credit was assumed, and the 0.8 percent tax rate was used.

STUDY RESULTS

Background

Upon incorporation of all the tax and royalty policies into the spreadsheet models developed for the study, results were generated by which a direct comparison could be made of the relative impact those policies had on the economics of each hypothetical operation.

Three widely accepted project evaluation criteria; 1) internal rate of return (IRR; discounted cash flow rate of return or DCF-ROI), 2) payback period, and 3) net present value (NPV), were used to make the necessary economic comparisons. A compilation of tax and royalty costs was also produced that was attributable to each tax and royalty category, both in total dollars over the life of each hypothetical operation and in dollars per short ton produced. This information is presented in the form of figures and tables in the following sections.

Two separate tax and royalty evaluations were made for Minnesota per hypothetical model for the four scenarios, reflecting both former and current tax and royalty policies. South Dakota's taxes were evaluated twice for the polymetallic base metal operation; the first evaluation reflects existing tax policy whereby only gold and silver are subject to taxation, while the second assumes taxation of all metals.

Finally, it must be emphasized again that the analyses performed were primarily intended to allow for relative comparisons to be made between each state and province. Furthermore, the results that are presented are specific for the assumptions made and scenarios analyzed, and reflect the best available tax and royalty information through 1987 and a portion of 1988. However, the spreadsheets that were developed to perform those analyses are not limited to

just those assumptions and scenarios, but are capable of handling numerous variations and updates.

Presentation of Results

Underground Gold Operation

Tables 1,2,3 and 4 present the relevant tax and royalty information for each state and province on a per ton basis. Economic analysis criteria are also included. This information is depicted in graphical form in Figures 1, 2 and 3 for all four scenarios. A comparative summary follows.

NOTE: Rounding by the spreadsheet software may account for addition discrepancies of $0.01 per ton in the tables.

Underground Gold - Scenario 1

Under former state tax and royalty policies, Minnesota had the greatest state-imposed burden ($17.24 per ton) and the smallest IRR (11.29%) relative to each state and Ontario (see Table 1).

Under current tax and royalty policies, Minnesota's state-imposed burden drops to $12.24 per ton, which would put Michigan (at $13.89 per ton), and Ontario (at $12.96 per ton) ahead of it. A commensurate improvement in IRR to 14.24% also puts Minnesota ahead of Ontario (12.44%) and Michigan (13.00%).

Of the remaining states, Utah has the lowest taxes ($5.89 per ton), followed by Nevada ($6.92 per ton), Idaho ($7.28 per ton), and South Dakota ($9.29 per ton). Again, in this scenario, no royalties were assumed for these four states, or for Ontario.

Table 1: UNDERGROUND GOLD OPERATION: SCENARIO 1

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$4.51	$5.51	$5.18	$6.22	$6.65	$7.36	$7.01	$6.24
STATE/PROVINCIAL INCOME TAX	0.00	0.80	0.69	0.00	0.89	0.72	0.00	3.04
MINING TAXES	3.63	0.63	2.10	6.32	3.26	1.36	0.60	4.93
GENERAL BUSINESS TAXES	5.05	4.97	4.68	2.97	3.13	3.81	6.33	4.98
STATE ROYALTY	8.57	5.83	6.43	0.00	0.00	0.00	0.00	0.00
GRAND TOTAL	$21.76	$17.74	$19.07	$15.51	$13.94	$13.24	$13.93	$19.21
STATE TAX AND ROYALTY TOTAL	17.24	12.24	13.89	9.29	7.28	5.88	6.92	12.96
STATE TAX TOTAL	8.67	6.40	7.46	9.29	7.28	5.88	6.92	12.96
PERCENT IRR	11.29%	14.24%	13.00%	15.20%	16.30%	16.59%	16.14%	12.44%
PAYBACK (YEARS)	7.13	5.22	6.42	5.24	4.80	4.71	4.83	5.81
NPV @10% ($ MILLIONS)	2.83	9.42	6.77	12.08	14.73	15.59	14.50	5.58

Table 2: UNDERGROUND GOLD OPERATION: SCENARIO 2

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$4.51	$5.51	$5.18	$6.22	$5.30	$6.04	$7.01	$6.24
STATE/PROVINCIAL INCOME TAX	0.00	0.80	0.69	0.00	0.63	0.58	0.00	3.04
MINING TAXES	3.63	0.63	2.10	6.32	3.16	1.36	0.60	4.93
GENERAL BUSINESS TAXES	5.05	4.97	4.68	2.97	3.13	3.81	6.33	4.98
STATE ROYALTY	8.57	5.83	6.43	0.00	5.97	4.32	0.00	0.00
GRAND TOTAL	$21.76	$17.74	$19.07	$15.51	$18.18	$16.11	$13.93	$19.21
STATE TAX AND ROYALTY TOTAL	17.24	12.24	13.89	9.29	12.89	10.07	6.92	12.96
STATE TAX TOTAL	8.67	6.40	7.46	9.29	6.92	5.75	6.92	12.96
PERCENT IRR	11.29%	14.24%	13.00%	15.20%	13.71%	14.82%	16.14%	12.44%
PAYBACK (YEARS)	7.13	5.22	6.42	5.24	6.11	5.49	4.83	5.81
NPV @10% ($ MILLIONS)	2.83	9.42	6.77	12.08	8.40	11.21	14.50	5.58

Table 3: UNDERGROUND GOLD OPERATION: SCENARIO 3

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$5.26	$5.79	$5.55	$5.35	$5.55	$6.13	$5.79	$5.28
STATE/PROVINCIAL INCOME TAX	0.00	0.84	0.68	0.00	0.71	0.59	0.00	2.60
MINING TAXES	4.11	0.63	2.10	6.05	3.19	1.54	0.52	4.93
GENERAL BUSINESS TAXES	5.05	4.97	4.68	2.97	3.13	3.81	6.33	4.98
ROYALTY	4.33	4.59	4.59	4.22	4.59	4.41	4.59	4.59
GRAND TOTAL	$18.75	$16.82	$17.61	$18.59	$17.17	$16.48	$17.23	$22.39
STATE TAX AND ROYALTY TOTAL	13.49	11.03	12.06	13.24	11.62	10.35	11.43	17.11
STATE TAX TOTAL	9.16	6.44	7.47	9.02	7.03	5.94	6.84	12.52
PERCENT IRR	13.11%	14.50%	13.89%	13.35%	14.34%	14.65%	14.16%	10.35%
PAYBACK (YEARS)	6.38	5.69	6.09	6.27	5.77	5.57	5.95	6.87
NPV @10% ($ MILLIONS)	7.08	10.32	8.90	7.57	9.89	10.74	9.57	0.78

Table 4: UNDERGROUND GOLD OPERATION: SCENARIO 4

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$6.21	$7.00	$6.75	$6.22	$6.65	$7.36	$7.01	$6.24
STATE/PROVINCIAL INCOME TAX	0.00	0.97	0.65	0.00	0.89	0.72	0.00	3.04
MINING TAXES	4.08	0.63	2.01	6.32	3.26	1.36	0.60	4.93
GENERAL BUSINESS TAXES	5.05	4.97	4.68	2.97	3.13	3.81	6.33	4.98
ROYALTY (NONE ASSUMED)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRAND TOTAL	$15.34	$13.57	$14.10	$15.51	$13.94	$13.24	$13.93	$19.21
STATE TAX AND ROYALTY TOTAL	9.12	6.57	7.35	9.29	7.28	5.88	6.92	12.96
PERCENT IRR	15.16%	16.46%	16.04%	15.20%	16.30%	16.59%	16.14%	12.44%
PAYBACK (YEARS)	5.29	4.74	4.88	5.24	4.80	4.71	4.83	5.81
NPV @10% ($ MILLIONS)	12.12	15.18	14.19	12.08	14.73	15.59	14.50	5.58

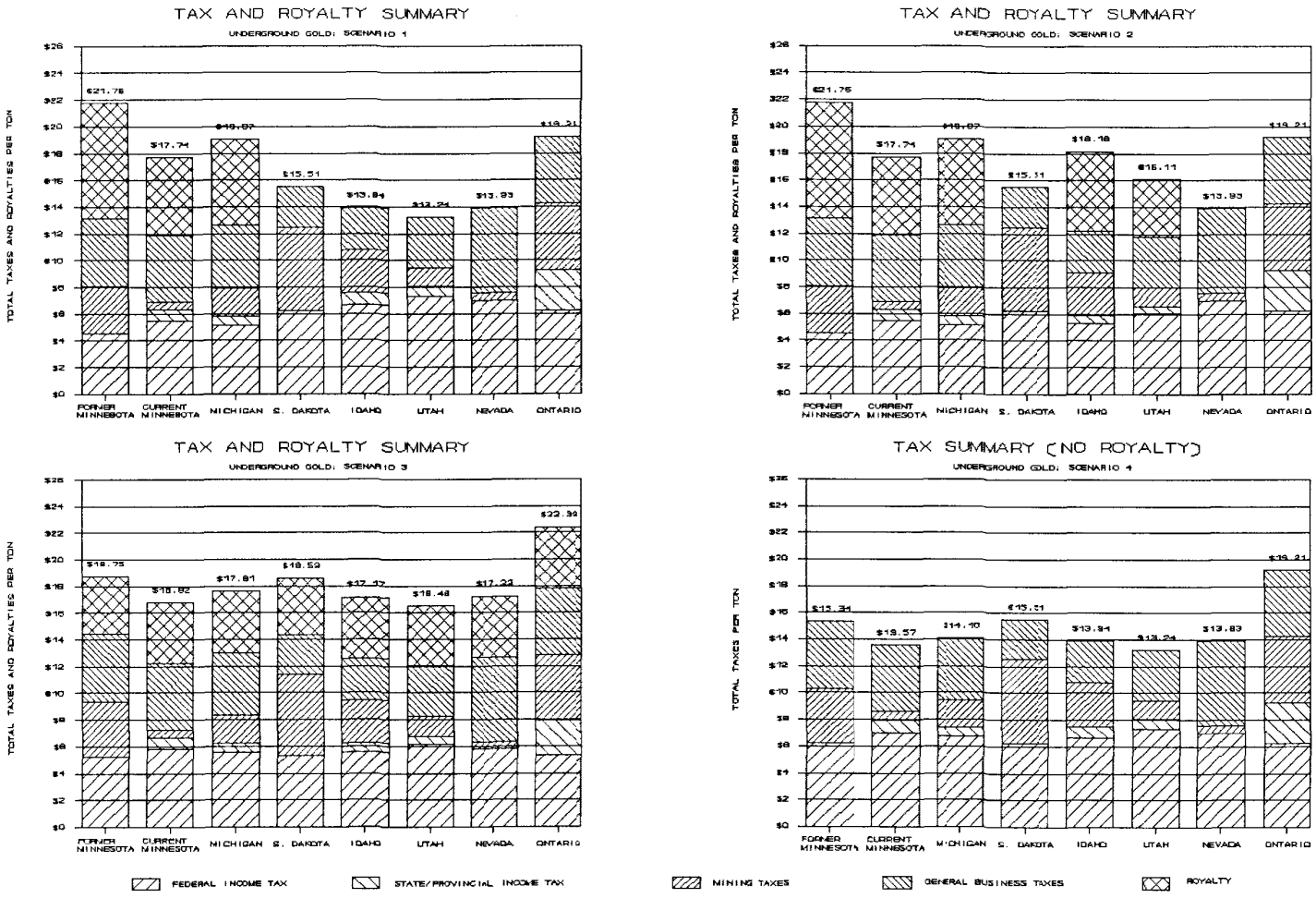

Figure 1. Total taxes and royalties per short ton of ore produced over life of operation: UNDERGROUND GOLD MODEL

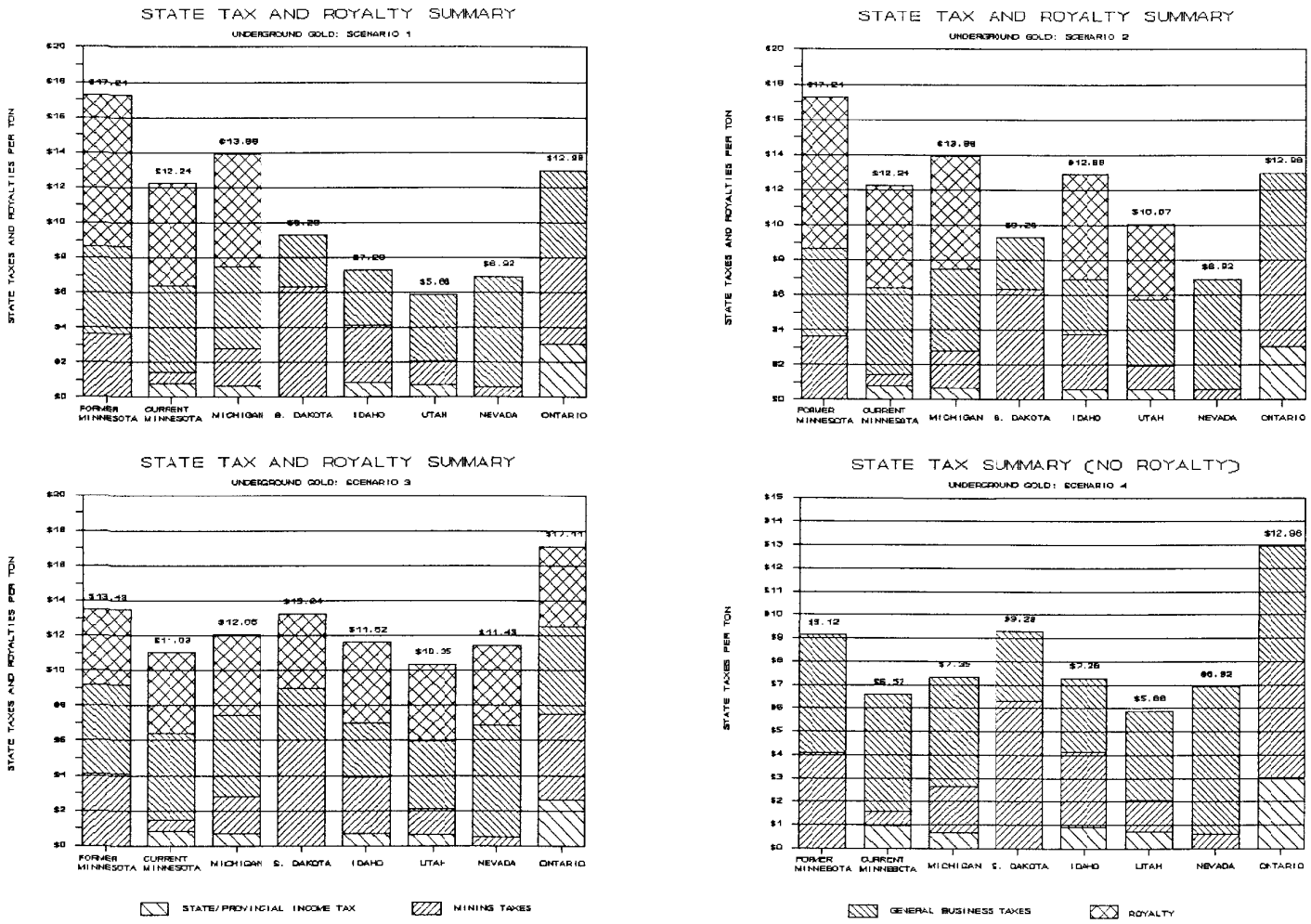

Figure 2. Total state/provincial taxes and royalties per short ton of ore produced over life of operation: UNDERGROUND GOLD MODEL

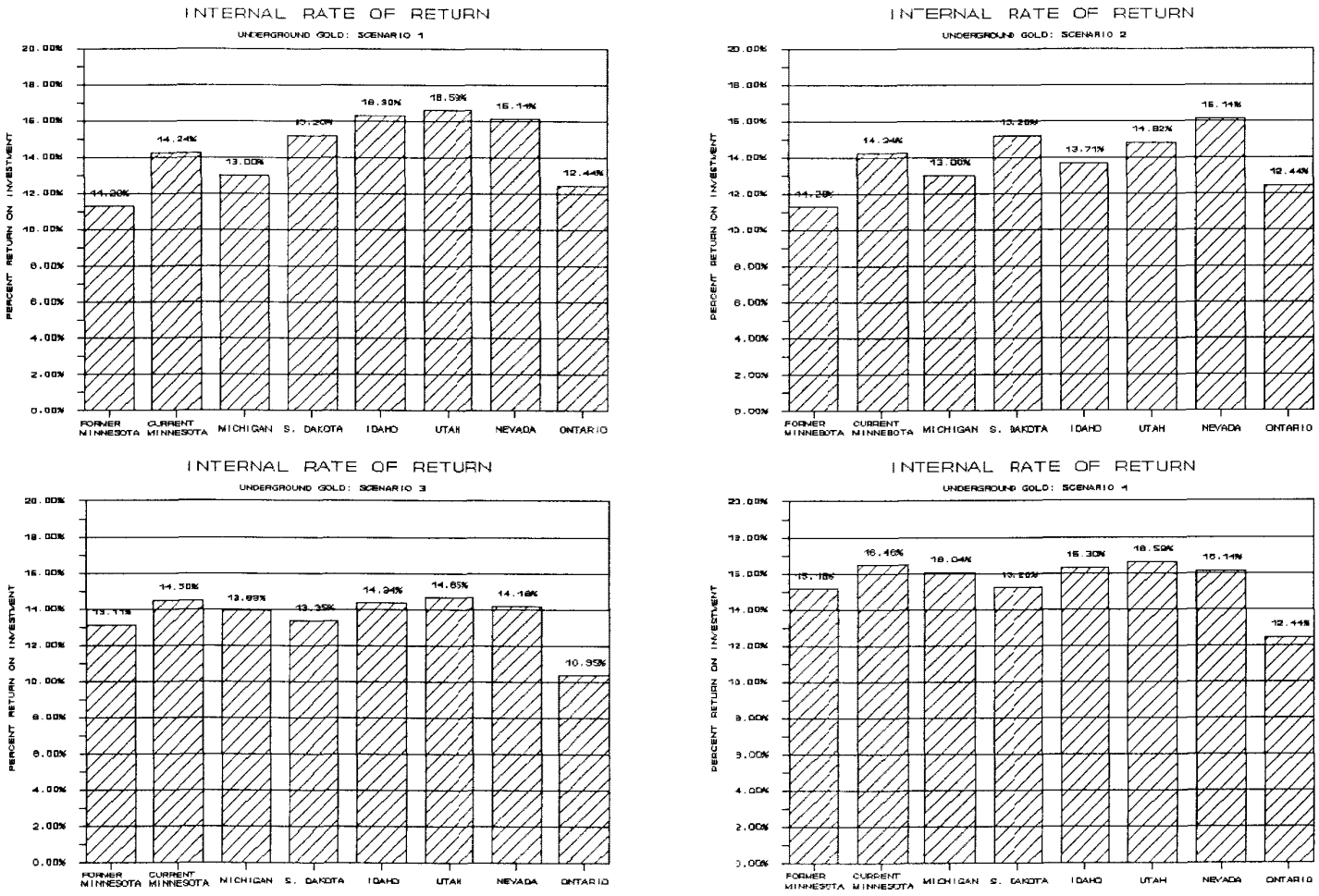

Figure 3. Internal Rate of Return for each evaluated scenario: UNDERGROUND GOLD MODEL

In the order of greatest combined state tax and royalty burden per ton to the smallest (1 being greatest and 7 being smallest), the six states and Ontario ranked as follows for Scenario 1:

FORMER MINNESOTA v OTHERS		CURRENT MINNESOTA v OTHERS	
1) MINNESOTA	$17.24	1) MICHIGAN	$13.89
2) MICHIGAN	13.89	2) ONTARIO	12.96
3) ONTARIO	12.96	3) MINNESOTA	12.24
4) SOUTH DAKOTA	9.29	4) SOUTH DAKOTA	9.29
5) IDAHO	7.28	5) IDAHO	7.28
6) NEVADA	6.92	6) NEVADA	6.92
7) UTAH	5.88	7) UTAH	5.88

Underground Gold - Scenario 2

In this scenario, state royalties were included for Idaho and Utah. Consequently, the additional cost boosted their combined state tax and royalty burdens to $12.89 per ton and $10.07 per ton, respectively (see Table 2).

In the order of greatest combined state tax and royalty burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 2:

FORMER MINNESOTA v OTHERS		CURRENT MINNESOTA v OTHERS	
1) MINNESOTA	$17.24	1) MICHIGAN	$13.89
2) MICHIGAN	13.89	2) ONTARIO	12.96
3) ONTARIO	12.96	3) IDAHO	12.89
4) IDAHO	12.89	4) MINNESOTA	12.24
5) UTAH	10.07	5) UTAH	10.07
6) SOUTH DAKOTA	9.29	6) SOUTH DAKOTA	9.29
7) NEVADA	6.92	7) NEVADA	6.92

Underground Gold - Scenario 3

In this scenario, a uniform five percent (5%) net smelter return royalty was assumed for each state and province (see Table 3). Under these circumstances, Ontario had the highest combined taxes and royalties ($17.11 per ton), while Minnesota dropped from second highest ($13.43 per ton) to second

lowest ($11.03 per ton), reflecting the differences between former and current taxing policies. Utah, at $10.35 per ton, had the lowest combined total.

In the order of greatest combined state tax and royalty burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 3:

FORMER MINNESOTA v OTHERS		CURRENT MINNESOTA v OTHERS	
1) ONTARIO	$17.11	1) ONTARIO	$17.11
2) MINNESOTA	13.49	2) SOUTH DAKOTA	13.24
3) SOUTH DAKOTA	13.24	3) MICHIGAN	12.06
4) MICHIGAN	12.06	4) IDAHO	11.62
5) IDAHO	11.62	5) NEVADA	11.43
6) NEVADA	11.43	6) MINNESOTA	11.03
7) UTAH	10.35	7) UTAH	10.35

Underground Gold - Scenario 4

In this scenario, no production royalty payment was assumed; only taxes were considered (see Table 4).

In the order of greatest combined state tax burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 4:

FORMER MINNESOTA v OTHERS		CURRENT MINNESOTA v OTHERS	
1) ONTARIO	$12.96	1) ONTARIO	$12.96
2) SOUTH DAKOTA	9.29	2) SOUTH DAKOTA	9.29
3) MINNESOTA	9.12	3) MICHIGAN	7.35
4) MICHIGAN	7.35	4) IDAHO	7.28
5) IDAHO	7.28	5) NEVADA	6.92
6) NEVADA	6.92	6) MINNESOTA	6.57
7) UTAH	5.88	7) UTAH	5.88

Surface Gold Operation

Tables 5, 6, 7, and 8 present the relevant tax and royalty information for each state and province on a per ton basis for this model. Economic analysis criteria are also included. This information is depicted in graphical form in Figures 4, 5 and 6 for all four scenarios. A comparative summary follows.

Table 5: SURFACE GOLD OPERATION: SCENARIO 1

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$4.19	$5.01	$5.20	$5.05	$5.27	$5.81	$5.99	$4.53
STATE/PROVINCIAL INCOME TAX	0.00	0.58	0.25	0.00	0.72	0.55	0.00	2.10
MINING TAXES	3.59	0.46	1.05	3.21	2.14	0.65	0.39	3.57
GENERAL BUSINESS TAXES	0.74	0.65	0.56	0.70	0.46	0.82	0.76	1.09
STATE ROYALTY	2.04	2.23	1.44	0.00	0.00	0.00	0.00	0.00
GRAND TOTAL	$10.56	$8.93	$8.50	$8.95	$8.60	$7.83	$7.15	$11.30
STATE TAX AND ROYALTY TOTAL	6.38	3.92	3.30	3.91	3.33	2.01	1.15	6.76
STATE TAX TOTAL	4.34	1.69	1.86	3.91	3.33	2.01	1.15	6.76
PERCENT IRR	40.00%	46.23%	45.69%	44.24%	45.81%	46.69%	48.74%	37.93%
PAYBACK (YEARS)	1.77	1.47	1.52	1.58	1.52	1.50	1.41	1.65
NPV @10% ($ MILLIONS)	46.86	56.05	57.32	54.99	57.04	60.58	64.15	41.66

Table 6: SURFACE GOLD OPERATION: SCENARIO 2

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$4.19	$5.01	$5.20	$5.05	$4.90	$5.34	$5.99	$4.53
STATE/PROVINCIAL INCOME TAX	0.00	0.58	0.25	0.00	0.66	0.50	0.00	2.10
MINING TAXES	3.59	0.46	1.05	3.21	2.12	0.65	0.39	3.57
GENERAL BUSINESS TAXES	0.74	0.65	0.56	0.70	0.46	0.82	0.76	1.09
STATE ROYALTY	2.04	2.23	1.44	0.00	1.17	1.44	0.00	0.00
GRAND TOTAL	$10.56	$8.93	$8.50	$8.95	$9.32	$8.75	$7.15	$11.30
STATE TAX AND ROYALTY TOTAL	6.38	3.92	3.30	3.91	4.42	3.41	1.15	6.76
STATE TAX TOTAL	4.34	1.69	1.86	3.91	3.25	1.97	1.15	6.76
PERCENT IRR	40.00%	46.23%	45.69%	44.24%	44.04%	44.52%	48.74%	37.93%
PAYBACK (YEARS)	1.77	1.47	1.52	1.58	1.59	1.58	1.41	1.65
NPV @10% ($ MILLIONS)	46.86	56.05	57.32	54.99	53.45	56.00	64.15	41.66

Table 7: SURFACE GOLD OPERATION: SCENARIO 3

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$4.33	$5.25	$5.16	$4.59	$4.79	$5.31	$5.48	$4.15
STATE/PROVINCIAL INCOME TAX	0.00	0.59	0.25	0.00	0.65	0.50	0.00	1.93
MINING TAXES	3.84	0.46	1.06	3.15	2.11	0.72	0.36	3.57
GENERAL BUSINESS TAXES	0.74	0.65	0.56	0.70	0.46	0.82	0.76	1.09
ROYALTY	1.61	1.80	1.80	1.66	1.80	1.73	1.80	1.80
GRAND TOTAL	$10.52	$8.75	$8.84	$10.09	$9.81	$9.07	$8.41	$12.54
STATE TAX AND ROYALTY TOTAL	6.19	3.50	3.67	5.50	5.02	3.76	2.92	8.39
STATE TAX TOTAL	4.58	1.70	1.87	3.85	3.22	2.03	1.12	6.59
PERCENT IRR	40.13%	45.62%	44.86%	41.45%	42.81%	43.74%	45.79%	34.52%
PAYBACK (YEARS)	1.76	1.52	1.56	1.69	1.64	1.61	1.51	1.83
NPV @10% ($ MILLIONS)	47.08	56.35	55.61	49.33	51.00	54.39	57.87	35.42

Table 8: SURFACE GOLD OPERATION: SCENARIO 4

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$4.79	$5.75	$5.69	$5.05	$5.27	$5.81	$5.99	$4.53
STATE/PROVINCIAL INCOME TAX	0.00	0.64	0.25	0.00	0.72	0.55	0.00	2.10
MINING TAXES	3.85	0.46	1.05	3.21	2.14	0.65	0.39	3.57
GENERAL BUSINESS TAXES	0.74	0.65	0.56	0.70	0.46	0.82	0.76	1.09
ROYALTY (NONE ASSUMED)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRAND TOTAL	$9.38	$7.50	$7.55	$8.95	$8.60	$7.83	$7.15	$11.30
STATE TAX AND ROYALTY TOTAL	4.59	1.76	1.86	3.91	3.33	2.01	1.15	6.76
PERCENT IRR	43.03%	48.60%	47.95%	44.24%	45.81%	46.69%	48.74%	37.93%
PAYBACK (YEARS)	1.63	1.41	1.44	1.58	1.52	1.50	1.41	1.65
NPV @10% ($ MILLIONS)	52.76	62.56	62.06	54.99	57.04	60.58	64.15	41.66

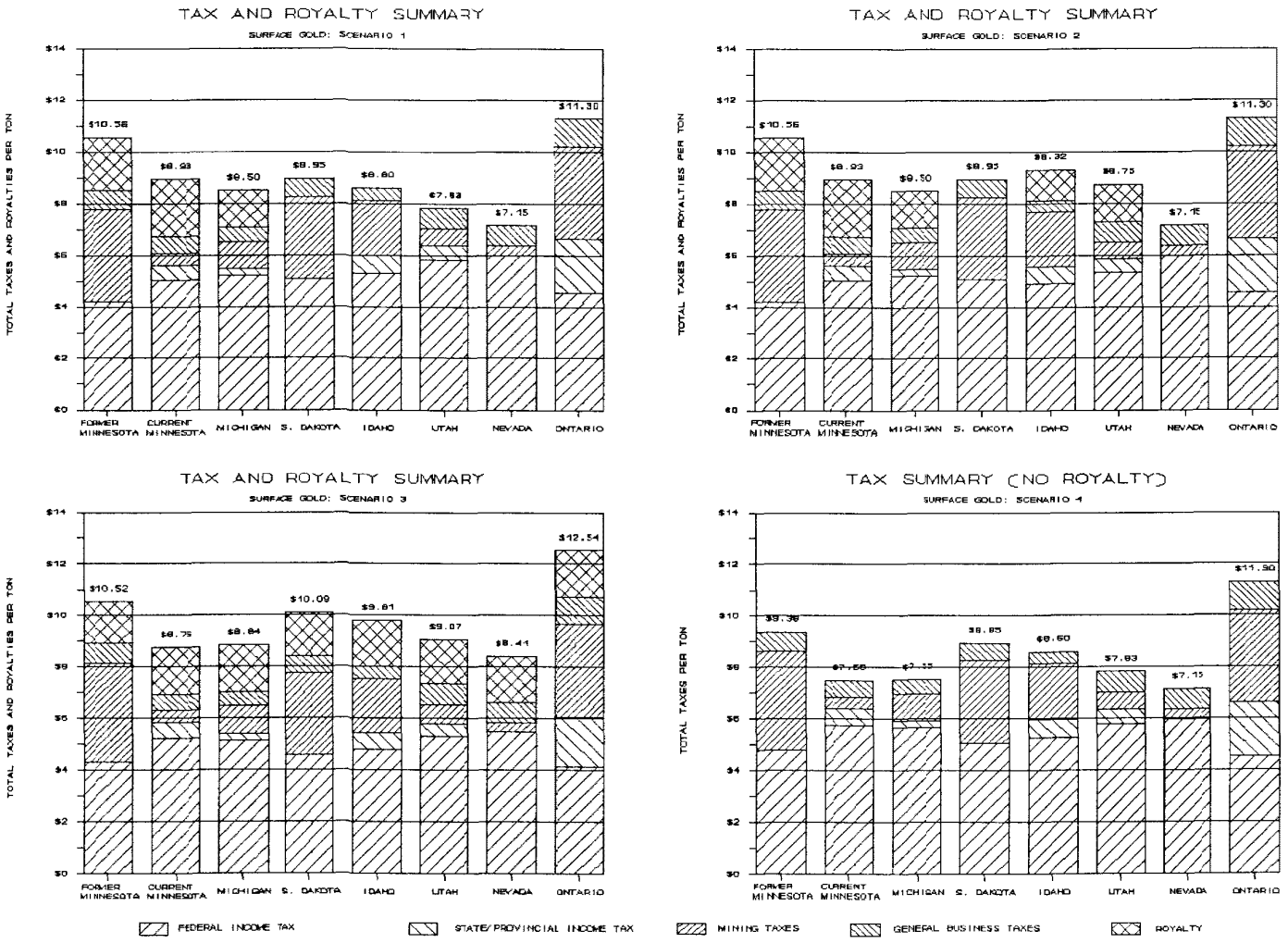

Figure 4. Total taxes and royalties per short ton of ore produced over life of operation: SURFACE GOLD MODEL

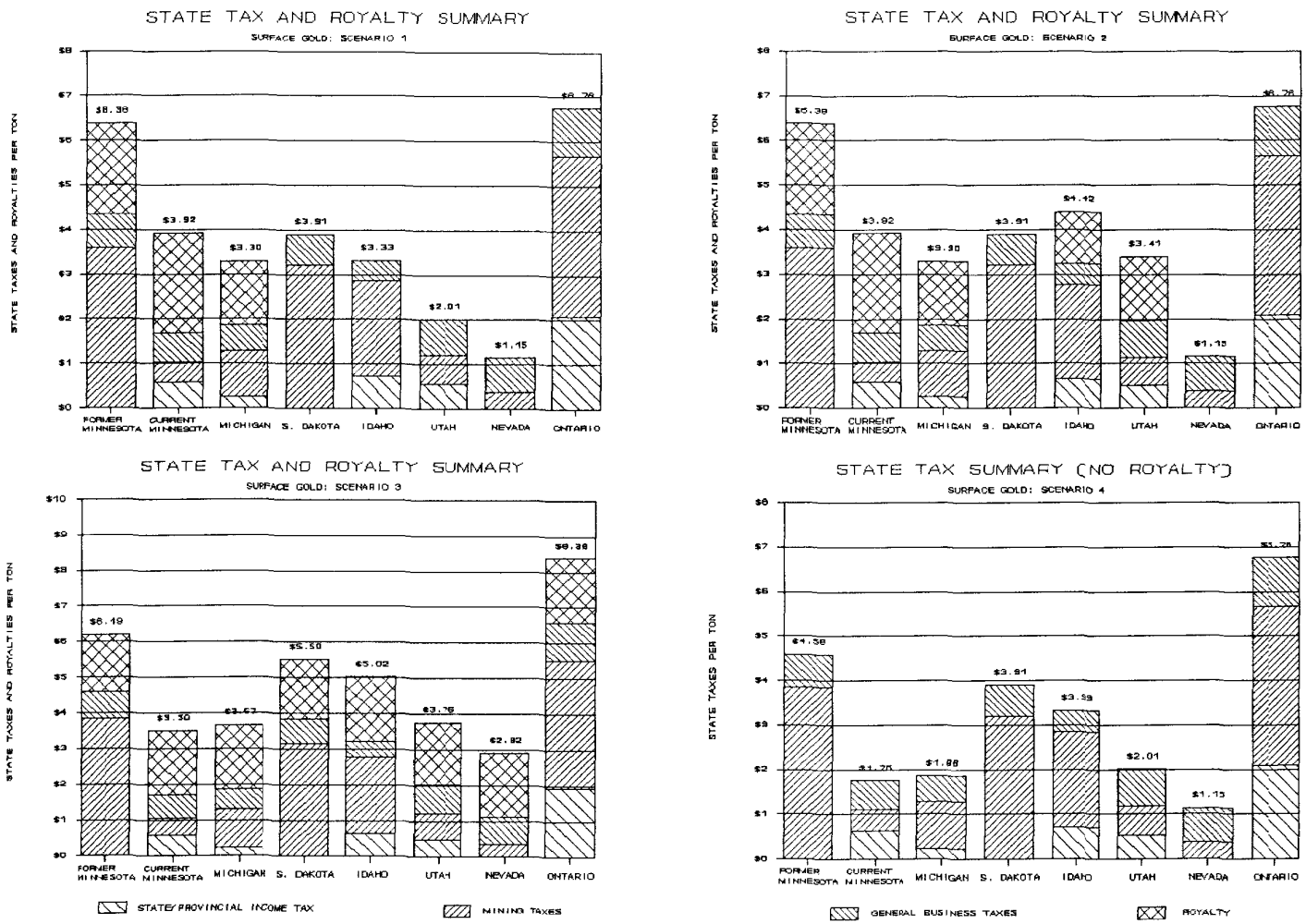

Figure 5. Total state\provincial taxes and royalties per short ton of ore produced over life of operation: SURFACE GOLD MODEL

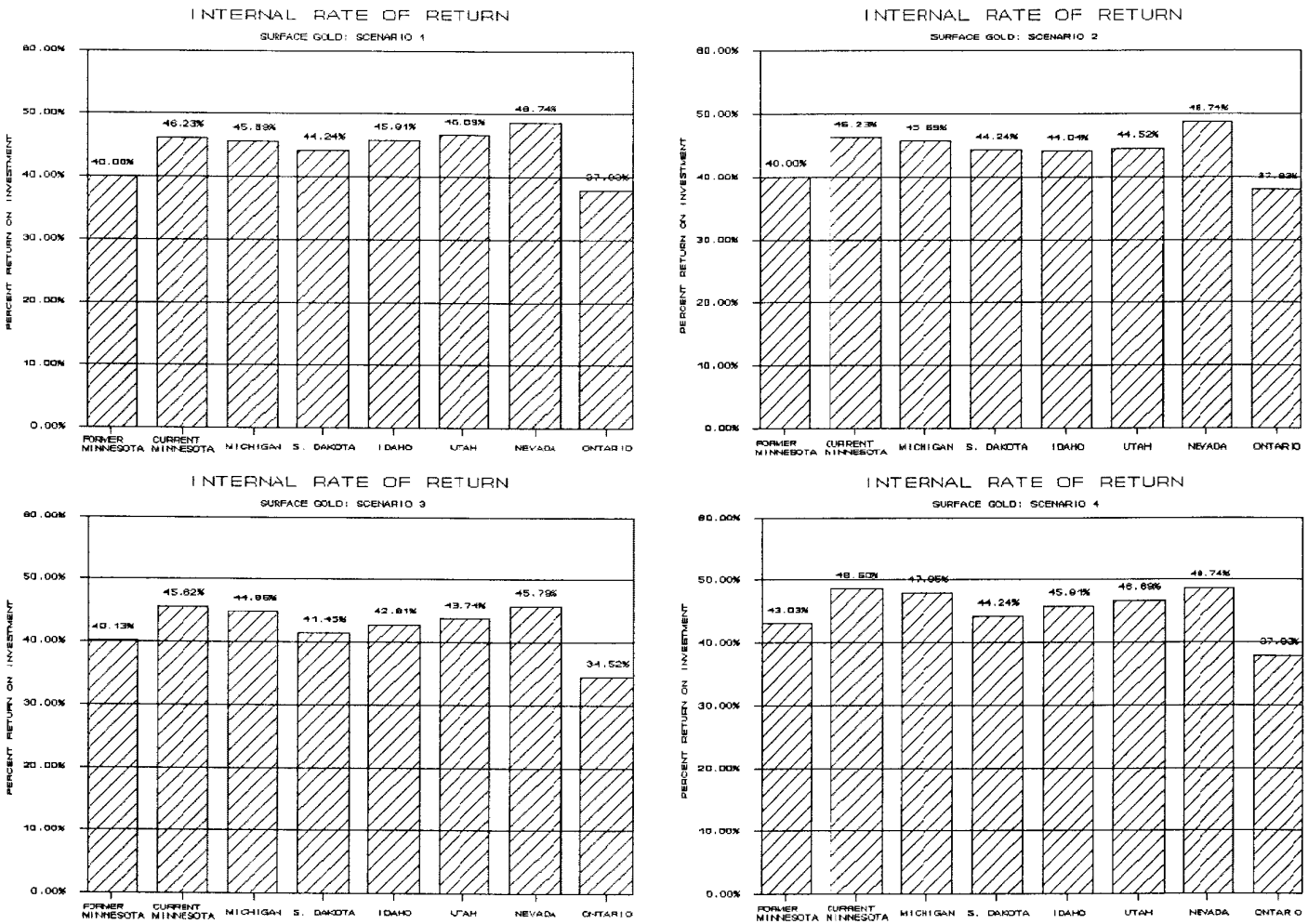

Figure 6. nternal Rate of Return for each evaluated scerario:
SURFACE GOLD MODEL

Surface Gold Scenario 1

Under former state tax and royalty policies, Minnesota had the second greatest state-imposed burden ($6.38 per ton) and the second smallest IRR (40.00%) relative to each state and Ontario (Table 4). Only Ontario had a greater state/provincial burden ($6.76 per ton) and lower IRR (37.93%).

Under current tax and royalty policies, Minnesota's state-imposed burden drops to $3.92 per ton, with a commensurate improvement in IRR to 46.23%. Of the remaining states, Nevada has the lowest burden ($1.15 per ton) and the best IRR (48.74%) (Table 5 and Figures 4, 5 and 6). In the order of greatest combined state tax and royalty burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 1:

FORMER MINNESOTA v OTHERS	
1) ONTARIO	$6.76
2) MINNESOTA	6.38
3) SOUTH DAKOTA	3.91
4) IDAHO	3.33
5) MICHIGAN	3.30
6) UTAH	2.01
7) NEVADA	1.15

CURRENT MINNESOTA v OTHERS	
1) ONTARIO	$6.76
2) MINNESOTA	3.92
3) SOUTH DAKOTA	3.91
4) IDAHO	3.33
5) MICHIGAN	3.30
6) UTAH	2.01
7) NEVADA	1.15

Surface Gold - Scenario 2

In this scenario, state royalties were included for Idaho and Utah. Consequently, the additional cost boosted their combined state tax and royalty burdens accordingly (Table 6). In the order of greatest combined state tax and royalty burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 2:

FORMER MINNESOTA v OTHERS	
1) ONTARIO	$6.76
2) MINNESOTA	6.38
3) IDAHO	4.42
4) SOUTH DAKOTA	3.91
5) UTAH	3.41
6) MICHIGAN	3.30
7) NEVADA	1.15

CURRENT MINNESOTA v OTHERS	
1) ONTARIO	$6.76
2) IDAHO	4.42
3) MINNESOTA	3.92
4) SOUTH DAKOTA	3.91
5) UTAH	3.41
6) MICHIGAN	3.30
7) NEVADA	1.15

Surface Gold - Scenario 3

In this scenario, a uniform five percent (5%) net smelter return royalty was assumed for each state and province (Table 7). In the order of greatest combined state tax and royalty burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 3:

FORMER MINNESOTA v OTHERS	
1) ONTARIO	$8.39
2) MINNESOTA	6.19
3) SOUTH DAKOTA	5.50
4) IDAHO	5.02
5) UTAH	3.76
6) MICHIGAN	3.67
7) NEVADA	2.92

CURRENT MINNESOTA v OTHERS	
1) ONTARIO	$8.39
2) SOUTH DAKOTA	5.50
3) IDAHO	5.02
4) UTAH	3.76
5) MICHIGAN	3.67
6) MINNESOTA	3.50
7) NEVADA	2.92

Surface Gold - Scenario 4

In this scenario, no production royalty payment was assumed; only taxes were considered (Table 8). In the order of greatest combined state tax burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 4:

FORMER MINNESOTA v OTHERS		CURRENT MINNESOTA v OTHERS	
1) ONTARIO	$6.76	1) ONTARIO	$6.76
2) MINNESOTA	4.59	2) SOUTH DAKOTA	3.91
3) SOUTH DAKOTA	3.91	3) IDAHO	3.33
4) IDAHO	3.33	4) UTAH	2.01
5) UTAH	2.01	5) MICHIGAN	1.86
6) MICHIGAN	1.86	6) MINNESOTA	1.76
7) NEVADA	1.15	7) NEVADA	1.15

Underground Polymetallic Operation

Tables 9, 10, 11, and 12 present the relevant tax and royalty information for each state and province on a per ton basis for this model, as well as economic analysis criteria. This information is depicted in graphical form in Figures 7, 8 and 9 for all four scenarios. A comparative summary follows.

Underground Polymetallic - Scenario 1

Under former state tax and royalty policies, Minnesota had, by far, the greatest state-imposed burden ($19.83 per ton) and the smallest IRR (23.95%) relative to each state and Ontario for this evaluated scenario (Table 9). By comparison, Ontario, with a total burden of $11.74 per ton, was the next highest.

However, when Minnesota's current tax and royalty policies were evaluated, the state-imposed burden dropped to $8.57 per ton, with a commensurate improvement in IRR to 34.56%. Of the remaining states, Nevada has the lowest burden ($2.80 per ton) and the best IRR (37.00%) (Table 9 and Figures 7, 8 and 9).

Table 9: UNDERGROUND POLYMETALLIC OPERATION: SCENARIO 1

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK (Au/Ag)	S.DAK (All)	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$4.54	$7.75	$7.64	$9.28	$8.07	$8.64	$9.45	$9.80	$8.21
STATE/PROVINCIAL INCOME TAX	0.00	0.99	0.48	0.00	0.00	1.27	0.94	0.00	3.84
MINING TAXES	5.92	0.79	2.65	3.03	6.59	3.63	1.38	0.70	6.64
GENERAL BUSINESS TAXES	1.71	1.66	1.52	1.18	1.18	1.00	1.58	2.10	1.26
STATE ROYALTY	12.21	5.12	4.19	0.00	0.00	0.00	0.00	0.00	0.00
GRAND TOTAL	$24.38	$16.32	$16.47	$13.50	$15.85	$14.53	$13.35	$12.60	$19.95
STATE TAX AND ROYALTY TOTAL	19.83	8.57	8.84	4.22	7.77	5.89	3.90	2.80	11.74
STATE TAX TOTAL	7.62	3.45	4.65	4.22	7.77	5.89	3.90	2.80	11.74
PERCENT IRR	23.95%	34.56%	32.89%	35.84%	33.60%	35.50%	36.26%	37.00%	30.35%
PAYBACK (YEARS)	3.38	2.17	2.37	2.13	2.30	2.14	2.09	2.04	2.14
NPV @10% ($ MILLIONS)	78.54	141.80	137.23	158.62	141.98	141.98	130.05	135.94	166.85

Table 10: UNDERGROUND POLYMETALLIC OPERATION: SCENARIO 2

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK (Au/Ag)	S.DAK (All)	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$4.54	$7.75	$7.64	$9.28	$8.07	$6.94	$7.68	$9.80	$8.21
STATE/PROVINCIAL INCOME TAX	0.00	0.99	0.48	0.00	0.00	1.01	0.76	0.00	3.84
MINING TAXES	5.92	0.79	2.65	3.03	6.59	3.53	1.38	0.70	6.64
GENERAL BUSINESS TAXES	1.71	1.66	1.52	1.18	1.18	1.00	1.58	2.10	1.26
STATE ROYALTY	12.21	5.12	4.19	0.00	0.00	5.21	5.36	0.00	0.00
GRAND TOTAL	$24.38	$16.32	$16.47	$13.50	$15.85	$17.68	$16.77	$12.60	$19.95
STATE TAX AND ROYALTY TOTAL	19.83	8.57	8.84	4.22	7.77	10.75	9.09	2.80	11.74
STATE TAX TOTAL	7.62	3.45	4.65	4.22	7.77	5.53	3.73	2.80	11.74
PERCENT IRR	23.95%	34.56%	32.89%	35.84%	33.60%	32.08%	32.63%	37.00%	30.35%
PAYBACK (YEARS)	3.38	2.17	2.37	2.13	2.30	2.44	2.38	2.04	2.14
NPV @10% ($ MILLIONS)	78.54	141.80	137.23	158.62	141.98	130.05	135.94	166.85	114.12

Table 11: UNDERGROUND POLYMETALLIC OPERATION: SCENARIO 3

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK (Au/Ag)	S.DAK (All)	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$6.76	$8.56	$8.13	$8.43	$7.29	$7.75	$8.60	$8.90	$7.53
STATE/PROVINCIAL INCOME TAX	0.00	1.05	0.48	0.00	0.00	1.13	0.85	0.00	3.53
MINING TAXES	7.34	0.79	2.70	3.05	6.40	3.58	1.51	0.64	6.64
GENERAL BUSINESS TAXES	1.71	1.66	1.52	1.18	1.18	1.00	1.58	2.10	1.26
ROYALTY	2.94	3.26	3.26	3.00	3.00	3.26	3.13	3.26	3.26
GRAND TOTAL	$18.75	$15.31	$16.09	$15.66	$17.87	$16.71	$15.67	$14.90	$22.21
STATE TAX AND ROYALTY TOTAL	11.98	6.76	7.96	7.23	10.58	8.96	7.07	6.00	14.68
STATE TAX TOTAL	9.04	3.50	4.70	4.23	7.58	5.71	3.94	2.74	11.42
PERCENT IRR	30.30%	34.60%	33.39%	33.68%	31.50%	33.28%	33.89%	34.71%	27.88%
PAYBACK (YEARS)	2.60	2.21	2.31	2.29	2.48	2.32	2.26	2.20	2.37
NPV @10% ($ MILLIONS)	120.23	147.37	140.20	142.91	127.25	137.48	144.19	150.01	97.64

Table 11: UNDERGROUND POLYMETALLIC OPERATION: SCENARIO 3

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK (Au/Ag)	S.DAK (All)	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$6.76	$8.56	$8.13	$8.43	$7.29	$7.75	$8.60	$8.90	$7.53
STATE/PROVINCIAL INCOME TAX	0.00	1.05	0.48	0.00	0.00	1.13	0.85	0.00	3.53
MINING TAXES	7.34	0.79	2.70	3.05	6.40	3.58	1.51	0.64	6.64
GENERAL BUSINESS TAXES	1.71	1.66	1.52	1.18	1.18	1.00	1.58	2.10	1.26
ROYALTY	2.94	3.26	3.26	3.00	3.00	3.26	3.13	3.26	3.26
GRAND TOTAL	$18.75	$15.31	$16.09	$15.66	$17.87	$16.71	$15.67	$14.90	$22.21
STATE TAX AND ROYALTY TOTAL	11.98	6.76	7.96	7.23	10.58	8.96	7.07	6.00	14.68
STATE TAX TOTAL	9.04	3.50	4.70	4.23	7.58	5.71	3.94	2.74	11.42
PERCENT IRR	30.30%	34.60%	33.39%	33.68%	31.50%	33.28%	33.89%	34.71%	27.88%
PAYBACK (YEARS)	2.60	2.21	2.31	2.29	2.48	2.32	2.26	2.20	2.37
NPV @10% ($ MILLIONS)	120.23	147.37	140.20	142.91	127.25	137.48	144.19	150.01	97.64

Table 12: UNDERGROUND POLYMETALLIC OPERATION: SCENARIO 4

Tax and royalty costs per ton mined over life of operation and associated economic evaluation criteria (IRR, Payback and NPV).

	OLD MINN	CURRENT MINN	MICH	S.DAK (Au/Ag)	S.DAK (All)	IDAHO	UTAH	NEVADA	ONTARIO
FEDERAL INCOME TAX	$7.58	$9.44	$9.06	$9.28	$8.07	$8.64	$9.45	$9.80	$8.21
STATE/PROVINCIAL INCOME TAX	0.00	1.14	0.48	0.00	0.00	1.27	0.94	0.00	3.84
MINING TAXES	7.37	0.79	2.65	3.03	6.59	3.63	1.38	0.70	6.64
GENERAL BUSINESS TAXES	1.71	1.66	1.52	1.18	1.18	1.00	1.58	2.10	1.26
ROYALTY (NONE ASSUMED)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRAND TOTAL	$16.66	$13.03	$13.71	$13.50	$15.85	$14.53	$13.35	$12.60	$19.95
STATE TAX AND ROYALTY TOTAL	9.08	3.59	4.65	4.22	7.77	5.89	3.90	2.80	11.74
PERCENT IRR	32.54%	36.90%	35.83%	35.84%	33.60%	35.50%	36.26%	37.00%	30.35%
PAYBACK (YEARS)	2.40	2.05	2.13	2.13	2.30	2.14	2.09	2.04	2.14
NPV @10% ($ MILLIONS)	135.67	164.04	157.63	158.62	141.98	153.34	161.26	166.85	114.12

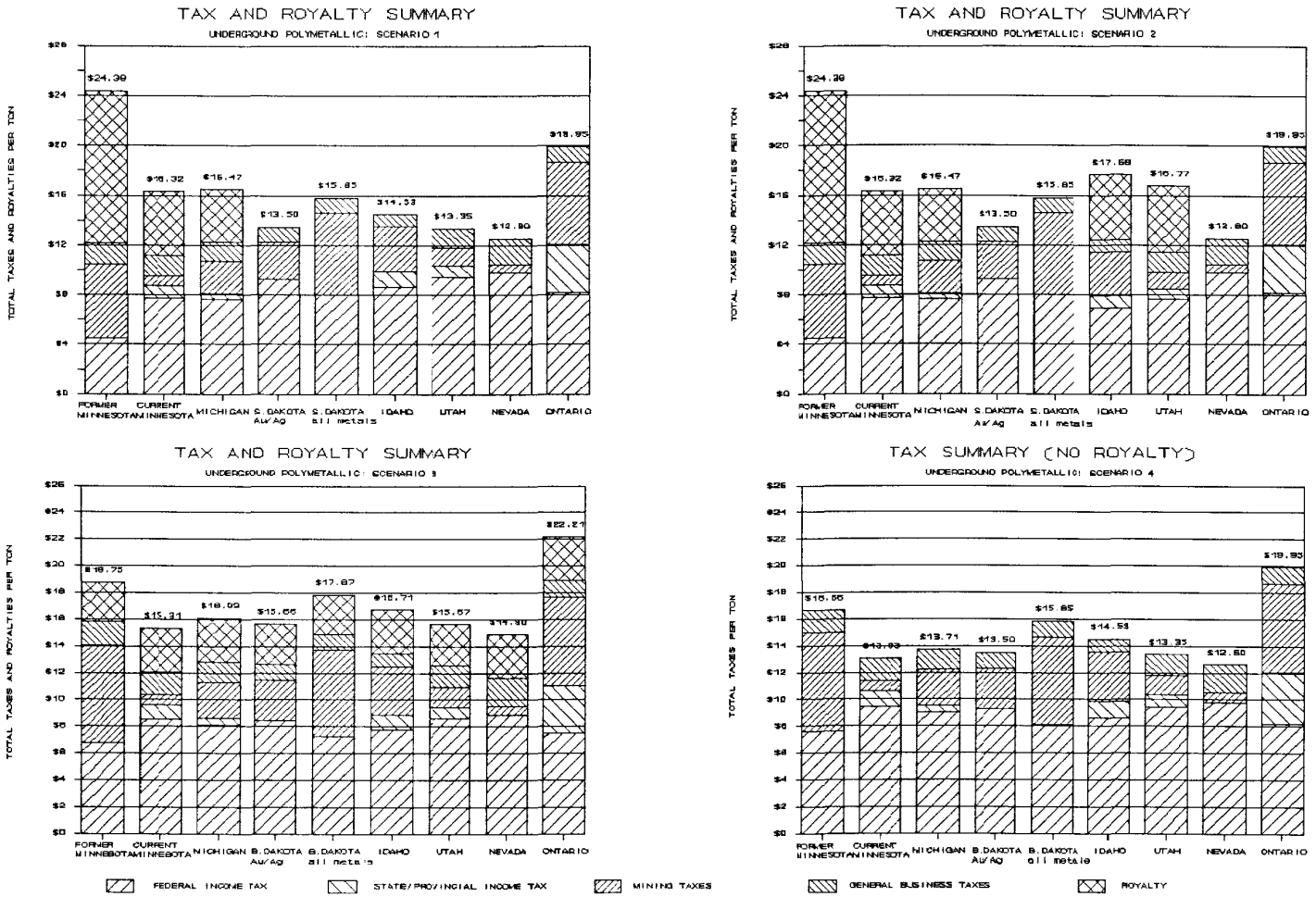

Figure 7. Total taxes and royalties per short ton of ore produced over life of operation: UNDERGROUND POLYMETALLIC BASE METAL MODEL

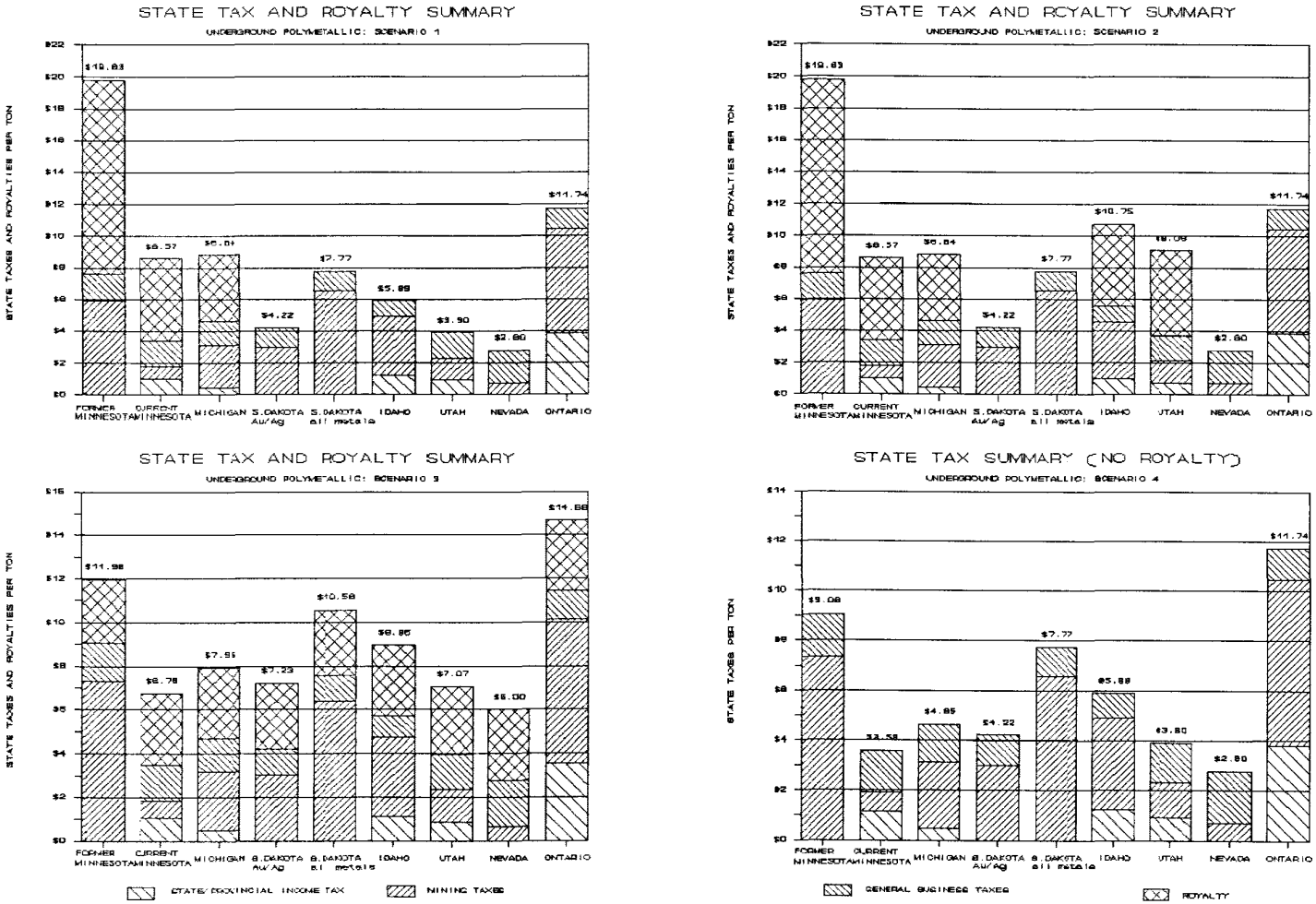

Figure 8. Total state/provincial taxes and royalties per short ton of ore produced over life of operation: UNDERGROUND POLYMETALLIC BASE METAL MODEL

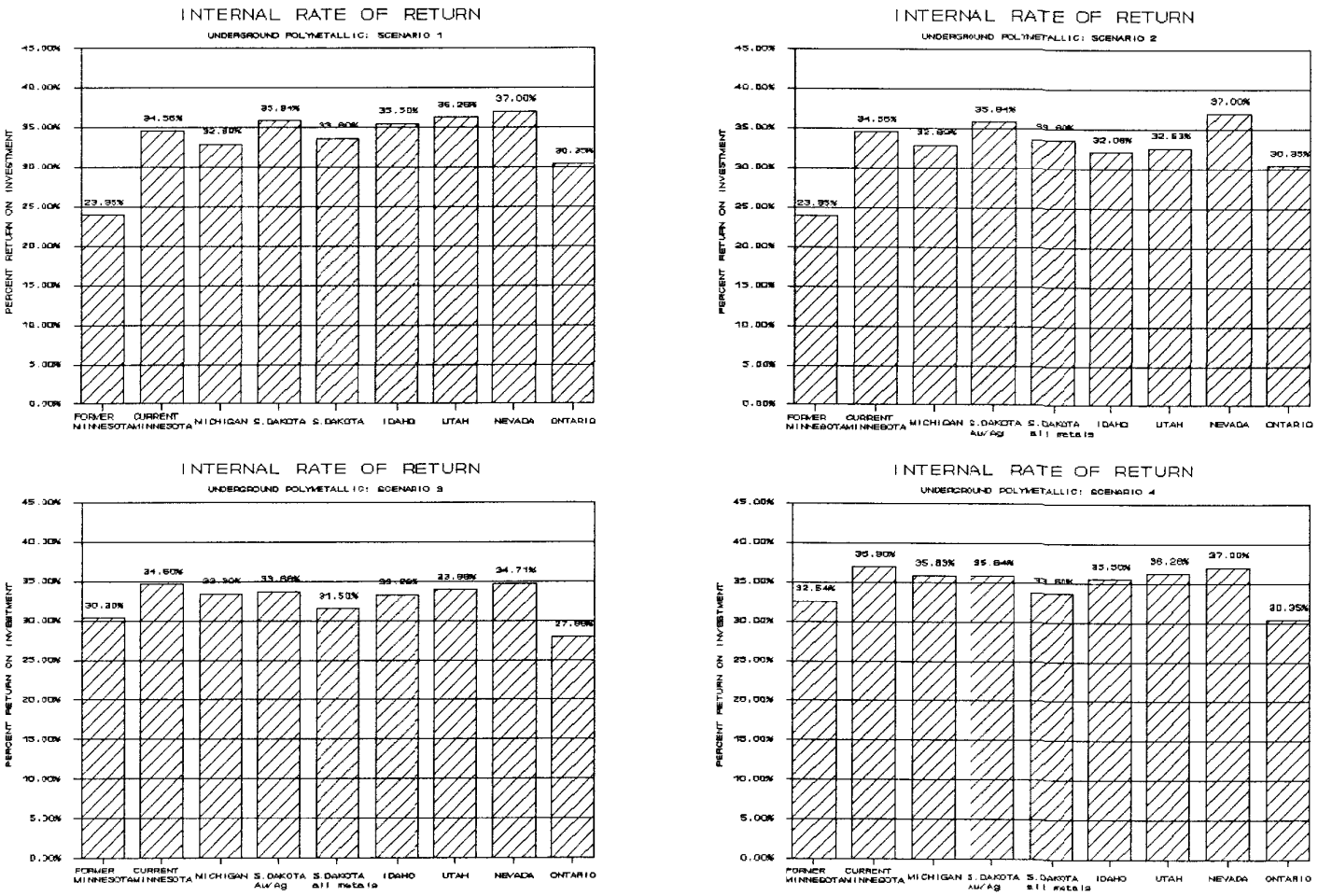

Figure 9. Internal Rate of Return for each evaluated scenario:
UNDERGROUND POLYMETALLIC BASE METAL OPERAT ON

In the order of greatest combined state tax and royalty burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 1:

FORMER MINNESOTA v OTHERS		CURRENT MINNESOTA v OTHERS	
1) MINNESOTA	$19.83	1) ONTARIO	$11.74
2) ONTARIO	11.74	2) MICHIGAN	8.84
3) MICHIGAN	8.84	3) MINNESOTA	8.57
4) IDAHO	5.89	4) IDAHO	5.89
5) SOUTH DAKOTA*	4.22	5) SOUTH DAKOTA*	4.22
6) UTAH	3.90	6) UTAH	3.90
7) NEVADA	2.80	7) NEVADA	2.80

* NOTE: The total for South Dakota represents taxation of income attributable only the gold and silver contained in the ore, and reflects current tax policy. However, when all metal constituents are valued for taxation purposes, the total burden increases to $7.77 per ton, which would put South Dakota in the fourth position, just behind Michigan.

Underground Polymetallic - Scenario 2

Again, in this scenario, state royalties were included for Idaho and Utah. Consequently, the additional cost boosted their combined state tax and royalty burdens accordingly (Table 10). In the order of greatest combined state tax and royalty burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 2:

FORMER MINNESOTA v OTHERS		CURRENT MINNESOTA v OTHERS	
1) MINNESOTA	$19.83	1) ONTARIO	$11.74
2) ONTARIO	11.74	2) IDAHO	10.75
3) IDAHO	10.75	3) UTAH	9.09
4) UTAH	9.09	4) MICHIGAN	8.84
5) MICHIGAN	8.84	5) MINNESOTA	8.57
6) SOUTH DAKOTA*	4.22	6) SOUTH DAKOTA*	4.22
7) NEVADA	2.80	7) NEVADA	2.80

* NOTE: The total for South Dakota represents taxation of income attributable only the gold and silver contained in the ore, and reflects current tax policy. However, when all metal constituents are valued for taxation purposes, the total burden increases to $7.77 per ton, which would leave South Dakota in the sixth position for this scenario.

Underground Polymetallic - Scenario 3

In this scenario, a uniform five percent (5%) net smelter return royalty was assumed for each state and province (Table 11). In the order of greatest combined state tax and royalty burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 3:

FORMER MINNESOTA v OTHERS		CURRENT MINNESOTA v OTHERS	
1) ONTARIO	$14.68	1) ONTARIO	$14.68
2) MINNESOTA	11.98	2) IDAHO	8.96
3) IDAHO	8.96	3) MICHIGAN	7.96
4) MICHIGAN	7.96	4) SOUTH DAKOTA*	7.23
5) SOUTH DAKOTA*	7.23	5) UTAH	7.07
6) UTAH	7.07	6) MINNESOTA	6.76
7) NEVADA	6.00	7) NEVADA	6.00

* NOTE: The total for South Dakota represents taxation of income attributable only the gold and silver contained in the ore, and reflects current tax policy. However, when all metal constituents are valued for taxation purposes, the total burden increases to $10.58 per ton, which would put South Dakota in the second position for this scenario, behind Ontario (current comparison).

Underground Polymetallic - Scenario 4

In this scenario, no production royalty payment was assumed; only taxes were considered (Table 12). In the order of greatest combined state tax burden per ton to the smallest, the six states and Ontario ranked as follows for Scenario 4:

FORMER MINNESOTA v OTHERS		CURRENT MINNESOTA v OTHERS	
1) ONTARIO	$11.74	1) ONTARIO	$11.74
2) MINNESOTA	9.08	2) IDAHO	5.89
3) IDAHO	5.89	3) MICHIGAN	4.65
4) MICHIGAN	4.65	4) SOUTH DAKOTA*	4.22
5) SOUTH DAKOTA*	4.22	5) UTAH	3.90
6) UTAH	3.90	6) MINNESOTA	3.59
7) NEVADA	2.80	7) NEVADA	2.80

* NOTE: The total for South Dakota represents taxation of income attributable only the gold and silver contained in the ore, and reflects current tax policy.

However, when all metal constituents are valued for taxation purposes, the total burden increases to $7.77 per ton, which would put South Dakota in the second position for this scenario, behind Ontario (current comparison).

DISCUSSION

Introduction

Presented below and on the following pages is a brief synopsis of how each state and province fared relative to each other in the study. Additional observations are included when warranted. Please refer to the previous section and the figures and tables contained within.

Minnesota

The study has shown that Minnesota's current non-ferrous mining tax climate has improved dramatically following the legislative reform of 1987. When only the taxes of each state and province are considered (Scenario 4 for each model, previous section), Minnesota's taxes are the second lowest, with only Utah (underground gold operation) and Nevada (surface gold and underground polymetallic operations) having lower taxes.

Michigan

When the current tax policies of the six states and one province are considered alone, Michigan receives a rank of 3 for both underground operations, and a rank of 5 for the surface gold operation (1 is equivalent to the highest tax ranking and 7 is equivalent to the lowest tax ranking).

South Dakota

When the current tax policies of the six states and one province are considered separately, South Dakota receives a rank of 2 for the underground and surface gold operations, and a rank of 4 for the underground polymetallic operation.

Idaho

When the current tax policies of the six states and one province are considered alone, Idaho receives a rank of 4 for the underground gold operation, a rank of 3 for the surface gold operation, and a rank of 2 for the underground polymetallic operation.

Utah

When the current tax policies of the six states and one province are considered alone, Utah receives a rank of 7 for the underground gold operation, a rank of 4 for the surface gold operation, and a rank of 5 for the underground polymetallic operation.

Nevada

When the current tax policies of the six states and one province are considered alone, Nevada receives a rank of 5 for the underground gold operation, a rank of 7 for the surface gold operation, and a rank of 7 for the underground polymetallic operation.

Ontario

When the current tax policies of the six states and one province are considered alone, Ontario receives the number 1 ranking for each operation evaluated.

CONCLUSIONS

State taxes and royalties represent a significant cost of mining, so much so that they have the potential to prevent a marginal mineral deposit from being developed. The wide differences that exist between states can also have an impact on economic decision-making, especially if a potential mineral investor must decide between two otherwise equivalent investment alternatives.

The volatility of state tax policies, plus their generally inherent complexity, make them especially complex variables in the consideration of any mining project. Consequently, much more care should be taken when such projects are under scrutiny, to the point of maintaining ongoing contact with state and local taxing officials.

Conversely, while state and local governments have the difficult task of providing for the public's welfare, they should also remember that uncertain, overly complex, and inequitable tax policies are a likely impediment to potential business development. Prior to the changes mandated by the state legislature in the spring of 1987, Minnesota's non-ferrous mining tax policies were perceived to have all three of those characteristics, and it is possible that this may have had a detrimental effect on prospective non-ferrous mineral exploration and development.

Whether lower taxes will actually lead to non-ferrous mineral development in Minnesota remains to be seen, but because corporate investment capital generally goes where wealth is maximized, it can be said with reasonable certainty that the prospect is much brighter than if taxes had remained at the level at which Whitney and Whitney, Inc. found them in 1985. What is clearly evident is that Minnesota has taken positive steps towards creating a favorable

tax climate for the mineral industry in Minnesota. Therefore, much of the perceived or real anxiety over high taxes in Minnesota should now be put aside.

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APPENDIX A

THE HYPOTHETICAL MODELS: ADDITIONAL INFORMATION

Underground Gold Operation

Processing

For this model, it was assumed that a pyritic gold ore was mined and that flotation was used to produce a gold concentrate (Parkinson, 1985; Nendick, 1984). With such a process, a mill recovery of 90 percent is possible (Mular, 1982). Using this 90 percent figure, an average recovered ore grade of 0.27 troy ounces gold per short ton was achieved.

Smelting and Refining

A further assumption was that the precious metal concentrate was shipped out of state for smelting and refining. While this is not a common practice for most larger scale (greater than 500 short tons per day) gold operations, it does occur. For example, many western U.S. mines ship concentrate to Salt Lake City, Utah (Skillings Mining Review, 1987). However, Asamera's Cannon operation in Washington state, its mill having a designed capacity of 2,000 short tons per day, ships its gold concentrate overseas for smelting and refining (O'Neil, 1985).

Charges for precious metal concentrate smelting and refining vary considerably, anywhere from 5 to 50 percent of an ore's value (Malcolm, 1987; Ludwig, 1987; Madsen, 1987). For this model, a 15 percent charge was used.

Revenue

A gold price of $400.00 per troy ounce was assumed. Given the recovered ore grade of 0.27 oz. Au per short ton, this translated to a gross ore value of

$108.00 per short ton. Upon application of the 15 percent concentrate treatment charge, average gross revenue per short ton of ore was established at $91.80. At a production rate of 250,000 short tons per year, annual gross revenues totaled $22,950,000 per year.

Capital and Operating Costs

Mine and mill capital and operating costs for this model were based exclusively on cost models in Schumacher (1987). As described in the following subsections, some liberties were taken with the given information so that a more complete evaluation of tax and royalty policies could be performed.

Mine Capital Costs

The deepest of the 1,000 ton per day cut and fill models (Schumacher, 1987) was deemed the most suitable for use in this mining scenario. The mine capital costs for the model were apportioned as follows:

1) REAL PROPERTY: $1,188,798

2) PERSONAL PROPERTY: $4,891,421
   a) of which $1,222,855 was assumed 5-year property
   b) of which $3,668,566 was assumed 7-year property

3) LABOR: $1,188,798

Additional mine capital costs included:

4) PREPRODUCTION DEVELOPMENT: $20,397,012

5) WORKING CAPITAL: $2,527,200

6) ENGINEERING AND MANAGEMENT: $2,303,907

Preproduction exploration was assumed to cost $6,000,000.

Mill Capital Costs

A 1,000 ton per day flotation mill model (Schumacher, 1987) was felt sufficient for this particular model. The given mill capital costs were apportioned as follows:

1) REAL PROPERTY: $1,630,268

2) PERSONAL PROPERTY: $4,890,803
   a) of which $978,161 assumed as 5-year property
   b) of which $3,912,643 assumed as 7-year property

3) LABOR: $1,630,268

Additional mill capital costs included:

4) WORKING CAPITAL: $510,000

5) ENGINEERING AND MANAGEMENT: $860,818

Mine Operating Costs

The following mine operating costs were:

LABOR (basis)	$28.66 per ton	(pre-adjustment)
MATERIAL AND SUPPLIES:	10.86 per ton	
EQUIPMENT OPERATION:	2.61 per ton	
TOTAL:	$42.13 per ton	

Mill Operating Costs

The following mill operating costs were:

LABOR (basis)	$4.00 per ton	(pre-adjustment)
MATERIAL AND SUPPLIES:	3.21 per ton	
EQUIPMENT OPERATION:	1.29 per ton	
TOTAL:	$8.50 per ton	

Total Operating Costs

Total operating costs were:

LABOR (basis):	*$32.66 per ton*	*(pre-adjustment)*
MATERIAL AND SUPPLIES:	14.07 per ton	
EQUIPMENT OPERATION:	3.90 per ton	
TOTAL:	$50.63 per ton	

Capital Equipment: Initial Purchase and Replacement

Capital equipment was considered to be of either a 5 or 7-year IRS property class. Initial purchases, and subsequent replacements, were made in the following manner:

PREPRODUCTION YEARS: INITIAL PURCHASE

5-YEAR CLASS: 20% of total two years before production
80% of total one year before production

7-YEAR CLASS: 50% of total two years before production
50% of total one year before production

PRODUCTION YEARS (1-20): REPLACEMENT PURCHASES

5-YEAR CLASS: 20% of original in year 4
30% of original in year 8
25% of original in year 12
25% of original in year 16

7-YEAR CLASS: 50% of original in year 6
50% of original in year 13

Specific dollar amounts for these capital purchases are not presented here because of changes brought about by the Tax Reform Act of 1986 (IRC, 1986), specifically in the deductibility of state sales taxes. Under previous law, sales taxes were deductible. Now, however, the amount of sales tax paid on the acquisition of depreciable property is added to the basis of the property and treated as part of the property's cost for depreciation purposes (Wakefield, 1987). Because sales and use tax rates vary from state to state, the total amount paid for capital equipment purchases would also vary. Thus, the percentages presented above provide a basis for capital purchases and replacement for each state and province in the study.

Surface Gold Operation

Processing

For this model, flotation was assumed to be used to produce a gold concentrate (Parkinson, 1985; Nendick, 1984). However, a cyanidation circuit was also assumed, precluding the sale of gold concentrates to an outside party. Again, a 90 percent recovery was achieved. Using these parameters, a recovered ore grade of 0.09 troy ounces gold per short ton resulted.

Smelting and Refining

It was assumed that gold bars were poured on site, and subsequently sold to an independent refiner.

Revenue

A gold price of $400.00 per troy ounce was assumed. Given the recovered ore grade of 0.09 oz. Au per short ton, this translated to a gross ore value of $36.00 per short ton. At a production rate of 1,500,000 short tons per year, annual gross revenues totaled $54,000,000 per year.

Capital and Operating Costs

Mine and mill capital and operating costs for this model were again based exclusively on Schumacher's (1987) cost models. As with the previous model, some costs were adjusted.

Mine Capital Costs

The following is a breakdown of capital costs for the 5,000 ton per day operation. Mine capital costs were apportioned as follows:

1) REAL PROPERTY: $701,294

2) PERSONAL PROPERTY: $11,845,832
   a) of which $7,107,499 was assumed 5-year property
   b) of which $4,738,333 was assumed 7-year property

3) LABOR: $701,294

Additional mine capital costs included:

4) PREPRODUCTION DEVELOPMENT: $659,250

5) WORKING CAPITAL: $1,671,000

6) ENGINEERING AND MANAGEMENT: $1,133,517

Preproduction exploration was assumed to cost $4,000,000.

Mill Capital Costs

The following is a breakdown of capital costs for the 5,000 ton per day capacity flotation/cyanide mill. Mill capital costs were apportioned as follows:

1) REAL PROPERTY: $4,304,804

2) PERSONAL PROPERTY: $12,914,413
   a) of which $2,582,883 assumed as 5-year property
   b) of which $10,331,530 assumed as 7-year property

3) LABOR: $4,304,804

Additional mill capital costs included:

4) WORKING CAPITAL: $1,581,000

5) ENGINEERING AND MANAGEMENT: $2,090,933

Mine Operating Costs

Mine operating costs were:

LABOR (basis):	$2.78	per ton (pre-adjustment)
MATERIAL AND SUPPLIES:	1.57	per ton
EQUIPMENT OPERATION:	1.22	per ton
TOTAL:	$5.57	per ton

Mill Operating Costs

Mill operating costs were:

LABOR (basis):	$1.85 per ton	(pre-adjustment)
MATERIAL AND SUPPLIES:	2.60 per ton	
EQUIPMENT OPERATION:	0.83 per ton	
TOTAL:	$5.28 per ton	

Total Operating Costs

Total operating costs were:

LABOR (basis):	$4.63 per ton	(pre-adjustment)
MATERIAL AND SUPPLIES:	4.17 per ton	
EQUIPMENT OPERATION:	2.05 per ton	
TOTAL:	$10.85 per ton	

Capital Equipment: Initial Purchase and Replacement

Purchases of capital equipment for the surface gold operation were made in the following manner:

PREPRODUCTION YEARS: INITIAL PURCHASE

5-YEAR CLASS: 20% of total two years before production
80% of total one year before production

7-YEAR CLASS: 50% of total two years before production
50% of total one year before production

PRODUCTION YEARS (1-7): REPLACEMENT PURCHASES

5-YEAR CLASS: 20% of original in year 4

7-YEAR CLASS: no replacement purchases made

Underground Polymetallic Operation

NOTE: Much of the basic information used for this model was based on previous work performed by John B. Malcolm (1986).

Processing

For this model, selective flotation was used to produce three flotation products - a zinc concentrate, a copper concentrate and a lead concentrate, with silver and gold reporting to both the copper and lead concentrates.

Smelting and Refining

Zinc, copper and lead concentrates were sold to out-of-state customers for smelting and refining.

Revenue

Revenues were based on the sales of concentrates to out-of-state smelters and refiners. The net smelter return from these sales was established at $65.14 per short ton of ore after taking into account assumed metal prices (Sellner, 1987) as well as smelting, refining and transportation charges. At a production rate of 1,250,000 short tons per year, annual net smelter return revenues totaled $81,425,000.

Capital and Operating Costs

Mine and mill capital and operating costs for this model were based on various references, including Power (1987), Schumacher (1987), and Malcolm (1986).

Mine Capital Costs

The following is a breakdown of capital costs for 5,000 ton per day operation. Mine capital costs were apportioned as follows:

1) REAL PROPERTY: $3,000,000

2) PERSONAL PROPERTY: $14,000,000
   a) of which $3,500,000 was assumed 5-year property
   b) of which $10,500,000 was assumed 7-year property

3) LABOR: $3,000,000

Additional mine capital costs included:

4) PREPRODUCTION DEVELOPMENT: $40,000,000

5) WORKING CAPITAL: $4,500,000

6) ENGINEERING AND MANAGEMENT: $3,000,000

Preproduction exploration expenditures were $7,000,000.

Mill Capital Costs

The following is a breakdown of capital costs for the assumed 5000 ton per day capacity, 3 product flotation mill. Mill capital costs were apportioned as follows:

1) REAL PROPERTY: $4,499,307

2) PERSONAL PROPERTY: $13,497,921
   a) of which $2,699,584 assumed as 5-year property
   b) of which $10,798,337 assumed as 7-year property

3) LABOR: $4,499,307

Additional mill capital costs included:

4) WORKING CAPITAL: $1,920,000

5) ENGINEERING AND MANAGEMENT: $2,177,117

Mine Operating Costs

Mine operating costs were:

LABOR (basis):	$7.12 per ton	(pre-adjustment)
MATERIAL AND SUPPLIES:	5.70 per ton	
EQUIPMENT OPERATION:	2.12 per ton	
TOTAL:	$14.94 per ton	

Mill Operating Costs

Mill operating costs were:

LABOR (basis):	$2.16 per ton	(pre-adjustment)
MATERIAL AND SUPPLIES:	3.34 per ton	
EQUIPMENT OPERATION:	0.91 per ton	
TOTAL:	$6.41 per ton	

Total Operating Costs

Total operating costs were:

LABOR (basis):	$9.28 per ton	(pre-adjustment)
MATERIAL AND SUPPLIES:	9.04 per ton	
EQUIPMENT OPERATION:	3.03 per ton	
TOTAL:	$21.35 per ton	

Capital Equipment: Initial Purchase and Replacement

Purchases of capital equipment for the polymetallic operation were made in the following manner:

PREPRODUCTION YEARS: INITIAL PURCHASE

5-YEAR CLASS: 20% of total two years before production
80% of total one year before production

7-YEAR CLASS: 50% of total two years before production
50% of total one year before production

PRODUCTION YEARS (1-20): REPLACEMENT PURCHASES

5-YEAR CLASS:	20% of original	in year 4
	30% of original	in year 8
	25% of original	in year 12
	25% of original	in year 16
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APPENDIX B

STATE AND PROVINCIAL TAX DESCRIPTIONS

Minnesota

Taxes

Tax reform enacted during the 1987 Legislative session led to dramatic changes in Minnesota's non-ferrous metallic mineral taxing policies. Eliminated were the tax on ore reserves (ad valorem tax), the royalty tax, and the old occupation tax. In addition, the state's corporate income tax was revised and is now called a corporate franchise tax.

Only one mining-specific tax remains in Minnesota, and that is the new 2 percent net proceeds tax. (Actually, there is also a new occupation tax, but it is identical to, and is determined in lieu of, the corporate tax. Consequently, it has been treated as such in this study and not as a mining tax.)

A new alternative minimum tax on corporations was also enacted and set at 40 percent of the federal alternative minimum tax for January 1, 1990 and beyond (M.S., 1987, Section 290.093, subd. 5). From December 31, 1986 through December 31, 1989, the tax is the excess of one-tenth of one percent (0.001) of a corporation's Minnesota factors (property, payroll and sales) over the regular tax (Minnesota Department of Revenue, 1987). In the study, the post-1989 alternative minimum tax was used.

Corporate Income Tax (Occupation Tax)

Minnesota's corporate income tax is really a corporate franchise tax according to the Minnesota Department of Revenue (1987) because, "the legal imperative of having a direct tax on corporations no longer exists". Regardless

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Corporate Income Tax (Occupation Tax)

Minnesota's corporate income tax is really a corporate franchise tax according to the Minnesota Department of Revenue (1987) because, "the legal imperative of having a direct tax on corporations no longer exists". Regardless

of its legal definition, the tax is still imposed "on the exercise of a corporate franchise which produces gross income attributable to sources within Minnesota".

The tax rate is currently 9.5 percent, reduced from its former 12 percent rate. A weighted apportionment formula consisting of 70 percent of sales and 15 percent of both property and payroll is used to determine the amount of a multi-state corporation's income that would be subject to the tax. For a base metal or precious metal mine selling its product out-of-state, the effective rate could be as low as 2.85 percent because of the heavily weighted sales factor.

A provision of the new tax rules, the so-called "trigger" provision, automatically increases the corporate tax rate in 1988 if the state's estimated budget surplus does not exceed $150 million. If the surplus is less than $50 million, the rate must rise to 10.3 percent. If the surplus is between $50 and $150 million, the rate rises to 9.9 percent. Once the rate is raised, it can only be lowered by an active move by the state legislature (Carideo, 1987). In this study, the 9.5 percent rate was used.

Mining Taxes

Because the occupation tax is determined identically to the corporate franchise and alternative minimum taxes, only one tax specifically applies to mining in Minnesota, and that is the two percent net proceeds tax.

Net Proceeds Tax

A two percent net proceeds tax is the only mining-specific tax that is imposed on non-ferrous mining in Minnesota. Minnesota Statutes (1987, Sections 290.015, 290.016 and 290.017) define and describe all of the pertinent information related to this tax.

Gross proceeds are the starting point in calculating the net proceeds tax. If the minerals are sold in an arms-length transaction, the gross proceeds are the the proceeds from the sale. If the minerals are used by the taxpayer or disposed of in a non-arms-length transaction, e.g., shipped to a wholly owned smelter, the gross proceeds are determined by multiplying the amount of mineral credited or paid for by the average market price of the metal(s). Then, any special smelter charges are deducted and the resulting amounts are the gross proceeds (M.S., 1987, Section 298.016, subd. 1 to 3; Boekhaus, 1987).

In this study, gross proceeds equalled:

1) The value received for gold concentrates sold by the underground gold operation (85% of gross concentrate value), which translated into $91.80 per short ton of ore.

2) The gross value of gold recovered by the surface gold operation, which translated into $36.00 per short ton of ore.

3) The net smelter return received by the polymetallic operation, which translated into $65.14 per short ton of ore.

Net proceeds are determined by subtracting from gross proceeds a number of deductions. For this study, the following deductions applied:

1) All mine and mill operating costs
2) Depreciation
3) Sales and use taxes
4) Preproduction exploration and development, but only if amortized and deducted over the first five years of production.

Royalty expenses, depletion, interest expenses, insurance, and taxes are not allowed as deductions (M.S., 1987, Section 290.017, subd. 1).

General Business Taxes

Property taxes, sales and use taxes, unemployment insurance taxes, and workers compensation insurance are common to each state and province in this

study. Below is a summary of the most important aspects of each, relative to non-ferrous metal mining activity in the state of Minnesota.

Property Taxes

Only real property is subject to taxation in Minnesota; personal property is exempt. Therefore, only a mining operation's land value and buildings would be taxed, while its machinery and mobile equipment would not. In the study, each hypothetical model was assumed to be located in St. Louis County, and an effective property tax rate of 7.74% was used.

Sales and Use Taxes

The Minnesota state sales and use tax rate is 6 percent. New or expanding industries are afforded an exemption for initial purchases of capital equipment. The general exemption is 2 percent, giving an effective tax rate of 4 percent. However, in certain counties designated as being economically "distressed", a full 6 percent exemption is available (M.S., 1987, Section 297A.257, subd. 2).

Many other mining-related items are exempt from sales and use taxation, such as chemicals (including explosives), fuels, petroleum products, lubricants, packaging materials, electricity, gas, steam, shovel dipper teeth, and drill bits (MN Department of Revenue, 1986).

For the study, each operation's location in St. Louis County (a distressed county in 1987) allowed for the full sales and use tax exemption to be taken on initial capital equipment purchases. With regard to other items (materials and supplies) an assumption was made that 50 percent would be exempt from taxation.

Unemployment Insurance Tax

Unemployment insurance tax rates were taken from Schumacher (1987). For Minnesota, the new mine tax rate in 1986 was 2.9 percent on a wage base of $10,700.

Workers Compensation Insurance

Workers compensation insurance rates were again taken from Schumacher (1987). The following rates were used, and are in dollars per $100 of payroll:

1) Underground non-coal mine: $13.87
2) Surface non-coal mine: $6.61
3) Ore mill operation: $4.60

These rates have since changed, as they have undoubtedly changed nationwide. However, for consistency, Schumacher (1987) was the sole source of rates used for each state in the study.

State Royalty Policy

As of October 1, 1987, nearly 250,000 acres of state land were under lease in northern Minnesota for potential non-ferrous metallic mineral exploration and development (Minnesota Department of Natural Resources, 1987). If minerals are found and produced, a production royalty would be paid to the state (Minnesota Rules, parts 6125.0100 to 6125.0700). The amount of royalty to be paid would be determined as follows, and would be in addition to the bid percentage offered to obtain the mineral lease.

1) The value of ore subject to production royalty payments would be "the value of metallic minerals and associated mineral products recovered in the mill concentrate from each ton of dried crude ore", less the "base smelter treatment charge assessed by the smelter for treating each ton of

the mill concentrate plus the smelter losses that are deducted from the assay or market values to arrive at the gross payment..". Smelter charges not deductible include: "mining or milling, or similar beneficiation costs or charges; refinery losses; refinery charges; penalties for impurities; freight and transportation charges either to or from the mill, concentrator, smelter, or refinery; weighing and sampling charges; handling charges; selling charges; taxes of any kind; processing charges; or any other charges (other than those specified above) assessed by the smelter or purchaser of the metallic minerals or associated mineral products."

2) The production royalty rate would be based on the bid rate plus a 3.5% base rate subject to escalation at ore values of $75.00, $150.00 and $225.00 multiplied by ore value.

The following example illustrates this more clearly, and is after Sellner (1987).

GIVEN: Bid rate of 2.25%

V = ore value after allowed deductions

a) For $0 < V < $75:
   2.25% + 3.50% = 5.75%

b) For $75 <= V < $150:
   2.25% + 3.50% + [0.015%(V-75)]

c) For $150 <= V < $225:
   2.25% + 3.50% + [0.015%(V-75)] + [0.02%(V-150)]

d) For V >= $225:
   2.25% + 3.50% + [0.015%(V-75)] + [0.02%(V-150)] + [0.025%(V-225)]

The values of $75.00, $150.00 and $225.00 are subject to increase each calendar year if the unadjusted Producer Price Index for All Commodities exceeds the base

index (310.5, August 1987). The amount by which they are increased is determined by multiplying each value by a fraction, the denominator of which being the base index, and the numerator of which being equal to the amount by which the Producer Price Index for All Commodities exceeds the base index. The product is then rounded to the nearest whole dollar and added to the value in question ($75.00, $150.00, or $225.00). In this study, no change in the Producer Price Index was assumed, and a 2.25% bid rate was used.

Michigan

Taxes

Corporate Income Tax

Technically speaking, Michigan does not possess a "corporate income tax". Instead, the state imposes what it calls the Single Business Tax. The tax has been described as a modified, value-added tax measuring the use of labor and capital in the business activity. The base of the tax is essentially profits, compensation, and interest paid, less the purchase of depreciable property during the tax year. Various deductions and credits are also available (Prentice-Hall Inc., 1986).

The tax rate is 2.35 percent of the adjusted tax base, the latter being subject to apportionment. The apportionment factor used in the study was assumed to be 66.67 percent, given Michigan's equal weighting of sales, property and payroll and the basic assumption that all mineral products were sold out of state.

Mining Taxes

Only one mining tax applies to non-ferrous metal mining activity in Michigan, and that is a property tax on metallic mining properties, including ore reserves.

Tax on Mining Properties

Metallic mining properties and mineral rights, including surface rights and personnel used in operation or development of the property, are valued at true cash value set by the state geologist (Prentice-Hall, 1981). According to Mr. Robert Reed (Reed, 1987), who is the state geologist responsible for making such valuations, a system of mine appraisal virtually identical to the Hoskold

method (Gentry and O'Neil, 1984) is used. This system of appraisal utilizes two interest rates to calculate the present worth of a mine's expected future profits. The interest rates used by Mr. Reed equal 4 and 9 percent ("safe rate" and "risk rate", respectively) for the White Pine copper mine, and 5 and 9 percent for the Ropes Gold Mine. Both mines are located in Michigan's Upper Peninsula.

For taxation purposes, an estimate of ore reserves (plus ore in stockpile that has not gone through the mill) is made, as well as an estimate of the mine's life, the latter based upon the mine's productive capacity. Then, the mine's future expected profits are estimated (Turneaure, et al., 1957). Finally, the mine's present worth is calculated using the appropriate interest rates and estimated future profits. The calculated present value is multiplied by the statutory assessment ratio (50 percent) and taxed at the local mill rate.

Metallic mineral ores that are newly discovered or proven and not part of an operating mine are exempt for a 10-year period or until they become part of an operating mine. Newly discovered ore which is part of an operating mine is exempt until it comes into a 10-year recovery period of the mine as determined by annual rate of extraction. No exemption may extend for more than ten years (Prentice-Hall, 1981; Reed, 1987).

The exemption just described essentially prevents the taxation of: 1) a newly discovered deposit until the mine goes into production and, 2) new reserves in an operating mine until they are recoverable within a ten year period. With respect to the latter, this does not mean that if 20 years of new reserves were discovered, then only 10 years worth could be taxed. Once those reserves went into production, or fell within a ten-year recovery period, they would all be taxable (Reed, 1987).

In this study, ten years of reserves were assumed to be taxable at any one time for both underground models, until both mines had less than ten years of producing life remaining. At that point, the number of years of reserves subject to taxation equalled the remaining years of production. For the surface gold model (which has a 7-year producing life), this latter point applied.

The 5 and 9 percent interest rates were used in the present worth calculations for both the underground and surface gold models, while the 4 and 9 percent interest rates were used for the underground polymetallic model.

Finally, all three models were assumed to be located in Marquette County and subject to its mill rate of 42.07 (Massa, 1987). Marquette County was chosen because much of the Ishpeming Greenstone Belt lies within it. In this Archean belt, numerous gold and base metal occurrences have been found (Morgan and DeCristoforo, 1980), the most significant of which being Callahan Mining Corporation's Ropes Gold Mine.

General Business Taxes

Property Taxes

Real and personal property are taxable in Michigan (Naftaly and Bowman, 1986). Therefore, mobile mining equipment and machinery would be taxed in addition to land and buildings.

Property is assessed at 50 percent of its true cash value (Prentice-Hall, 1980) and taxed at the local mill rate. Given this study's use of Marquette County's 42.07 mill rate, an effective property tax rate of 2.1035 percent was determined.

A provision of Michigan law affords a property tax exemption to industrial facilities which are certified by locality and located in a plant rehabilitation or industrial development district (Prentice-Hall, 1981). Buildings, machinery

and equipment are exempt, but land is not. The exemption can last for up to 12 years after the facility's completion.

In lieu of the property tax, however, an industrial facilities tax is available which equals one-half of the property tax rate applied to the property's value (Naftaly and Bowman, 1986). For this study, the industrial facilities exemption was assumed, and taxes were calculated accordingly.

Sales and Use Taxes

A sales and use tax of 4 percent is imposed in Michigan (Naftaly and Bowman, 1986). Equipment and supplies related to mining are taxable. However, equipment and supplies used in processing ("extractive operation") are exempt (Michigan Department of Treasury, 1987). This exemption was included in the tax analysis.

Unemployment Insurance Tax

A new mine tax rate of 2.7 percent on a wage base of $9,500 was used for this study (Schumacher, 1987).

Workers Compensation Insurance

The following rates were used, and are in dollars per $100.00 of payroll (Schumacher, 1987):

1) Underground non-coal mine: $13.31
2) Surface non-coal mine: $5.83
3) Ore mill operation: $8.86

State Royalty Policy

Michigan is similar to Minnesota in two respects. First, the staking of mining claims is not permitted and second, the state owns significant amounts of potentially leasable land (over 3.8 million acres of combined surface and mineral rights, and an additional 2.1 million acres of mineral rights only - Michigan DNR, 1983 Policy No. 2312). Currently, 42,000 acres are under lease for metallic mineral exploration and development (Edmondson, 1987).

If metallic minerals were produced from state land in Michigan, production royalty payments would be required. The production royalty rate is not less than two (2) percent, nor greater than seven (7) percent, of the adjusted sales value of the ore. According to the State of Michigan's Metallic Mineral Lease form, the adjusted sales value is determined by multiplying the gross sales value of the ore by a price index factor. Both are described below.

1) GROSS SALES VALUE: Section C.3.j.(a) of the lease

> "if copper, lead, zinc, gold and/or silver and their byproducts are produced from the leased premises and are processed at a smelter and/or refinery owned by the lessee, or where they are treated on a toll basis for the lessee, the net smelter returns method shall be used to calculate gross sales value."

2) PRICE INDEX FACTOR: Section C.3.b. of the lease

> The price index factor is determined "by dividing the constant price index" (the producer price index for all commodities for February of 1983, quoted as 301.2) "by the current price index." (again, the producer price index for all commodities).

Upon calculating the adjusted sales value (ASV), the appropriate royalty rate is determined. According to section C.3.d. of the lease:

> "For every dry short ton of ores containing minerals and/or mineral products other than iron ores that is mined from the leased premises and sold...the royalty rate shall be two (2) percent when the adjusted sales value of the minerals and/or mineral products is twelve dollars ($12.00) or less. The royalty rate shall be increased by one-half (1/2) percent for each six dollar ($6.00) increase in the adjusted sales value per ton of minerals and/or mineral products above twelve dollars ($12.00) per ton, fractions

> prorated to three decimal places, with a maximum royalty rate limit of seven (7) percent, which limit will be reached when the adjusted sales value per ton of minerals and/or mineral products is seventy-two ($72.00) dollars per ton."

No other rates are added to the royalty rate so determined for a metallic mineral lease in Michigan. The amount of production royalty is simply the product of the royalty rate and the gross sales value.

Finally, unlike Minnesota, Michigan's metallic mineral leases are awarded on a cash bonus bidding basis, with a minimum bid of $1.00 per acre required (Edmondson, 1987). In 1986, the average bid was $11.23 per acre, and the average area leased was approximately 300 acres.

When Michigan royalties were evaluated for this study, cash bonus bids and annual land rentals were ignored due to their relative insignificance. Only the production royalty was considered.

South Dakota

Taxes

Corporate Income Tax

South Dakota has no state corporate income tax.

Mining Taxes

Three taxes apply to the mining of non-ferrous metallic minerals in South Dakota, and they are:

1) a Mineral Severance Tax on:
   a) 2 percent of gross yield
   b) 8 percent of net profits

2) a tax on the value of a mine, including ore reserves

3) a tax on royalty owners (royalty tax)

Mineral Severance Tax

Chapter 10-39 of South Dakota Codified Laws (SDCL, 1986) covers the Mineral Severance Tax. As written, the mineral severance tax applies only to the severing of gold and silver (SDCL, 1986, 10-39-42). Given the history of metal mining in South Dakota, one could, with some justification, call this tax the "Homestake Tax". The tax is imposed on both gross yield and net profit, at rates of two (2) and eight (8) percent, respectively.

Gross Yield Portion of Tax

SDCL (1986, 10-39-44) defines gross yield as "total receipts from the sale of precious metals severed in this state." SDCL (1986, 10-39-45) states that the severing of precious metals and the further acts or processes necessary to separate, refine or finish the product are considered a continuous and uninterrupted process, and the tax is imposed on the value of the finished

product. Furthermore, if the processes of refining, finishing or smelting are carried on by a different person than mined or severed the ore or product from its natural state, the amount of tax payable by each party engaged in the production is to be allocated by the Secretary of Revenue by a computation of the value of the product in each stage of production.

For an operation like the Homestake mine, the tax calculation is straightforward because all of its product is produced on site within South Dakota. The total amount of recoverable gold and silver produced, less an exemption of 20 ounces for both gold and silver (SDCL, 1986, 10-39-53), is multiplied by the respective selling price of each precious metal, giving gross yield (Homestake Mining Co. v. Johnson, 1985). The tax is then determined by multiplying gross yield by the two (2) percent tax rate.

However, for an operation like this study's hypothetical polymetallic operation, where concentrates are sold in an arm's length transaction to out-of-state customers for further processing (smelting and refining), proper application of the tax becomes more difficult, and potential problems arise.

First, most of the ore's value would be attributable to its base metal content. The tax, however, does not consider metals other than gold and silver. Therefore, only the ore's gold and silver value would be taxed. Second, since the severing and smelting of precious metals is construed to be a continuous process, a smelter would technically be subject to the tax, even if totally independent of the severing party. This latter issue was raised with Mr. James Fry, Director of the Division of Special Taxes, and he said that in such a situation, the law would probably be challenged (Fry, 1987).

Because South Dakota lacks a tax policy for metals other than gold and silver, the following steps were taken when the polymetallic operation was evaluated:

First, the tax was evaluated twice, once under current law (gold and silver taxed), and once under hypothetical law (all metals taxed). While the latter does not at all reflect current tax policy in South Dakota, it is difficult to believe that major base metal mining activity would be exempt from taxation for very long. That is why two evaluations were performed.

Second, because smelting and refining were assumed to be performed by a different entity than mined or severed the ore, gross yield was assumed to equal net smelter return rather than the fully refined value of the concentrate. It was further assumed that the remaining tax liability (on the difference between fully refined value of the concentrate and net smelter return) was allocated to the smelter and refiner.

The legal arguments that could be made against such an allocation of tax were well beyond the scope of the study. However, it is suggested that two court cases, "Commonwealth Edison Co. v. Montana", 453 U.S. 609, 101 S.Ct. 2946, 69 L.Ed.2d 884 and "Homestake Mining Co. v Johnson", 374 NW 2d 357 (S.D. 1985), be reviewed instead. Both cases raised similar legal arguments.

Net Profits Portion of Tax

Net profits from the sale of gold and silver severed in South Dakota are taxed at eight (8) percent (SDCL, 1986, 10-39-45.1). To determine net profits, various deductions are subtracted from gross yield (SDCL, 1986, 10-39-45.2). Relative to this study, the most important of those deductions included:

1) Mine and mill operating costs;

2) Transportation costs from the mine to the place or places of reduction, refining and sale;

3) Reduction, refining and sale costs;

4) Depreciation at the same rates allowable for federal income tax purposes;

5) All state and local taxes;

6) The cost of royalty payments;

7) Exploration and development costs.

As with the two (2) percent gross yield tax, the net profits tax allows an exemption for the first 20 ounces of precious metals severed each year (SDCL, 1986, 10-39-53). Following subtraction of the above deductions to determine net profits, an eight (8) percent tax rate is imposed, giving the net profits tax that must be paid.

Tax on Mine Value (Ore Reserves)

According to SDCL (1986, 10-4-2), property subject to taxation includes land and "...all mines, minerals, quarries in and under the same." However, Schumacher (1987), when summarizing South Dakota's property taxes, stated, "Ore reserves are supposed to be included in property valuations. In practice, however, they are often excluded." Not only does this statement run counter to statute, it would also be news to the people at Homestake where, according to the Lawrence County Director of Equalization, Mr. Howard Larson, fifteen years of ore reserves have long been included in the valuation of Homestake's property for taxing purposes (Larson, 1987). Therefore, ore reserves <u>were</u> considered in this study's evaluation of South Dakota taxes.

The valuation process used in this study was patterned after that used by Mr. Larson in his valuation of Homestake. According to Mr. Larson, a new mine coming into production would be valued according to what has been determined for Homestake's mine ($85 million for 15 years worth of reserves). That value would then be adjusted, based on the new mine's size, income and annual production. Finally, the adjusted value would be taxed at the local property tax rate. If

the mine were located in Lawrence County, that property tax rate would be 3.4029 percent, based on: 1) an assessment ratio of 45% for industrial property, and 2) a mill rate of 75.62 (Larson, 1987). Indeed, Lawrence County was the choice for the location of this study's hypothetical mines.

Determining the value of a mine is a difficult and arguably inexact practice which, at times, appears to be largely dependent upon the person performing the valuation. Consequently, while much care was taken when estimating the value of each hypothetical mine located in South Dakota, it was still necessary to make some broad assumptions. Nevertheless, those assumptions were believed reasonable.

Tax on Royalty Owners (Royalty Tax)

According to SDCL (1986, 10-39-56), "The owner of a royalty interest, of an overriding royalty or of profits or working interest shall pay a tax equal to 8 percent of the value received for the right to sever precious metals. The person severing precious metals shall withhold the tax from the distributions made to the owner of interest."

This tax does not apply to royalty interests owned by the federal government, state government or a local government. Therefore, for this study's purposes, the tax was only applicable when the owner of the royalty interest was a private entity.

In actuality, the tax would not increase the burden imposed on a mining company, it would merely re-arrange it, due to the withholding provision of the law (see first paragraph above). Rather than receiving the full royalty payment from the mining company, the owner of a royalty interest would receive a payment reduced by the amount of the tax.

General Business Taxes

Property Taxes

Only real property is taxed in South Dakota (Fry, 1987). Personal property, including business inventories, machinery and equipment, is exempt (Urban Institute, 1983).

Real property is assessed in the taxing district where located (Prentice-Hall, 1986) at its true and full value (SDCL, 1986, 10-6-36). In South Dakota, such property is taxable at a maximum of 60 percent of its assessed value. In Lawrence County, the county in which each of the hypothetical mines were located, industrial property is taxable at 45 percent of its assessed value.

SDCL (1986, 10-6-35.2) allows county taxing authorities to, at their discretion, reduce taxation of new structures and additions for a period up to five years following construction. The degree of tax relief would depend on the decision of the board of county commissioners, and could vary anywhere from 0 to 100 percent.

This form of property tax relief could be significant for a new mining operation. However, there is no guarantee that such relief would be granted in all instances.

Sales and Use Taxes

South Dakota currently imposes a sales and use tax of 5 percent. This rate is effective until April 30, 1988, when it will return to a 4 percent level (Schumacher, 1987). Local municipal option allows imposition of up to three cents (3 percent) as appropriate for the support of local government (Fry, 1987).

The tax is applicable to the sale and use of tangible personal property or the use of such personal property, including mining equipment and supplies

(Fry, 1987; Schumacher, 1987). In the study, the assumption was made that all mining and processing equipment and supplies were subject to a 5 percent tax (the state's 4 percent rate plus a 1 percent municipal option).

Unemployment Insurance Tax

A new mine tax rate of 3.5 percent on a wage base of $7,000 was used for this study (Schumacher, 1987).

Workers Compensation Insurance

The following rates were used, and are in dollars per $100.00 of payroll (Schumacher, 1987):

1) Underground non-coal mine: $6.18
2) Surface non-coal mine: $7.09
3) Ore mill operation: $2.13

State Royalty Policy

Metallic mineral leases on state-owned land in South Dakota are a rarity (Hazeltine, 1987). For that reason, royalty payments to the state were not considered in this study. Nonetheless, South Dakota does have a mineral leasing policy, and it was felt a brief description of that policy would be justified. All relevant aspects of South Dakota's mineral leasing policy are covered in SDCL (1986, Chapter 5-7) and in Administrative Rules of South Dakota (ARSD, 1986).

In general, a prospecting permit is first obtained at a cost of not less than 50 cents per acre per year, with each permit limited to one tract of 640 acres (SDCL, 1986, 5-7-7). If a discovery is made, the commissioner of school and public land may offer a lease on the lands specified in the permit for the

mineral or minerals discovered and specified. Any state-owned minerals not subject to a prospecting permit or to an application to exchange a permit for a lease are subject to sale at a public auction, with the lease going to the highest bidder (SDCL, 1986, 5-7-11.1).

Once a lease is obtained, the annual rental is $2 per acre per year for the first term of the lease. Rental rates for extensions are set by the commissioner at not less than $2 per acre (ARSD, 1986).

The production royalty rate for a mineral lease is set by the commissioner for no less than 10 percent of the market value of the mineral removed, at the time it is sold or processed by the lessee (ARSD, 1986). According to Mr. Dave Hazeltine, Oil and Gas Administrator for the Office of the Commissioner of School and Public Lands, this means the royalty is paid on market value prior to any processing (Hazeltine, 1987).

Idaho

Taxes

Corporate Income Tax

Corporations are subject to an 8 percent income tax in Idaho (Schumacher, 1987). The basis for the tax is taxable income as defined in the Internal Revenue Code with certain adjustments (Idaho Dept. of Revenue and Taxation, 1987). Such income is subject to apportionment using an equally weighted, three-factor formula consisting of the usual sales, property and payroll components (Prentice-Hall, 1986). Given this study's assumption of all sales being made out-of-state, 66.67 percent of each operation's income was considered taxable.

An investment tax credit of 3 percent on qualifying depreciable property (Idaho Code, 1986, Sec. 63-3029B), and a New Jobs Tax Credit (Idaho Code, 1986, Sec. 60-3029E and Sec. 60-3029F), can be claimed in Idaho to reduce corporate income tax liability.

Mining Taxes

Two mining-specific taxes are imposed in Idaho, and they are:

1) Mine License Tax

2) Net Profits of Mines Tax

The Mine License Tax is administered and collected at the state level, whereas the Net Profits of Mines Tax is administered and collected at the county level and is the responsibility of the county assessor (Idaho State Tax Commission, 1986).

Mine License Tax

The Mine License Tax is 2 percent of the net value of the royalties received or the ores mined or extracted (Idaho Code, 1986, 47-1201), and applies to any entity in the business of mining. To determine the net value of ore for taxing purposes, a taxpayer can elect one of two methods. If the first method is elected, that determination can be made rather easily, as net ore value is essentially equal to federal taxable income. According to Idaho Code (1986, 47-1202.(a)), "the net value of ores mined shall be the amount of taxable income from the property as defined by Section 613 of the Internal Revenue Code and Treasury Regulation 1.613-5 less the deduction for depletion expense on the property which was allowed in the taxpayer's federal income tax return." If the second method is elected, the starting point for determining net value is the gross value used by the U.S. Department of the Interior for computing the value of minerals on public lands for royalty purposes (Idaho Code, 1986, 47-1202 (b)). From this figure certain costs of mining (Idaho Code, 1986, 47-1202 (b)(1)) and an applicable portion of the federal deduction for depletion (Idaho Code, 1986 47-1202 (b)(2)) are deducted, giving net value for taxing purposes. Once a method is elected, it is binding for all succeeding years unless the taxpayer gets permission from the state tax commission to change methods (Idaho Code, 1986, 47-1202). For the study, the first method was used.

Net Profits of Mines Tax

All producing mines are assessed on the basis of their net profits from the preceding year. Net profits are considered to be the amount of money received from the actual mining operation after deducting certain costs directly related to the extraction and processing of the ore (Idaho State Tax Commission, 1986). Those costs include: all mine and mill operating costs, transportation

costs, smelting and refining costs, and the cost of capital expenditures that would normally be depreciated. Non-deductible costs include: income taxes, property taxes, royalties, mining taxes, depreciation, and depletion. Once net profits are determined, they are multiplied by five, and taxed at the local property tax rate (mill rate).

For this study, all mines were assumed to be located in Shoshone County. The average rural property tax rate was 14.587 mills, or 1.4587 percent.

General Business Taxes

Property Taxes

Both real and personal property are taxed in Idaho. Therefore, in addition to land, buildings and structures, a mining operation's machinery and mobile equipment would also be taxed.

All property in Idaho is assessed at full market value, or a 100 percent assessment ratio (Idaho State Tax Commission, 1986). Consequently, the effective property tax rate at any location in Idaho is equal to the local mill rate. Again, for this study, that rate equalled 1.4587 percent.

Sales and Use Taxes

A sales and use tax of 5 percent is imposed on the purchase or consumption of personal property in Idaho. However, the mining industry is afforded substantial exemptions on most equipment and supplies (Regulation 22,4, 1986).

Unemployment Insurance Tax

A new mine tax rate of 3.7 percent on a wage base of $15,600 was used for this study (Schumacher, 1987).

Workers Compensation Insurance

The following rates were used, and are in dollars per $100.00 of payroll (Schumacher, 1987):

1) Underground non-coal mine: $7.97

2) Surface non-coal mine: $4.00

3) Ore mill operation: $5.11

State Royalty Policy

Approximately 3 million acres of state-owned land are under lease in Idaho (Johnson, 1987). A sliding scale production royalty, ranging from a minimum of 25 cents per ton of ore produced to a maximum rate of 10 percent of net smelter return, is imposed by the state.

As explained by Ms. Linda Johnson (1987), a mineral leasing specialist with the Idaho Department of Lands, the appropriate royalty rate is established by the gross value of the metal(s) recovered in the mill concentrate. That value is translated into a gross ore value per ton which corresponds to a specific production royalty rate, up to a maximum of 10 percent. The royalty rate so determined is then applied to a lessee's net smelter return, giving the amount of royalty due the state.

All land belonging to the state of Idaho in which the mineral rights are owned by the state, and which have not been located, leased or withdrawn, are open to casual exploration (Idaho Code, 1986, Sec. 47-702). The location of claims on such land is allowed, with the locator entitled to hold a claim for a period of two years from the first of July next succeeding its location, provided that $100.00 of work is performed per year for each 20 acre tract or fraction thereof (Idaho Code, 1986, Sec. 47-703). After the two year period, if interest in the land remains, the locator is required to apply for a lease.

Occasionally, cash bidding for leases occurs. However, leases are often awarded merely on the receipt of the first filed lease application (Idaho Code, 1986, Sec. 47-704(4)). For the study, bidding was ignored.

Utah

Taxes

Corporate Income Tax

Utah imposes a 5 percent tax on the apportionable net income of corporations doing business in the state (Utah Code Annotated (UCA) 59-7-102, 1987). Net income is simply gross income less the deductions specified in UCA (1987, 59-7-108). Among the more important deductions (as they related to this study) were: mine and mill operating costs, royalties, all in-state taxes except for the corporate tax (Luhrs, 1987), and the amounts claimed as depreciation, amortization and depletion for federal tax purposes.

Following the calculation of net income, the amount allocable to Utah was determined. According to UCA (1987, 59-7-311), this is accomplished by multiplying net income by a fraction. This fraction, as in Michigan and Idaho, is the result of dividing the sum of sales, property and payroll attributable to Utah by three. Again, because this study has assumed that all sales have been made out-of-state, the fraction is two-thirds, or 66.67 percent, giving an effective tax rate of 3.33 percent.

Mining Taxes

Three taxes apply to metal mining in the state of Utah. They are:

1) Mining Occupation Tax
2) Net Proceeds Tax
3) Mineral Production Withholding Tax

Mining Occupation Tax

All metalliferous mining operations in Utah must pay an occupation tax equal to 1 percent of the gross amount received for or the gross value of

metalliferous minerals sold (UCA, 1987, 59-5-102(1)). An exemption of $50,000 in gross value of the minerals is allowed annually (UCA, 1987, 59-5-102(4)).

Gross value for tax purposes in this study equalled the amount paid for by the smelter or refiner (when smelting and refining costs were relevant), less the costs of transportation, assaying, smelting, and refining (UCA, 1987, 59-5-102(2)(a)(iii)). For the polymetallic model, this was net smelter return. The same approach for determining gross value was used by Laing (1977) in his study.

Net Proceeds Tax

A net proceeds tax is imposed on metalliferous mines in Utah. The tax is determined by applying the property tax rate of the locality in which a mine operates to the mine's average net proceeds (revenue) for the preceding 5 years, or for as many years as the mine has operated, whichever is less. If the value of a mine's other assessments (buildings and tangible personal property) exceeds the mine's average net proceeds, then the value of the former is used for tax purposes (Eyre, 1987), thereby guaranteeing the payment of some amount of tax irrespective of a mine's profitability.

To determine annual net proceeds for the study, gross value for occupation tax purposes was used as the starting point. From this value the following annual deductions were taken: mine and mill operating costs, all state and local taxes including the corporate income tax, and capital expenditures made during the tax year. Depreciation is not a deduction (Stewart, 1987), nor is depletion or preproduction exploration and development expenditures.
Following the determination of net proceeds, the local property tax rate is applied, giving the net proceeds tax.

For the study, both gold operations were assumed to be located in Tooele County, while the polymetallic operation was assumed to be located in Salt Lake

County. The property tax rates used were 1.21 percent (12.10 mills) and 1.80 percent (18.00 mills) for the respective counties (Schumacher, 1987).

Mineral Production Withholding Tax

Any mining company making royalty payments to an entity or entities other than: a) the United States or the state of Utah, b) any charitable institution, or c) any Indian or Indian tribe where such payments are subject to the supervision of the United States or agency thereof, must withhold 4 percent of those payments (UCA, 1987, 59-6-102). The withheld portion must be paid to the state tax commission (UCA, 1987, 59-6-103). Consequently, the withholding tax only applies when a royalty payment is made to a private entity.

Because the tax essentially reduces the royalty payment a mining company would pay to a private entity by the amount of the tax, there is no net increase in total burden due to the tax. It is only an additional accounting entry to the mining company.

General Business Taxes

Property Taxes

Real and personal property are taxable in Utah, including all mining-related property. Such property would be assessed at 100 percent of its cash value (Schumacher, 1987) and taxed at the local property tax rate (mill rate). As mentioned previously, Tooele County and Salt Lake County were the assumed locations for each mining operation in the study.

Sales and Use Taxes

Mining equipment and supplies purchased and used in Utah are subject to sales and use taxation (Schumacher, 1987) at the state level and at the local

level, providing the local option is exercised (UCA, 1987, 59-12-201 to 59-12-204). State and local (city or county) rates are combined to give a total tax rate. In 1986, the combined rate for locations without a mass transit system totaled 5.50 percent (Utah Small Business Development Center, 1986). However, further discussion with the Auditing Division (1988) of the Utah State Tax Commission revealed that in 1987, the tax rate in most places ranged from 6.00 to 6.25 percent. The absolute minimum rate anywhere was said to be 5.875 percent. Consequently, it was assumed that a sales and use tax rate of 6.00 percent would be reasonable for the study.

Unemployment Insurance Tax

A new mine tax rate of 3.5 percent on a wage base of $7,000 was used for this study (Schumacher, 1987).

Workers Compensation Insurance

The following rates were used, and are in dollars per $100.00 of payroll (Schumacher, 1987):

1) Underground non-coal mine: $5.62
2) Surface non-coal mine: $3.61
3) Ore mill operation: $2.31

State Royalty Policy

There are 5 million acres of state land in Utah, but only a fraction of that acreage is up for lease (Blake, 1987). Leases are issued by the Utah Division of State Lands and Forestry, and two methods of granting leases are used. With the first method, lease applications are considered in the order in which they are filed, with the lease going to the first qualified applicant

(UCA, 1986, 65-1-45(1)). With the second method, in the case where lands become available for leasing as a result of the revocation of a previous withdrawal, or because they are newly acquired, or because an existing mineral lease was terminated, such land can only be leased in a cash bidding process (UCA, 1986, 65-1-45(2)), and a minimum bid of $1.00 per acre is required (Blake, 1987). However, if no bids are submitted, the Division may opt to lease the land according to the first method (UCA, 1986, 65-1-45(4)).

If non-fissionable metalliferous minerals are produced from land leased from the state of Utah, a production royalty rate of 4 percent is imposed on gross ore value per ton. According to Mr. John Blake, a Minerals Resource Specialist with the state of Utah, a good basis for determining such a value would be the gross value of the metallic minerals recovered in the mill concentrate applied to each ton of ore mined. Such a basis was used in this study.

Nevada

Taxes

Corporate Income Tax

Nevada has no state corporate income tax.

Mining Taxes

Only one mining specific tax is imposed in Nevada, and that is the Net Proceeds of Mines Tax.

Net Proceeds of Mines Tax

Nevada Revised Statutes (NRS, 1986) deals specifically with the taxation of mines in Nevada. Net proceeds, for taxing purposes, are determined by starting with gross yield and subtracting the usual deductions, such as mine and mill operating costs, smelting and refining charges, transportation, royalties, and depreciation. Net proceeds are then taxed at the local property tax rate, giving the net proceeds tax. According to Mr. David Pursell, an official with the Nevada Department of Taxation, the average rate for taxing purposes in 1987 was approximately 1.70 percent (Pursell, 1987). Consequently, this rate was used for this study.

A major change in the net proceeds tax is anticipated by industry officials, as the 1987 Nevada legislature approved a resolution to amend the constitution so that the tax could be raised to 5 percent of net proceeds (Schumacher, 1987). The proposed amendment cannot be presented to the people of Nevada until 1989. Nevertheless, the likelihood of its approval, while not certain, is very good (Win, 1987).

This proposed tax increase is almost assuredly a response to the boom-level of gold mining activity occurring in the state, particularly in the Carlin

gold trend. While most companies can expect, on average, their net proceeds tax to nearly triple assuming the tax is approved, alternative tax changes had been considered which would have had a much greater cost impact. These alternatives included a gold-specific severance tax and a net proceeds tax having a much higher tax rate (Win, 1987).

General Business Taxes

Property Taxes

Real and personal property are taxed in Nevada. As such, all mining related equipment is assessed and taxed. Property is assessed at 35 percent of its market value, and taxed at the local property tax rate (mill rate). For the study, the 1.70 percent rate used for the net proceeds tax was used for general property taxation.

Sales and Use Taxes

A sales and use tax of 5.75 percent is imposed on the purchase and consumption of personal property in Nevada (State of Nevada Dept. of Taxation, 1986). However, the tax rate in Carson City, Churchill, Clark, Nye, Storey, Washoe, and White counties is 6 percent (Schumacher, 1987). Most mining equipment and supplies are taxable, although a tax exemption is granted for the sale, storage, or use of natural gas, electricity, or water delivered through mains, lines or pipes (Schumacher, 1987).

Unemployment Insurance Tax

A new mine tax rate of 3.0 percent on a wage base of $11,700 was used for the study (Schumacher, 1987).

Workers Compensation Insurance

The following rates were used, and are in dollars per $100.00 of payroll (Schumacher, 1987):

1) Underground non-coal mine: $23.22 on first 24,000
2) Surface non-coal mine: $6.06
3) Ore mill operation: $5.85

State Royalty Policy

Only two-tenths of one percent (0.002) of the land in Nevada is state-owned, and then, only a portion of that is potentially available for mineral exploration and development (Merian, 1987). Conversely, 86 percent of the land is federal land, with 48,829,332 acres being Bureau of Land Management (BLM) land (Leschendalk, 1987). Consequently, like South Dakota earlier, royalty payments to the state of Nevada were not considered in the study.

The state does, however, have a royalty policy. In the extremely rare event land is leased from the state, a mine would pay a 12 percent net smelter return production royalty (Merian, 1987).

Ontario

Background

A mining operation in Ontario is subject to an array of taxes and tax policies which are very similar in type to those found in the United States. In many respects, however, the similarity is in name only. Consequently, the objective of this particular section is to present a discussion of all relevant aspects of Canadian taxing policy, and to point out the similarities and differences to U.S. taxing policy when they occur.

Before proceeding, one very important feature of the study's examination of Canadian taxation must be mentioned. Major federal tax reform is imminent in Canada following the tabling of a white paper by Canada's finance minister, Michael Wilson, in June of 1987 (Scales, 1987). Included in the tax reform proposals presented by Mr. Wilson were a lowering of the corporate income tax rate and changes in both depletion and depreciation deductions with respect to the mining industry (Playfair and Dent, 1987). While not officially enacted at the time of this writing, these changes are probable, with the reduction of the income tax rate to take place effective July 1, 1988. Further changes are scheduled to take place by 1990.

For the study, the proposed tax reform was assumed to be a reality. However, this assumption was made only after reviewing many articles about the subject and after personal communication with Mr. Robert B. Parsons, a partner with Price Waterhouse in Toronto and a well respected Canadian mining taxation expert (Parsons, 1987).

Finally, all cost and revenue figures were in U.S. dollars. When adjustments were necessary, a monetary exchange rate of 1.30 Canadian dollars per U.S. dollar was used.

Taxes

Federal Taxation

Federal Corporate Income Tax

Rate of Tax

As mentioned above, the basic federal tax rate is to drop, effective July 1, 1988, from 46 to 38 percent. This rate is further reduced by a 10 percent abatement which allows the provinces, the Northwest Territories and Yukon room to impose corporate income taxes of their own (Price Waterhouse, 1986). Thus, the net federal corporate income tax rate in Canada will be 28 percent, compared to 34 percent in the United States. However, the abatement is available only in respect of taxable income allocable to a Canadian province, the Northwest Territories and the Yukon. If income is allocated to a foreign jurisdiction, the income is subject to the full rate of federal tax (Price Waterhouse, 1986). For the study, all income was assumed allocable to Canada, allowing the use of the 28 percent tax rate.

Adjustments to Income

Many adjustments to net mining revenue (gross revenue less operating expenses) are allowed prior to federal income taxation. Three of the more important ones afforded to mining operations, and utilized in this study, include: capital cost allowance (CCA), the resource allowance, and Canadian exploration expense (CEE). The earned depletion and mining exploration depletion allowances would also have been included in the study, but the proposed tax reform discussed previously calls for their total phase-out by June 30, 1989 (Playfair and Dent, 1987).

Capital Cost Allowance

Capital cost allowance is another term for depreciation allowance. However, unlike the depreciation allowance in the United States, a taxpayer in Canada is entitled to claim any amount of CCA desired from nil up to the maximum permitted for the each class of depreciable property. This essentially allows a Canadian taxpayer to optimize the timing of deductions and thereby achieve the greatest possible positive impact on taxes.

Relative to the mining industry (and this study), the principal classes of property for CCA purposes are:

1) Class 10 property - mining buildings and equipment acquired after the start of commercial production (capital replacements); depreciated at 25 percent declining balance.

2) Class 28 property - certain buildings and equipment acquired prior to the start of commercial production of a new mine or that are part of a major expansion to increase capacity by at least 25 percent. This class is eligible for accelerated depreciation consisting of depreciation at a rate of 30 percent of the undepreciated balance, plus any amount of the remaining undepreciated balance as long as it is less than or equal to the income of the mine.

A "pooling" concept of depreciation applies to both property classes, with the initial capital cost of property in each class put into their respective pools. (With respect to Class 10 property, additions to its pool are possible whenever capital replacement purchases are made.) Whatever amount is used as a capital cost allowance for tax purposes is subtracted from the appropriate property class pool. The balances remaining in each pool are then used in subsequent tax years, until they are consumed. Capital cost allowance is

deducted after operating costs but before the resource allowance (see following discussion).

Resource Allowance

The resource allowance is another important deduction in calculating the taxable income of a mining company. The allowance is equal to 25 percent of a taxpayer's income derived from the mining and processing (concentrating, smelting, or refining) of ore from mineral resources in Canada to any stage not beyond the prime metal stage (Price Waterhouse, 1986).

This allowance was incorporated into Canada's Income Tax Act in 1976 to partially compensate for the nondeductibility of provincial mining taxes and royalties, and to encourage greater exploration and development (Parsons and Carr, 1987). Because it is, essentially, an extra deduction with no strings attached, the resource allowance effectively reduces the federal income tax a mining company would otherwise pay by 25 percent. In the determination of taxable income, the resource allowance is taken <u>after</u> deducting capital cost allowance, but before deducting Canadian Exploration Expense (see below) (Parsons and Carr, 1987).

Canadian Exploration Expense

Canadian exploration expense is a deduction for the exploration and development expenses a mining company incurs prior to the start of production. Such expenses <u>must</u> be deducted to the maximum amount possible if the taxpayer is a principal business corporation (a principal business corporation is a corporation whose principal business is mining or certain other related activities; Price Waterhouse, 1986). For the study, it was assumed that the hypothetical mines were operated by a principal business corporation.

As with CCA, CEE is pooled, and any amount that is unused is carried forward indefinitely for deduction in a future tax year. This contrasts strongly with the U.S. treatment of preproduction exploration and development expenditures, where such expenditures can be: 1) expensed currently, with 70 percent deductible in the year in which they are incurred, and the remaining 30 percent deducted over 5 years, or 2) amortized rateably over 10 years.

Other Adjustments and Deductions

Interest expenses and prior years losses are also deductible items in determining taxable income. Both of these deductions are taken after operating expenses, CCA, the resource allowance, and CEE have been deducted. Furthermore, losses may be carried back three years and forward indefinitely (Price Waterhouse, 1986). However, due to the initial assumptions made in setting up each of the hypothetical models, their inclusion in the study was unnecessary.

Non-Deductible Items

While the adjustments and deductions just discussed are very important components of Canadian tax policy, perhaps even more important are those items which are <u>not</u> deductible. For the study, that meant all provincial levies in whatever form, such as Ontario's corporate income tax, Ontario's mining tax (royalty), and other provincial taxes like property taxes. Royalties paid to private entities, however, are deductible. This non-deductibility differs from U.S. practice where state taxes and royalties are deductible items in arriving at federal taxable income.

Canada Pension Plan

The Canadian equivalent of the United States' Social Security Tax (FICA) is the Canada Pension Plan. Employers and employees both contribute to the plan at a rate of 1.90 percent on wages between $2,500 and $25,900 Canadian (Canada Department of Health and Welfare, 1987).

For the study, an adjustment in the range subject to the tax was made using an exchange rate of 1.30 dollars Canadian per 1.00 dollar U.S. The resulting Canada Pension Plan contribution was then rolled into the labor component of mine and mill operating costs.

Provincial Taxation (Ontario)

The following three categories of provincial taxation were considered in the study:

1) Corporate income tax

2) Mining taxes

3) General business taxes

Corporate Income Tax

Ontario imposes a 14.50 percent corporate income tax on profits (taxable income) from mining. Ontario taxable income is defined as federal taxable income with certain exceptions (Price Waterhouse, 1986). The most important exceptions include:

1) While Ontario uses the same CCA classes and rates as the federal government, the actual amount of CCA deducted in a particular tax year at the provincial level may differ from the federal amount (Price Waterhouse, 1986).

2) Ontario has a depletion deduction which is calculated as 33.33 percent of mining profits (resource profits). Mining profits equal net mining revenue (gross revenue less operating expenses) less CCA and CEE (Price-Waterhouse, 1986).

3) The 25 percent resource allowance is not allowed in calculating taxable income in Ontario (Price-Waterhouse, 1986).

Neither federal income tax nor Ontario's mining tax are deductible items in the determination of taxable income.

Mining Taxes

Only one mining-specific tax is imposed in Ontario, and that is Ontario's mining tax. The intent of the tax is to compensate the province for the removal of its mineral wealth (Stoddart, 1986). Consequently, the tax is also referred to as a provincial or crown royalty (Parsons and Carr, 1987).

Ontario Mining Tax

The Ontario Mining Tax Act imposes a 20 percent tax on income derived from mining operations in the province (Revised Statutes of Ontario, 1985b). The first $500,000 of taxable income are exempt from taxation (Playfair, 1987).

Taxable income derived from mining operations equals gross revenue (net smelter return) less mine and mill operating costs, depreciation at specified rates, certain exploration and development expenditures (CEE), property taxes, and processing allowances (Price Waterhouse, 1986). No deductions are allowed for interest expense, provincial mining taxes, provincial income taxes, royalties, or depletion (Northern Miner, 1987).

Many of the allowable deductions differ from federal or provincial deductions. For instance, mining assets are depreciated differently than processing or transportation assets. With respect to the former, mining assets acquired after the start of production are depreciated on a 30 percent straight-line basis. However, the depreciation on mining assets acquired before the start of production can be claimed up to the income of the mine, which is similar to CCA treatment of Class 28 property under federal law. Processing and transportation assets, on the other hand, must be depreciated on a 15 percent straight-line basis (Price Waterhouse, 1986).

In addition to the depreciation allowance on the original, pre-production, processing investment, a processing allowance equal to a certain percentage of that investment is allowed. The amount of the allowance depends on the degree of processing achieved. For example, if a company processes ore only to the concentrate stage, an 8 percent allowance applies. If ore is processed to the smelting stage, a 12 percent allowance applies. Finally, if a company operates a concentrator, smelter and refinery, a 20 percent allowance is granted (Price Waterhouse, 1986).

The amount of processing allowance that can actually be taken cannot be less than 15 percent, nor more than 65 percent, of mining and processing income after deducting all other expenses (operating costs, depreciation, property taxes, and CEE) (Parsons and Carr, 1987).

For the study, the processing allowances granted to each hypothetical model were:

1) UNDERGROUND GOLD: produced a gold concentrate for subsequent sale - 8 percent allowance.

2) SURFACE GOLD: produced gold dore on site - 12 percent allowance.

(A processing plant which produces gold bullion is considered a smelter according to Revised Regulations of Ontario, 1985).

3) UNDERGROUND POLYMETALLIC: produced base metal concentrates for subsequent sale - 8 percent allowance.

Final Note On Mining Tax

Ontario's Treasurer, Robert Nixon, has proposed that new mines commencing production after May 20, 1987 be given an exemption from Ontario's mining tax (Playfair, 1987). The exemption would apply to income earned from the first 36 months (3-years) of production from such new mines (Wu, 1987).

During the exemption period, companies will be required to deduct all non-discretionary expenses against income in the year such expenses are incurred. They will also be required to deduct the regular depreciation allowance, but not the accelerated allowance for depreciation of mining assets (Wu, 1987). Also, with respect to CEE deductions, indications are that they will be permitted to be deferred and claimed after the exempt period ends (Playfair, 1987).

General Business Taxes

Property Taxes

Only real property associated with a mining operation is taxable in Ontario. Such property is assessed at 60 percent of its market value (Revised Statutes of Ontario; 1985a, Sec. 7 (1)(d)) and taxed at the property tax rate (mill rate) of the municipality in which it is located.

For the study, the 1986 mill rates of Hemlo (105.005), Timmins (235.01) and Sudbury (111.631) were used for the underground gold, surface gold, and underground polymetallic operations, respectively (Wu, 1987).

Sales Tax

The provincial sales tax rate in Ontario is 7 percent. However, mine and mill equipment and machinery, as well as materials and supplies, are exempt from taxation (Intergovernmental Working Group on the Mineral Industry, 1986). Consequently, the Ontario sales tax was not considered in the study.

Unemployment Insurance Tax

The unemployment insurance premium (tax) an employer must pay in Ontario is 3.29 percent of wages paid to an employee. There is no differentiation between a mining company and any other company relative to the tax rate (Ontario Department of Employment and Immigration, 1987).

Workers Compensation Insurance

It was necessary to use two sets of workers compensation rates in this study because, according to the Ontario Workers Compensation Board (1987), the rates for base metal (nickel-copper-lead) operations are different than the rates for gold operations. Unlike workers compensation rates in the United States, the Ontario rates for each type of metal are the same for underground mine workers, surface mine workers and mill workers.

The following rates were used, and are in dollars per $100.00 of payroll. Included in the rates are contributions for silicosis.

1) Underground, and surface, gold operations: $12.80

2) Underground polymetallic operation: $9.18

Provincial Royalty Policy

Ontario has no provincial royalty policy.