WORKING PAPER

MINING INDUSTRY EMPLOYMENT FORECAST
ALBERTA
1971 - 1981

ECONOMIC ANALYSIS BRANCH
PLANNING DIVISION

REGIONAL ECONOMIC EXPANSION CANADA
EXPANSION ÉCONOMIQUE RÉGIONALE CANADA

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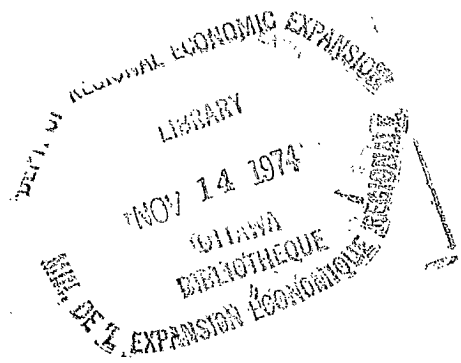

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A. Robertson
Natural Resource Studies Section
Economic Analysis Branch

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ALBERTA MINING INDUSTRY EMPLOYMENT FORECAST 1971 to 1981

I. FORECAST PROCEDURE

This paper contains employment forecasts for the mining industry in Alberta for the period 1971-81. It is based upon employment forecasts that have been made for each company that was in production in 1970, for companies that have announced their intentions to bring mines into production and for "significant mineral deposits" that may be brought into production. Individual company forecasts are contained in a data bank that has been created in the Economic Analysis Branch. The data bank is used for continuous analysis of the Canadian mining industry.

Data are obtained from a wide range of sources. These include company reports and statements, provincial and federal government reports, personal contacts and press articles. The reliability of the information varies but it can be used with confidence because data problems generally occur in respect of the smaller and less significant companies.

The definition of the mining industry in this report corresponds to that of Statistics Canada as used in Division 4 - Mines (including Milling), Quarries and Oil Wells. Thus, the forecasts can be used in conjunction with data from Statistics Canada.

Employment forecasts are presented in three categories, namely upper, realistic and lower. These reflect a range of employment levels that may occur if different combinations of economic and marketing factors come into play. Aggregate mining industry group employment figures have been derived, and are shown in Tables 3, 4 and 5 as well as in Figure 1.

Each of the major mineral industry groups is briefly reviewed in this report. Forecasts have also been aggregated by Census Division in order to show those areas where mining industry activity is expected to change. These figures are shown in Table 6. Figure 2 shows a map of Census Divisions in Alberta where mining activity occurs.

No specific method has been employed in making the employment forecasts for individual mines. However, a wide range of current and historical information has been consulted and used, and those factors of greatest significance have been given their appropriate weighting. Thus, for a very large low grade open pit copper mine, the metal price will be a

critical factor concerning its viability, whereas for a small high grade underground silver mine, the maintenance of adequate ore reserves is frequently the critical factor. The man-year employment forecasts shown here provide one uniform method of presenting the expectations that result from an analysis of each mine.

Seasonal changes of employment in the mineral industry occur frequently. The fluctuations within the year can be substantial. Therefore, all employment figures shown in this report are in terms of man-years of paid employment per year. Thus, due to seasonal fluctuations of the work force, the employment shown in this report will be less than the peak employment experienced during the year.

As in all forecasts, the possibility of unforeseen events affecting the figures increases over time. For the most part, considerable confidence can be placed in the forecast to 1976 because company intentions are generally indicated and sometimes specified for up to five years in the future. Beyond 1976, the forecasts become increasingly judgemental. Consequently, they should be viewed with caution for this latter period.

In making the forecasts a number of important assumptions have been made. These are listed below:-

(a) That both Federal and Provincial legislation concerning taxation, royalties, land tenure etc. remains constant throughout the forecast period with the exception of already announced changes. These changes have been taken into account.

(b) That the supplies of labour, capital and materials to the industry in terms of price and availability will be adequate throughout the forecast period.

(c) That the markets for minerals will not change dramatically in terms of volume, relative price and location throughout the forecast period, and

(d) That end-use substitution between different minerals or between minerals and other non-mineral products is not great throughout the forecast period.

It should be noted that all forecasts have been made by the same person, and that where possible they have been reviewed by specialists in the minerals sector. By this means, it is to be hoped that large errors have been eliminated and that any bias in the forecasts will be small and consistent.

II. SUMMARY OF MINING INDUSTRY EMPLOYMENT IN ALBERTA 1971-81

The fuels sector will continue to completely dominate the mineral economy of Alberta in the 1970's. It is forecast that employment in the mining industry - which includes petroleum and natural gas production employment - will continue to increase steadily through the forecast period at a compounded rate of 3.2 per cent. Thus, the realistic forecast indicates that mining industry employment will rise from about 15,100 in 1970 to about 21,300 in 1981, and could be as high as 22,600 in that year. The lowest forecast suggests that mining industry employment will rise by some 3,700 in the period 1971-81 whilst the highest forecast shows an increase of 7,500 and the realistic forecast suggests that employment will increase by 6,200.

Clearly, the employment picture for the mining sector of the Alberta economy is bright for the 1970's. It should be noted, however, that the growth of employment beyond the 1970's will not be sustained. Alberta's massive dependence upon the oil and gas industry has led the Province to a position of considerable economic strength and prosperity. In 1950, Alberta produced 13 per cent of the total value of Canadian mineral production which was slightly over one billion dollars. In 1970, Alberta's contribution had risen

to 24 per cent of the value of Canadian mineral production which had risen to over five and three quarter billion dollars. Thus, in a twenty year period the value of mineral production in Alberta had increased tenfold.

Forecasts beyond 1981 are extremely speculative; but there are indications that employment in the mining industry in Alberta will rise slowly or even decline in the 1980's. The timing and magnitude of the effects on mining employment will largely depend upon the rate of oil and gas exploration in the Arctic in the 1970's and upon the rate of exploitation of oil and gas from that region. Already the effects of Arctic exploration have been felt in Alberta through decreased drilling activity in the Province and a reduction in the rate of discovery of new reserves though production continues to rise.

Mining employment in Alberta is forecast to grow steadily in the 1970's due to higher production of oil and gas and because coal mining is forecast to become increasingly important as production capacity grows. The oil and gas forecasts include an allowance for an expansion of tar sand exploitation at Fort McMurray.

The growing energy crisis in the United States and increasing long term demands for coking coal in Japan are factors that will assure Alberta of a continued and increasingly powerful mineral industry through the forecast period. The possible decline of activity in the oil and gas sector in the 1980's should be viewed with some apprehension and remedial steps may be necessary towards the end of the decade. This would help to alleviate potentially serious employment problems in the somewhat narrowly based provincial economy.

Table 7 at the end of this paper has been included to indicate the names of companies involved in mining activity other than oil and gas production. The locations of active mines and development prospects in 1970 are shown in Figure 3.

TABLE 1

VALUE OF MAJOR MINERAL COMMODITIES PRODUCED

IN ALBERTA 1968 TO 1970

Year / Commodities	1968	1969	1970 (p)
	($ million)		
Petroleum Crude	660	740	845
Natural Gas	185	218	300
Natural Gas By-Products	120	132	153
Sulpher Elemental	77	59	29
Coal	12	13	26
Cement	18	21	20
Sand and Gravel	11	11	10
Clay Products	4	5	3

(p): preliminary

Source: Department of Energy, Mines and Resources

111. THE ALBERTA MINING INDUSTRY IN 1970

In 1970 the value of Alberta's mineral production was $1,410.9 million, a 17.1 per cent increase over the previous year. This continued the rapid expansion in mineral production from the Province. Alberta was Canada's leading producer of energy minerals in 1970. Having led Canadian production of crude petroleum and natural gas for many years, Alberta became the leading producer of coal in 1970. The most important mineral commodities produced and their values in 1968, 1969 and 1970 are shown in Table 1 on the previous page.

The fuels sector contributed 95.0 per cent of the total value of mineral production in Alberta in 1970 compared to 91.6 per cent in 1969. The absolute dollar gain in value of production from the fuels sector from 1969 to 1970 exceeded by threefold the total value of all other minerals produced in Alberta in 1970. Metallic mineral production was negligible in 1970. The value of production in the non-metallic sector fell by almost 50 per cent to comprise only 2.4 per cent of the provincial total. This decline was entirely due to a precipitous fall in the average value of sulphur from $20.48 per ton in 1969 to $8.70 per ton in 1970. The value of production in the structural materials sector fell from 3.3 per cent of the provincial total in 1969 to 2.6 per cent in 1970, with a small absolute decline being recorded.

TABLE 2

MINING INDUSTRY EMPLOYMENT IN ALBERTA

1961-1981*

Year	Past Mining Employment	Forecast Mining Employment
1961	4,985	
1962	4,991	
1963	6,071	
1964	10,927	
1965	11,553	
1966	11,954	
1967	12,745	
1968	13,568	
1969	14,182	
1970	NA	
1971		16,130
1972		16,970
1973		17,660
1974		18,250
1975		18,700
1976		19,080
1977		19,715
1978		20,185
1979		20,650
1980		21,035
1981		21,330

NA - Not Available

* All employment figures are shown in man-years of paid employment

IV. MINING INDUSTRY EMPLOYMENT FORECASTS BY COMMODITY GROUP

In this chapter, the realistic employment forecasts are analysed for each major sector of the mining industry. In Tables 3, 4 and 5, that follow, the upper, realistic and lower forecasts by commodity group are summarized. The tabulations are followed by a series of more detailed descriptions of each mineral commodity group. Table 2 on the previous page shows total past employment and the realistic total forecast of mining employment.

At the start of each commodity group summary, a sub-table is included that indicates the realistic employment forecast for that group and its relative importance as an employer in the mining sector. The sub-tables have been derived by taking the realistic commodity group forecast from Table 4.

TABLE 3

ALBERTA MINERALS EMPLOYMENT FORECAST *

1971-1981

UPPER ESTIMATE

Commodity Group	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Metalic minerals	-	-	-	-	-	-	-	-	-	-	-
Non-metallic minerals	130	130	130	130	130	130	130	130	130	130	130
Structural materials	370	380	380	380	380	390	390	390	390	400	400
Fuels	15,685	16,505	17,135	17,555	18,115	18,565	19,080	19,530	19,980	20,370	20,620
Other services	300	325	350	400	450	500	550	600	650	700	750
Contingency	-	75	150	225	300	375	450	525	600	675	750
TOTAL	16,485	17,415	18,145	18,690	19,375	19,960	20,600	21,175	21,750	22,275	22,650

* All employment figures are shown in man-years of paid employment

TABLE 4

ALBERTA MINERALS EMPLOYMENT FORECAST *

1971-1981

REALISTIC ESTIMATE

Commodity Group	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Metallic minerals	-	-	-	-	-	-	-	-	-	-	-
Non-metallic minerals	100	100	100	100	100	100	100	100	100	100	100
Structural materials	360	360	360	360	360	350	350	350	350	350	350
Fuels	15,470	16,310	16,900	17,440	17,790	18,130	18,665	19,085	19,450	19,785	19,980
Other services	200	200	250	250	300	300	350	350	400	400	450
Contingency	-	-	50	100	150	200	250	300	350	400	450
TOTAL	16,130	16,970	17,660	18,250	18,700	19,080	19,715	20,185	20,650	21,035	21,330

* All employment figures are shown in man-years of paid employment

TABLE 5

ALBERTA MINERALS EMPLOYMENT FORECAST *

1971-1981

LOWER ESTIMATE

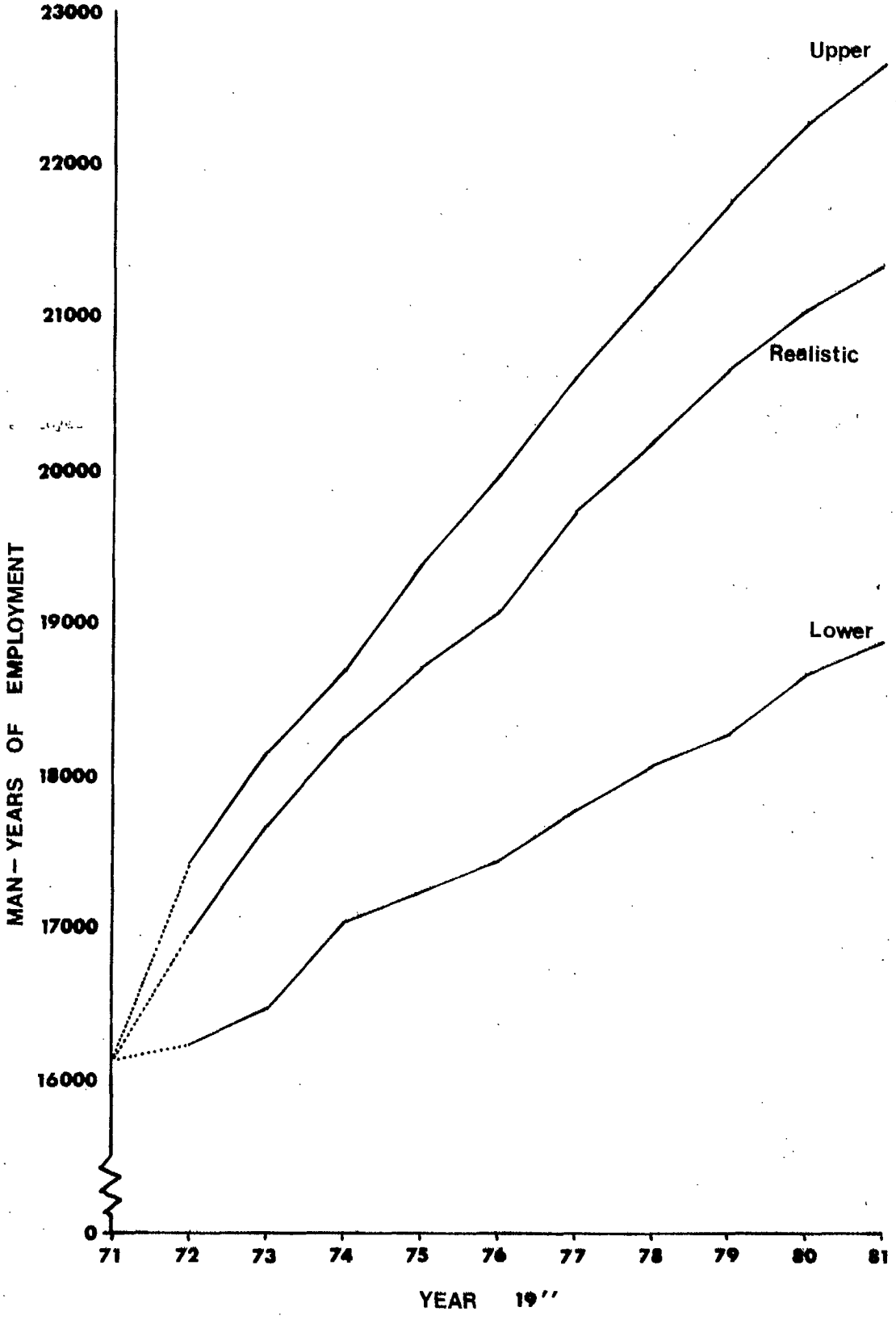
Commodity Group	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Metallic minerals	-	-	-	-	-	-	-	-	-	-	-
Non-metallic minerals	75	75	75	75	75	75	75	75	75	75	75
Structural materials	350	350	350	350	350	350	350	350	340	340	340
Fuels	15,195	15,640	15,900	16,360	16,545	16,700	17,000	17,225	17,465	17,740	17,950
Other services	150	150	150	200	200	200	250	250	250	300	300
Contingency	-	-	-	50	50	100	100	150	150	200	200
TOTAL	15,770	16,215	16,475	17,035	17,220	17,425	17,775	18,050	18,280	18,655	18,865

* All employment figures are shown in man-years of paid employment

FIGURE I

ALBERTA

PERMANENT MINING INDUSTRY EMPLOYMENT FORECASTS 1971 – 1981



(a) Metallic Minerals

Metallic mining activity in Alberta is negligible and no employment increase is forecasted in the 1970's.

Realistic Forecast of Employment	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
No. of employees	0	0	0	0	0	0	0	0	0	0	0
% of forecast total	0	0	0	0	0	0	0	0	0	0	0

The production of metallic minerals in Alberta is confined to small amounts of placer gold and silver, the quantities of which fluctuate considerably from year to year. There is a possibility that vanadium could be produced from the tar sand operations at Fort McMurray, but the quantities would not be large and the employment generated would be small. No employment figures appear in the table above because all present metallic production comes from very small seasonal producers. It is estimated that perhaps one or two man years of activity are involved in this sector.

(b) Non-Metallic Minerals

Employment in the non-metallic mineral sector will remain steady through the forecast period.

Realistic Forecast of Employment	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
No. of employees	100	100	100	100	100	100	100	100	100	100	100
% of forecast total	1.	1	1	1	1	1	1	-	-	-	-

Production of non-metallic minerals is comprised of four commodities namely sulphur, salt, peat moss and sodium sulphate. Of these, sulphur is the most important, but employment in sulphur production is included under the fuels sector because all elemental sulphur produced in Alberta is derived from the cleaning of sour natural gas and thus constitutes a by-product of natural gas production.

Three non-metallic minerals are mined at four relatively small operations in Alberta. Sodium sulphate, salt and bentonite are mined in the province and barite from British Columbia is milled at one location. The total value of these products was about $3.5 million in 1970. It is forecast that

although production of non-metallic minerals will increase, the level of employment will remain stable through the forecast period as operations increase their efficiency.

Four small peat moss producers operate seasonally in the vicinity of Edmonton, but production is quite small and employment is unlikely to exceed 30 man years annually. An allowance for this employment is made in the "other" category.

(c) Structural Materials

Employment in the structural materials sector is forecast to decline marginally during the 1970's.

Realistic Forecast of Employment	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
No. of employees	360	360	360	360	360	350	350	350	350	350	350
% of forecast total	2	2	2	2	2	2	2	2	2	2	2

Activity in this sector of the mineral industry is mainly determined by the demands of the provincial construction industry. The major commodities in this group are sand, gravel, stone and limestone. None of these operations is sufficiently large to be individually included in the company forecasts.

Sand, gravel and stone operations exist at various strategic points in the Province. The majority of employment in structural materials mining is not reported by Statistics Canada under mining activity but appears under construction industry employment. For this reason, it is estimated that perhaps 200 man-years of employment are not reported in the mining sector for Alberta.

(d) Fuels

Employment in the fuels sector will continue to dominate mining employment in Alberta in the 1970's.

Realistic Forecast of Employment	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
No. of employees	15,470	16,310	16,900	17,440	17,790	18,130	18,665	19,085	19,450	19,785	19,980
% of forecast total	96	96	95	95	95	94	94	95	94	94	94

The fuels sector of the Alberta mining industry is comprised of operations that produce crude petroleum, natural gas, natural gas by products and coal. The mining of the Athabasca tar sands is included in this sector. As can be seen from the table, the relative importance of employment in the fuels sector will decline marginally in the 1970's, but there will be a large absolute gain in employment. Approximately one-third of the employment gains will be in coal mining and the two-thirds in oil and gas production.

In 1970, Canada's reserves of conventional crude oil and natural gas liquids declined for the first time since 1947. In Alberta the decline was most pronounced because only very minor quantities of oil were discovered whilst

a record production year was experienced. In addition, exploratory drilling in Alberta declined due to a lack of important discoveries in previous years and to a shift in emphasis to Northern and Arctic areas. Barring a rather unlikely reversal of present trends, it would appear that the oil reserve position in Alberta will continue to decline and that provincial production rates will not rise as rapidly as in the 1960's. However, the increased use of more complex secondary recovery methods in existing oilfields is expected to lead to a continued increase in employment through the forecast period.

For natural gas, the situation in Alberta is somewhat better, but despite high levels of exploration drilling, total provincial reserves only increased marginally in 1970. The forecast for natural gas takes into account a trend that will follow that of the crude petroleum sector with a lag time of perhaps five years. However, it is extremely difficult to forecast the future price, demand and policy conditions that will determine the level of employment in this sector.

In 1970 the coal mining industry in Alberta enjoyed a doubling in the value of production over that of 1969. The opening of new mines in the foothills region selling coking coal to Japan on long term contracts was mainly responsible

for this sudden increase. In the 1970's it is forecast that further new developments will take place that will create new employment opportunities. In the Plains region it is forecast that employment will at least remain fairly constant in the coal mining industry as increased coal demands for thermal power generation are met by greater productivity at existing mines.

In 1970, Alberta produced over 3.6 million tons of sulphur compared to 2.9 million tons the year before. However, a world over-supply situation in 1970 caused prices to decline to less than half those of 1969. Employment in sulphur production from cleaning sour natural gas will increase as involuntary sulphur production increases, but the employment created will be small.

(e) Other Mineral Industry Activity

Realistic Forecast of Employment	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
No. of employees	200	200	300	350	450	500	600	650	750	800	900
% of forecast total	1	1	2	2	2	3	3	3	4	4	4

This sector is composed of the "Other Services" and the "Contingency" groups. The other services to the mineral industry include items such as contract drilling, but this grouping is very small. The contingency grouping is intended to account for developments that cannot be specifically forecast, and yet can be anticipated to occur in the Province. Any increase in the "Other Services" group is accounted for in the "Contingency" group.

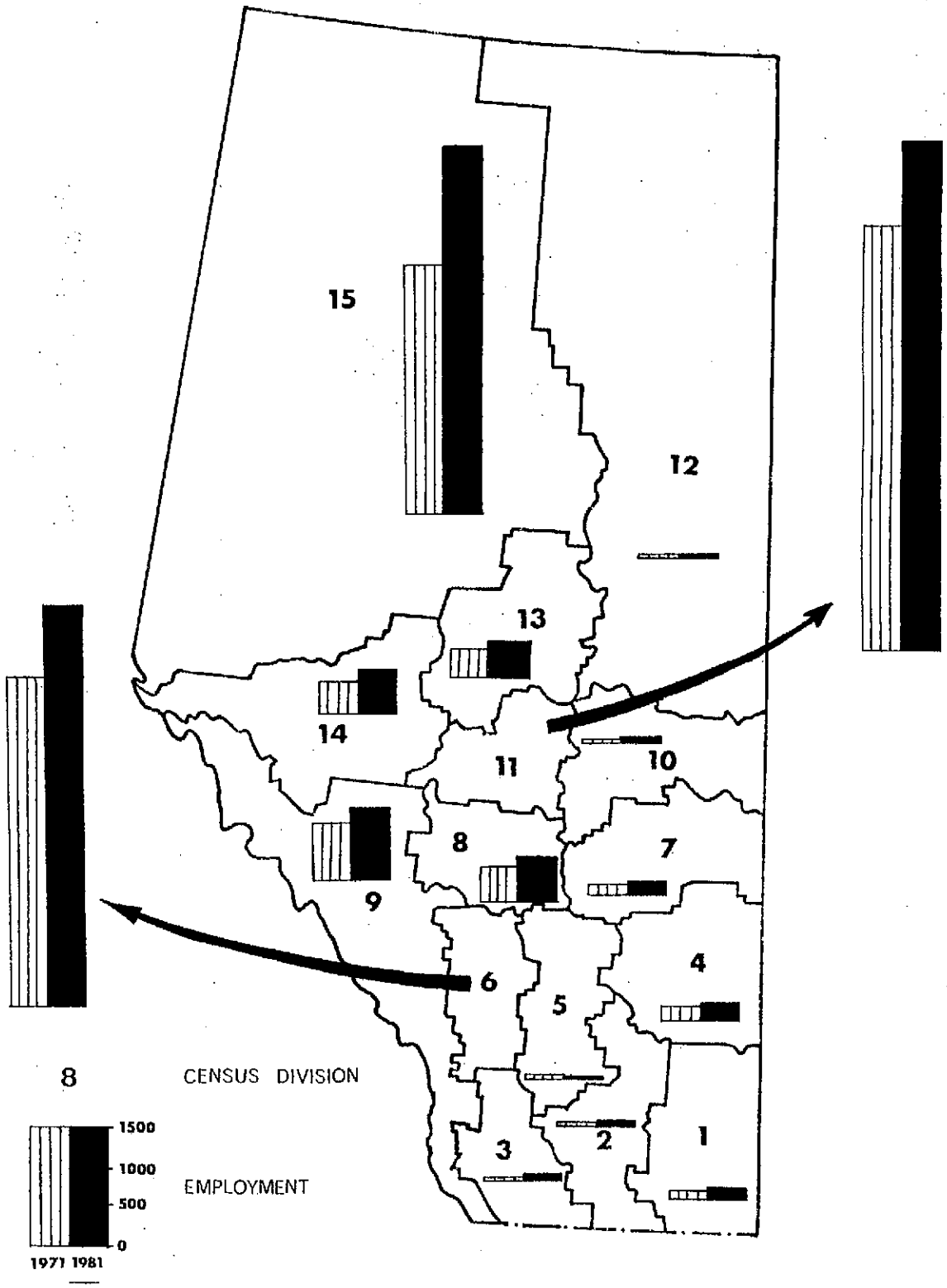
V. MINING INDUSTRY EMPLOYMENT FORECASTS BY CENSUS DIVISION

While it is useful to have employment forecasts on a provincial or on a commodity group basis, many planning functions require a more detailed disaggregation of mining industry employment in order to evaluate the impact of that employment on a specific area. Figure 2 shows the Census Divisions in Alberta. A breakdown of the upper, realistic and lower employment forecasts by Census Division is shown in Table 6. Figure 2 also shows the realistic forecast of mining industry employment in diagrammatic form. It is not possible to disaggregate some of the industry sectors such as sand and gravel that are characterized by a number of small operators. These have been included in the "Other" groupings, which also contains "Other Services" and the "Contingency".

It is difficult to disaggregate employment in the crude petroleum and natural gas sector by Census Division because Statistics Canada receives information from this sector on a provincial basis rather than on an establishment basis. Therefore, in order to estimate the distribution of employment by Census Division a number of arbitrary assumptions have been used. Petroleum and natural gas production employment is experienced in almost every Census Division in the province. Total oil and gas employment was initially forecast

and then 70 per cent was apportioned to the crude petroleum sector and 30 per cent to the natural gas sector. In each of these two sectors it was assumed that half of the employment was split evenly between Calgary and Edmonton and half was in the rest of the Province. This latter half was then redistributed among the Census Divisions according to production volumes experienced in 1970 in each Census Division. Thus, constant production functions are assumed to exist throughout Alberta for the crude petroleum and for the natural gas industries. The results give a reasonable first approximation of the distribution of employment in these sectors of Alberta's mineral economy.

In the other sectors of the mining industry considerable growth in employment will be experienced in Census Divisions 9, 14 and 15, with almost all growth being attributed to expansion of coal mining along the western borders of the province.



ALBERTA

Mining Employment by Census Division 1971 & 81

Table 6

FORECAST PERMANENT MINING INDUSTRY EMPLOYMENT*
IN ALBERTA 1971-1981
BY CENSUS DIVISION

Census Division	Estimate Class **	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
	U	100	100	100	100	110	110	110	120	120	120	120
01	R	100	100	100	100	110	110	110	110	110	120	120
	L	100	100	100	100	100	100	100	100	110	110	110
	U	70	70	70	70	70	70	70	80	80	80	80
02	R	65	65	65	65	65	65	65	65	75	75	75
	L	55	65	65	65	65	65	65	65	65	65	65
	U	60	60	60	60	60	60	60	70	70	70	70
03	R	50	60	60	60	60	60	60	60	70	70	70
	L	50	60	60	60	60	60	60	60	60	60	60
	U	190	200	200	200	210	220	220	210	220	220	220
04	R	190	190	200	200	210	200	210	210	210	210	220
	L	190	190	190	190	200	190	190	190	200	200	200
	U	100	100	100	100	110	110	50	50	50	50	50
05	R	100	100	100	90	100	50	50	50	50	50	50
	L	90	90	90	40	40	40	40	40	50	50	50
	U	4190	4320	4440	4500	4660	4780	4890	5000	5090	5160	5240
06	R	4170	4280	4390	4490	4590	4690	4790	4890	4950	5010	5070
	L	4110	4170	4180	4270	4320	4370	4430	4490	4550	4600	4660
	U	225	225	235	235	235	245	245	245	245	255	255
07	R	215	215	225	225	225	225	235	235	235	235	235
	L	205	205	205	205	205	215	215	215	215	215	215

Table 6 - Forecast Permanent Mining Industry Employment in Alberta 1971-1981 by Census Division

Census Division	Estimate Class **	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
	U	470	480	500	510	520	540	550	560	570	580	590
08	R	470	480	490	500	510	530	540	550	560	560	570
	L	460	470	470	480	490	490	500	500	510	520	520
	U	810	940	940	940	950	950	950	960	960	960	960
09	R	765	885	885	885	895	895	895	895	895	905	905
	L	720	850	850	850	850	850	850	850	860	860	860
	U	55	55	55	55	65	65	65	65	65	65	65
10	R	50	50	50	50	60	60	60	60	60	60	60
	L	45	45	45	45	45	45	45	45	55	55	55
	U	5450	5620	5770	5860	6050	6150	6315	6435	6565	6655	6755
11	R	5415	5555	5685	5835	5900	6040	6165	6295	6380	6445	6510
	L	5330	5385	5405	5515	5570	5645	5725	5800	5820	5905	6005
	U	70	70	70	70	70	70	70	70	70	70	70
12	R	60	60	60	60	60	60	60	60	60	60	60
	L	50	50	50	50	50	50	50	50	50	50	50
	U	385	405	415	425	435	445	455	465	465	475	485
13	R	380	390	400	410	420	430	440	450	450	460	460
	L	375	375	375	385	395	395	405	405	415	415	425
	U	440	470	510	530	570	580	590	590	600	600	610
14	R	430	460	490	510	550	550	560	570	570	570	580
	L	420	430	450	480	500	500	510	510	520	520	520
	U	3200	3520	3800	4030	4130	4300	4570	4740	4940	5140	5180
15	R	3130	3400	3770	3930	3980	4100	4210	4370	4510	4640	4680
	L	3070	3230	3440	3700	3730	3760	3890	3980	4060	4190	4230

Table 6 - Forecast Permanent Mining Industry Employment in Alberta 1971-1981 by Census Division

Census Division	Estimate Class **	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
	U	15,815	16,635	17,265	17,685	18,245	18,695	19,210	19,660	20,110	20,500	20,750
SUB TOTAL	R	15,590	16,290	16,970	17,410	17,735	18,065	18,450	18,870	19,185	19,470	19,665
	L	15,270	15,715	15,975	16,435	16,620	16,775	17,075	17,300	17,540	17,815	18,025
	U	670	780	880	1,005	1,130	1,265	1,390	1,515	1,640	1,775	1,900
OTHER ***	R	540	680	690	840	965	1,015	1,265	1,315	1,465	1,565	1,665
	L	500	500	500	600	600	650	700	750	740	840	840
	U	16,485	17,415	18,145	18,690	19,375	19,960	20,600	21,175	21,750	22,275	22,650
TOTAL	R	16,130	16,970	17,660	18,250	18,700	19,080	19,715	20,185	20,650	21,035	21,330
	L	15,770	16,215	16,475	17,035	17,220	17,425	17,775	18,050	18,280	18,655	18,865

* All employment figures are shown in man-years of paid employment.

** The identifying letters U, R and L stand for Upper, Realistic and Lower estimates respectively.

*** The "other" classification shown here contains commodity groups that are province wide and cannot be split by census division. This also contains the "contingency" grouping.

APPENDIX A

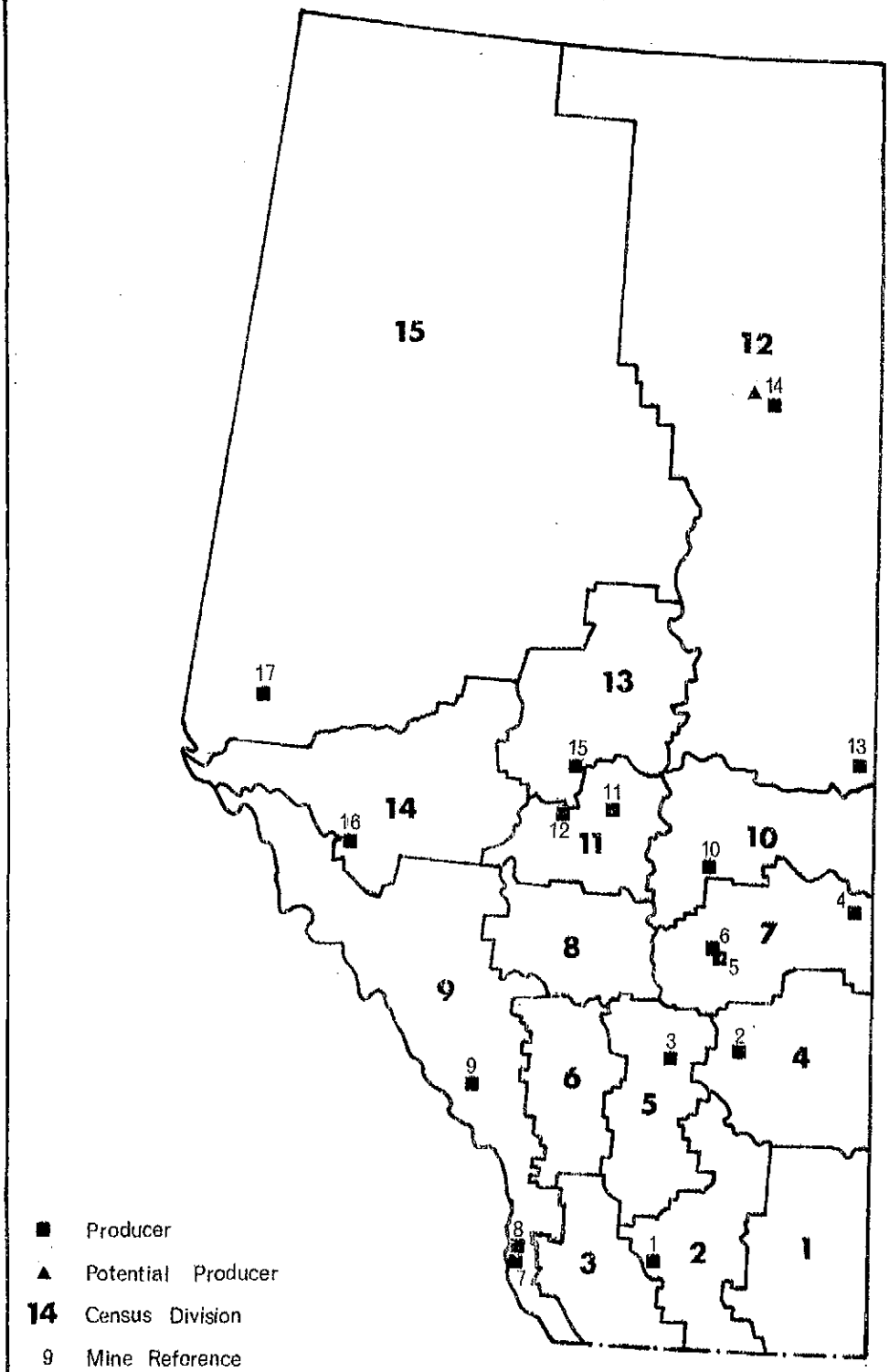
Company Names, Locations and Commodities Produced in Alberta 1970

TABLE 7

COMPANY NAMES, LOCATIONS AND COMMODITIES
MINED IN ALBERTA 1970

Map Reference	Company Name	Property Name	Mineral(s)	Latitude		Longitude	
				o	'	o	'
(1)	Mountain Minerals Ltd.	Lethbridge Mill	Barite	49	40	112	50
(2)	Alberta Coal Ltd.	Roselyn Mine	Coal	51	30	111	45
(3)	Charter Coals Ltd.	Atlas Mine	Coal	51	27	112	40
(4)	Alberta Sulphate Ltd.	Horseshoe Lake Property	Sodium Sulphate	52	21	110	45
(5)	Alberta Coal Ltd.	Vesta Mine	Coal	52	17	112	08
(6)	Forestburg Collieries Ltd.	Diplomat Mine	Coal	52	35	112	10
(7)	Coleman Collieries Ltd.	Vicary Creek Mine	Coal	49	42	114	35
(8)	Coleman Collieries Ltd.	Tent and Racehorse Mines	Coal	49	50	114	40
(9)	Canmore Mines Ltd.	Number Two Mine	Coal	51	05	115	25
(10)	Dresser Industries Inc.	Rosalind Mine	Bentonite	52	47	112	27
(11)	Star Key Mines Ltd.	Star Key Mine	Coal	53	30	113	40
(12)	Alberta Coal Ltd.	Whitewood Mine	Coal	53	33	114	26
(13)	Canadian Salt Co. Ltd.	Lindbergh Operation	Salt	53	52	110	40
(14)	Great Canadian Oil Sands Ltd.	Athabasca Tar Sand Project	Oil	56	55	111	30
(15)	Baroid of Canada	Baroid Property	Bentonite	53	50	114	10
(16)	Cardinal River Coals Ltd.	Cardinal River Mine	Coal	53	05	117	20
(17)	McIntyre Porcupine Mines Ltd.	Smoky River Mines	Coal	54	05	118	50

FIGURE 3



ALBERTA

MINE LOCATIONS