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EXXON MINERALS COMPANY

CRANDON PROJECT

SOCIOECONOMIC STUDY

prepared by RPC, Inc.

FISCAL ANALYSIS METHODOLOGY

SOCIOECONOMIC ASSESSMENT

EXXON CRANDON PROJECT

prepared for
Exxon Minerals Company, U.S.A.

by
RPC, Inc.
Austin, Texas

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March 1981

We will appreciate any comments you may have on the methods and techniques we describe in this paper. You may direct comments and suggestions to any of the following:

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HOW TO USE THIS REPORT

This report is part of a comprehensive study commissioned by Exxon Minerals Company to determine the potential socioeconomic effects of a proposed mine/mill complex in northeastern Wisconsin. The report describes the techniques we plan to use to estimate the potential effects of the project on the finances of state and local study area governments.

Part of the intent of Exxon Minerals Company in commissioning this socioeconomic assessment is that everyone with an interest in the proposed project should have access to the reports concerning the socioeconomic effects that might result from project development. However, this intended readership covers a wide spectrum of interests and technical backgrounds. In an effort to provide information for those with nontechnical interests, as well as for readers who want all the statistical and mathematical details, we have designed our reports in two parts. The first part, printed on yellow paper, covers the highlights of the technical work described in the white pages.

We have organized the technical discussion in the white pages as follows:

- Chapter 1: Our overall approach to the analysis and the relationship of this to other elements of the socioeconomic assessment
- Chapter 2: How we will estimate state government revenues
- Chapter 3: How we will estimate revenues for local government jurisdictions
- Chapter 4: How we will estimate revenues from the net proceeds tax and distribute the revenues to jurisdictions within the local study area

The yellow-page summary section describes the procedures we discuss in detail in the white pages, without listing specific data requirements, mathematical formulas, or other technical details.

SUMMARY

Exxon Minerals Company (Exxon) is considering the establishment of a mine/mill complex near Crandon, Wisconsin. This proposed complex would be based on a large ore body containing commercial quantities of zinc and copper. Engineering and economic feasibility studies are underway for the project, and environmental studies are in progress to satisfy local, state, and federal regulatory requirements. Exxon estimates that construction and operation phases of the project will each employ 800 to 900 people.

Exxon has retained RPC, Inc. to prepare a comprehensive assessment of potential socioeconomic effects of the Crandon Project. The overall assessment will forecast effects of the project on the local study area's economy, demography, housing and land use, public facilities and services, fiscal capabilities, sociocultural characteristics, and Native American communities. We will conduct statistical surveys in the local study area to supplement available information for these analyses. In addition, we are preparing two case studies on communities that share characteristics with the local study area and that have experienced industrial development of a type similar to that expected from the Crandon Project.

This report describes the techniques and methods we will use to determine the potential fiscal effects of the proposed Crandon mine/mill complex. We will perform this analysis of the state government and of local governments in the local study area. Specifically, we will determine effects for the three county governments, for all cities and townships, for school districts that fall substantially within the local study area, and for the Nicolet Vocational, Technical, and Adult Education District. A separate methodology paper for our analysis of Native American communities describes our techniques for assessing fiscal effects on Native American reservations in the local study area.

The fiscal analysis has two major purposes. The first purpose is to calculate the net fiscal effect of the proposed Crandon Project required for regulatory findings. To do this, we first estimate annual tax revenues for the state of Wisconsin generated within the local study area and for each relevant jurisdiction over the expected life of the Crandon Project. These estimates, when combined with estimated public facilities

and services costs, will determine the net fiscal effect of the proposed project for the state's finances within the local study area and for each jurisdiction on an annual basis.

The second purpose of the fiscal analysis is to provide government officials and interested citizens with information they can use to make operating and capital budgeting decisions. Local officials can use our forecasts of future conditions without the project as they plan for future budgets and revenues. They can make similar use of forecasts of future conditions with development of the Crandon Project. If a community is likely to face increased demands for facilities and services with or without the project, local officials can begin to plan to meet those needs. In these planning efforts Exxon representatives will be available to work with local and state authorities to ensure that project development, if it goes forward, will provide a net economic benefit.

Our intent in preparing this methodology paper is to ensure maximum usefulness of the information produced by the fiscal analysis by involving officials and interested parties early in the work process. We hope that they will be stimulated to discuss and comment on the methodology.

Our methodology for the fiscal analysis consists of the following steps:

1. Describe current fiscal conditions.

2. Estimate revenues without the proposed Crandon Project for the state as a whole and for the state and local governments within the local study area.

3. Estimate revenues with the proposed Crandon Project for the state as a whole and for the state and local governments within the local study area.

4. Determine net fiscal effects of the proposed Crandon Project on state government finances within the local study area and on local study area jurisdictions.

DESCRIBE EXISTING CONDITIONS

The first task in the fiscal analysis is to describe current fiscal conditions for the state and the local governments within the local study area. We will describe the state and the local government tax systems, identify major revenue sources, and

discuss state and local government finance characteristics and trends.

ESTIMATE REVENUES UNDER WITHOUT- AND WITH-PROJECT CONDITIONS

We will then forecast state and local government revenues as they will be without the proposed Crandon Project and as they will be with the project under various conditions of project development. We will estimate state tax revenues generated within the state as a whole and state government revenues generated within the local study area. We will estimate state revenues from the net proceeds tax, income taxes, sales tax, other taxes (such as motor fuels and alcoholic beverages), and federal-to-state transfers. We will estimate local revenues from property taxes, state-to-local transfers, federal-to-local transfers, and other sources (such as fees and charges).

Except for the net proceeds tax, we will base our estimates of revenues on historical data and on forecasts from the economic, demographic, housing and land use, and public facilities and services analyses. We will use several techniques. For the local property tax, we will use estimates of the property tax base for additional residential and commercial construction (from the housing and land use analysis) and current equalized property tax rates. For revenues from other sources, we will develop forecasting equations of revenues by type using per capita multipliers or statistical approaches.

We will calculate the net proceeds tax due from the project using formulas specified by Wisconsin law and information provided by Exxon Minerals Company and industry sources. We will distribute guaranteed net proceeds payments according to existing Wisconsin law and according to a reasonable number of viable proposals for amendment to that law. We will distribute discretionary payments within the local study area so as to minimize project-related deficits under the assumption that the Mining Investment and Local Impact Board would distribute monies to minimize adverse project-related effects.

DETERMINE NET FISCAL EFFECTS

The annual net fiscal effect of the proposed Crandon Project on state government finances within the local study area is the difference between the state's net revenues (total revenues minus

expenditures) with the project and without the project. We will estimate revenues for the without-project and with-project futures as described above. We will estimate state government costs in the local study area as part of the public facilities and services analysis. We will also estimate the total tax revenues generated within Wisconsin as a whole due to the Crandon Project.

The annual net fiscal effect of the project on each local jurisdiction is the difference between the jurisdiction's net revenues (total revenues including net proceeds tax monies minus expenditures) with and without the project. We will estimate total revenues under without- and with-project conditions as described above, and we will estimate local government costs as part of the public facilities and services analysis.

The result of the fiscal analysis will be annual estimates of the project's net fiscal effect on each jurisdiction. Throughout the fiscal analysis, we assume that current institutional arrangements will continue. This means, for example, that we will use existing equalized property tax rates and current formulas for the calculation and distribution of certain state aids and shared taxes. We will not attempt to forecast changes in these variables or in other elements of the tax system.

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1. GENERAL APPROACH

This paper describes the techniques we will use to estimate the fiscal effects of the proposed Crandon Project. The analysis consists of four parts:

1. Describe current fiscal conditions
2. Estimate revenues without the project
3. Estimate revenues with project development
4. Determine net fiscal effects resulting from the project.

We will describe and estimate the state and local revenues listed in table 1. We will determine the fiscal effects for the state of Wisconsin's finances within the local study area; for all counties, cities, and townships in the local study area; for all school districts that fall substantially within the local study area; and for the Nicolet Vocational, Technical, and Adult Education (VTAE) District. We describe fiscal effects for the Chippewa and Potawatomi reservations as part of our separate Native American communities analysis.

Figure 1 diagrams the steps involved in the fiscal analysis. Throughout the analysis we assume that current institutional arrangements will continue. This means, for example, that we will use equalized property tax rates for the latest year for which data are generally available and current formulas for calculation and distribution of certain state aids and shared

Table 1

REVENUES ESTIMATED FOR THE STATE AND THE LOCAL STUDY AREA

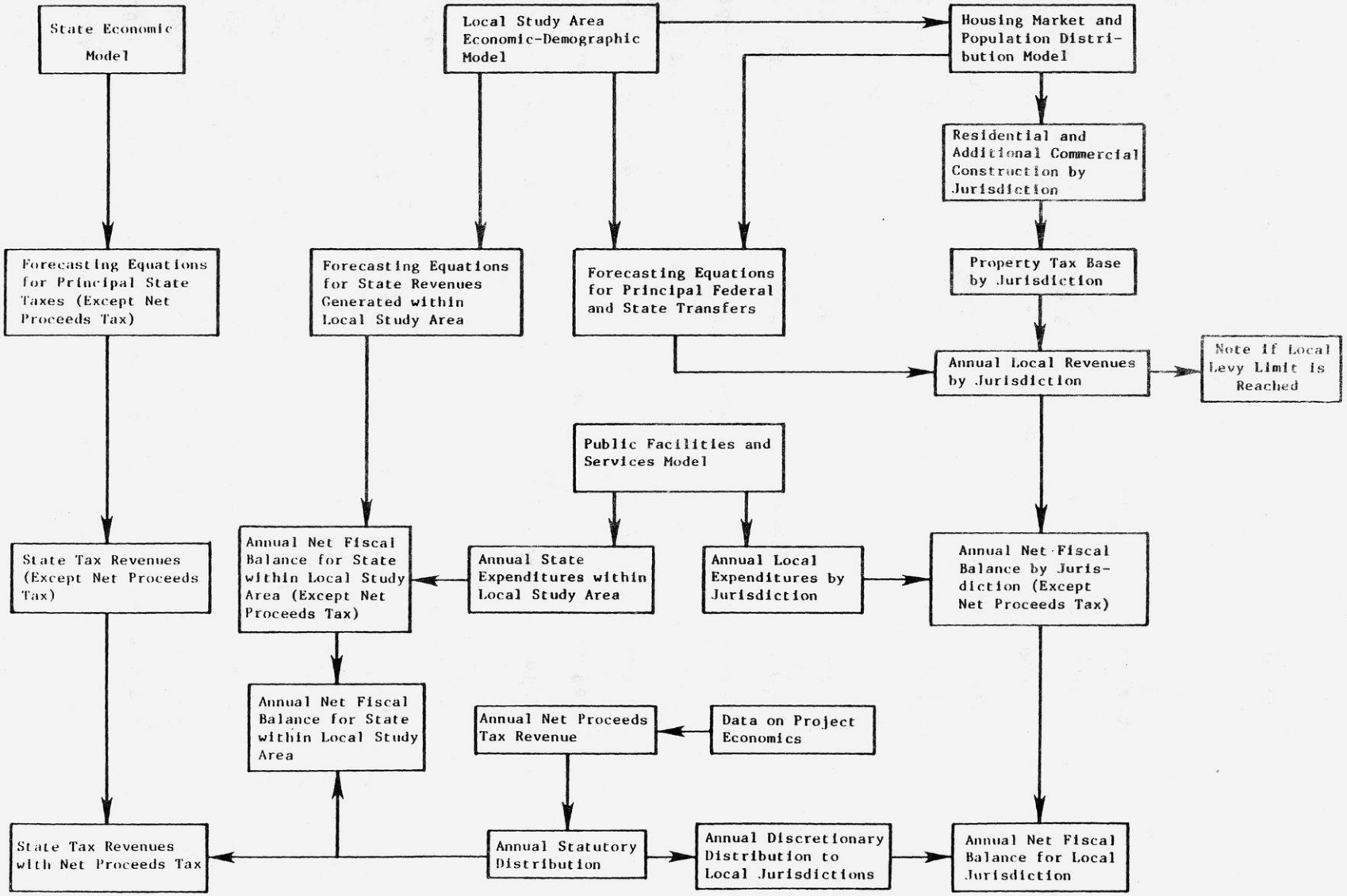
State Revenues	Local Revenues
Net proceeds tax	Property tax
Personal income tax	State-to-local transfers
	General government
Corporate income tax	Education
	Health and social services
Retail sales and use tax	Natural resource aids
	Transportation aids
Miscellaneous taxes	Machinery and equipment aids
Motor fuels	Special utility payment
Alcoholic beverages	Per capita payment
Tobacco	Aidable revenue
Public utilities	General property tax relief
Motor vehicle registration	General state aid to school districts
Forestry tax	Miscellaneous
Other	
Federal-to-state transfers*	Federal-to-local transfers
	Miscellaneous local revenues
	Fees and charges
	Other

NOTE:

*We will estimate the amount attributable to the local study area only.

Figure 1

FLOWCHART OF FISCAL ANALYSIS FOR WITHOUT-PROJECT AND WITH-PROJECT FUTURES



taxes. We will not attempt to forecast changes in these variables or in other elements of the tax system.

In reality, of course, institutional arrangements will change over the next 55 years (our projection period). This means that, in absolute terms, projections based on current arrangements (such as existing tax rates and statewide proration factors) will probably miss actual conditions, and the amount of error will increase the further into the future we forecast. The errors will be systematic, however, in the sense that they will be present under both the without- and with-project conditions. Subsequently the errors will cancel in our determination of net effects because we compare the without- and with-project conditions in order to estimate net effects. The crucial values in terms of our effects assessment of the proposed Crandon Project are not the absolute values in the without- and with-project projections but rather the comparison between the two futures.

We will make all projections in terms of then-current dollars using inflation forecasts prepared by Data Resources, Inc. (1981).

This introductory chapter provides an overall outline of the study. The remaining three chapters describe the approaches and data we will use to estimate tax revenues. Chapter 2 outlines the methods for estimating revenues for the state of Wisconsin; chapter 3 discusses the techniques for estimating revenues for

local government jurisdictions; and chapter 4 describes our procedure for estimating revenues from the net proceeds tax.

STATE GOVERNMENT ANALYSIS

Describe Current Fiscal Conditions

The current fiscal profile for the state will consist of a description of the state tax system, an identification of major revenue sources, and a discussion of trends. Table 2 presents more detailed information on the data series and sources we will use.

In addition to describing fiscal conditions for the most recent period, we will collect time-series data on revenues by type. We will use these data series to estimate future revenues by type.

Estimate Without-Project and With-Project Revenues

We will estimate all state tax revenues listed in table 1. We will estimate revenues generated within the state as a whole and within the local study area. We will use the same process to estimate the without-project and with-project futures. The difference will be in the values we use as the basis of our calculations. The following chapter describes the approach we use to estimate tax revenues other than the net proceeds tax. We

Table 2

DATA TO BE PRESENTED IN REPORT ON
CURRENT STATE FISCAL CONDITIONS

Revenue by Type	Data Sources
A. Tax revenues	CRC Publications, 1980, Wisconsin Tax Reporter
1. Accruing to General Fund	
a. Income taxes b. Sales and excise taxes c. Public utility taxes d. Miscellaneous taxes	Wisconsin Legislative Reference Bureau, Wisconsin Blue Book, 1979-1980
2. Accruing to transportation fund	Wisconsin Department of Revenue, Taxes, Aids and Shared Taxes in Wisconsin Municipalities
a. Motor vehicle fuel taxes b. Motor vehicle registration c. Miscellaneous taxes and fees	
B. Federal transfers	Wisconsin Legislative Reference Bureau, Wisconsin Blue Book, 1979-1980
1. Commerce 2. Education 3. Environmental resources 4. Transportation 5. Human relations and resources 6. Other	U.S. Community Services Administration, Geographic Distribution of Federal Funds in Wisconsin

describe calculation and distribution of the net proceeds tax in chapter 4.

Determine Net Fiscal Effects

We will estimate the total tax revenues generated within the state as a result of the proposed Crandon Project. The value equals the difference between tax revenues projected both with the proposed project (including the state's share of net proceeds tax revenues) and without the project.

We will also determine the net fiscal effect of the proposed project on state government finances within the local study area. The annual net fiscal effect on state government finances within the local study area is the difference between the state's net revenues (total revenues minus expenditures) with the project and without the project. Revenues generated within the local study area come from three general sources: federal-to-state transfers, the net proceeds tax, and taxes other than the net proceeds tax. We will estimate state revenues in the local study area for the without-project and with-project futures for each year.

We will estimate state government costs incurred within the local study area for the without-project and with-project futures for each year as part of the public facilities and services analysis. The net fiscal position of the state within the local study area in the without-project and with-project futures is

found by subtracting the respective estimates of expenditures from revenues. The effect of the proposed Crandon Project on state finances within the local study area is found by comparing the net fiscal position without the project to the net fiscal position with the project.

Then we will add the state's share of net proceeds tax monies as described in chapter 4. The result of this process will be estimates of the annual net fiscal effect, including the net proceeds tax, for the state's finances within the local study area. Finally, we will sum project-related annual surpluses or deficits for all time periods to achieve the project's net fiscal effect on the state's finances through time. We will also calculate the present value of the fiscal effect over time using discounted cash flow techniques and an appropriate discount factor.

LOCAL GOVERNMENT ANALYSIS

Describe Current Fiscal Conditions

The current fiscal profile for local jurisdictions will consist of an identification of sources of local revenues; a description of the local tax structure, including a summary of the system of state-to-local government aids, shared taxes, and federal-to-local transfers; and a discussion of local government finance characteristics and trends. Among the data we will

present are full equalized valuations and tax rates, property tax burden, revenues by type, total bonded indebtedness, and bonding capacity. Table 3 presents more detailed information on the data series and sources we will use.

Estimate Without-Project and With-Project Revenues

The next tasks in the local government analysis are to forecast revenues for the without-project and with-project futures. The forecasting process is the same for both the without-project and with-project fiscal analyses.

In this step we will forecast local government revenues from the sources listed in table 1 except for transfers from the net proceeds tax. We explain the specific forecasting methods in chapter 3.

Determine Net Fiscal Effects

To determine the net fiscal effects on local jurisdictions, we will first subtract annual expenditures (estimated as part of the public facilities and services analysis) from annual revenues for the without-project and with-project futures. The result will be estimates of the annual net fiscal position of each jurisdiction given existing tax rates.

Next, we will compare the annual net fiscal balances without and with project development for each jurisdiction. The result is the project's effect on each jurisdiction without considering

Table 3

DATA TO BE PRESENTED IN REPORT ON
CURRENT LOCAL STUDY AREA CONDITIONS

Data Items	Jurisdictions	Data Sources
A. Taxation		
1. Property taxes levied by type (state, county, local, school)	Cities, towns	Wisconsin Department of Revenue, Town, Village and City Taxes
2. State taxes levied by type	Counties, cities, towns	Wisconsin Department of Revenue, Taxes, Aids and Shared Taxes in Wisconsin Municipalities
3. Tax base tax rate, full valuation	Counties, cities, towns	Wisconsin Department of Revenue, Town, Village and City Taxes
4. Residential and commercial full valuation/total property full valuation ratio	Cities, towns	Wisconsin Department of Revenue, Property Tax
B. Revenues		
1. Revenues by type	Counties, cities, towns	Wisconsin Department of Revenue, Municipal Resources Provided and Expended
	School districts	Wisconsin Department of Public Instruction: unpublished data and 1979, Distribution of Wisconsin Public School State Aid Dollars for 1977-1978
	VTAE district	VTAE Administration, 1980, personal communication
2. Intergovernmental transfers		
a. Intergovernmental revenues	Counties	Wisconsin Department of Revenue, unpublished data
b. Shared taxes, state aids and grants	Counties, cities, towns	Wisconsin Department of Revenue, Taxes, Aids and Shared Taxes in Wisconsin Municipalities, and unpublished data
3. Aids to school districts		
a. State aid by type	School districts	Wisconsin Department of Public Instruction, Distribution of Wisconsin Public School Aid Dollars
b. Other aid	School districts	Wisconsin Department of Public Instruction, unpublished data
4. Aids to other districts	VTAE district	Wisconsin Department of Revenue, unpublished data
C. Indebtedness		
1. Long-term debt obligations	Counties, cities, towns, school districts, VTAE district	Wisconsin Department of Revenue, Long-Term Indebtedness of Wisconsin Political Subdivisions
2. Statutory borrowing limit	Counties, cities, towns, school districts, VTAE district	Wisconsin Department of Revenue, Long-Term Indebtedness of Wisconsin Political Subdivisions

the distribution of net proceeds tax monies from the Investment and Local Impact Fund.

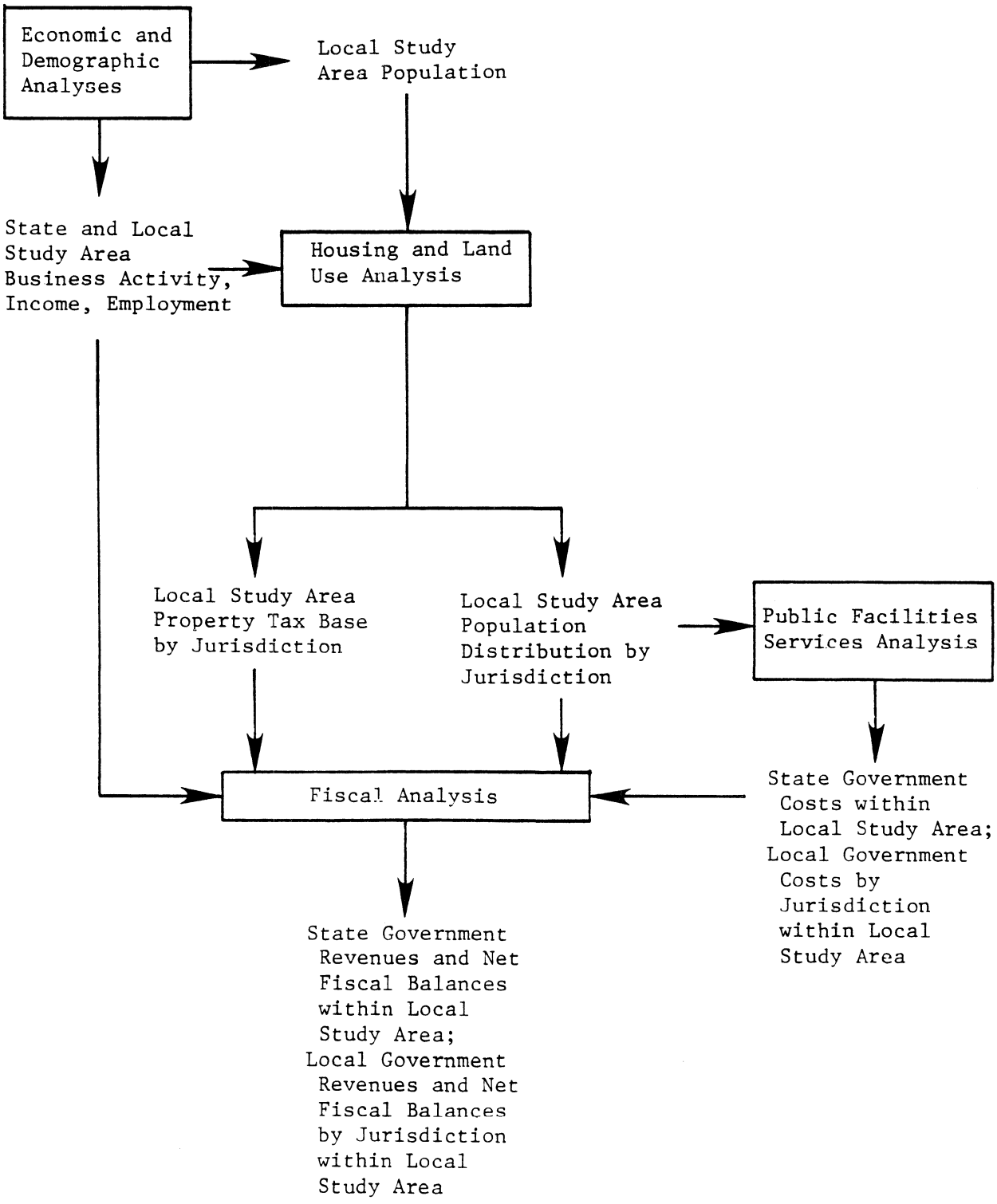
Then we will distribute net proceeds tax monies within the local study area as described in chapter 4. The result of this process will be estimates of the annual net fiscal effect, including the net proceeds tax, for each jurisdiction. A positive value (surplus) will indicate that the project contributed more in revenues than costs to the jurisdiction; a negative value (deficit) will indicate that project-related costs exceeded total revenues generated by the project. Finally, we will sum project-related annual surpluses or deficits for all time periods to achieve the project's net fiscal effect on each jurisdiction through time. We will also calculate the present value of the fiscal effect over time using discounted cash flow techniques and an appropriate discount factor.

INTERACTIONS WITH OTHER ELEMENTS OF THE SOCIOECONOMIC ASSESSMENT

Figure 2 shows the interactions between the fiscal and other elements of the socioeconomic assessment. The housing and land use analysis (RPC, Inc., 1980b) uses inputs from the demographic and economic analyses (RPC, Inc., 1980a, 1981) to distribute local study area population to jurisdictions and to provide forecasts of the local study area property tax base. The fiscal analysis uses this information in conjunction with estimates of local study area government costs (from the public facilities and

Figure 2

INTERACTIONS AMONG STUDY ANALYSES



services analysis(RPC, Inc., 1980c) to forecast annual local government revenues and annual net fiscal balances by jurisdiction. The fiscal analysis also uses estimates of state and local study area business activity, income, and employment (from the economic analysis) and state government costs within the local study area (from the public facilities and services analysis) to forecast state tax revenues generated within Wisconsin as a whole and annual net fiscal balances for state finances within the local study area.

2. STATE GOVERNMENT REVENUES

The economic effects of the proposed Crandon Project are likely to extend beyond the local study area to the state as a whole. This is because project development is likely to induce greater production in Wisconsin industries, especially machinery and equipment manufacturing, that may supply goods and services to the proposed mine/mill complex. The increased economic activity, in turn, is likely to increase incomes within the state, thereby expanding the tax base for many state taxes and contributing to tax revenues. In addition the state will receive net proceeds tax revenue based on the value of the project's mineral production.

A major objective of the fiscal analysis is to estimate those state tax revenues listed in table 1 for Wisconsin as a whole through the year 2035 as well as to estimate state revenues attributable to the local study area. We will forecast tax revenues for without-project and with-project conditions. By comparing the revenues generated under alternative futures, we will determine the change in state government revenues generated within the state as a whole and within the local study area due to the Crandon Project.

In this chapter we discuss the methods we will use to estimate state revenues from sources other than the net proceeds tax. We will use statistical techniques to develop forecasting equations for state tax revenues by type for the state as a whole. We will also develop separate estimates of state tax revenues and federal-to-state transfers attributable to the local study area using a per capita approach. These methods have been used successfully in other fiscal modeling efforts; see, for example, Hertsgaard et al. (1978) and Murdock et al. (1979).

STATE TAX REVENUES GENERATED WITHIN THE STATE AS A WHOLE

We will use regression techniques to develop our estimates of state tax revenues generated within the state as a whole for without-project and with-project future conditions. Regression is a method used to examine the historical relationship between a variable we wish to forecast (the dependent variable) and one or more explanatory (independent) variables. Using the historical relationships, we have a basis to forecast future values.

For example, we might reason that the amount of state income taxes collected depends on the level of state personal income:

$Y' = A + BX$

Where:

Y' = the estimated value of the dependent variable (state income taxes collected)

A = a constant that is added to each case

B = the regression coefficient, a constant by which all values of X are multiplied

X = the independent variable (state personal income)

The regression coefficient shows the change in tax collections for each dollar change in state personal income. We calculate values for A and B from historical values of the dependent and independent variables. Once we compute values for A and B, all we need to forecast the dependent variable are forecasts of the independent variable for each year. Texts such as Kmenta (1971) and Nie et al. (1975) discuss regression techniques in detail.

We will use employment and/or income as our independent variables; forecasts of these variables will be available by economic sector by year from our state economic analysis. The approach we will use to perform the analysis of economic effects on the state economy as a whole is discussed in detail in our report, Economic Analysis Methodology (RPC, Inc., 1981). To summarize, the analysis involves three major steps. First, we develop an input/output (I/O) model for Wisconsin by localizing the national I/O model developed by the University of Maryland INFORUM project. Then, we forecast final demand for each sector in the state I/O model for the without-project and with-project

futures. Finally, we apply the forecasts of final demand to the I/O tables to obtain without-project and with-project forecasts of output, earnings, and employment by sector. We will use these results as independent variables to forecast state revenues from major taxes.

The underlying assumption of this approach is that most state tax revenues are based on economic activity in a way that causes variations in economic variables such as employment and income to explain much of the variation in tax revenue collections. To test this assumption, we developed preliminary tax forecasting equations using historical data from 1952 to 1979 (from 1963 for the sales tax). We estimated separate equations for eight Wisconsin taxes with state personal income as the independent variable.

Table 4 shows the results. The coefficient of determination (R^2) indicates the fraction of the variance in the dependent variable explained by the independent variable. If all variance in the dependent variable were explained by the independent variable, R^2 would equal 1.

The results of the test regressions are encouraging. The most important revenue-producing taxes (personal and corporate income taxes and the state sales tax) are highly correlated with state personal income as indicated by the R^2 values. The remaining taxes have at least a moderate degree of correlation with state personal income.

Table 4

PRELIMINARY STATE FORECASTING EQUATIONS*

Tax Collections (Y′)	Constant (A)	Regression Coefficient (B)	Coefficient of Determination (R^2)
Sales	-9454.46	46.66	.86
Personal income	-8450.22	57.61	.99
Corporate income	-40.78	7.07	.83
Motor fuels	837.26	4.11	.55
Alcoholic beverages	140.03	1.08	.71
Tobacco	-298.83	3.98	.83
Public utilities	-669.33	4.58	.38
Motor vehicle registration	745.93	1.30	.73

NOTE:

*All equations were specified as follows:

$$Y' = A + BX$$

Where: Y' = tax collections
A = constant
B = regression coefficient
X = state personal income

These equations are preliminary and were done only for test purposes. Additional specifications incorporating one or more of the following modifications should provide improved results:

1. Combine some of the smaller taxes and estimate one equation for the group.
2. Relate certain taxes to income or employment in specific sectors (e.g., the utilities tax to income or employment in public utilities).
3. Specify logarithmic rather than linear equations.
4. Use a lagged dependent variable.
5. Use dummy variables to account for major changes in tax structure.

The final specification for each tax equation will be the one with the best statistical properties for forecasting.

We will use the same equations for the without-project and with-project forecasts. Differences among forecasts will arise from the changed income and employment levels in the state for the with-project conditions. The effect of the proposed mine/mill complex on state tax revenues will be the difference between the without-project and with-project revenue estimates.

STATE REVENUES GENERATED WITHIN THE LOCAL STUDY AREA

State Tax Revenues

We will estimate state government revenues generated within the local study area by using estimates of local study area value of production, income, and population from the demographic and

economic analyses (RPC, Inc., 1980a, 1981) and the most current estimates of state revenue collections within the local study area provided in Taxes, Aids and Shared Taxes in Wisconsin Municipalities (Wisconsin Department of Revenue, annual e).

First, we will aggregate state revenue generated within the local study area into four categories: income-related taxes, sales taxes, other state taxes, and nontax state revenues. Income-related taxes consist of individual and corporation income taxes. Sales taxes consist of sales and use tax collections. Other revenues include excise taxes, utility taxes, other taxes, and nontax revenues. Then for each category of revenues we will derive a multiplier which will be applied to our forecasts of output, income, and population for the local study area.

We will derive the multiplier for income-related taxes by dividing income-related tax collections within the local study area by local study area personal income. We will then apply this multiplier to our projections of local study area personal income from the economic analysis to yield annual forecasts of income tax revenues generated in the local study area.

The sales tax multiplier will equal the ratio of sales and use taxes collected in the local study area to the value of production in the local study area retail trade sector. We will apply this multiplier to annual forecasts of the value of retail production in the local study area (from the economic analysis)

to obtain projections of sales tax revenue generated in the local study area.

The other tax revenues multiplier will be estimated by calculating the total of other tax revenues collected in the local study area and dividing by local study area population. This multiplier will be applied to forecasts of population in the local study area from the demographic analysis to yield annual estimates of other tax revenues generated within the local study area.

The nontax revenue multiplier will be derived by totaling all nontax, nonfederal revenues to the state for the most recent fiscal year from the Annual Fiscal Report (Wisconsin Department of Revenue, annual a). We will use a weighted average to convert this data to a calendar-year total of nontax revenues. We will develop a multiplier by dividing this total by the population of the state of Wisconsin. We will apply this multiplier to our local study area population forecasts to yield annual estimates of nontax state revenues generated within the local study area.

Federal-to-State Transfers

In addition to tax revenues, the state receives transfers from the federal government. Unlike tax payments, however, these transfers depend less on economic activity and more on population-related variables and political decisions at the

federal level. At the state level these factors will be largely unaffected by the proposed Crandon Project.

The federal revenue-sharing program provides a good illustration of the process for allocating federal aids. One-third of the total allocation to a state goes to the state government. The total allocation to a state depends first on the revenue-sharing appropriation by Congress and second on formulas that incorporate such factors as population, general tax effort, and relative income. The amount received by a state depends on the criteria of Congress, a state's actual values for the allocation factors, and changes in these values relative to other states. The allocation received by the state of Wisconsin is likely to be affected little, if at all, by the proposed Crandon Project. Subsequently, we will estimate federal-to-state transfers attributable to the local study area only.

We will estimate federal-to-state transfers attributable to the local study area through a per capita approach. First, we will calculate the per capita federal aids to Wisconsin. This figure will exclude amounts channeled by the state to local governments. We will then multiply this number by our without- and with-project forecasts of local study area population; we will obtain these population estimates from our demographic analysis. The results of this procedure will be forecasts of federal transfers to the state attributable to the local study area under without- and with-project conditions.

3. LOCAL GOVERNMENT REVENUES

The proposed Crandon Project will affect the fiscal balance of jurisdictions in the local study area. These effects arise from the changes that will occur in population, property values, state transfers to local governments, and federal transfers to local governments. This chapter describes the methods we will use to forecast local government revenues from the property tax, from state-to-local transfers, from federal-to-local transfers, and from miscellaneous sources both without and with the project. Methods of calculating revenues from the net proceeds tax are decribed in the next chapter.

Table 5 lists the revenues (excluding monies from the net proceeds tax) that we will estimate for each type of local jurisdiction. Certain jurisdictions such as the counties, some school districts, and the Nicolet VTAE extend beyond the local study area. We will estimate and determine net fiscal balance for the portions of these jurisdictions located within the local study area only. We will not include Northland Pines and Minoqua school districts in our analysis because only a small portion of these jurisdictions fall within the local study area. They are not likely to be substantially affected by the proposed project.

Table 5

SOURCES OF LOCAL GOVERNMENT REVENUE TO BE ESTIMATED BY TYPE OF JURISDICTION

Revenue	Jurisdiction			
	County	Township/ Municipality	School District	VTAE
Property tax	X	X	X	X
State-to-local transfers:				
General government	X			
Education	X			
Health and social services	X			
Natural resource aids	X	X		
Transportation aids	X	X		
Machinery and equipment	X	X		
Special utility payment	X	X		
Per capita	X	X		
Aidable revenues	X	X		
General property tax relief	X	X	X	X
General state aid to school districts			X	
Miscellaneous	X	X	X	X
Federal-to-local transfers	X	X	X	X
Miscellaneous revenues				
Fees and charges	X	X		
Other	X	X	X	X

Table 6 shows the formulas we use to calculate local government revenues.

PROPERTY TAX

We will estimate property tax revenues for each jurisdiction by multiplying the tax base by the current equalized value property tax rate. The tax base is the equalized property valuation and will be estimated annually as part of the housing and land use analysis for residential and commercial construction. We will use the resulting property tax estimates to calculate aidable revenue payments as discussed below.

Wisconsin law limits the amount of property tax a local jurisdiction may levy. The limitation is based on the previous year's allowable levy and a percentage growth factor. The allowable levy is also affected by rapid population growth and some other adjustments. A jurisdiction may levy and collect property taxes in excess of the calculated allowable levy only if a referendum on the levy is passed.

In calculating property tax revenues for jurisdictions in the local study area, we will compare the estimated tax to an estimate of the levy limit by applying the levy growth factor to the 1979 allowable levy in each jurisdiction. We will use the levy growth factor applicable in 1979 for succeeding years.

Where the estimated tax exceeds the levy limit we will constrain local property tax revenue to equal the levy limit. We

Table 6

EQUATIONS FOR ESTIMATING LOCAL GOVERNMENT REVENUES[a]

Revenue	Forecasting Equation
Property tax	(Estimated equalized valuation)(Equalized valuation tax rate)
State-to-local transfers	
General government	(Payment/capita)(Estimated population)
Education	(Payment/capita)(Estimated population)
Health and social service aids	(Payment/capita)(Estimated population)
Natural resource aids	(Payment/capita)(Estimated population)
Transportation aids	(Payment per dollar of transportation cost)(Estimated transportation cost)
Machinery and equipment	(Payment/capita)(Estimated population)
Special utility	Current payment
Per capita	
Counties	(Payment/capita statewide)(Estimated population)(16.25%)
Towns and cities	(Payment/capita statewide)(Estimated population)(83.75%)
Aidable revenues[b]	$\left(\begin{array}{c}\text{Estimated own source}\\ \text{revenue averaged over}\\ \text{preceding three years}\end{array}\right)\left(1 - \frac{\text{Estimated equalized valuation}}{\text{Guaranteed valuation/capita}} \Big/ \text{Estimated population}\right)$
General property tax relief[c]	$\left(\begin{array}{c}\text{Local gross}\\ \text{tax rate}\end{array} - \frac{\text{Statewide gross tax rate}}{2}\right)\left(\begin{array}{c}\text{Estimated}\\ \text{equalized}\\ \text{valuation}\end{array}\right)\left(\begin{array}{c}\text{Proration}\\ \text{factor}\end{array}\right)$
General state aid to school districts	
Primary aids	$\left(\frac{\text{Estimated shared cost/member up to statewide ceiling}}{\text{Primary guaranteed valuation member}}\right)\left(\begin{array}{c}\text{Net primary guaranteed}\\ \text{valuation/member}\end{array}\right)\left(\begin{array}{c}\text{Estimated number}\\ \text{of members}\end{array}\right)$
Secondary aids	$\left(\frac{\text{Estimated shared cost/member in excess of ceiling}}{\text{Secondary guaranteed valuation/member}}\right)\left(\begin{array}{c}\text{Net secondary guaranteed}\\ \text{valuation/member}\end{array}\right)\left(\begin{array}{c}\text{Estimated number}\\ \text{of members}\end{array}\right)$
Miscellaneous	(Payment/capita)(Estimated population)
Miscellaneous revenues	
Fees and charges	(Payment/capita)(Estimated population)
Other	(Payment/capita)(Estimated population)

NOTES:

[a] The formula for calculating net proceeds tax is given in chapter 4. For all variables for which we do not estimate a value, we will use projected values when available or values for the most recent year for which data are available; this year is generally 1978.

[b] For cities and towns the estimated equalized valuation excludes the value of manufacturing property.

[c] The statewide and local gross tax rates are averages of these rates for the preceding three years.

will also print a message for jurisdictions where the limit is reached. The message will show the year(s) the limit was reached and the amount the estimated tax exceeded the levy limit.

STATE-TO-LOCAL TRANSFERS

The nontax revenues we will forecast for the local study area are intergovernmental transfers to local jurisdictions from the state government. Many state transfers are based on formulas with allocation factors such as total population, school-age population, equalized property valuation, and property tax rates. We will forecast the following state transfers based on the applicable allocation formula: transportation aids, per capita shared revenues, aidable revenues, general property tax relief, and general state aid to school districts. We will estimate special utility payments based on existing payments. We will estimate the remaining state transfers by multiplying current per capita payments by estimated population levels in each jurisdiction.

Transportation Aids

We will estimate transportation aids to each jurisdiction by multiplying the current value of highway aids per dollar of transportation cost by estimates of future transportation cost.

We will forecast transportation costs in the public facilities and services analysis.

Per Capita Shared Revenues

We will estimate per capita shared revenue payments to each jurisdiction by multiplying the statewide per capita payment by estimates of future population. We will use the current per capita payment through 1982 and the value projected by the Wisconsin Department of Revenue for 1983 for later years (Wisconsin Department of Revenue, 1981).

Aidable Revenues

As shown in table 4, aidable revenue payments depend on (1) own-source revenues (primarily property taxes and some fees and charges), (2) equalized full valuation, (3) guaranteed valuation per capita (statewide value), and (4) population. The guaranteed valuation per capita is set by the legislature. We will use values for the guaranteed valuation per capita that have been projected by the Wisconsin Department of Revenue through 1982 and we will extrapolate those values for future years (Wisconsin Department of Revenue, 1981). We will estimate own-source revenues in the fiscal analysis. We will estimate equalized full valuation and population as part of the housing and land use, economic, and demographic analyses.

General Property Tax Relief

The value of general property tax relief transfers is a function of local and statewide average gross tax rates, local full valuation, and a proration factor (statewide value). As with other transfers, we will use existing values for tax rates and the proration factor. We will derive forecasts of local full valuation as part of the housing and land use analysis.

School Aids

The school aids allocation formulas are given in table 6. Factors are (1) district shared costs per member, (2) guaranteed valuation per member (statewide constant), (3) school district net guaranteed valuation per member, and (4) number of members. A district's shared costs per member are included in the primary aid formula to a statewide maximum ceiling. Shared costs in excess of the ceiling are used in the secondary aid formula. The legislature sets the guaranteed valuation per member. If the net guaranteed valuation per member is negative, the district receives no aid.

We will assume current guaranteed valuations per member and current state ceilings on primary shared costs per member. We will estimate the number of members, school district valuation, and shared costs per member as part of the demographic, housing and land use, and public facilities and services analyses.

Other State Transfers

The remaining transfers are not amenable to estimation through direct application of formulas because reasonably straightforward allocation formulas do not exist or because forecasts of key factors will not be available. We will estimate special utility aids by applying appropriate inflation forecasts to current aid payments. This approach assumes that major new utility investments such as a power plant will not be sited in the local study area. We will estimate the remaining payments by applying current per capita values to population estimates from the demographic analysis. The per capita multiplier approach is a common modeling technique for estimating revenues; examples incude Hertsgaard et al. (1978) and Murdock et al. (1979). Since machinery and equipment aids are scheduled to be phased out in 1983, we will estimate these aids for the period 1980 to 1982 only.

FEDERAL-TO-LOCAL TRANSFERS

As with some state-to-local transfers, federal-to-local transfers cannot be readily estimated by using transfer formulas. We will estimate payments, including federal monies channeled through the state government, by applying the current per capita payments to population estimates from the demographic analysis.

MISCELLANEOUS REVENUES

Miscellaneous revenues received by local jurisdictions consist of revenues from sources other than the property tax, state-to-local transfers, and federal-to-local transfers. An example is income from licenses and permits. We will estimate these revenues by multiplying current per capita receipts by forecasts of future population.

4. NET PROCEEDS TAX

This chapter describes the approach we will use to estimate the net proceeds tax payable on production from the proposed mine/mill complex. The methods for computing and distributing the tax are given by Wisconsin law (§ 70.37 to 70.395). We will estimate tax payments according to statutory formulas. Data sources will be project information supplied by Exxon Minerals and industry literature. We will then estimate the distribution of part of the revenue to local jurisdictions.

CALCULATION OF NET PROCEEDS TAX

The statutory language establishing the tax may be reduced to these formulas:

tax = (rate)(gross proceeds - allowable deductions)

gross proceeds= (units of recovered minerals)(price per unit)

The following sections explain our methods for deriving values for each of the terms in these equations.

Tax Rates

The tax is determined by applying the tax rate to the average net proceeds (gross proceeds minus allowable deductions)

for the preceding three years or the average for those months in which production occurred. The tax is progressive and the rates are set by Wisconsin law (§ 70.375). We will assume existing rates in our analysis.

Allowable Deductions

Allowable deductions are those expenses as defined by Wisconsin statutes § 70.374(4) and by Wisconsin Department of Revenue regulations for operating the mine/mill complex, including property taxes and depreciation of certain tangible, capital costs. Deductions are permitted for all processing required to obtain the product to which the published price applies. In the case of copper, for example, the published price is the U.S. producer price, F.O.B. refinery. Thus, we will include refining costs as an allowable deduction regardless where the refining occurs.

We will estimate annual costs based on information supplied by Exxon Minerals. We must emphasize that the project-specific information used to calculate the net proceeds tax will of necessity be preliminary data only and will reflect the present stage of project planning and design. All information is subject to revision as more is learned about the characteristics of the mineral deposit and as project plans are refined.

Gross Proceeds

We will compute gross proceeds for each year by multiplying recovered mineral production during that taxable year by the average price of the mineral for the taxable year. We will obtain annual estimates of recovered mineral production by type of mineral from Exxon Minerals.

The unit price of each type of metal is and will continue to be determined by international market forces. Published forecasts of prices are available (e.g., U.S. Department of the Interior, Bureau of Mines, 1978; Malenbaum, et al., 1977; Predicasts, Inc., 1979). We will conduct a literature review to obtain a range of forecasted unit prices. We will use this information to calculate a range of expected gross proceeds for each year. We will state all forecasts in then-current dollars using inflation forecasts prepared by Data Resources, Inc. (1981).

DISTRIBUTION OF NET PROCEEDS TAX

The net proceeds tax revenue generated by the Crandon Project will be distributed among state, county, and local governments according to Wisconsin Statutes § 70.395 and according to a reasonable number of viable proposals for amendment to that law.

Based on existing law, the initial distribution will be 60 percent to the Investment and Local Impact Fund and 40 percent to the state General Fund. We will then distribute Impact Fund monies to counties and municipalities. Each county is guaranteed 20 percent of the revenue collected from mining operations in that county, up to a maximum of $750,000. Each municipality in which minerals are extracted is eligible for ten percent of the total net proceeds revenue collected from operations in that municipality, up to $75,000.

The Mining Investment and Local Impact Board distributes the remaining funds to communities affected by mineral development or invests the funds with the state Investment Board to be used at a later date to alleviate metalliferous mining-related impacts. We will distribute discretionary payments within the local study area in a way that will minimize any project-related deficits. If any funds remain after deficits associated with the Crandon Project are eliminated, we will distribute the remainder to local study area jurisdictions according to each jurisdiction's percent of project-related population. In actuality, the Mining Investment and Local Impact Board could also distribute excess funds to communities expected to be impacted by mining developments other than the Crandon Project, or the board could invest the extra money.

Loans made from the General Fund to the Investment and Local Impact Fund for local distribution before net proceeds revenues

are collected will be repaid. The assumption is that the payback will be made with Impact Fund revenues from the proposed Crandon Project.

The guaranteed distributions to counties and to municipalities will continue to be made in full during the payback period. Of the funds remaining after the guaranteed distributions, two-thirds will be used to repay the loan and one-third will be distributed as discretionary payments.

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