

A BENEFIT-COST ANALYSIS OF THE COAL  
DEVELOPMENT OF KAISER RESOURCES LTD.

by

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## ABSTRACT

This paper is a benefit-cost analysis of the coal development undertaken by Kaiser Resources Ltd. in the Crowsnest area of British Columbia. The benefit-cost analysis is undertaken from the "point of view" of residents living in the East Kootenay prior to the development. The analysis seeks to examine the production efficiency of the allocation of resources resulting from the project from the point of view of East Kootenay residents.

The project will provide primary gross benefits in the form of payroll income to local labour. The social opportunity cost of the use of this local labour must be subtracted from payroll income to obtain the net primary benefit. The social opportunity cost of labour is the value of the marginal product of the labour in alternative employment. A secondary benefit will accrue to local factors in the form of an increase in local income through an expansion of service and retail industries. The expansion will result from the regional multiplier effect of the increase in payroll income in the East Kootenay. The general level of unemployment was high in the East Kootenay prior to the development, and I assume that sufficient local labour and facilities exist to supply the increase in demand for services without requiring importation of labour or capital. Income generated by the regional multiplier will therefore accrue to local factors, located in the East Kootenay prior to the development. Intangible benefits in the form of training in coal mining

and an increase in the cultural activities of the community will also occur.

The costs attributable to the project include the negative externality effect on wildlife and the deterioration of the quality of the environment in the East Kootenay. A decline of wildlife will decrease the value added by local labour in supplying services to non-resident and residents hunters. The consumers' surplus obtained by residents from hunting will decline, since greater expenditures will be incurred elsewhere for the same or a lower quality of hunting. The tourist industry will also decline in the East Kootenay. The decrease in local value added due to a decline in the quality of hunting and tourism can be estimated. However, the cost to residents of the East Kootenay from deterioration of the quality of the environment cannot be estimated and the effect is denoted as an unmeasurable intangible cost.

The cumulative present value of net measurable benefits at 9% is \$14,717,983. A decision concerning the desirability of the project cannot be made on the basis of this calculation alone. The unmeasurable intangible costs and benefits must also be taken into account. The community, using the relative valuations placed on increased regional income versus the quality of the environment as expressed in a political consensus, must decide how large the unmeasurable intangible costs and benefits are. The project is desirable when only measurable benefits and costs are considered. However, if the cumulative present value of net unmeasurable intangibles is

negative and exceeds in magnitude the cumulative present value of net measurable benefits, the Kaiser project should be terminated.

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## CHAPTER I

### Introduction

This paper examines by means of a benefit-cost analysis the economic impact on the East Kootenay of the contract by which Kaiser Resources Ltd. is to supply ~~seventy-five million~~ long tons of coal over a fifteen year period to Japanese steel firms. Production of the coal will take place in the Crowsnest area of the East Kootenay near the communities of Fernie, Natal and Michel. Public controversy over the project arose due to fear that the East Kootenay would be subjected to the same fate that befell the mountainous beauty of East Kentucky when strip mining was introduced. East Kentucky now contains miles of devastated terrain and mountain valleys polluted with pools of sulphuric acid caused by contour strip-ping.<sup>1</sup> This mining technique involves excavating the earth from the mountain and pushing it over the side to reach the coal seam. Legislation requiring reclamation of strip mined land was at first absent and then ineffective in preventing deterioration of the East Kentucky environment.

The Province of British Columbia has instituted legislation requiring restoration of strip mined land. Kaiser Resources Ltd. will initially strip mine 2.4 square miles. However, the possible extent of strip mining by Kaiser could be great, since the firm holds 108,000 acres, purchased from Crows Nest Industries Ltd., and an additional 7,657 acres in coal licences.<sup>2</sup>

The annual volume of coal production and sales in the East Kootenay had been declining since 1950 due to a decrease in demand in British Columbia for locomotive consumption and for heating homes and commercial buildings. Crows Nest Industries Ltd. had been unable to compete in the expanding Eastern Canadian and world markets for metallurgical coal. High transportation costs increased the delivered price of Crowsnest coal above that of other producers supplying metallurgical markets.<sup>3</sup> The transportation cost of coal represented 53% of the total delivered cost of Crowsnest coal in Japan in 1965 and 1966.<sup>4</sup> In order to lower transportation costs and to obtain the coal contract with expanding Japanese steel firms, Kaiser persuaded the federal and provincial governments to construct the Roberts Bank Port and railway access facilities across the Lower Mainland to the port.

The port will lower bulk loading costs and will provide berths of sufficient depth to accommodate the largest sea going bulk carriers.<sup>5</sup> A unit train operation undertaken by the Canadian Pacific Railway will run from the coal mines at Fernie to the port and will also reduce the transportation cost of coal. Prior to the Kaiser project, the federal government had supplied a subvention of approximately \$3.00 per ton to be subtracted from the c.i.f. price of coal, so that the delivered price could be reduced.<sup>6</sup> The subvention represented a subsidy to the coal mining industry in the East Kootenay, and will be discontinued in 1970 since it is no longer required. It is the reduction of transportation

costs, rather than production costs, which has led to the economic revitalization of the coal mining industry in the East Kootenay.<sup>7</sup>

A controversy arose due to the location of the railway access facilities to the port. Rather than using the existing railway corridor along the Fraser River, the B.C. Hydro and Power Authority reached agreement with the Canadian Pacific Railway, the Canadian National Railway and the Great Northern Railway on the construction of tracks from Matsqui across the farming and residential areas of Langley, Surrey and Delta municipalities, and thence along the northern shore of Boundary Bay to Roberts Bank.<sup>8</sup> Construction of the tracks across farming and residential areas will necessitate relocation of farmers and home owners. The proximity of the railway to Boundary Bay will be to the detriment of wildlife in a unique habitat and will retard development of a potential recreational area. Running of a high speed coal train will also be detrimental to the quality of the environment of the residential area through which the train passes. The above costs represent negative externalities, attributable to the coal project, imposed on residents of the Lower Mainland.

In analyzing the project, I shall be concerned with its effect on both the quantity and the quality of the standard of living achieved, or in more descriptive terms, the per capita real income and condition of the environment respectively. The Kaiser coal development is expected to have an effect on both the per capita income of British Columbia and East Kootenay residents and on the quality of

the environment. The East Kootenay economy has in the past exhibited a low average per capita income and a high average unemployment rate. High unemployment has persisted in clerical, retail trade, service, construction and forest occupations from 1965 to 1968 inclusive.<sup>9</sup> The coal development will permanently alleviate a substantial amount of unemployment in clerical, retail trade and service occupations. Unemployment in construction and forestry will also decline during the construction period.

The rationale behind objections to the coal development lies in doubts over whether the benefits of this industrial operation will exceed the costs when degradation of the quality of the environment is considered. Behind any industrial development there is always a trade-off between the benefits of increased economic activity and increased environmental pollution, whether water, soil or air pollution, or a change in the appearance of the landscape detrimental to its aesthetic qualities.

Increased coal mining in the East Kootenay will also have a detrimental effect on wildlife and the quality of hunting in the area. The East Kootenay and particularly the Elk and Flathead River Valleys are noted for the existence of an abundant and varied supply of wildlife.<sup>10</sup> Revenue obtained from non-resident hunters' expenditures in the area will decline due to expanded coal mining.

I shall evaluate the project by means of a benefit-cost analysis from the "point of view" of residents living in the

East Kootenay prior to the coal development. The effect of the project from the "point of view" of British Columbia residents is not examined, but I expect that the cumulative present value of the net benefits will be small.<sup>11</sup> The gross primary benefit to British Columbia residents will not be the value of the increased coal output attributable to Kaiser, since most of the increase will be exported.<sup>12</sup> A gross primary benefit will occur in the form of factor income from construction and operation of the Roberts Bank Port, the railway access facilities and the CPR unit train operation. Factor income will also stem from production in British Columbia of equipment and operating supplies for the Kaiser mines. However, the social opportunity cost of the factors will approximate the factor income. The net primary benefit, from the point of view of residents living in the East Kootenay prior to the development, in the form of increased payroll income to East Kootenay labour<sup>13</sup> will also represent a net primary benefit to British Columbia as a whole, if it is assumed that East Kootenay labour is geographically immobile. Even if the East Kootenay labour were geographically mobile, the return on labour and the value of the marginal product might still be higher in the coal operations than in alternative employment in other parts of British Columbia and a net benefit will still occur. A net primary benefit will also accrue to the Province of British Columbia in the form of taxes from the operation and construction of the mine.<sup>14</sup> The province will receive approximately \$552,500

annually from the mining tax on property owned by Kaiser and the royalty payments on property under coal licence.<sup>15</sup> Twenty per cent of the corporation income tax paid by Kaiser Resources Ltd. will also accrue to British Columbia. Welfare payments made to East Kootenay residents will decline due to the employment provided by the Kaiser project. On the cost side, in addition to the social opportunity cost of resources, negative externality effects will also be attributable to the project. The port will adversely affect waterfowl and perhaps the salmon fishery in the area. The location of the railway access facilities will cause the negative spillover effects mentioned above. The deterioration of the quality of hunting in the East Kootenay will probably reduce the revenue obtained from British Columbia licence fees and from service expenditures in British Columbia by non-resident hunters. The enjoyment of the area by British Columbia hunters will decline and future expenditures incurred by residents on hunting elsewhere for the same or a lower quality of hunting experience may increase.

In the benefit-cost analysis to be performed from the point of view of residents living in the East Kootenay prior to the development, I shall be concerned with the extent and form of primary, secondary and intangible benefits and with the social cost, in terms of the social opportunity cost of resources and the negative externality effects attributable to the project. Data problems exist in placing dollar values

on intangible benefits and costs and in determining the magnitude of the positive opportunity cost of resources. A benefit-cost analysis will clarify the production efficiency, from the point of view of East Kootenay residents, of the allocation of resources resulting from the project.

In the following chapter, I shall describe the technique of benefit-cost analysis. In Chapter III I shall present a benefit-cost analysis of the coal development from the point of view of residents living in the East Kootenay prior to the development. Chapter IV will contain a summary and conclusions.



## CHAPTER II

### Benefit-Cost Analysis as an Evaluation Procedure

Benefit-cost analysis is an evaluation procedure for examining the production efficiency of the allocation of resources resulting from a project or investment.<sup>1</sup> By production efficiency is meant an allocation of resources which will produce the maximum value of goods and services from those resources. The technique may be applied to both public and private projects. The procedure involves specifying the benefits and costs attributable to the project in money terms, finding the annual net benefits and discounting by an appropriate rate to find the cumulative present value of net benefits over the life of the project. If the cumulative present value of net benefits is positive, then the project may be termed efficient. However, if benefit-cost analysis is being used to choose among competing projects, then in order for this project to be most desirable, its cumulative positive present value of net benefits must be greater than that produced by alternative projects. Other decision rules, such as the ratio of the cumulative present value of benefits to the cumulative present value of costs, may be used to determine the desirability of a project or to choose among alternative projects. However, I shall use the cumulative present value of net benefits to examine the Kaiser development.

Benefit-cost analysis with accurate data provides a measure of the production efficiency of a project, but does not evaluate changes in the distribution of income which may occur due to the project. Benefit-cost analysis takes as given the distribution of income which exists at the time of a project. Many government investments, however, are not undertaken for provision of a good in the most efficient manner, but rather as a form of inter-regional income redistribution. The economic development and population of a region may be the goal of a public project. If this is the case, then a benefit-cost analysis must be qualified by considering the success of the project in achieving the above goals.

In order to undertake a benefit-cost analysis the relevant "point of view" must be stated. The efficiency of the resulting allocation of resources from the "point of view" of residents of a region may be different from the efficiency from the "point of view" of a larger region, for example British Columbia.<sup>2</sup> The cumulative present value of net benefits will change as the reference group varies. The larger the size of the reference group, the less important are secondary benefits and costs. For example, the project may induce a firm to locate in a region. The value of output of the firm may be described as a gross secondary benefit from the point of view of the region.<sup>3</sup> However, from the point of view of the larger area, the value of the output of the firm does not represent a gross secondary benefit, if the firm would have located elsewhere in the larger area in the absence of the project.

The benefits and costs are described as primary if they result directly from the project. In the case of a government investment to produce hydroelectric power, the gross primary income benefit will be the value of power produced. The gross primary income cost will be the value of the goods or services foregone by the use of resources in hydroelectric power production. The social opportunity cost of the use of resources is the value of the good or service foregone by the use of inputs in the production of another good or service. If full employment of factors of production is assumed, then the social opportunity cost of the factors is measured by the money outlay spent on the factors. The gross primary income cost is therefore the money outlay on factors of production, if full employment of factors is assumed.

The benefits and costs are described as secondary if they result indirectly from the project. A gross secondary income benefit may be in the form of the value of a good or service produced, which would not have been produced in the absence of the project. The gross secondary income cost is the money outlay on factors of production, if full employment of the inputs is assumed.

Benefits and costs are described as intangible, if their value is not usually measured in money terms in the market. While it is possible to place a money value on some intangible benefits and costs, many intangibles cannot be evaluated and may be denoted as unmeasurable.<sup>4</sup> Scenic beauty is an example of an unmeasurable intangible. The value of

wilderness preserved for recreation and hunting may be estimated by measuring the expenditures incurred by users to partake of the resource.

Many investment projects involve externality or spill-over effects, which may be benefits and/or costs. These externalities must be considered in a benefit-cost analysis. A technological externality stemming from an investment project alters the production decisions of another decision maker and therefore the allocation of resources. Externality effects are not considered in the revenue or cost considerations of the organization undertaking the project. For example, Kaiser Resources Ltd. has not considered the detrimental effect which strip mining will have on the wildlife of the Crowsnest area. Revenue to local residents, who lived in the area prior to the coal development, from hunters' expenditures on services and food and lodging will decrease due to the decline in the quality of hunting. The latter cost is a negative externality which must be taken into account in a benefit-cost analysis from the point of view of East Kootenay residents living in the area prior to the Kaiser project.

Most benefit-cost analyses assume full employment of the factors of production used in the project. The analysis presented in Chapter III does not assume full employment. High unemployment has persisted for a number of years in certain occupations in the East Kootenay. The money outlay on labour and other production factors will therefore not

always represent the true social opportunity cost.

The following statements may be applied to examine the relationship between the social opportunity cost of labour and the money outlay or wage expended on this labour.<sup>5</sup> The social opportunity cost of labour is zero, if the labour had been unemployed and had no prospective means of employment in the same or in another occupation. In this case the money outlay or wage represents a net gain to the worker. The social opportunity cost of labour is positive but less than the money outlay, if the labour had been employed prior to the project, but if the value of its marginal product had been lower. In the absence of inflation the social opportunity cost of labour approximates the money outlay on labour, if the labour had been employed previously and if the value of its marginal product had approximated that in the new employment. The same analysis may be applied to examine the relationship between the social opportunity cost of other factors of production and the money outlay expended on these factors.

The primary gross income benefits from the point of view of East Kootenay residents from the Kaiser project will accrue in the form of payroll income to local labour.<sup>6</sup> The East Kootenay residents referred to are those resident in the area prior to the Kaiser project. The social opportunity cost of local labour, in the form of a previous wage rate, must be subtracted from the wage rate paid by Kaiser to obtain the net primary income benefit.

The benefit-cost analysis presented in Chapter III will produce the cumulative present value of measurable benefits less measurable costs. However, many of the costs which have been the source of public controversy are intangible and unmeasurable. The result of the analysis must therefore be qualified in order to reach a conclusion on the desirability of the project. If the cumulative present value of net unmeasurable intangibles is negative and if the cumulative present value of measurable benefits less measurable costs is positive, the project should only be continued if the cumulative present value of net measurable benefits exceeds the magnitude of the cumulative present value of net unmeasurable intangibles.<sup>7</sup> The project should be discontinued if the  $\text{/- cumulative PV of net unmeasurable intangibles/ > / + cumulative PV of net measurable benefits/}$ . The government using a political consensus can decide if this is so.<sup>8</sup>

### CHAPTER III

#### Benefit-Cost Analysis of the coal development of Kaiser Resources Ltd. from the "point of view" of Residents living in the East Kootenay prior to the Coal Development

The East Kootenay is Census Division One and contains the cities of Cranbrook, Kimberley, Golden, Invermere and Fernie. The analysis will be undertaken from the point of view of residents living in the East Kootenay prior to the development. For the purpose of this analysis, local labour is therefore defined as labour located in the East Kootenay prior to the development. Windfall gains and losses will be included in benefits and costs.

##### (a) Primary Income Benefits and Costs

The gross primary income benefits stemming from the project will occur in the form of payroll income or wages accruing to local labour from the operating phase and the construction phase. Income will also accrue to other local factors of production used in producing operating supplies and fixed plant and equipment for the Kaiser project.

##### (1) Primary Income Benefits and Costs from the Operating Phase

Before commencement of the project, Crows Nest Industries Ltd. had employed 500 people in its coal mining operations.<sup>1</sup> Of these approximately 220 had been employed in underground mining, 165 in surface mining and 115 in engineering, clerical duties, processing and materials handling and truck and tractor driving. In its operating phase Kaiser

Resources Ltd. will employ a total of nine hundred workers consisting of 400 underground miners, 300 surface miners and 200 workers employed in engineering, clerical services, processing and materials handling and truck and tractor driving.<sup>2</sup> The total increase in employment of coal miners will therefore be 315. I assume that one-half of this labour will be imported into the area from Alberta. The remainder, 157, will be supplied from the East Kootenay. Kaiser is undertaking a training program for inexperienced local workers having a grade twelve education.<sup>3</sup> The increase in employment in engineering, clerical services, processing and materials handling and truck and tractor driving is 85. I assume that one-half of this labour will be imported and that one-half will be supplied locally. Skilled repair mechanics, truck and tractor drivers and Japanese engineers will be imported.

The annual wages which would have been earned in alternative occupations represent the social opportunity costs of the 500 workers previously employed by Crows Nest Industries Ltd. and of the additional 200 local workers. A net benefit will accrue to the local labour if the wages of the 500 workers increase due to the Kaiser project and/ or if the wages of the 200 extra workers are greater than the wages foregone in alternative employment. A summary of the magnitude of the social opportunity cost of the 700 local workers is provided in Table I, where I have examined the amount of past unemployment in the East Kootenay in those occupations in which the additional 200 jobs are being of-



ferred. A portion of the 200 extra workers may have been unemployed. However, in order to assign a zero opportunity cost to this labour, it must be shown not only that the labour had been unemployed in that occupation in which it had experience, but also that it had been occupationally immobile and so had no prospective means of alternative employment.<sup>4</sup> The relationship between the money outlay on labour and the social opportunity cost of labour was examined in Chapter II.

The total annual payroll income accruing to both local and imported labour from the operating phase is \$6,000,000.<sup>5</sup> Total employment is 900 of which 700 is provided by local labour. An estimate of the payroll income or gross primary benefit accruing to local labour from the operating phase is \$4,666,662 or  $\frac{700}{900}$  times \$6,000,000, assuming that each worker obtains the same annual wage. I assume that the social opportunity cost of the 500 local workers previously employed is  $\frac{500}{900}$  times \$6,000,000 or \$3,333,330. I assume that the opportunity cost of the additional 200 local workers is zero. I shall discuss this assumption below. The net primary benefit accruing to local labour from the operating phase is therefore \$1,333,332.

The net benefit assumes that the annual wages of the 500 workers, previously employed, did not change after commencement of the Kaiser project. The opportunity cost is therefore probably

TABLE I

The Social Opportunity Cost of Local Labour employed in  
Operating Phase of Kaiser Project

Local Labour employed  
in Operating Phase

500 workers previously employed by Crows Nest Industries Ltd. in coal mining, processing and materials handling, truck and tractor driving, clerical duties and engineering services.

Increase of 200 local workers to be employed by Kaiser consisting of:  
 157 coal miners

Value of Social Opportunity  
Cost of Local Labour

The value of the social opportunity cost is large, but will be below the payroll income from Kaiser Resources Ltd. if wages rise.

A maximum of 21 of these positions could have been taken up in 1968 by unemployed labour experienced in mineral extraction.<sup>6</sup> If this labour had been occupationally immobile and had no prospective means of employment in other mining ventures, then the value of the opportunity cost of the labour is low.

The remaining 136 workers will be obtained from labour previously employed in other occupations. Some of the labour may be recruited from workers previously employed as coal miners who had entered other occupations when the coal mining industry declined in the 1950's. Kaiser is providing training for inexperienced workers having a grade twelve education. Average unemployment is high in the East Kootenay. However, coal miners will not be obtained from the hard core unemployed in construction and forestry, since this labour has a low educational level.<sup>7</sup> A scarcity

TABLE I (Continued)Local Labour employed  
in Operating PhaseValue of Social Opportunity  
Cost of Local Labour

43 workers employed in materials handling and processing, clerical duties and services and truck and tractor driving.

of suitably qualified labour for coal mining may exist in the East Kootenay. Local labour drawn into coal mining will have a positive opportunity cost in the form of alternative wages in other occupations. However, the value of the social opportunity cost may be lower than payroll income, if wages in coal mining are higher.

The value of the social opportunity cost is low, because the positions will be taken up by unemployed labour. The average monthly unemployment of clerical workers in the East Kootenay in 1967 was 113, while a monthly average of 65 truck and tractor drivers were unemployed in 1968. The persistent high level of unemployment in the above occupations between 1965 and 1968 is indicative of the occupational and/or geographical immobility of the workers.<sup>8</sup>

overstated. Data is not available on changes in the wage rates of these workers.

It is reported that strip miners employed by Kaiser are paid the highest strip mining wage rates in Canada.<sup>9</sup> The rates are between \$3.01 and \$4.15 an hour. Wage rates for strip miners may have increased over those paid by Crows Nest Industries Ltd. due to an increase in labour productivity in a capital intensive operation. The average annual wage of \$6,600 for the 900 workers to be employed in the operating phase compares favourably with the average wage of \$4,363 earned by East Kootenay residents in 1966.<sup>10</sup>

The above net benefit of \$1,333,332 assumes that the opportunity cost of the additional 200 local workers employed is zero. As Table I indicates, the social opportunity cost of approximately three-quarters of this labour is positive and should be subtracted from the payroll income to obtain the net benefit accruing to the 200 workers.

I have not adequately taken into account the positive opportunity costs of local labour induced into coal mining or the increase of wage rates to the 500 local workers previously employed because of data insufficiencies. The two factors tend to offset each other, since one would decrease the income benefits, while the other would increase the income benefits.

(ii) Primary Income Benefits and Costs from Construction Phase

The total construction employment provided is 800.<sup>11</sup>

I assume that 180 of the 800 workers are local with zero opportunity cost. The average monthly unemployment in construction occupations in the East Kootenay in 1967 and 1968 was 180 and 340 workers respectively. Unemployment has been high in construction occupations in the East Kootenay from 1965 to 1968 inclusive.<sup>12</sup>

The total annual construction payroll to be expended in the first and second years of the project is \$8,500,000.<sup>13</sup> I have assumed that the portion of this payroll accruing to local labour with negligible opportunity cost is  $\frac{180}{800}$  times \$8,500,000 or \$1,912,500. An influx of transient construction workers occurred in the spring of 1969.<sup>14</sup> These workers will compete with local construction labour for employment. I have not included in the net benefit the possible increase in wages of local construction workers, now employed by Kaiser, who were employed previously in other construction work at a lower wage.

(iii) Primary Income Benefits and Costs from Production of Mine Operating Supplies

Kaiser Resources Ltd. may purchase operating supplies and fixed plant and equipment from firms located in the East Kootenay prior to the development. An increase in factor income may accrue to local labour and other local inputs employed by the firms. I assume that the increase in income, which would represent a net primary income benefit, will be low, because most operating supplies and equipment will be obtained from other parts of Canada and the United States.

(b) Secondary Income Benefits and Costs

(i) The Multiplier

A regional multiplier effect, stemming from the increased payroll income of local labour and the payroll income of imported labour, will produce a gross secondary income benefit in the form of income accruing to local labour and local capital from an expansion of the service, retail and other local industries. The East Kootenay has exhibited a high general level of unemployment from 1965 to 1968.<sup>15</sup> Average unemployment in the East Kootenay in 1967 and 1968 was 7.0% and 8.5% respectively. I assume that both the capacity of service facilities, located in the East Kootenay prior to the development and owned by residents, and the supply of suitably qualified local labour will be sufficient to supply the increase in the demand for services. I therefore assume that local service facilities were characterized by excess capacity prior to the development. The service facilities owned by residents could also be expanded.

If the above two conditions do not hold, an increase in the regional income due to an expansion of service industries in the East Kootenay would still occur, if capital and labour were imported into the area. However, the income would accrue to the imported capital and labour and not to local inputs. The benefits accruing to residents living in the East Kootenay prior to the development from industry attracted from other regions would be low, if the labour employed by the firm was also imported. Local wages might rise, however, if

the labour imported into the area increased the demand for the services or goods produced by local labour.

The average monthly unemployment in the East Kootenay of male workers experienced in the service industries in 1968 was 105, out of a labour force of approximately 15,000.<sup>16</sup> A persistent high level of unemployment of labour experienced in the service industries has existed from 1965 to 1968 inclusive. Unemployed labour might also be drawn into the service industries from forest and construction occupations. However, this is unlikely because the latter labour has been occupationally immobile and would have difficulty in adapting to some service occupations, because of inexperience and a low educational level.<sup>17</sup> Local labour previously employed in the service industries could be utilized more intensively. I also assume that sufficient excess capacity of facilities and local labour exists to handle the increased volume of retail sales in the area. Unemployment in retail sales in July 1967 was 56.

A regional income multiplier of 1.3 is applied to the increase in payroll income accruing to both local and imported labour from the operating phase.<sup>18</sup> I have excluded the multiplier effect of the increase in construction income, because the income injection into the economy will not be permanent, and therefore will not result in an increase in equilibrium regional income. The increase in employment of

local and imported labour in coal mining operations is 400(900 - 500) and the annual payroll income accruing to this labour is  $\frac{400}{900}$  times \$6,000,000 or \$2,666,664. The total annual income generated in the region from the operating phase is therefore 1.3 times \$2,666,664 or \$3,466,663. The annual secondary benefit is thus \$3,466,663 - \$2,666,664 or approximately \$800,000. As explained above, I assume that all of the income generated by the multiplier effect is received by labour and other inputs located in the area prior to the development. I assume that the \$800,000 annual increase in income due to the multiplier effect occurs every year from the first year of production to the fifteenth year, when the present sales contract terminates. The opportunity cost of inputs used in the expansion of services and retail trade is low, because the expansion will absorb previously unemployed labour and because little alternative production will be foregone by more intensive use of labour already employed in services and retail trade.

Other coincident coal developments, such as the project of Fording Coal Co., will add to the growth of population and market size of the East Kootenay. Full utilization of existing local facilities and local labour in supplying services will be reached in a shorter period of time. The assumption made above, that the amount of induced industry locating in the area will be small, must be qualified when the other coal developments are considered. Some induced investment and importation of labour will occur.



I assume that most of the induced investment attracted from other regions would be in service and retail outlets. I do not expect that a significant amount of industry producing consumer durables would be attracted into the area, because of the large capital investment involved and large market size required. Induced investment into the East Kootenay would bring in both capital and labour; the increase in factor incomes accruing to labour and other inputs located in the area prior to the development would be small. While the total regional income would increase, the per capita benefit to prior residents would be low. The income effect of potential induced investment from other regions and importation of labour is not considered in the benefit-cost calculation performed.

The main increase in local employment stemming from the Kaiser project will occur in the service and retail trade occupations. The persistent unemployment of construction and forestry workers will only be temporarily alleviated due to the Kaiser project.

#### (11) Appreciation of land values

Residents of the East Kootenay may receive a capital gain in the form of an appreciation of property values during the first year of the project. It must be pointed out that while the average value of property in down-town Fernie will increase, the value of some property will decrease due to pollution and the decline of tourism.

#### (c) Intangible Benefits and Costs and Externalities

Coal mining in the East Kootenay will produce negative

externality effects in the form of pollution and deterioration of the environment. Income obtained by local labour in the East Kootenay from tourism and hunting will be adversely affected by the development, and the annual local income foregone should be considered in the costs attributable to the project.

(1) Externality Effect on Tourism, Wildlife and the Sport Fishery

Cranbrook City obtained a gross revenue of approximately \$196,000 from tourism and \$4,000 from hunting in 1968.<sup>19</sup> The gross revenue from tourism is significant to the economy of Cranbrook, when compared to the value of factory shipments of manufactured goods of \$841,000.<sup>20</sup> Gross revenue from tourism in the Cranbrook, Kimberley, Golden and Invermere areas is not likely to be adversely affected by the coal development. However, gross revenue in the Fernie area could be affected by the deterioration of scenery. The annual gross revenue previously obtained from tourism in Fernie is not likely to have exceeded the \$196,000 obtained in Cranbrook, since Cranbrook is a convenient stopover for highway travellers. I assume a maximum annual loss of \$196,000 in gross revenue from the existing state of tourism in Fernie and therefore in the East Kootenay due to the coal project. However, the \$196,000 represents gross revenue or expenditures and not local value added.

The 1961 Canadian census figures for industries in the Province of B.C. indicate the relevant retail businesses have a local income component (value-added) of 25 per cent of gross sales, while the comparable figure for services outlets is 33 per cent.<sup>21</sup>

I shall assume that 29 per cent of the \$196,000 (\$56,840) represents local income foregone from the existing state of tourism in the first year of coal production.

The decline of tourist expenditures will be reduced due to legislation requiring restoration of strip mined land. The government is attempting to put the cost of land reclamation into the cost calculations of strip mining firms by requiring them to post a \$500 bond with the provincial Mines Department for every acre strip mined.<sup>22</sup> If the firm fails to restore land, the government will reclaim the land with the proceeds of the bond.<sup>23</sup> The social cost being considered is the deterioration of the appearance of the environment.

The ranges of the Elk and Flathead River Valleys of the East Kootenay are noted for their variety and abundance of wildlife. The area is one of the best big-game hunting districts in British Columbia and abounds with Rocky Mountain Bighorn sheep, moose, elk, mountain goat, deer and grizzly and black bear. The area is popular with both British Columbia and non-resident hunters from other parts of Canada and the United States.

The wildlife of the area will be adversely affected by air and water pollution and the loss of ranges. While legislation requiring restoration and reforestation of strip mined land will tend to reduce the deterioration of the en-

vironment caused by strip mining, it is debatable whether reclamation and reforestation will be adequate to restore wildlife ranges. The effect of the coal mining will depend on the ability of wildlife to migrate and adapt to conditions on other ranges, and on the importance to wildlife of those particular ranges strip mined.<sup>24</sup> The problem will increase as strip mining is extended in the East Kootenay through the commencement of mining by other coal producers in the northern ranges of the Elk River Valley. The more southerly ranges to be strip mined by Kaiser are not important as winter feeding ranges for wildlife. However, ranges in the north of the Elk River Valley are important.<sup>25</sup>

The extent and condition of winter ranges is the major limiting factor of East Kootenay big game populations.<sup>26</sup>

The multiplicity of winter range requirements of bighorn sheep greatly restricts the distribution and density of this species, and results in the development of male local populations which are very susceptible to interference from human activities.<sup>27</sup>

The quality of hunting in terms of the probability of hunter success was very high in the East Kootenay. Table II provides an estimate of the annual value added by local labour from the expenditures of resident hunters. Table III provides an estimate of the income obtained by residents from the expenditures of non-resident hunters.

TABLE II

Income accruing to Residents of the East Kootenay from Annual Expenditures by Local  
Hunters on East Kootenay Hunting

|  | Annual Expenditures <sup>28</sup><br>(1) | Annual Value Added by Local Labour<br>(2) |
|--|--|---|
| Guides' and Packers' Fees and Horse Hire | \$ 1,565                                 | \$ 1,565                                  |
| Travel and Lodging                       | 307,774                                  | 101,565                                   |
| Food and Alcohol                         | 153,607                                  | 38,402                                    |
| Taxidermy and Storage                    | 82,263                                   | 27,147                                    |
| Special Equipment and Miscellaneous      | <u>46,440</u>                            | <u>11,610</u>                             |
|  | \$591,649                                | \$180,289                                 |

I assume that 33% of expenditures on services and 25% on retail expenditures represent Local Value added.

Source: The figures in column (1) were obtained from Peter H. Pearse and Gary Bowden, Big Game Hunting in the East Kootenay, Study Report No. 1 on the Economics of Wildlife and Recreation, sponsored by the Fish and Wildlife Branch of the Department of Recreation and Conservation, Victoria, B.C., 1966, p. 26.

TABLE III

Income accruing to Residents of the East Kootenay from Annual Expenditures by Non-  
resident Hunters on East Kootenay Hunting<sup>29</sup>

Non-resident hunters are hunters from other parts of B.C., Canada and the U.S.A.

|   | Annual Expenditures<br>incurred in B.C.<br>(1) | Annual Expenditures<br>incurred in<br>East Kootenay<br>(2) | Annual Value<br>Added by Resi-<br>dents of East<br>Kootenay<br>(3) |
|---|--|--|--|
| Guides' and Packers' Fees<br>and Horse Hire | \$ 396,246                                     | \$396,246  | \$396,246  |
| Travel and Lodging                          | 305,707  | 229,280  | 75,662   |
| Food and Alcohol                            | 258,589  | 193,942  | 48,486   |
| Taxidermy and Storage                       | 35,102   | 26,327   | 8,688  |
| Special Equipment and<br>Miscellaneous      | 87,750   | 65,813   | 16,453   |
|   | <u>\$1,083,394</u>                             | <u>\$911,608</u>   | <u>\$545,535</u>   |

The expenditures in column (1) were incurred in B.C. by non-resident hunters on hunting in the East Kootenay. I assume that 3/4 of these expenditures were incurred in the East Kootenay. (All of the expenditure on guides' and packers' fees and horse hire was made in the East Kootenay.) I assume that 33% of expenditures incurred in East Kootenay on services and 25% of expenditures on retail items in the East Kootenay represented value added by East Kootenay residents.

Source: The figures in column (1) were obtained from Peter H. Pearse and Gary Bowden, Big Game Hunting In the East Kootenay, Study Report No. 1 on the Economics of Wildlife and Recreation, sponsored by the Fish and Wildlife Branch of the Department of Recreation and Conservation, Victoria, B.C., 1966, p. 26.

The total annual revenue accruing to local labour from the present state of hunting in the East Kootenay is therefore \$725,824. I assume that half of the acreage in the East Kootenay containing coal reserves is held by Kaiser.<sup>30</sup> If the wildlife were spread evenly over all ranges, the maximum foregone local income from the hunting industry in the first year of the coal development would be \$362,912.<sup>31</sup> The future operations of other coal operators in the East Kootenay will increase the magnitude of foregone revenue. Local income from hunters' expenditures also results in a multiplier effect in the East Kootenay. The above figure of \$362,912 does not consider the foregone income from the multiplier.

The sport fishery of the Elk River Valley is popular with fishermen. The area abounds with Rainbow, Cut-throat and Eastern Brook Trout as well as Dolly Varden and Koka-nee.<sup>32</sup> Sulphuric acid forms when water comes into contact with coal. Crows Nest Industries Ltd. had caused water pollution and destruction of fish by locating slag heaps adjacent to streams.<sup>33</sup> Data is not available on past annual income obtained by residents from expenditures by resident and non-resident sport fishermen. A portion of annual local income may be foregone if adequate care is not taken to prevent water pollution and siltation of streams.

I assume that in the absence of coal mining, income accruing to residents from tourism and hunting would have increased cumulatively by 10 per cent during every year of coal production. I assume that all of this revenue is foregone.

Table IV presents the annual local income foregone from hunting and tourism over the fifteen years of coal production.<sup>34</sup> I assume that in the absence of the coal development, the annual rate of growth of local income from tourism and hunting would have been high.

Hunting provides an important source of recreation to residents, since over 55 per cent of the hunter-days spent in the East Kootenay is attributable to local hunters.<sup>35</sup>

A significant proportion of the local male population hunts. Hunting expenditures incurred by residents of the East Kootenay do not take into account the consumers' surplus obtained by local hunters. Deterioration of the quality of hunting in the East Kootenay will decrease this consumers' surplus. Local hunters may spend more elsewhere for the same quality of hunting experience.

(ii) Summary of Benefits and Costs including Intangibles

Table V presents a summary of the sources of benefits and costs from the point of view of residents living in the East Kootenay prior to the development. The table includes some intangible benefits and costs not considered in the above discussion. When considering the negative externality effects on the community from air and water pollution, it must be noted that pollution had already been prevalent in the area due to the operations of Crows Nest Industries Ltd.

The benefit-cost table does not include the two hundred homes to be built by Kaiser for the coal miners. These homes will be leased by Kaiser and therefore largely paid for by their users. However, construction of the homes will represent



TABLE IV

Projected Annual Loss of Local Income from decline of Hunting  
and Tourism in the East Kootenay

| Years of Coal Production | Loss of Local Income |
|--------------------------|----------------------|
| 1                        | \$ 419,752           |
| 2                        | 461,727              |
| 3                        | 507,900              |
| 4                        | 558,690              |
| 5                        | 614,559              |
| 6                        | 676,015              |
| 7                        | 743,617              |
| 8                        | 817,979              |
| 9                        | 899,777              |
| 10                       | 989,755              |
| 11                       | 1,088,731            |
| 12                       | 1,197,604            |
| 13                       | 1,317,364            |
| 14                       | 1,449,100            |
| 15                       | 1,594,010            |

a small amount of benefit to residents, because Kaiser Resources Ltd. will lease or sell these homes at lower than prevailing interest rates.<sup>36</sup> I assume that expenditure on residential housing is included in consumption and therefore that the income effect of the construction has already been included in the multiplier effect caused by payroll income. The opportunity cost of construction labour is assumed to be low and all labour used in construction is obtained locally.

The effect of the personal income tax has not been taken into account in the estimates of increased payroll income and its multiplier effect or in the estimates of local income foregone due to a decline in tourism and hunting. Since I assume that unemployed labour will be taken up by the coal project, welfare payments to residents will

TABLE V

Sources of Benefits and Costs from the "point of view" of Residents of the East

Kootenay due to the coal project of Kaiser Resources Ltd.

(residents are limited to those who lived in the East Kootenay prior to the development)

| Description of Annual Gross Benefits   | Annual Gross Benefits | Description of Annual Gross Costs   | Annual Gross Costs |
|--|-----------------------|---|--------------------|
| (A) Primary Income Benefits  |                       | (A) Primary Income Costs  |                    |
| (1) Annual Payroll Income to accrue to the 500 local workers previously employed in the coal mining operations of Crows Nest Industries Ltd. plus  |                       | (1) Opportunity cost of the 500 local workers previously employed in the coal mining operations of Crows Nest Industries Ltd. plus    |                    |
| Annual Payroll Income to accrue to the additional 200 local workers to be employed by Kaiser from the first to the fifteenth year of production.<br>(The net benefit to local labour will occur in the form of the increase in the wages of the 500 workers previously employed by Crows Nest Industries Ltd. in coal mining operations plus the increases in the wages of the additional 200 local workers to be employed.) | \$4,666,662           | the opportunity cost of the additional 200 local workers to be employed by Kaiser from the first to the fifteenth year of production. | \$3,333,330        |

TABLE V (Continued)

| Description of Annual Gross Benefits  | Annual Gross Benefits   | Description of Annual Gross Costs   | Annual Gross Costs   |
|---|---|---|--|
| (2) Annual Construction Income accruing to local labour during the first and the second years of the project.   | \$1,912,500   | (2) Opportunity cost of the local labour employed in the construction phase.  | 0  |
| (3) Income to local capital and other local inputs, employed by firms already established in the East Kootenay, used in producing operating supplies and fixed plant and equipment for the coal development.  | Data not available. I assume that the income will be low, because Kaiser will obtain most of its operating supplies and equipment from other parts of B.C., Canada and the U.S.A. | (3) Opportunity cost of the local inputs used in producing operating supplies and fixed plant and equipment for the coal development. | Data not available. I assume the opportunity cost will be large. |
| (B) Secondary Income Benefits   |   | (B) Secondary Income Costs  |  |
| (4) Annual secondary benefit accruing to local labour from a regional income multiplier of 1.3. The income multiplier will result in an expansion of local service and retail industries in which there was excess capacity prior to the development. | \$ 800,000  | Opportunity cost of local labour.   | Low  |

TABLE V (Continued)

| Description of Annual Gross Benefits   | Annual Gross Benefits | Description of Annual Gross Costs   | Annual Gross Costs  |
|--|-----------------------|---|---------------------|
| (5) Capital gain on property owned by residents in the East Kootenay. The capital gain will occur in the first year of the project. Value of property in down-town Fernie will increase. | Data not available.   | Capital Loss on property owned by residents in the East Kootenay, due to pollution and decline of tourism.  | Data not available. |
| (C) Intangible Benefits and Positive Externalities   |                       | (C) Intangible Costs and Negative Externalities   |                     |
| (6) —  | —                     | (6) Loss of local income in the first year of coal production due to a decline in the local gross revenue obtained from the existing state of tourism.  | \$56,840            |
| (7) —  | —                     | (7) Decrease in value added by local labour from resident and non-resident hunters' expenditures in the East Kootenay. Non-resident hunters are from other areas of B.C., Canada and the U.S.A. The ex- | \$362,912           |

TABLE V (Continued)

| Description of Annual Gross Benefits | Annual Gross Benefits | Description of Annual Gross Costs  | Annual Gross Costs  |
|--------------------------------------|-----------------------|--|---|
|                                      |                       | penditures referred to are incurred on hunting in the East Kootenay. Strip mining and the location of industry in the Elk River Valley will result in the loss of winter feeding ranges. Water and air pollution will also be detrimental to wildlife and to the quality of hunting. The figure represents foregone local income in the first year of coal production. |   |
| (8)                                  | —                     | (8) I assume that in the absence of the coal development, local income from tourism and hunting would have expanded cumulatively by 10% each year. I assume that all of the increase will be foregone.   | Items (6) and (7) are added and are increased cumulatively by 10% each year |

TABLE V (Continued)

| Description of Annual Gross Benefits | Annual Gross Benefits | Description of Annual Gross Costs   | Annual Gross Costs  |
|--------------------------------------|-----------------------|---|---|
| (9)                                  | —                     | (9) Annual loss of local income from non-resident and resident sport fishermen, due to deterioration of the environment and the sport fisheries, caused by water pollution and siltation.                                     | from the 2nd to the 15th year of production to produce the annual loss of revenue from tourism and hunting. |
| (10)                                 | —                     | (10) Decrease in the enjoyment from hunting and the outdoors by residents of the East Kootenay. Denser population and the deterioration of the quality of the environment may also be a dis-benefit to residents of the area. | non-estim-able.   |

TABLE V (Continued)

| Description of Annual Gross Benefits   | Annual Gross Benefits | Description of Annual Gross Costs  | Annual Gross Costs |
|--|-----------------------|--|--------------------|
| (11) The cultural activities available to residents are likely to increase due to the expansion of population in the East Kootenay. A greater variety of services and goods in retail stores will be available to residents. | non-estimable.        | (11) —   | —                  |
| (12) The social benefit due to the training of inexperienced workers as coal miners. The training will be provided by Kaiser.  | non-estimable.        | (12) The cost of training residents as coal miners will be borne by Kaiser and not by the community. Therefore, the social opportunity cost of the training to the community will be negligible. | 0                  |

also decline. This effect is also not taken into account in the benefit-cost table.

I have also not included the user cost of coal in the table. The marginal user cost is "the present value of the future profit foregone by a decision to produce a unit of output today."<sup>37</sup> I do not expect the price of high quality coking coal to increase in the world market in the future. World supply of coal is abundant relative to demand, and I do not expect this situation to change.<sup>38</sup> The coal contract with Mitsubishi Shoji Kaisha was obtained because Kaiser was able to lower the delivered price of coal in Japan by applying cost reducing technology. It would not be in the interest of the East Kootenay to decrease the rate at which coal will be mined by Kaiser, since increases in future coal prices are unlikely. I assume that Kaiser has chosen a rate of output which is efficient. It must also be pointed out that user cost is a relevant consideration to East Kootenay residents only if the possible increased present value of net profits by delaying production were in part distributed to them. However, user cost is an important consideration from the point of view of B.C. and Canada, since increased factor income (including retained earnings) would be forthcoming if the marginal user cost exceeded the marginal profit from production today.

The marginal user cost would be zero if the interest rate were infinitely large or if a delay in coal production would mean discontinuation of future production. Whether or



another firm would have revitalized coal mining in the area, in the absence of Kaiser Resources Ltd., is uncertain. It is conceivable that a Canadian producer might have increased coal production in the East Kootenay in the future. The present value of income accruing to Canadian factors might have been higher than that produced by Kaiser, which is a subsidiary of a United States firm. While the present value of net revenue accruing to B.C. and Canada might have increased, East Kootenay residents might not have gained by a delay in production. A crown corporation might also have been established by the federal government to increase coal production.

(d) Benefit-Cost Analysis

Table VI provides the annual gross benefits and costs attributable to the coal project, the annual net benefits and the present value of the annual net benefits for each year of project life. Table VI includes only those benefits and costs on which money values have been placed. Unmeasurable intangible benefits and costs are not included in Table VI or in the calculation of the cumulative present value of net benefits.

Under the present contract the project will produce coal for fifteen years. While continued coal production is likely beyond this date, I assume that the project ends after the present sales contract is completed. I assume that the length of project life will be 16 years, since the first year will be devoted to construction and no production will occur. In the second year both construction and coal production will take place. I assume that revenue foregone from tourism and hunting commences in the second year of the project.

Several discount rates are used to show the effect of different rates on the cumulative present value of net measurable benefits. Interest rates of 8% and 9% are used to reflect the opportunity cost of capital to a public agency in 1969, as determined by present economic conditions. Interest rates of 16% and 18% are used to reflect the opportunity cost of capital to a private firm in 1969. The corporation income tax is considered in the last two interest rates. I assume that the first year of the project takes place in the present. Therefore I begin discounting annual net measurable benefits in the second year.

The cumulative present values of net measurable benefits are \$15,312,284; \$14,717,983; \$11,606,882 and \$11,010,596 when interest rates of 8%, 9%, 16% and 18% are used respectively. Changing the interest rate has not affected the conclusion to be drawn from the analysis, when only measurable benefits and costs are considered, which is that the project

TABLE VI

Cumulative Present Value of Net Benefits from "point of view" of Residents, living  
in the East Kootenay prior to the development, due to the coal project of Kaiser  
Resources Ltd.

| Year of Project | Annual Gross Benefits | Annual Gross Costs | Annual Net Benefits |
|-----------------|-----------------------|--------------------|---------------------|
| 1               | \$1,912,500           | 0                  | \$1,912,500         |
| 2               | 7,379,162             | \$3,753,082        | 3,626,080           |
| 3               | 5,466,662             | 3,795,057          | 1,671,605           |
| 4               | 5,466,662             | 3,841,230          | 1,625,432           |
| 5               | 5,466,662             | 3,892,020          | 1,574,642           |
| 6               | 5,466,662             | 3,947,889          | 1,518,773           |
| 7               | 5,466,662             | 4,009,345          | 1,457,317           |
| 8               | 5,466,662             | 4,076,947          | 1,389,715           |
| 9               | 5,466,662             | 4,151,309          | 1,315,353           |
| 10              | 5,466,662             | 4,233,107          | 1,233,555           |
| 11              | 5,466,662             | 4,323,085          | 1,143,577           |
| 12              | 5,466,662             | 4,422,061          | 1,044,601           |
| 13              | 5,466,662             | 4,530,934          | 935,728             |
| 14              | 5,466,662             | 4,650,694          | 815,968             |
| 15              | 5,466,662             | 4,782,430          | 684,232             |
| 16              | 5,466,662             | 4,927,340          | 539,322             |

The benefits and costs are those which are measurable in money values.

TABLE VI (Continued)

| Year of<br>Project | PV of Net<br>Benefits<br>@ 8% | PV of Net<br>Benefits<br>@ 9% | PV of Net<br>Benefits<br>@ 16% | PV of Net<br>Benefits<br>@ 18% |
|--------------------|-------------------------------|-------------------------------|--------------------------------|--------------------------------|
| 1                  | \$1,912,500                   | \$1,912,500                   | \$1,912,500                    | \$1,912,500                    |
| 2                  | 3,372,254                     | 3,335,994                     | 3,118,429                      | 3,082,168                      |
| 3                  | 1,437,580                     | 1,404,148                     | 1,236,988                      | 1,203,556                      |
| 4                  | 1,284,091                     | 1,251,583                     | 1,040,277                      | 991,514                        |
| 5                  | 1,165,235                     | 1,117,996                     | 866,053                        | 818,814                        |
| 6                  | 1,032,766                     | 987,203                       | 729,011                        | 668,260                        |
| 7                  | 918,110                       | 874,390                       | 597,500                        | 539,207                        |
| 8                  | 806,035                       | 764,343                       | 486,400                        | 430,812                        |
| 9                  | 710,291                       | 657,677                       | 407,759                        | 355,145                        |
| 10                 | 616,778                       | 567,435                       | 320,724                        | 283,718                        |
| 11                 | 526,045                       | 480,302                       | 263,023                        | 217,280                        |
| 12                 | 449,178                       | 407,394                       | 198,474                        | 167,136                        |
| 13                 | 374,291                       | 336,862                       | 159,074                        | 131,002                        |
| 14                 | 301,908                       | 269,269                       | 122,395                        | 97,916                         |
| 15                 | 232,639                       | 205,270                       | 88,950                         | 68,423                         |
| 16                 | 172,583                       | 145,617                       | 59,325                         | 43,146                         |

Cumulative  
Present  
Value of  
Net

Benefits= \$15,312,284

\$14,717,983

\$11,606,882

\$11,010,596

is efficient and should be continued. However, the length of project life assumed in this analysis may have a significant effect on the cumulative present value of net measurable benefits. If the project life were extended by perhaps another fifteen years, the present value of measurable costs, due to increased foregone revenue from hunting and tourism, might have exceeded the present value of the measurable benefits. I have assumed a very rapid rate of revenue growth from hunting and tourism in the absence of the coal project. The 10 per cent cumulative annual increase in foregone revenue would not continue indefinitely, because there are limits on the maximum ability of the area to sustain wildlife. The quality of hunting is also severely reduced by overcrowding. After a number of years, the rate of increase in foregone revenue will decrease and a constant annual foregone revenue will prevail. If the existence of economically exploitable coal reserves were the only consideration for continued coal production by Kaiser, then coal production could continue for a substantial period after the present contract.<sup>39</sup>

It must also be pointed out that I assumed that all of the local income presently obtained from tourism and hunting will be foregone due to the project. Taking this into consideration, the cumulative present values of net measurable benefits are likely to be understated. I overstated the magnitude of this negative externality effect, because the magnitude is uncertain and I wished to subject the project

to a severe test.

The cumulative present values of net measurable benefits obtained do not take into account the intangible costs due to pollution, deterioration of the environment, and decline of the enjoyment obtained by local residents from hunting and fishing. The calculations also do not take into account the loss of local revenue from the sport fishery. From this point of view, the cumulative present values of net measurable benefits are overstatements of the worth of the project. The unmeasurable intangible benefits are also not considered in the cumulative present values calculated. In order to reach a decision on the desirability of the project, the cumulative present value of net unmeasurable intangibles must be compared with the cumulative present value of net measurable benefits. The project should be discontinued if the cumulative present value of net unmeasurable intangibles is negative and exceeds in magnitude the cumulative present value of net measurable benefits. At 9% the cumulative present value of net unmeasurable intangibles would have to be  $-\$14,717,983$  to require termination of the project.<sup>40</sup> However, if the measurable negative externality effects on hunting and tourism have been overestimated, then a still greater negative cumulative present value of net unmeasurable intangibles could be borne by the community without requiring termination of the project. The measurable benefits and costs must be good estimates in order to determine what cumulative present value of net unmeasurable intangibles would require discontinuation of the

project.

It is the responsibility of the community or local government to evaluate the net unmeasurable intangibles over the life of the project. An evaluation can only be accomplished by referring to the value judgments specified in a political consensus or by designating whose values are to count. Only in this way can a decision be made concerning the relative desirability of increased regional income to residents living in the East Kootenay before the project versus the quality of the environment.

## CHAPTER IV

### Summary and Conclusions

The cumulative present values of net measurable benefits from the Kaiser project are \$15,312,284; \$14,717,983; \$11,606,882 and \$11,010,596 when interest rates of 8%, 9%, 16% and 18% are used respectively. The coal development will produce negative externality effects in the East Kootenay in the form of pollution, deterioration of the environment and a decline in the enjoyment of residents from hunting and the outdoors. These externality effects are unmeasurable intangible costs, which are not taken into account in the present value calculations. In addition to the above externalities, local value added from the expenditures of resident and non-resident hunters and from tourism will decline. These measurable externalities have been taken into account in the present value calculations. I assume that in the absence of the coal development, local value added from hunting and tourism would have increased rapidly. The above cumulative present values of net measurable benefits are understatements, if the magnitude of foregone local income is overstated. The unmeasurable intangible benefits due to training and a potential increase in the cultural activities of the community are also not considered in the calculations.

The cumulative present values of net measurable benefits were calculated from the point of view of residents



living in the East Kootenay prior to the development. The benefits and costs do not necessarily represent those attributable to the project from the point of view of all British Columbia residents.

The Kaiser project may also have an interregional income redistribution effect which has not been examined. While benefits will accrue to residents in other regions of British Columbia from provincial tax revenues<sup>1</sup> and a decrease in welfare payments to the East Kootenay, costs will also be borne in the form of the negative externality effects on residents of the Lower Mainland due to the railway access facilities and the port. A decrease in the revenue obtained from British Columbia licence fees from non-resident hunters and in the quality of hunting obtained by residents for the same expenditure will also be costs attributable to the project. From the point of view of residents in other regions of British Columbia, the cumulative present value of all costs may exceed the cumulative present value of all benefits. If this is the case, an implicit transfer of income is taking place between other regions of British Columbia and the East Kootenay. This may be deemed desirable, because of the depressed state of the East Kootenay economy. However, the Kaiser project will only be justified on income redistribution grounds, if the positive cumulative present value<sup>2</sup> of all benefits less all costs from the point of view of East Kootenay residents exceeds the negative cumulative present value of all benefits less all costs to the rest of British Columbia. Otherwise, the residents of other regions

could redistribute income by a simple transfer to the East Kootenay at less cost than they would incur due to the Kaiser project.

Coal production will probably continue in the East Kootenay for a substantial period of time after the termination of the present coal contract. The long-run effect of the Kaiser project may be disadvantageous with regard to both the level of per capita income and the social welfare of residents if the coal development encourages local labour to rely heavily on coal mining for economic support and if residents are not occupationally and/or geographically adaptable in the future when the coal industry declines.<sup>3</sup> If other staple production expands or develops in the East Kootenay in the future, the requirement for labour emigration after the decline of coal mining may be reduced.<sup>4</sup>

East Kentucky is an example of an area which experienced high average unemployment and a low per capita income, because local labour was unable to adapt in other areas after the decline of coal mining. The educational level of East Kentucky labour was low. The industry of the region had not been able to absorb the local labour released from coal mining.<sup>5</sup>

In conclusion, while the Kaiser project is desirable on the basis of the cumulative present value of net measurable benefits, the unmeasurable intangible benefits and costs must also be taken into account. If the community decides that the cumulative present value of net unmeasurable intan-

gibles is negative and exceeds in magnitude the cumulative present value of net measurable benefits, the Kaiser project should be terminated, provided that the measurable benefits and costs are good estimates. It is possible that the cumulative present value of net intangibles may be positive, in which case the project would definitely be desirable from the point of view of the East Kootenay. Intangibles are likely to be an important deciding factor, since the per capita present value of net measurable benefits is low.

## FOOTNOTES

### Chapter I

1 Bryce Williams, "Time for Strip Mine Law Is Right Now, Says Expert," The Vancouver Sun, Vancouver, Monday, 27 January, 1969, pp. 1-2.

2 Bob McMurray, Business Editor, "The Coal Conflict," The Province, Vancouver, Wednesday, 29 January, 1969, p. 13. A description of the strip mining to be undertaken by Kaiser Resources Ltd. is provided in (A) of Appendix I.

3 Crows Nest Industries Ltd. had employed a costly form of rail transportation and materials handling techniques. Other competitors were closer to metallurgical markets than Crows Nest Industries Ltd. The importance of lowering transportation costs for Crows Nest was therefore greater than for other competitors.

4 I.S. Ross, President, Swan Wooster Engineering Co. Ltd., Coal at Roberts Bank - Now a Reality, paper presented at the Twentieth Dominion - Provincial Conference on Coal, Quebec City, Quebec, 12 and 13 September, 1968, p. 4.

5 "Roberts Bank in step with superport trend," The Province, Vancouver, Tuesday, 3 June, 1969, p. 17A.

6 Canada, Fuels and Mining Practice Division, Mines Branch, Department of Energy, Mines and Resources, T.E. Tibbetts and J.C. Botham, "Coal and Coke," Canadian Minerals Yearbook: 1966, preprints, no. 15, Queen's Printer, Ottawa, 1965, 1966, 1967, p. 5.

7 Part (A) of Appendix II and parts (B) and (C) of Appendix I contain a more detailed discussion of the history of coal mining in the East Kootenay, the reasons for its decline and the cost reducing technology and other factors which have led to its revitalization.

8 Executive Director and Technical Staff of the B.C. Lower Mainland Regional Planning Board, "Rail Service to the Roberts Bank Port Facility," 5, Submissions to the Aug. 28 public hearing on the proposed B.C. Hydro rail route from Matsqui to Roberts Bank, 28 August, 1968, pp. 11-15.

9 For a discussion of the industrial structure and prior condition of the East Kootenay economy refer to part (B) of Appendix II.

10 Peter H. Pearse and Gary Bowden, Big Game Hunting in the East Kootenay, Study Report No. 1 on the Economics of Wildlife and Recreation, sponsored by the Fish and Wildlife Branch of the Department of Recreation and Conservation, Victoria, B.C., 1966, p. 10.

11 The following discussion of benefits and costs attributable to the Kaiser project from the point of view of British Columbia residents identifies the most important benefits and costs, but is not an attempt to enumerate every benefit and cost.

12 Markets in British Columbia for metallurgical coal have been small. Approximately 450,000 tons have been sold annually to British Columbia producers. Kaiser Resources Ltd. is not concentrating on increasing coal sales in British Columbia or other parts of Canada. Refer to part (A) of Appendix II for a discussion of past East Kootenay coal sales in Canadian markets. However, a small benefit from the Kaiser operation may accrue to British Columbia producers if the transportation cost of coal to British Columbia users represents a significant portion of the total delivered cost, since the transportation costs of Crowsnest coal have been reduced. However, the reduction in the cost per ton of coal to these users is also likely to be low, because the transportation system was designed specifically for export coal to be shipped through the Roberts Bank Port. It must be pointed out that if the value of increased coal production had represented a primary gross benefit, factor income could not also be taken as a gross benefit, since double counting would have occurred.

13 This net primary benefit from the point of view of residents living in the East Kootenay prior to the development is discussed in Chapter III. Some construction labour may be imported into the East Kootenay from other parts of British Columbia, and a net benefit will occur if the payroll income to this labour is above the social opportunity cost of the labour.

14 A net primary benefit will accrue from taxes, since I assume that in the absence of Kaiser Resources Ltd., increased coal production would not have taken place in the East Kootenay and since I assume a low tax revenue from alternative production possibilities using the same East Kootenay resources. The taxes designated as net primary benefits should be limited to those payments attributable to increased coal production. The taxes which would have been paid by Crows Nest Industries Ltd. in the absence of Kaiser should not be included in the net tax benefit due to Kaiser. Both the Roberts Bank Port and the railway access facilities across the Lower Mainland will be self-financing. Only the first phase of the Roberts Bank Port is attributable to Kaiser and includes reclamation of 50 acres of land and con-

struction of a causeway between the Mainland and the reclaimed land. Kaiser Resources Ltd. will lease the facilities of the first phase from the National Harbours Board. The construction cost of \$5.1 million plus accruing interest will be paid back through fees over a 30 year period. Bulk handling facilities will be initially constructed and owned by Kaiser Resources Ltd. Refer to part (C) of Appendix I for a description of the Roberts Bank Port. The railway access facilities will be self-financing due to user fees paid by the railways. The total construction cost is \$10 million and \$4 million of this will be paid directly by CPR.

15 The B.C. Mining Tax will amount to 10¢ per ton and the royalty on property under coal licence will be 25¢ per ton. See Bob McMurray, Business Editor, "The Coal Conflict," The Province, Vancouver, Wednesday, 29 January, 1969, p. 14.

## Chapter II

1 The articles to which I have referred are: A.R. Prest and R. Turvey, "Cost-Benefit Analysis: A Survey," Economic Journal, December 1965, pp. 683-735.

Julius Margolis, "Secondary Benefits, External Economics and the Justification of Public Investment," Review of Economics and Statistics, vol. 39 (August 1957), pp. 284-291.

Otto Eckstein, "Survey of the Theory of Public Expenditure Criteria," in NBER, Public Finances: Needs, Sources and Utilization, Princeton, 1961, pp. 439-504.

Robert Haveman and John Krutilla, "Unemployment, Excess Capacity, and Benefit-Cost Investment Criteria," The Review of Economics and Statistics, vol. XLIX, no. 3 (August 1967), pp. 382-392.

W.R.D. Sewell, J. Davis, D.W. Ross and A.D. Scott, Guide to Benefit-Cost Analysis, Ottawa, Queen's Printer, 1961.

2 The cumulative present value of net benefits from the "point of view" of residents, living in the East Kootenay prior to the Kaiser project, will probably differ greatly from the cumulative present value of net benefits from the "point of view" of British Columbia residents.

3 For a discussion of secondary benefits see W.R.D. Sewell, J. Davis, D.W. Ross and A.D. Scott, op. cit., p. 5. The net secondary benefit is the increase in value added by local factors in the region. If a firm is merely transferred from one region to another, but the local value added does not increase in the new region, a net secondary benefit does not occur from the point of view of the region.

4 For a discussion of measurable and unmeasurable intangibles see W.R.D. Sewell, J. Davis, D.W. Ross and A.D. Scott, op. cit., pp. 6 and 19.

5 For a discussion of the relationship between the opportunity cost of factors and the money outlay expended on them see W.R.D. Sewell, J. Davis, D.W. Ross and A.D. Scott, op. cit., pp. 19-21.

6 For a discussion of payroll income to local labour and the multiplier effect of the income as benefits from a regional point of view see W.R.D. Sewell, J. Davis, D.W. Ross and A.D. Scott, op. cit., pp. 20-21.

7 The annual unmeasurable intangible cost may vary and an unmeasurable intangible cost may extend beyond the life of the project.

8 Since values must be placed on unmeasurable intangible costs and on unmeasurable intangible benefits and since the values of different individuals vary and cannot be compared, it is necessary to decide whose value judgments are to prevail. A political consensus may be used to evaluate the worth of different goods and services. It is interesting to note that the social welfare function of East Kootenay residents may differ from the social welfare function of the majority of B.C. residents. If a benefit-cost analysis were performed from the "point of view" of B.C. residents, the value placed on unmeasurable intangibles might differ from the value placed on unmeasurable intangibles by East Kootenay residents.



### Chapter III

1 This information was obtained from an interview with Mr. L.C. Reed, formerly of Hedlin-Menzies and Associates Ltd. in June 1969.

2 "Kaiser Strip Mine Yield 'Less than Underground'," The Vancouver Sun, Vancouver, 1969.

3 This information was obtained from Mr. D.M. Roussel, District Economist, Okanagan-Kootenay District, Department of Manpower and Immigration by letter of 14 July, 1969.

4 I am excluding the possibility of geographical mobility which would be desirable from the "point of view" of local labour, if the return from the same occupation were higher in another region in which positions were available. If local labour were both occupationally and geographically mobile, it would be desirable for local labour to immigrate to other areas if higher paid positions in alternative occupations could be obtained.

5 Bob McMurray, Business Editor, "The Coal Conflict," The Province, Vancouver, Wednesday, 29 January, 1969, p. 13.

6 Refer to Table X of part (B) of Appendix II.

7 Refer to part (B) of Appendix II for a discussion of unemployment in the East Kootenay.

8 Refer to Tables IX and X of part (B) of Appendix II for unemployment figures.

9 "Coal mining resumes if injunction obeyed," The Province, Vancouver, Friday, 11 July, 1969, p. 16.

10 The average wage of \$4,363 refers to 1966 income tax returns which were taxable. Canada, Department of National Revenue, Taxation Division, Taxation Statistics, Part One - Individuals, Table 6, Ottawa, 1968, p. 98.

11 This information was obtained from an interview with Mr. L.C. Reed, formerly of Hedlin-Menzies and Associates Ltd. in June 1969.

12 Refer to Table XI of part (B) of Appendix II for unemployment figures in construction occupations. Construction of the railways, roads and plant for the Kaiser project and the 200 homes for the coal miners in Sparwood will create a construction boom absorbing unemployed construction and forestry labour. Unemployment in construction and logging and lumber manufacture was higher absolutely in the East Kootenay than in the West Kootenay between 1965 and

1968, even though the West Kootenay labour force was approximately double that of the East Kootenay. Refer to Table XI of part (B) of Appendix II. The number of forestry workers unemployed in 1968 in the East Kootenay was 54. Unemployment in construction and forestry was not entirely alleviated even during peak cyclical periods. Occupational immobility was prevented by a low educational level and inexperience in other occupations. The latter information was obtained from Mr. D.M. Roussel, District Economist, Okanagan-Kootenay District, Department of Manpower and Immigration by letter of 14 July, 1969. Geographical immobility was prevented due to the uncertainties involved with a relocation and due to the absence of employment opportunities in the same occupation in adjacent areas. Unemployed construction and forestry workers also exist in the West Kootenay. The construction boom will only alleviate the latter unemployment for several years.

13 Bob McMurray, Business Editor, "The Coal Conflict," The Province, Vancouver, Wednesday, 29 January, 1969, p. 13.

14 This information was obtained from Mr. D.M. Roussel, District Economist, Okanagan-Kootenay District, Department of Manpower and Immigration by letter of 14 July, 1969.

15 Refer to Table VIII of Part (B) of Appendix II.

16 Refer to Table IX of part (B) of Appendix II.

17 That local construction labour is occupationally immobile and of a low educational level was cited by Mr. D.M. Roussel, District Economist, Okanagan-Kootenay District, Department of Manpower and Immigration by letter of 14 July, 1969.

18 The regional income multiplier is:

$$\frac{1}{1 - (b - e)}$$

b= marginal propensity to spend

e= marginal propensity to import

See Hugh O. Nourse, Regional Economics, A Study in the Economic Structure, Stability and Growth of Regions, Seymour E. Harris, Editor, Economics Handbook Series, McGraw-Hill Book Co., New York, New York, 1968, p. 160.

The value of 1.3 assumed for the regional income multiplier is a conservative estimate. Approximately 58% of the labour force of the area is employed in nonbasic industries, defined as those producing goods for local consumption only. The figure of 58% was obtained from data on the 1961 labour force employed in different industries in the East Kootenay. See Province of B.C., Bureau of Economics and Statistics, Department of Industrial Development, Trade and Commerce, Regional Index of British Columbia, January, 1966, p. 5.

The employment multiplier of an economic base model is defined as the ratio of total employment to basic employment and in this case equals 2.4. Basic employment is the number of workers employed in producing exports. The employment multiplier of an economic base model serves as a proxy for an income multiplier, but is likely to be too high. For a discussion of the assumptions behind the multiplier of an economic base model, see Hugh O. Nourse, op. cit., pp. 161-163. The regional income multiplier for the East Kootenay is likely to be between 1.3 and 2.4.

19 This information was obtained from M.L. McFarlane, Secretary Treasurer, Cranbrook Chamber of Commerce, Cranbrook, B.C. by letter of 22 July, 1969.

20 Province of B.C., Bureau of Economics and Statistics, Department of Industrial Development, Trade and Commerce, Regional Index of British Columbia, January, 1966, pp. 10-11.

21 Peter H. Pearse and Michael E. Laub, The Value of The Kootenay Lake Sport Fishery, Study Report No. 3 on the Economics of Wildlife and Recreation, sponsored by the Fish and Wildlife Branch of the Department of Recreation and Conservation, Victoria, British Columbia, 1969, p. 58.

22 Bryce Williams, "Wildlife Brief to Government U.S. - Type Control Urged for Strip Mining in B.C.," The Vancouver Sun, Vancouver, 1969.

23 The bonds are to cover actual strip mine sites and areas where rock and earth overburden are placed. Those companies which fail to obtain a permit before mining and to deposit the performance bond with the government will be fined up to \$1,000 a day. If the offence continues after written notice from the Mines Department, the firm will be fined a minimum of \$100 and a maximum of \$1000 a day. The government may also close down the mine if the offence continues. As of February 10, 1969 approximately 240 square miles or 150,000 acres of the Elk River and Flathead River Valleys in the East Kootenay were under coal licences. An additional 50,000 acres are held under coal licences in other parts of British Columbia. The possible extent of strip mining in British Columbia is thus great.

The legislation does not specifically set out what is meant by continuous reclamation of strip mined land and the B.C. Wildlife Federation is concerned that adequate restoration will not be forthcoming as a result of the legislation. Forest and grass cover are required to prevent soil slippage.

The really serious problems of surface mining are those of siltation and land slippage, both during and after the operation, and...continuous grading and inspection and the quick stabilization of soil by cover crops is the key to a successful reclamation program.

See Bryce Williams, "Wildlife Brief to Gov't. U.S. - Type Control Urged for Strip Mining in B.C.," The Vancouver Sun, Vancouver, 1969.

24 Problems have been encountered in reforesting and in growing grasses on strip mined land in the United States. There is some debate over whether strip mined land can be recovered with the same type of vegetation which existed prior to coal mining. Particular ranges are important to wildlife because of the type of vegetation cover. The wildlife may be lost, even if land is reclaimed.

25 The legislation will not be successful in inserting the social cost of lost wildlife into the cost calculations of mining firms. Ranges in the Elk and Flathead River Valleys vary substantially in their importance as winter feeding grounds for wildlife. See Bob McMurray, Business Editor, "The Coal Conflict," The Province, Vancouver, Wednesday, 29 January, 1969, p. 14. Access to particular wildlife ranges has not been restricted in the past by a price mechanism and so the value of land in this use has not been represented in the market. The land allocation decision among the competing uses of coal mining and hunting can only be made by a public authority. Each strip mine operation should be considered individually to take into account the varying marginal social opportunity cost of coal mining in different ranges.

26 W.G. Smith, The Status, Requirements, and Management of the East Kootenay Game Resource, A Report to the B.C. Game Commission, January, 1957, p. 5.

27 Ibid., p. 9.

28 The annual expenditures refer to 1964. I have assumed that the 1968 figure equals the 1964 figure.

29 The annual expenditures refer to 1964. I have assumed that the 1968 figure equals the 1964 figure.

30 Kaiser Resources Ltd. has purchased 108,000 acres from Crows Nest Industries Ltd. and has obtained an additional 7,657 acres in coal licences. There are 122,894 acres in the Elk River Valley presently held in coal licences. Kaiser Resources Ltd. therefore holds a significant proportion of the coal reserves. See Bob McMurray, Business Editor, "The Coal Conflict," The Province, Vancouver, Wednesday, 29 January, 1969, p. 13.

31 I assume that if expenditures by local hunters decline, the residents do not spend the released income on other forms of recreation in the East Kootenay. Local hunters are likely to hunt outside the East Kootenay. I also assume that local labour employed due to hunting in the area has no alternative income sources.

32 Province of B.C., Bureau of Economics and Statistics, Department of Industrial Development, Trade and Commerce, Regional Index of British Columbia, January, 1966, p. 16.

33 This information was obtained at a seminar on strip mining held by the Faculty of Forestry at U.B.C. in the spring of 1969. The guest speakers were Dr. Warren, Dr. A.D. Scott, Dr. Thirgood of U.B.C. and Mr. Paish of the B.C. Wildlife Federation.

34 The estimate of foregone income in the first year of coal production is liberal, since I have assumed that all of the present annual local value added due to tourism and hunting in the Crowsnest will be foregone. I have also assumed that over the fifteen year period there are no alternative income sources for workers who would have been earning income from tourism and hunting. The decline in value added by local inputs will therefore not be offset by an increase in the value added by transfer of the released local inputs to other industries in the East Kootenay. The Kaiser project will therefore result in a decline of employment in those service and retail industries linked with hunting and tourism. I have assumed that local value added from tourism and hunting would have increased cumulatively by 10%. This is the same as assuming that tourist and hunters' expenditures in the East Kootenay would have increased cumulatively by 10%, if it is also assumed that the proportion of local value added remains constant.

35 Peter H. Pearse and Gary Bowden, Big Game Hunting in the East Kootenay, Study Report No. 1 on the Economics of Wildlife and Recreation, sponsored by the Fish and Wildlife Branch of the Department of Recreation and Conservation, Victoria, B.C., 1966, p. 13.

36 This information was obtained from an interview with Mr. L.C. Reed, formerly of Hedlin-Menzies and Associates Ltd. in June 1969.

37 A.D. Scott, "The Theory of the Mine Under Conditions of Certainty," Extractive Resources and Taxation, ed. Mason Gaffney, The University of Wisconsin Press, Madison, 1967, p. 34.

38 Refer to part (A) of Appendix II for a description of the world market for coal.

39 Total estimated coal reserves in the Elk River Valley are 15 million tons. Fifty per cent of these reserves are economically recoverable by today's mining standards. Kaiser Resources Ltd. holds a significant proportion of the coal reserves. The coal project of Kaiser Resources Ltd. would be expected to continue for many years, if 5 million tons

were mined annually and if the availability of economically exploitable coal reserves were the only consideration. See McMurray, op. cit., p. 13.

The negative externalities from strip mining in the form of loss of wildlife and local hunters' consumer surplus will continue indefinitely after termination of the project. The loss of wildlife will be irreversible. The present value of these negative externalities after the 15 years of coal production have not but should be included in the calculation of the cumulative present value of net measurable benefits. Decline in welfare payments and the personal income tax have not been taken into account in the benefits and costs. I assume that per capita welfare payments are \$150 per month. The number of workers with low previous opportunity cost employed by Kaiser has been estimated at (180+43+200) or 423. The annual welfare payments foregone would therefore be  $\$150 \times 12 \times 423$  or \$761,400. The loss of these welfare payments represents a cost which should be subtracted from gross income benefits. The expansion of service industries would also lead to a decrease in welfare payments not included in the above figure.

Personal income tax may be estimated at 10% of income and should be subtracted from payroll income due to the operating and construction phases and from the multiplier effect. The foregone income from tourism and hunting should also be adjusted downwards for personal income tax.

40 Assuming an East Kootenay population of 35,000 prior to the development, the per capita negative cumulative present value of net unmeasurable intangibles would have to be \$421 to require termination of the project. The unmeasurable intangible costs are likely to be high. It was estimated that in 1964 the weighted average consumer surplus from hunting in the East Kootenay over all income classes was \$197 per B.C. hunter. See Peter H. Pearse, "A New Approach to the Evaluation of Non-Priced Recreational Resources," Land Economics, vol. XLIV, no. 1, February 1968, p. 96.

## Chapter IV

1 Provincial tax revenues and revenue from B.C. hunting licence fees are also benefits in part to residents of the East Kootenay.

2 I assume in this statement that the cumulative present value of all benefits less all costs is positive.

3 The income of both the labour which emigrates to regions where production offers a higher rate of return and of the labour which remains in the declining area will rise due to emigration of some of the local labour. Labour remaining in the area becomes scarce and its rate of return rises. See A.D. Scott, "Policy for Declining Regions: A Theoretical Approach," in D. Woods, ed., Areas of Economic Stress in Canada, Queen's University, Kingston, Ontario, 1965, pp. 73-85.

4 For an efficient allocation of resources, labour should still emigrate from the region even if jobs are available in the region, if the rate of return offered these workers would be higher in other areas.

5 Mary Jean Bowman and W. Warren Haynes, Resources and People in East Kentucky, Problems and Potentials of a Lagging Economy, published for Resources for the Future, Inc. by the Johns Hopkins Press, Baltimore, Maryland, 1963, pp. 25-35, 204-227, 243-264, 289-308, 336-384, 420-434.

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## APPENDIX I

### (A) A Description of the Strip Mining to be carried out by Kaiser Resources Ltd.

Kaiser Resources Ltd. plans to continue operations of three existing underground mines and to bring into production a fourth underground mine. In addition, Kaiser plans to employ open pit mining and strip mining, both of which are forms of surface mining. The open pit mining will initially be restricted to 2.4 square miles of land on a mountain top, but the operation will later be transferred to other mountain tops. The open pit mining is expected to yield about  $5\frac{1}{2}$  million tons per year in the first few years of operation. The underground mining is expected to yield four million tons a year over the same period. However, in the long run and over the life of the contract, the output from underground mining is expected to exceed that produced by open pit mining.<sup>1</sup>

Surface mining, including both strip and open pit mining, entails stripping off the successive layers of clay, gravelly clay, limestone, gray shale, limestone and black slate to reach the coal seam. A large stripping shovel and wheel, dragline and bulldozer and sometimes blasting are used to excavate the overburden. The coal is then loosened from the seam by use of drilling or ripping equipment and is hauled into trucks by loading shovels. The coal is then prepared by use of a tippie for screening and a clean-

ing plant for removing impurities.<sup>2</sup>

The particular form in which strip mining appears depends on the character of the terrain. For example, contour mining augmented by auger mining is used in East Kentucky because of the mountainous terrain. On level terrain, strip mining simply involves moving back and forth over the land producing a series of parallel rows of spoil banks.<sup>3</sup>

Kaiser Resources Ltd. will employ hydraulic mining in its strip mining operations. This involves spraying jets of highly pressurized water on exposed coal seams in order to cut the coal from the seams. The water will be recycled and re-used. This technique has been employed in Japanese coal mines but has never before been used in the operations of the Kaiser Steel Corporation. Japanese engineers have been imported into the Crowsnest area in order to assist Kaiser in the use of this new technique.

The assurance of a long-term market for coal from Kaiser's properties permitted investment in development of huge trucks to haul the coal. These trucks are capable of hauling up to 100 and 200 tons of coal, and were developed in Tulsa, Oklahoma, where the trucks and repair parts will be manufactured.<sup>4</sup>

It is interesting to note that contrary to the impression created in newspaper and other media reports concerning the Kaiser project, production by strip mining has in the past represented a substantial proportion of total coal

output in both the East Kootenay area and in Canada. In 1967, 614,590 short tons of coal were mined in B.C. by underground methods compared to 593,096 short tons by strip mining.<sup>5</sup> The ratio of production by strip mining to production by underground mining has increased rapidly in the last several years. Kaiser Resources Ltd. is not introducing strip mining to British Columbia.

In 1967 coal production in Canada by strip mining was 5,911,438 short tons and production by conventional underground mining was 5,484,316 short tons.<sup>6</sup> Production by strip mining in Alberta in all three years was more than double production by underground methods. The greater use of strip mining in Alberta, relative to British Columbia, may indicate a more rapid adjustment to the use of more efficient production methods on the part of Alberta, but differences in terrain with related difficulties in adequately employing strip mining may also have contributed to the difference in the ratio of output by strip mining to output by underground mining. Strip mining is capital intensive and may entail the use of a smaller amount of labour than conventional underground mining, but the quality and therefore the cost of this labour may be much higher. In its strip mining operations, Kaiser will employ skilled machine repairmen and truck and shovel operators, and intends to offer employment only to those inexperienced miners, who have had a grade twelve education.<sup>7</sup> These standards of labour will also be applied to the employment policy used in hiring miners for

the underground operations. The quality of the labour employed by Kaiser Resources Ltd. is higher than that formerly employed by Crows Nest Industries Ltd.

(B) Factors Leading to the Revitalization of the Coal Mining Industry in the East Kootenay

The coal mining industry has been revitalized due to the application of the following cost reducing technological improvements, which have lowered the delivered price of coal in Japan: development and use of high speed unit trains to carry the coal between Natal and Vancouver; construction of the Roberts Bank Port, capable of accommodating the largest bulk sea carriers being developed and to be developed by Japanese trading firms; development of 100 ton and 200 ton trucks to haul the coal and the use of an hydraulic technique in strip mining. An analysis of renewed profitability of coal mining in the Crowsnest area must take into account not only improvements in supply conditions but also favourable conditions on the demand side. Favourable Japanese steel markets have created a greater induced demand for metallurgical coal.

Japanese steel producers experienced a period of great increase in the rate of growth of exports and Japanese demand between 1958 and 1962.<sup>8</sup> A significant decrease in the rate of growth of Japanese demand and a slow down in the rate of growth of exports occurred between 1962 and 1965. Since 1965 the steel industry in Japan has again been on the up-swing, and this forms part of the reason for the Japanese



coal contract with Kaiser Resources Ltd.

The length of Kaiser's contract to supply Japanese steel firms has encouraged investment in a new form of rail transportation. The profitability of such an undertaking was ensured by the existence of a certain long-term market for the commodity transported. Use of the CPR unit train and construction of time and cost reducing facilities for loading coal into bulk carriers at the port will sufficiently reduce the transportation costs applicable to Crowsnest coal to enable selling the coal at a competitive c.i.f. price without subvention assistance. Competitors had been able to sell coal at \$17.00 per ton c.i.f., while the former price of Crowsnest coal had been \$19.50 without subtraction of the subvention assistance. The price of coal delivered in Japan will now be reduced to \$16.00 per ton. A comparison of the estimated cost of coal c.i.f. before and after the transportation improvements has been made by Swan Wooster Engineering Co. Ltd. and is presented on the following page.

Transportation costs have thus been reduced from \$10.50 to \$7.00 per ton. It has been the reduction of transportation costs rather than production costs at the mine, which has made Crowsnest coal competitive. Production costs have remained at \$9.00 per ton. While the project may require a smaller amount of labour per ton mined due to strip mining, the reduction in the required amount of labour will be offset by a rise in productivity and therefore wage rates and/or by a greater amount of capital investment per ton mined.

TABLE VII

Comparison of c.i.f. price of East Kootenay coal before and after cost reducing  
transportation improvements

|                               | <u>1965</u>           | <u>1970</u>            |
|-------------------------------|-----------------------|------------------------|
| f.o.b. mine price             | \$9.00 per ton (U.S.) | \$ 9.00 per ton (U.S.) |
| rail freight to west coast    | 5.50                  | 3.50                   |
| deep sea terminal             | 1.00                  | .50                    |
| ocean freight and demurrage   | 4.00                  | 3.00                   |
|                               | <hr/>                 | <hr/>                  |
| for a total of                | \$19.50               | \$16.00                |
| less the subvention of        | 2.50                  | -                      |
|                               | <hr/>                 | <hr/>                  |
| giving an approximate cost of | \$17.00               | \$16.00 per ton        |

Source: I.S. Ross, President, Swan Wooster Engineering Co. Ltd., Coal at Roberts Bank - Now a Reality, paper presented at the Twentieth Dominion - Provincial Conference on Coal, Quebec City, Quebec, 12 and 13 September, 1968, p. 4.

Thus the commencement of the coal project of Kaiser Resources Ltd. has entailed the institution of many new cost reducing technological developments and techniques. The vitality of the coal staple in the East Kootenay has been renewed due to these developments. Transportation costs have been and will in the future be most important in securing coal markets, because of the distance to coal markets and the absence of large markets in B.C.

(C) The Technology of Unit Trains and the Roberts Bank Port

In this section I shall describe the unit trains to be used by the Canadian Pacific Railway in transporting the coal and the history of the Roberts Bank Port. The railway system will consist of three 105-car trains each of which will make the round trip between the mine site, the Roberts Bank Port and back again in seventy-two hours.<sup>9</sup> It is envisioned that while one train is loading in Natal, the second will be unloading at the dock site and the third will be back on route to the mine site, after having delivered its coal. At Natal the coal will be loaded while in motion by an automatic conveyor system, and at the dock an automatic dumping system will be used to unload the train while in transit. The operation will involve a minimum of car delay and switching time, and the time required for loading and unloading will be minimized. There will thus be no needless tying up of cars while waiting in the dock to unload and then to be reconnected together once more. The locomotives will be remotely controlled to improve handling

under the severe operating conditions occasionally encountered in the Rockies. Use of unit trains, which are designed to serve a particular shipper and market, also tend to eliminate seasonality, ensure the regularity of shipments, standardize in-transit times and maximize the use of multiple-car handling. This form of railway freight operation is becoming most important in the handling of large amounts of bulk commodities sold in world markets.

Turning now to the Roberts Bank Port, the development was encouraged by Kaiser Resources Ltd. Responsibility for port planning and investments falls with the National Harbours Board of the federal government. In anticipation of future increased port traffic and the need for berths able to accommodate the largest bulk load carriers, the National Harbours Board in 1966 expanded the extent of the Port of Vancouver from forty-nine square miles within Burrard Inlet to two hundred square miles extending from the City of Vancouver to the United States border.<sup>10</sup> Construction of the first stage of the Roberts Bank Port was begun in 1968 and consists of a three mile causeway connecting the Lower Mainland with fifty acres of reclaimed land. The cost of this first stage of the development is estimated at \$5.1 million including the cost of utilities and services. This first stage has been constructed mainly to serve the needs of Kaiser Resources Ltd., which is incurring the cost of bulk handling facilities for efficient loading of coal into the ocean carriers. Bulk handling facilities at the port will be owned and operated by their users. The berth site and as-

sociated acreage will be leased to Kaiser Resources Ltd. in such a way as to "recover the actual cost of the capital investment, including interest accruing during construction, over a period of 30 years."<sup>11</sup> The lease of land and berth sites to other users will be handled in a similar fashion.

The National Harbours Board plans to reclaim approximately 1400 acres in the next several years as dictated by future demand for port facilities. "Two principal deepwater channels with a minimum depth of 65 feet will provide almost nine miles of potential berth face."<sup>12</sup> The Government of British Columbia has in addition assembled industrial backup acreage of approximately 3600 acres on the mainland, and the B.C. Hydro and Power Authority is providing rail access from Matsqui to the causeway at Roberts Bank.

In addition to construction of the Roberts Bank Port, which will form the outer port for Vancouver, the National Harbours Board plans to undertake a program to dredge Burrard Inlet to allow the passage of deep sea bulk carriers within the inner port of Vancouver.

## APPENDIX II

### (A) The History of Coal Mining in the East Kootenay and Reasons for its Decline

The rise and fall of the coal mining industry will be analyzed by reference to changing market patterns and transportation costs. Settlement of the East Kootenay was largely a response to the presence of coal deposits when demand for coal for domestic heating and railway consumption was high. The Michel Colliery of the Crow's Nest Pass Coal Co. was opened in 1888 largely to supply the Canadian Pacific Railway. The coal properties of the Crow's Nest Pass Coal Co., which were acquired by Kaiser Resources Ltd. in 1968, have produced the major portion of coal mined in British Columbia. The economy of the East Kootenay has diversified into the production of other staples of the forest and mining industries. The Sullivan Mine at Kimberley, British Columbia was opened in 1889 and is one of the world's largest producers of lead and zinc concentrates. Agriculture has never played an important role in the East Kootenay.

Production of coal in British Columbia and in the East Kootenay reached a high in the 1950's and has experienced a secular decline since then. The demand for coal for domestic and commercial heating has declined. The substitution of oil and natural gas for coal in domestic heating has occurred, because of the lower cost of using substitutes and the greater convenience and cleanliness of natural gas and

oil. Substitution of diesel oil for coal in locomotive use has occurred, not because of the greater cost of coal per BTU, but because of the greater efficiency in the use of diesel oil. "Diesel engines proved so much more efficient and cheaper to maintain than coal-burning steam locomotives that the change to oil proved more economical despite the fact that its cost per BTU is higher than coal."<sup>1</sup> The railway market for coal has also declined, because of the declining relative importance of the railways as a form of transportation. Coal is now used mainly as a raw material in the production of steel and for other metallurgical purposes. This shift in user markets has occurred in both the Canadian and in the world market for coal.

Coal production in the East Kootenay has not responded well to the shift for a number of different reasons. Production for domestic heating and railway purposes had been carried out mainly to serve the B.C. market. The major coal markets in Canada for metallurgical coal and coke are located in the east. The market in B.C. for coke to be used in the blast furnace and for metallurgical coal is small. However, a small foundry market for coke has been developed in western Canada and in the western United States.<sup>2</sup> A small amount of coke has been sold to the pig iron plant located in Kimberley and operated by COMINCO.<sup>3</sup> Crows Nest Industries Ltd. was the only western producer of coke. These markets have not expanded sufficiently to offset the decline in domestic and railway markets.

Crows Nest Industries Ltd. thus was faced with the challenge of tapping the metallurgical markets in Eastern Canada, or of extending sales on the international market through the Port of Vancouver. Crowsnest coal did not penetrate the Eastern Canadian market for high grade coal, probably because of prohibitively high transportation costs. Substantial investment in improving the efficiency of rail transportation would have been required. In 1965 "about 12.5 per cent of the coal output of British Columbia was shipped to Manitoba and 3 per cent went to markets in Ontario."<sup>4</sup> Alberta coal producers also did not effectively penetrate the Ontario or Quebec markets.

Between 60 and 70 per cent of the coal consumed in Canada between 1965 and 1967 was imported from the United States, with occasionally small amounts imported from the United Kingdom. Approximately one-third of the coal imported was high grade metallurgical coal used by industry in Ontario and Quebec.<sup>5</sup> The transportation costs of coal imported from the United States were probably substantially below the transportation costs which would have been incurred in moving Crowsnest coal to Ontario.

The following figures, referring to coal mined in the United States, give the ratio of the rail charge to the production cost per unit of coal.<sup>6</sup> The figures indicate the importance of transportation costs in determining the delivered cost of coal.



| Year | Average<br>Value per ton,<br>f.o.b. mine<br>(1) | Average<br>Revenue per ton<br>hailed on Class<br>I Railroads<br>(2) | (2) as<br>percentage<br>of (1)<br>(3) |
|------|---|---|---------------------------------------|
| 1959 | \$4.86  | \$3.57  | 73.4%                                 |
| 1958 | 4.86  | 3.58  | 73.7                                  |
| 1957 | 5.08  | 3.57  | 70.3                                  |
| 1956 | 4.82  | 3.45  | 71.6                                  |

Contracts with the Japanese were also elusive and were made for short time periods of three years. Forty-one per cent of coal production in B.C. in 1965 was exported to Japan.<sup>7</sup> Approximately ninety per cent of the coal produced in B.C. was mined in the East Kootenay. However, the volume of production of coal in the East Kootenay in 1965 was only 1,058,446 short tons.<sup>8</sup>

Subvention assistance was needed to lower the cost of Crowsnest coal and thus to enable it to compete on a price basis in a world market characterized by an abundant supply of high grade coking coal. The latter can be obtained from such diverse countries as Australia, Poland, the United States, China, Russia and Western Europe. The fact of an abundant supply of metallurgical coal, increasing production efficiency in the use of metallurgical coal in steel making, European national policies of maintaining a minimum annual production of coal which has resulted in stock piling, the ability of natural gas and oil to be substituted in thermal electricity generation and domestic and commercial heating, the increasing price competitiveness of natural gas and oil compared to coal and the anticipated glut on the world energy market has led to vigorous price competition in the world

coal market.

The delivered price of Crowsnest coal has not been competitive because of high transportation and handling costs. The length of coal contracts which buyers were willing to give Crowsnest coal was perhaps shortened by the fear that production and transportation costs would rise during the period of the contract or that the government subvention might be discontinued.

(B) Description of the East Kootenay Economy prior to the project - Unemployment and Per-capita Income

The industrial mix of an area may be divided into basic and non-basic industries.<sup>9</sup> The basic industry is the staple or export around which other non-basic industries are built, in order to supply producer and consumer goods and services to local businesses, government and households. The economic base of the East Kootenay economy is composed essentially of the forest and mining industries. In the forest industry I am including both logging and lumber manufacture. Employment in logging, lumber manufacture and mining represented 4.3%, 11.4% and 14.7% of the 1961 labour force respectively.<sup>10</sup> The logging and lumber industries compete in a market in which demand is highly price sensitive and income inelastic. The lumber market is primarily a "rail" market to the Prairies and the United States Midwest, and is sensitive to the condition of the economy in these areas.<sup>11</sup> The lumber industry is seasonal with demand for lumber increasing in the spring as wholesalers build up their stocks and declining in the fall,

as buyers do not wish to carry over large inventories during the winter. In the past there has been an excess supply of labour in logging and lumber manufacture which has not been completely eliminated even during the peak production season. The Canada Manpower Centre in Penticton is hopeful that the stability of employment in lumber manufacture will be aided in the future by the construction of modern lumber manufacturing plants and a pulp mill and by the application of new techniques in logging. However, due to the generally lower level of education in the area, unemployment in the forest industry could increase in the future, because of the requirement for labour of a higher quality in the newly automated sawmills, replacing the older conventional mills. The Canada Manpower Centre is hopeful that this situation can be avoided through retraining.

While the Sullivan mine at Kimberley, operated by COMINCO, has provided a stable economic base for Kimberley, increases in employment in its fertilizer, pig iron and mining operations have been limited, due to technological improvements in production and increasing productivity of labour.<sup>12</sup> Coal mining, as already mentioned, has been a declining industry for many years.

With regard to the manufacturing industry, it represented approximately 19.5% of the 1961 labour force, compared to 29.4% in the West Kootenay.<sup>13</sup> The West Kootenay is an area adjacent to the East Kootenay, but with a much different industrial mix and employment and income record. Over one-half of the above figure for the East Kootenay represents employ-

ment in lumber manufacture.

The construction industry in the East Kootenay is characterized by high unemployment of both skilled and unskilled workers. The seasonality of the construction industry, which is normally also experienced in other areas, is heightened by the very severe winter conditions which exist in the East Kootenay.<sup>14</sup> The construction industry also tends to be cyclically sensitive, since the demand for its services tend to be income elastic. Within the construction industry, high unemployment exists in materials handling and in truck and tractor driving. There is also high unemployment in the service and tourist industry and in clerical and sales occupations. The service industry is seasonal, since it is sensitive to the level of activity in the tourist industry.

From the above discussion, it can be concluded that the industrial base of the community is unstable in terms of both seasonality and cyclical sensitivity. Significant unemployment also exists in non-basic industries including service and construction. The unemployment rates for the East Kootenay area, the West Kootenay area and British Columbia are provided in Table VIII. It can be seen that the average unemployment rate in the East Kootenay has in the past been comparatively high. The causes of this unemployment have been due to the unstable market conditions for lumber and coal, the high degree of seasonality experienced in the construction, service and forest industries and the generally low skill level and lack of mobility of the labour force.<sup>15</sup>

TABLE VIII

Unemployment Rates for the East Kootenay, West Kootenay and  
British Columbia, 1965-1968

| Quarter   | West Kootenay<br>(estimated) I | East Kootenay<br>(estimated) II | B.C. |
|-----------|--------------------------------|---------------------------------|------|
| Year 1965 |                                |                                 |      |
| 1st       | 3.9                            | 8.7                             | -    |
| 2nd       | 3.1                            | 6.1                             | 4.2  |
| 3rd       | 1.6                            | 2.7                             | 3.3  |
| 4th       | 2.1                            | 4.6                             | 3.4  |
| Year 1966 |                                |                                 |      |
| 1st       | 3.2                            | 8.59                            | -    |
| 2nd       | 2.4                            | 7.33                            | 4.4  |
| 3rd       | 1.6                            | 4.44                            | 3.8  |
| 4th       | 2.0                            | 5.85                            | 4.7  |
| Year 1967 |                                |                                 |      |
| 1st       | 2.94                           | 6.88                            | 6.2  |
| 2nd       | 2.29                           | 7.00                            | 5.0  |
| 3rd       | 1.64                           | 5.92                            | 3.8  |
| 4th       | 3.28                           | 8.30                            | 5.6  |
| Year 1968 |                                |                                 |      |
|           |                                | II                              |      |
| 1st       | 4.65                           | 9.11                            | 7.3  |
| 2nd       | 3.17                           | 11.05                           | 6.3  |
| 3rd       | 2.89                           | 8.97                            | 4.9  |
| 4th       | 2.46                           | 5.66                            | 5.4  |
| Year 1969 |                                |                                 |      |
| 1st       | n.a.                           | 6.7                             | 6.3  |

I. Unemployment rates are for full time workers. Part time workers are not included.

II The large unemployment rates will be due to cyclical fluctuations and to an influx of workers due to the Kaiser Project.

Source: Unemployment rates for East and West Kootenay were calculated from data obtained from the Cranbrook and Trail Canada Manpower Centres, Department of Manpower and Immigration, Report of Registered Clients and Vacancies, Form 757, monthly from January 1965 to January 1969. Labour force statistics were obtained from D.M. Roussel, District Economist, Okanagan-Kootenay District, Department of Manpower and Immigration by letter of July 14, 1969. Unemployment rates for B.C. were taken from DBS, Catalogue No. 71-001 Monthly, Vol. 24, No. 4, 7, 10, Vol. 25, No. 1 and 4, p. 8.

Tables IX and X provide the occupational breakdown in absolute numbers of this unemployment in the East Kootenay. This data was obtained from monthly reports of the Canada Manpower Centre at Cranbrook, and thus the accuracy of the distribution of unemployment by occupation is subject to the degree of manpower centre penetration of the labour market. It is interesting to note that unemployment in coal and other mining does not show up to any great extent in the figures, although unemployment in coal mining in the Fernie area must have been significant in some years. The population of Fernie declined between 1956 and 1961, which is indicative of the declining condition of the coal mining industry.<sup>16</sup>

Table XI provides a comparison between the East and West Kootenays of unemployment in certain occupations characterized by high unemployment. Even though the absolute labour force of the West Kootenay, during the period being investigated, was approximately double that of the East Kootenay, the amount of unemployment in absolute numbers in the East Kootenay often exceeded that in the West Kootenay. Unemployment in skilled and semi-skilled occupations in lumber and lumber products was much higher in the East than in the West Kootenay in 1965, 1966 and 1967. In skilled and semi-skilled construction occupations, the unemployment in the East Kootenay exceeded that in the West Kootenay in 1966 and 1967. In 1965 the two absolute amounts were almost the same. In transportation occupations (taxi, truck and tractor drivers), unemployment in the East Kootenay exceeded that in the West Kootenay from 1965 to 1968 inclusive. In unskilled occupations in lumber and lumber

products, unemployment in the East Kootenay was also higher between 1965 and 1968. In unskilled construction occupations, unemployment in absolute numbers was greater in the West Kootenay in 1965 and 1966 and approximately equal in 1967.

A comparison among the East Kootenay, West Kootenay and the Lower Mainland of the percentage distribution of the labour force by industry is provided in Table XII.

TABLE IX

## UNEMPLOYMENT BY OCCUPATION FOR THE EAST KOOTENAY, 1965-1969

## Number of Employees Registered for Full Time Employment

| <u>1965 I</u>   | <u>Male</u> | <u>Total</u> | <u>Prof-Tech<br/>Managerial</u> | <u>Clerical</u> | <u>Sales</u> | <u>Services</u> | <u>Farm, Fish<br/>Forestry</u> | <u>Processing</u> | <u>Machine<br/>Trades</u> | <u>Bench</u> | <u>Structural</u> | <u>Miscellaneous</u> | <u>Unskilled Occ.</u>   |
|-----------------|-------------|--------------|---------------------------------|-----------------|--------------|-----------------|--------------------------------|-------------------|---------------------------|--------------|-------------------|----------------------|-------------------------|
| January         | 673         | 962          | 7                               | 8               | 15           | 61              | 4                              | 11                | 72                        | 0            | 93                | 110                  | 242                     |
| February        | 758         | 1,121        | 8                               | 10              | 15           | 84              | 5                              | 12                | 71                        | 0            | 106               | 128                  | 272                     |
| March           | 953         | 1,333        | 13                              | 17              | 17           | 90              | 4                              | 15                | 98                        | 0            | 89                | 209                  | 363                     |
| April           | 849         | 1,160        | 8                               | 14              | 8            | 75              | 1                              | 14                | 181                       | 0            | 78                | 217                  | 292                     |
| May             | 494         | 683          | 5                               | 18              | 2            | 48              | 11                             | 7                 | 51                        | 0            | 47                | 109                  | 172                     |
| June            | 364         | 569          | 3                               | 14              | 5            | 48              | 4                              | 4                 | 29                        | 0            | 45                | 40                   | 157                     |
| July            | 213         | 363          | -                               | 12              | 5            | 40              | -                              | 2                 | 21                        | 1            | 19                | 22                   | 79                      |
| August          | 216         | 366          | -                               | 14              | 1            | 45              | 2                              | 4                 | 22                        | 0            | 27                | 24                   | 68                      |
| September       | 216         | 355          | -                               | 11              | 4            | 50              | 1                              | 5                 | 22                        | 0            | 36                | 27                   | 53                      |
| October         | 222         | 401          | 3                               | 12              | 5            | 53              | 1                              | 2                 | 21                        | 0            | 34                | 30                   | 56                      |
| November        | 389         | 574          | 5                               | 13              | 8            | 69              | 4                              | 4                 | 33                        | 0            | 54                | 61                   | 128                     |
| December        | 612         | 849          | 8                               | 15              | 12           | 89              | 5                              | 3                 | 48                        | 0            | 85                | 108                  | 214                     |
| <u>1966 II</u>  | <u>Male</u> | <u>Total</u> | <u>Prof-Tech<br/>Managerial</u> | <u>Clerical</u> | <u>Sales</u> | <u>Services</u> | <u>Farm, Fish<br/>Forestry</u> | <u>Processing</u> | <u>Machine<br/>Trades</u> | <u>Bench</u> | <u>Structural</u> | <u>Miscellaneous</u> | <u>U.I.C. (T400's)</u>  |
| January         | 752         | 1,057        | 12                              | 99              | 77           | 213             | 27                             | 36                | 81                        | 0            | 248               | 264                  | n.a.                    |
| February        | 730         | 1,071        | 11                              | 118             | 85           | 251             | 28                             | 22                | 71                        | 0            | 240               | 245                  | n.a.                    |
| March           | 955         | 1,275        | 11                              | 111             | 67           | 230             | 29                             | 20                | 98                        | 0            | 249               | 460                  | n.a.                    |
| April           | 912         | 1,211        | 10                              | 112             | 58           | 221             | 23                             | 15                | 114                       | 0            | 214               | 444                  | n.a.                    |
| May             | 658         | 890          | 6                               | 99              | 56           | 155             | 10                             | 12                | 79                        | 0            | 191               | 282                  | n.a.                    |
| June            | 576         | 804          | 5                               | 103             | 61           | 122             | 10                             | 25                | 57                        | 0            | 208               | 213                  | n.a.                    |
| July            | 363         | 551          | 4                               | 94              | 39           | 111             | 10                             | 12                | 42                        | 0            | 131               | 108                  | n.a.                    |
| August          | 319         | 516          | 5                               | 94              | 50           | 115             | 6                              | 13                | 34                        | 0            | 114               | 85                   | n.a.                    |
| September       | 396         | 595          | 7                               | 98              | 50           | 125             | 5                              | 7                 | 45                        | 0            | 143               | 115                  | n.a.                    |
| October         | 345         | 514          | 3                               | 86              | 41           | 113             | 1                              | 10                | 30                        | 0            | 124               | 106                  | n.a.                    |
| November        | 590         | 866          | 6                               | 147             | 63           | 149             | 3                              | 24                | 78                        | 0            | 192               | 204                  | n.a.                    |
| December        | 709         | 939          | 13                              | 75              | 46           | 165             | 7                              | 20                | 87                        | 0            | 277               | 249                  | n.a.                    |
| <u>1967 III</u> | <u>Male</u> | <u>Total</u> | <u>Prof-Tech<br/>Managerial</u> | <u>Clerical</u> | <u>Sales</u> | <u>Services</u> | <u>Farm, Fish<br/>Forestry</u> | <u>Processing</u> | <u>Machine<br/>Trades</u> | <u>Bench</u> | <u>Structural</u> | <u>Miscellaneous</u> | <u>Unskilled Occup.</u> |
| January         | n.a.        | n.a.         |                                 |                 |              |                 |                                |                   |                           |              |                   |                      |                         |
| February        | 625         | 860          | 16                              | 101             | 50           | 97              | 6                              | 6                 | 35                        | 0            | 72                | 90                   | 275                     |
| March           | 700         | 946          | 12                              | 107             | 57           | 164             | 12                             | 11                | 43                        | 0            | 79                | 117                  | 297                     |
| April           | n.a.        | n.a.         |                                 |                 |              |                 |                                |                   |                           |              |                   |                      |                         |
| May             | 926         | 1,187        | 8                               | 109             | 50           | 173             | 8                              | 13                | 75                        | 0            | 94                | 205                  | 402                     |
| June            | 356         | 1,020        | 8                               | 133             | 73           | 180             | 4                              | 5                 | 45                        | 0            | 82                | 120                  | 601                     |
| July            | 813         | 1,007        | 12                              | 92              | 56           | 116             | 26                             | 4                 | 189                       | 3            | 338               | 325                  | 0* New Form             |
| August          | 530         | 708          | 16                              | 75              | 43           | 120             | 12                             | 1                 | 30                        | 2            | 326               | 80                   | 0                       |
| September       | n.a.        | n.a.         |                                 |                 |              |                 |                                |                   |                           |              |                   |                      |                         |
| October         | 557         | n.a.         | 9                               | 9               | 4            | 57              | 15                             | 0                 | 54                        | 2            | 242               | 139                  | 26                      |
| November        | 843         | n.a.         | 26                              | 8               | 8            | 75              | 26                             | 9                 | 64                        | 4            | 372               | 220                  | 31                      |
| December        | 1,002       | n.a.         | 24                              | 11              | 11           | 84              | 41                             | 11                | 91                        | 3            | 412               | 291                  | 23                      |

\* The form changed in July 1967.



TABLE IX (Continued)

| <u>1968 IV</u> | <u>Male</u> | <u>Total</u> | <u>Prof-Tech<br/>Managerial</u> | <u>Clerical</u> | <u>Sales</u> | <u>Services</u> | <u>Farm, Fish<br/>Forestry</u> | <u>Processing</u> | <u>Machine<br/>Trades</u> | <u>Bench</u> | <u>Structural</u> | <u>Miscellaneous</u> | <u>Temporary Layoffs<br/>UIC (T400's)</u> |
|----------------|-------------|--------------|---------------------------------|-----------------|--------------|-----------------|--------------------------------|-------------------|---------------------------|--------------|-------------------|----------------------|---|
| January        | 1,163       | 1,199        | 28                              | 9               | 21           | 66              | 49                             | 13                | 17                        | 0            | 536               | 286                  | 53  |
| February       | 1,170       | 1,695        | 25                              | 16              | 23           | 103             | 48                             | 14                | 85                        | 3            | 524               | 271                  | 58  |
| March          | 891         | 1,320        | 6                               | 17              | 27           | 103             | 36                             | 5                 | 61                        | 1            | 302               | 266                  | 67  |
| April          | 1,240       | 1,877        | 16                              | 26              | 35           | 166             | 80                             | 16                | 97                        | 5            | 397               | 390                  | 12  |
| May            | 1,201       | 1,777        | 14                              | 16              | 36           | 106             | 61                             | 5                 | 74                        | 3            | 505               | 341                  | 40  |
| June           | 988         | 1,577        | 10                              | 13              | 29           | 132             | 53                             | 7                 | 73                        | 4            | 376               | 258                  | 33  |
| July           | 1,003       | 1,602        | 14                              | 16              | 20           | 133             | 44                             | 13                | 63                        | 2            | 387               | 244                  | 67  |
| August         | 935         | 1,482        | 13                              | 12              | 19           | 129             | 37                             | 9                 | 60                        | 1            | 352               | 215                  | 88  |
| September      | 660         | 1,058        | 20                              | 7               | 19           | 147             | 18                             | 3                 | 61                        | 5            | 193               | 95                   | 92  |
| October        | 516         | 785          | 9                               | 11              | 12           | 68              | 19                             | 1                 | 41                        | 3            | 211               | 141                  | 20  |
| November       | 546         | 753          | 22                              | 7               | 14           | 34              | 20                             | 4                 | 38                        | 1            | 241               | 165                  | 7   |
| December       | 782         | 1,081        | 11                              | 11              | 18           | 71              | 20                             | 3                 | 56                        | 1            | 385               | 206                  | 13  |

| <u>1969 V</u> | <u>Male</u> | <u>Total</u> | <u>Prof-Tech<br/>Managerial</u> | <u>Clerical</u> | <u>Sales</u> | <u>Services</u> | <u>Farm, Fish<br/>Forestry</u> | <u>Processing</u> | <u>Machine<br/>Trades</u> | <u>Bench</u> | <u>Structural</u> | <u>Miscellaneous</u> | <u>U.I.C. Reg.<br/>(T400's)</u> |
|---------------|-------------|--------------|---------------------------------|-----------------|--------------|-----------------|--------------------------------|-------------------|---------------------------|--------------|-------------------|----------------------|---------------------------------|
| January       | 864         | 1,033        | 32                              | 90              | 43           | 96              | 29                             | 2                 | 52                        | 1            | 447               | 241                  | 239                             |

- I The unemployment figures for 1965 are for male workers.
- II The unemployment figures for 1966 are for male and female workers
- III The unemployment figures for 1967 are for male and female workers.
- IV The unemployment figures for 1968 are for male workers.
- V The unemployment figures for 1969 are for male and female workers.
- VI The figures include clients registered for full time employment only.
- VII Structural and miscellaneous occupations include positions in construction, forestry and transportation industries.

Source: The figures were obtained from reports of the Cranbrook Canada Manpower Centre, Department of Manpower and Immigration, Report of Registered Clients and Vacancies, Form 757, monthly from January 1965 to January 1969.

TABLE X

BREAKDOWN OF UNEMPLOYMENT BY OCCUPATION FOR EAST KOOTENAY, 1967, 1968, 1969

Number of Employees Registered for Full-Time Employment at Cranbrook, East Kootenay Canada Manpower Centre

| Classification no.              | Total<br>All occupations | Prof.-Tech.<br>Mana-<br>gerial  | Clerical | Sales | Services | Farm,Fish<br>Forestry | Processing | Machine     |             | Trades | Bench<br>Work | Structural |       |             |             |             | Miscellaneous |             |             |       |             | UIC Reg. | Total<br>UIC & Full<br>Time |                |             |             |       |
|---------------------------------|--------------------------|---------------------------------|----------|-------|----------|-----------------------|------------|-------------|-------------|--------|---------------|------------|-------|-------------|-------------|-------------|---------------|-------------|-------------|-------|-------------|----------|-----------------------------|----------------|-------------|-------------|-------|
|                                 |                          |                                 |          |       |          |                       |            | 620<br>-625 | 626<br>-639 |        |               | 660<br>669 | Total | 800<br>-809 | 810<br>-819 | 820<br>-829 | 840<br>-849   | 850<br>-859 | 860<br>-869 | Total | 900<br>-906 |          |                             | 920<br>915-929 | 930<br>-939 | 940<br>-949 | Total |
|                                 |                          |                                 |          |       |          |                       |            |             |             |        |               |            |       |             |             |             |               |             |             |       |             |          |                             |                |             |             |       |
| I                               |                          |                                 |          |       |          |                       |            |             |             |        |               |            |       |             |             |             |               |             |             |       |             |          |                             |                |             |             |       |
| Male & Female                   |                          | Annual Average for Male Workers |          |       |          |                       |            |             |             |        |               |            |       |             |             |             |               |             |             |       |             |          |                             |                |             |             |       |
| 1968                            | 1350                     | 16                              | 13       | 23    | 105      | 41                    | 8          | na          | na          | na     | 61            | 3          | na    | na          | na          | na          | na            | na          | 367         | 65    | na          | na       | 21                          | 54             | 240         | 46          | 1396  |
| 1967                            | 955                      | 15                              | na       | na    | na       | 17                    | 7          | na          | na          | na     | 69            | 2          | na    | na          | na          | na          | na            | na          | 312         | na    | na          | na       | na                          | na             | 265         | na          | na    |
| II                              |                          |                                 |          |       |          |                       |            |             |             |        |               |            |       |             |             |             |               |             |             |       |             |          |                             |                |             |             |       |
| Jan. 1969 Male & Female Workers |                          |                                 |          |       |          |                       |            |             |             |        |               |            |       |             |             |             |               |             |             |       |             |          |                             |                |             |             |       |
| 1033                            | 32                       | 90                              | 43       | 96    | 29       | 2                     | 17         | 13          | 17          | 52     | 1             | 5          | 9     | 9           | 20          | 56          | 70            | 259         | 447         | 61    | 20          | 80       | 15                          | 40             | 241         | 239         | 1272  |

| Classification Number | Occupation Type   |
|-----------------------|---|
| 441-449               | Forestry (includes only Lumber manufacture)                   |
| 620-625               | Motorized vehicle repair                                      |
| 626-639               | Machinery mechanics & repairmen                               |
| 660-669               | Cabinet makers, pattern makers, wood, all other - woodworking |

## Under Structural

|         |   |
|---------|---|
| 800-809 | Riveters, Fitting, bolting, screwing and rel., Tinsmiths, cop'smiths, sh.metalwork and boilermakers, all other - metal fabricating.   |
| 810-819 | Welders, flame cutters and rel.   |
| 820-829 | Electrical assembling, installing and repairing   |
| 840-849 | Constr. and maintenance painters and paperhangers, Plasterers and rel. occupations, waterproofers, concrete finishing and related, all other - painting, plastering and cemeting. |
| 850-859 | Excavating, grading and drainage, concrete and asphalt paving, all other - excavating, grading, paving and related  |
| 860     | Carpenters and related  |
| 869     | All other - construction  |

## Under Miscellaneous

|         |  |
|---------|--|
| 900-906 | Concrete mixing and dump truck drivers   |
| 915     | Attendants and servicemen, park. lots and ser. facilities  |
| 920-929 | Packaging, hoisting and conveying, moving and storing materials, all other - packaging and materials handling  |
| 930-939 | Boring, drilling, cutting and related (minerals), blasting, loading and conveying, crushing, screening and related, all other - Extraction of minerals |
| 940-949 | Timber cutting and related, log inspection, grading, scaling and related, log sorting, gathering, storing and related, all other - logging             |
| UIC     | Temporary layoffs  |
| na      | Not available  |

I Unemployment figures for 1967 and 1968 from the Prof. - Tech. - Managerial Classification on are for male workers only. The figures are annual averages.

II All the figures for January 1969 are for male and female workers.

Source: The data was obtained from reports of the Cranbrook Canada Manpower Centre, Department of Manpower and Immigration, Report of Registered Clients and Vacancies, Form 757, monthly from January 1967 to January 1969.

TABLE XI

COMPARISON BETWEEN EAST AND WEST KOOTENAY OF  
UNEMPLOYMENT BY OCCUPATION, 1965-1968 (ABSOLUTE NUMBERS)

|         | <u>Skilled and Semi-Skilled Occupations</u> |             |              |                      |             |              |                      |             |              |                      |             |              |   |             |              |                      |             |              |
|---------|---|-------------|--------------|----------------------|-------------|--------------|----------------------|-------------|--------------|----------------------|-------------|--------------|---|-------------|--------------|----------------------|-------------|--------------|
|         | <u>Lumbering and Lumber Products</u>        |             |              |                      |             |              | <u>Construction</u>  |             |              |                      |             |              | <u>Transportation</u><br><u>(Taxi, Truck and Tractor) Drivers</u> |             |              |                      |             |              |
|         | <u>West Kootenay</u>                        |             |              | <u>East Kootenay</u> |             |              | <u>West Kootenay</u> |             |              | <u>East Kootenay</u> |             |              | <u>West Kootenay</u>  |             |              | <u>East Kootenay</u> |             |              |
|         | <u>1965</u>                                 | <u>1966</u> | <u>1967*</u> | <u>1965</u>          | <u>1966</u> | <u>1967*</u> | <u>1965</u>          | <u>1966</u> | <u>1967*</u> | <u>1965</u>          | <u>1966</u> | <u>1967*</u> | <u>1965</u>   | <u>1966</u> | <u>1967*</u> | <u>1965</u>          | <u>1966</u> | <u>1967*</u> |
| Jan.    | 55  | 31          | n.a.         | 87                   | 62          | n.a.         | 90                   | 99          | n.a.         | 89                   | 106         | n.a.         | 67  | 66          | n.a.         | 68                   | 96          | n.a.         |
| Feb.    | 38  | 30          | 1            | 86                   | 59          | 34           | 104                  | 96          | 35           | 99                   | 105         | 66           | 65  | 44          | 23           | 83                   | 94          | 58           |
| March   | 59  | 36          | 9            | 132                  | 123         | 59           | 119                  | 99          | 45           | 86                   | 101         | 77           | 85  | 33          | 35           | 129                  | 166         | 72           |
| April   | 45  | 28          | 6            | 169                  | 138         | n.a.         | 88                   | 68          | 37           | 74                   | 86          | n.a.         | 64  | 28          | 26           | 129                  | 159         | n.a.         |
| May     | 16  | 8           | 8            | 90                   | 97          | 112          | 60                   | 44          | 28           | 47                   | 53          | 83           | 43  | 25          | n.a.         | 52                   | 91          | 116          |
| June    | 5   | 2           | 1            | 33                   | 52          | 57           | 49                   | 23          | 25           | 37                   | 44          | 69           | 27  | 13          | 17           | 22                   | 44          | 78           |
| July    | 5   | 2           | n.a.         | 17                   | 28          | n.a.         | 33                   | 18          | n.a.         | 14                   | 23          | n.a.         | 24  | 16          | n.a.         | 15                   | 33          | n.a.         |
| August  | 2   | 5           | n.a.         | 17                   | 16          | n.a.         | 25                   | 38          | n.a.         | 22                   | 37          | n.a.         | 21  | 34          | n.a.         | 17                   | 31          | n.a.         |
| Sept.   | 3   | 4           | n.a.         | 17                   | 15          | n.a.         | 24                   | 19          | n.a.         | 29                   | 37          | n.a.         | 16  | 22          | n.a.         | 20                   | 35          | n.a.         |
| October | 6   | 7           | n.a.         | 19                   | 11          | n.a.         | 28                   | 14          | n.a.         | 29                   | 38          | n.a.         | 24  | 17          | n.a.         | 20                   | 33          | n.a.         |
| Nov.    | 9   | 5           | n.a.         | 38                   | 42          | n.a.         | 46                   | 32          | n.a.         | 46                   | 60          | n.a.         | 27  | 25          | n.a.         | 41                   | 68          | n.a.         |
| Dec.    | 18  | 7           | n.a.         | 43                   | 53          | n.a.         | 70                   | 34          | n.a.         | 78                   | 82          | n.a.         | 31  | 29          | n.a.         | 72                   | 87          | n.a.         |

\* The form from which these figures were taken was changed in July 1967.

TABLE XI - (Continued)

Unskilled Occupations

|          | Lumber and Lumber Products |             |             |               |             |             | Construction  |             |             |               |             |             |
|----------|----------------------------|-------------|-------------|---------------|-------------|-------------|---------------|-------------|-------------|---------------|-------------|-------------|
|          | West Kootenay              |             |             | East Kootenay |             |             | West Kootenay |             |             | East Kootenay |             |             |
|          | <u>1965</u>                | <u>1966</u> | <u>1967</u> | <u>1965</u>   | <u>1966</u> | <u>1967</u> | <u>1965</u>   | <u>1966</u> | <u>1967</u> | <u>1965</u>   | <u>1966</u> | <u>1967</u> |
| Jan.     | 109                        | 55          | n.a.        | 83            | 113         | n.a.        | 169           | 193         | n.a.        | 133           | 119         | n.a.        |
| Feb.     | 61                         | 43          | 6           | 101           | 99          | 75          | 187           | 168         | 153         | 140           | 125         | 172         |
| March    | 55                         | 36          | 14          | 128           | 152         | 70          | 165           | 134         | 236         | 204           | 142         | 196         |
| April    | 46                         | 22          | 14          | 139           | 145         | n.a.        | 159           | 141         | 229         | 118           | 126         | n.a.        |
| May      | 23                         | 15          | 18          | 70            | 97          | 103         | 199           | 166         | 236         | 86            | 125         | 252         |
| June     | 10                         | 6           | 9           | 44            | 103         | 114         | 309           | 222         | 224         | 98            | 143         | 443         |
| July     | 12                         | 5           | n.a.        | 28            | 45          | n.a.        | 190           | 106         | n.a.        | 47            | 98          | n.a.        |
| August   | 7                          | 6           | n.a.        | 20            | 36          | n.a.        | 73            | 119         | n.a.        | 42            | 67          | n.a.        |
| Sept.    | 6                          | 7           | n.a.        | 18            | 50          | n.a.        | 51            | 85          | n.a.        | 28            | 93          | n.a.        |
| October  | 4                          | 2           | n.a.        | 15            | 41          | n.a.        | 102           | 82          | n.a.        | 34            | 80          | n.a.        |
| November | 14                         | 5           | n.a.        | 50            | 77          | n.a.        | 99            | 138         | n.a.        | 64            | 125         | n.a.        |
| December | 31                         | 15          | n.a.        | 106           | 109         | n.a.        | 123           | 143         | n.a.        | 90            | 143         | n.a.        |

TABLE XI. -( Continued )

1968

(The figures for 1968 are listed separately because of the change in form used by the Canada Manpower Centres)

|          | Structural Work      |                      | Miscellaneous Occupations |                      | Concrete mining and dump truck drivers, tractor trailer drivers, all other motor freight occupations |                      | Blasting, loading and conveying, crushing, screening, all other extraction of minerals; boring, drilling, cutting and related (minerals) |                      |
|----------|----------------------|----------------------|---------------------------|----------------------|--|----------------------|--|----------------------|
|          | <u>East Kootenay</u> | <u>West Kootenay</u> | <u>East Kootenay</u>      | <u>West Kootenay</u> | <u>East Kootenay</u>   | <u>West Kootenay</u> | <u>East Kootenay</u>   | <u>West Kootenay</u> |
| Jan.     | 536                  | 624                  | 286                       | 157                  | 68   | 67                   | 30   | 15                   |
| Feb.     | 524                  | 674                  | 271                       | 106                  | 93   | 48                   | 29   | 10                   |
| March    | 302                  | 600                  | 266                       | 129                  | 92   | 54                   | 2  | 13                   |
| April    | 397                  | 328                  | 390                       | 65                   | 108  | 22                   | 44   | 6                    |
| May      | 505                  | 353                  | 341                       | 62                   | 85   | 21                   | 31   | 5                    |
| June     | 376                  | 478                  | 258                       | 78                   | 61   | 24                   | 27   | 6                    |
| July     | 387                  | 396                  | 244                       | 58                   | 66   | 19                   | 28   | 3                    |
| August   | 352                  | 311                  | 215                       | 46                   | 55   | 20                   | 28   | 3                    |
| Sept.    | 193                  | 250                  | 95                        | 52                   | 12   | 20                   | 8  | 8                    |
| October  | 211                  | 273                  | 141                       | 48                   | 42   | 17                   | 5  | 5                    |
| November | 241                  | 271                  | 165                       | 58                   | 47   | 21                   | 10   | 8                    |
| December | 385                  | 268                  | 206                       | 47                   | 56   | 17                   | 11   | 2                    |

Timber cutting and related, log inspecting, grading, scaling and related, log sorting, gathering, storing, and related, all other logging

|          | <u>East Kootenay</u> | <u>West Kootenay</u> |
|----------|----------------------|----------------------|
| Jan.     | 76                   | 33                   |
| Feb.     | 57                   | 14                   |
| March    | 77                   | 18                   |
| April    | 84                   | 17                   |
| May      | 60                   | 11                   |
| June     | 63                   | 12                   |
| July     | 54                   | 14                   |
| August   | 46                   | 6                    |
| Sept.    | 22                   | 5                    |
| October  | 25                   | 6                    |
| November | 36                   | 7                    |
| December | 47                   | 4                    |

Source: The figures were obtained from reports of the Cranbrook and Trail, Canada Manpower Centres, Department of Manpower and Immigration, Report of Registered Clients and Vacancies, Form 757, monthly from January 1965 to January 1969.

TABLE XII

Industrial Mix1961 % Distribution of Labour Force by Industry

| Industry                    | West<br>Kootenay | East<br>Kootenay | Lower<br>Mainland |
|-----------------------------|------------------|------------------|-------------------|
| Agriculture                 | 2.2%             | 2.9%             | 2.9%              |
| Forestry (logging)          | 4.3              | 4.3              | 1.5               |
| Fishing and Trapping        | 0.1              | 0.1              | 0.6               |
| Mines, Quarries & Oil Wells | 4.3              | 14.6             | 0.7               |
| Construction                | 6.2              | 7.9              | 6.8               |
| Wholesale Trade             | 2.6              | 2.0              | 7.2               |
| Retail Trade                | 10.2             | 9.4              | 12.3              |
| Service Industries          | 37.7             | 37.0             | 46.2              |
| Manufacturing               | 29.4             | 19.5             | 18.9              |
| (lumber manufacture)        | 7.35             | 11.4             |                   |

Source: Province of B.C., Bureau of Economics and Statistics, Department of Industrial Development, Trade and Commerce, Regional Index of British Columbia, January, 1966, pp. 5, 41, 155.

The industrial mix of the West Kootenay is thus different from that of the East Kootenay. There is less reliance on lumber manufacture and the construction industry. A stable economic base is provided in the form of the smelting operations of COMINCO, which is included in the manufacture classification. The comparison between the East and West Kootenay serves to point out the depressed economic condition of the East Kootenay. The difference in the amount of unemployment in lumber manufacture, logging, construction and transportation which has persisted over a number of years is also indicative of the geographical and occupational immobility of labour in these occupations in the East Kootenay.

Average wage rates are also lower in the East than in the West Kootenay. The average annual wage computed from all tax returns, including those which were nontaxable, in the East Kootenay in 1966 was \$3,571, while for the West Kootenay the figure was \$4,218.<sup>17</sup> The percentage of the total number of all returns below \$3,000 was greater in the East than in the West Kootenay. The existence of this differential is also in part indicative of immobility out of the East Kootenay. Thus the East Kootenay has in the past been a depressed area in terms of both high unemployment and low average income.

## FOOTNOTES TO THE APPENDICES

### Appendix I

(A)

1 "Kaiser Strip Mine Yield 'Less than Underground'," The Vancouver Sun, Vancouver, 1969.

2 C.L. Christenson, Economic Redevelopment in Bituminous Coal, The Special Case of Technological Advance in United States Coal Mines, 1930-1960, Harvard University Press, Cambridge, 1962, p. 129.

3 Ibid., pp. 129-130.

4 This information was obtained from an interview with Mr. L.C. Reed formerly of Hedlin-Menzies and Associates Ltd. in June 1969.

5 Canada, Fuels and Mining Practice Division, Mines Branch, Department of Energy, Mines and Resources, T.E. Tibbetts and J.C. Botham, "Coal and Coke," Canadian Minerals Yearbook: 1966, Preprints, no. 15, Queen's Printer, Ottawa, 1965, 1966, 1967, p. 8.

6 Ibid., p. 8.

7 This information was obtained from D.M. Roussel, District Economist, Okanagan-Kootenay District, Department of Manpower and Immigration by letter of 14 July, 1969.

(B)

8 Research Department, The Industrial Bank of Japan Ltd. (Nippon Kogyo Ginko), "The Iron and Steel Industry, Basic Problems and Policy Guidelines," Quarterly Survey of Japanese Finance and Industry, vol. XVIII, No. 4, October-December, 1966, p. 3.

(C)

9 "105-car unit trains for coal run," The Province, Vancouver, Tuesday, 3 June, 1969, p. 7A.

10 National Harbours Board, Vancouver Outerport at Roberts Bank, Press Release, 23 June, 1969, pp. 1-2.

11 This information was obtained from Mr. Yvan Gagnon, Acting Director, Research & Development Branch, National Harbours Board, Ottawa, by letter of July 17, 1969.

12 National Harbours Board, Roberts Bank, Port of Vancouver Outer Port Development, unpublished, 1969, p. 1.



## Appendix II

(A)

1 Sam H. Schurr and Bruce C. Netschert with Vera F. Eliasberg, Joseph Lerner, and Hans H. Landsberg, Energy in the American Economy, 1850-1975, an economic study of its history and prospects, published for Resources for the Future, Inc. by the Johns Hopkins Press, Baltimore, Maryland, 1960, pp. 77-78.

2 Canada, Fuels and Mining Practice Division, Mines Branch, Department of Energy, Mines and Resources, T.E. Tibbetts and J.C. Botham, "Coal and Coke," Canadian Minerals Yearbook: 1966, preprints, no. 15, Queen's Printer, Ottawa, 1965, 1966, 1967, p. 16.

3 Price Waterhouse and Co., The Growth and Impact of the Mining Industry in British Columbia, study done for the Mining Association of B.C., Vancouver, 4 December, 1968, p. 30.

4 Canada, Fuels and Mining Practice Division, op. cit., p. 4.

5 Ibid., p. 4.

6 Schurr, Netschert with Eliasberg, Lerner, and Landsberg, op. cit., p. 335.

7 Canada, Fuels and Mining Practice Division, op.cit., p. 4.

8 Province of B.C., Minister of Mines and Petroleum Resources, Annual Report, for the year ending December 31, 1965, pp. 386 and 401.

(B)

9 Hugh O. Nourse, Regional Economics, A Study in the Economic Structure, Stability and Growth of Regions, Seymour E. Harris, Editor, Economics Handbook Series, McGraw-Hill Book Co., New York, New York, 1968, pp. 161-163.

10 This information was obtained from D.M. Roussel, District Economist, Okanagan-Kootenay District, Department of Manpower and Immigration by letter of 14, July, 1969. The original source was the 1961 Census of Canada.

11 This information was obtained from D.M. Roussel, District Economist, Okanagan-Kootenay District, Department of Manpower and Immigration by letter of 14 July, 1969.

12 Province of B.C., Bureau of Economics and Statistics, Department of Industrial Development, Trade and Commerce, Regional Index of British Columbia, January 1966, p. 83.

13 Ibid., pp. 5 and 41.

14 D.M. Roussel, op. cit., by letter.

15 D.M. Roussel, op. cit., by letter.

16 Province of B.C., Bureau of Economics and Statistics, Department of Industrial Development, Trade and Commerce, op. cit., p. 17.

17 Canada, Department of National Revenue, Taxation Division, Taxation Statistics, Part One - Individuals, Table 6, Queen's Printer, Ottawa, 1968, p. 98.